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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

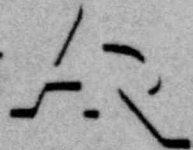
In the Matter of: 243rd Meeting.

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Part 1 - 8:30 a.m. to 6:00 p.m.

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON
REACTOR SAFEGUARDS

243rd MEETING

Nuclear Regulatory Commission
1717 H Street, N.W.
Room 1046
Washington, D.C.

Thursday, July 10, 1980

The 243rd meeting of the Advisory Committee was
convened, pursuant to notice, at 8:30 a.m.

Present:

- MILTON S. PLESSET, Chairman
- J. CARSON MARK, Vice-Chairman
- RAYMOND F. FRALEY, Designated Federal Employee

- JEREMIAH J. RAY
- DAVID OKRENT
- HAROLD W. LEWIS
- JESSE C. EBERSOLE
- WILLIAM M. MATHIS
- MAX W. CARBON
- WILLIAM KERR
- DADE W. MOELLER
- MYER BENDER
- STEPHEN LAWROSKI
- CHESTER P. SIESS

P R O C E E D I N G S

1
 2 MR. PLESSET: The meeting will now come to order. This
 3 is the 243rd meeting of the Advisory Committee on Reactor Safe-
 4 guards. During this meeting the Committee will follow the schedule
 5 outlined for discussion as published in the Federal Register
 6 Notice of Monday, July 7, 1980. Today, the Committee will work
 7 on a report to the Commission on the FY82 safety research budget.
 8 We'll discuss the recent operating experience of the Hatch/
 9 Brunswick, Browns Ferry and St. Lucie nuclear plants, and the
 10 venting of containment at Three Mile Island Unit 2 plant. We'll
 11 also discuss proposed replies to inquiries from Chairman Ahearne
 12 and Commissioner Gilinsky.

13 In addition, we will discuss items for a meeting with
 14 the Commissioners which is scheduled for tomorrow.

15 Also on the agenda for tomorrow will be a review of
 16 the Sequoyah nuclear plant and the preparation of reports on the
 17 proposed rule on fire protection, on cascade failures in nuclear
 18 power plants and on clarifying the ACRS letter on Atlas.

19 We have received a request from the General Electric
 20 Company to make an oral statement, and we have scheduled that
 21 presentation for Friday.

22 This meeting is being conducted in accordance with the
 23 provisions of the Federal Advisory Committee Act and the government
 24 and the Sunshine Act. Mr. Raymond Fraley is the designated
 25 federal employee for this portion of the meeting.

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1 A transcript of portions of the meeting is being kept,
2 and it is requested that each speaker first identify himself or
3 herself and speak with sufficient clarity and volume that he or
4 she can be readily heard.

5 The first item on today's agenda is the Chairman's
6 report, which I will now present.

7 The first thing to mention is that the American Nuclear
8 Society has shown its great wisdom and has awarded the first
9 "Tommy" Thompson Award to Dr. David Okrent.

10 (Applause.)

11 For his contributions, I believe, to nuclear power
12 plant safety.

13 (Laughter.)

14 MR. KERR: I thought it was for general perspicacity,
15 wisdom and good sense.

16 MR. PLESSET: The next item is a discussion of the
17 proposed items for meeting with the NRC Commissioners, and you
18 have a folder and you might want to take a look at it and see if
19 you wish to suggest changes, additions or deletions. Those who
20 have looked at it could give their ideas to us so that we can
21 adjust accordingly.

22 MR. OKRENT: You have time on the agenda?

23 MR. PLESSET: Yes.

24 MR. OKRENT: I wasn't clear. Were you asking if there
25 are other possible items?

1 MR. PLESSET: Or a deletion, yes.

2 MR. OKRENT: I think it would be interesting to hear
3 how the Commissioners plan to approach the topics related to the
4 upcoming rulemakings on degraded core accidents, siting; what
5 information they think should be developed in order to help them
6 arrive at a decision, how they expect to get that information
7 developed and things like that. I think they'll be useful
8 topics.

9 MR. SIESS: I think there's another aspect. There are
10 four rulemaking proceedings they've been talking about. The
11 four I can think of are degraded core, the NEPA Class 9, the
12 siting and emergency preparedness. Now, those sounds like the
13 same subject and that's what bothers me. As near as I understand,
14 there are four separate rulemakings and I'd be interested in how
15 they're going to separate them.

16 MR. OKRENT: I'd be more interested in knowing how
17 they're going to do that.

18 MR. SIESS: I accepted that argument. But it seems to
19 me that they've got four very closely related things, and I don't
20 see how they can make intelligent rules with four separate
21 actions going on in those areas. That's assuming that they're
22 supposed to be intelligent rules.

23 MR. PLESSET: I suspect, Dave, that -- Mike, you're
24 here. You were the one who raised this question about the NRC
25 resident inspectors. Would you mind if that got pushed off the

1 agenda?

2 MR. BENDER: Yes, I would.

3 MR. PLESSET: Okay, so that has to stay.

4 MR. BENDER: It's not because I have any doubts about
5 Dave's point. I don't think we're going to accomplish a heck of
6 a lot in discussing that particular matter without some thought
7 to what we would say. And I think if we want to raise it with
8 the Commissioners, we ought to develop a better understanding of
9 what we're asking about.

10 MR. PLESSET: Okay. You were there first.

11 MR. SIESS: Could we discuss Mike's item briefly enough
12 so we know what it is? I don't understand what Mike is
13 concerned about. I read everything Mike sent me and I still
14 don't understand what the question is. Is it your idea that there
15 should be a similarity between the role of the resident inspector
16 and the role of the Navy officer, the watch or whatever it is?
17 Or are you proposing that there's some relation between these two?

18 MR. BENDER: Let me try to explain the thought I had.
19 It obviously didn't come out very well in my letter.

20 In looking at what the Navy does, I was interested in
21 the fact that they had carefully stated what they expected their
22 inspector to do. And he had some duties -- it's true he didn't
23 have a large number of things to do but they had a scope for him
24 that was somewhere within his capabilities.

25 The NRC has an inspector at the site, and as you can see

1 from the documents that are sitting here, he has a random set of
2 duties. Some things he has to do, has to report at the time of
3 an incident. But as far as understanding how he's representing
4 the NRC, I came away with the distinct impression that it's a
5 pretty fuzzy kind of situation. And if an accident of some sort
6 really did arise, it's still not clear that they have at the site
7 somebody they would know how to use in connection with the public.

8 MR. SIESS: I never thought that was the intention.
9 I thought the intention was that this was just a resident inspector.
10 He had the same kind of duties as the inspectors working out of
11 the regional offices had, but he did them somewhat differently.
12 They did change his scope to do more direct observation and direct
13 work rather than QA documents. But I never got the impression
14 that the resident inspector program, as mandated by Congress or
15 as implemented by NRC, was intended to be anything other than just
16 a resident inspector.

17 MR. BENDER: I don't know what I thought he was supposed
18 to do. I thought maybe it would be a good idea to call to their
19 attention that they haven't defined very well what they intended.

20 MR. SIESS: I thought they over-defined it. There's
21 about 40 pages of what he's supposed to do.

22 MR. OKRENT: It seems to me if we're interested in this
23 topic, it would be well to have a short discussion with Inspection
24 and Enforcement, if there's a question about what the inspectors
25 are supposed to be doing, rather than first talking to the

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Commissioners.

While I've read about what the resident whatever he is called for the Navy program, it is different but they have a different setup and that's a different plant. They sort of own the plant, too, in that case, and they have their designated people running it. It wasn't clear to me just what we were going to try to talk about either.

MR. BENDER: I don't have any problem with deferring the discussion until such time as we have amplified the problem somewhat.

MR. MARK: Dave proposed we talk with Inspection and Enforcement. I wonder about that. These resident inspectors were not the invention of I&E. They're an invention, in fact, of either the Congress or the public or the White House or somebody. And the whole operation has been handed over to I&E, and it was just another personnel for them. They've issued instructions to them which make one sick to read. They don't say you can't go to the bathroom like the Navy does, but they do tell you what you must do all the rest of the time and to keep your hand on this phone. They don't suggest in the least that he should really keep an eye on how that plant is being run. They could say all I would have thought necessary in about the same space as the Navy, although it should be in a much less internalistic approach. The instructions are an evidence to the disease.

MR. BENDER: Carson's thoughts and mine are not much

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different. I'm not all that anxious to have a very strong definition but there's an inference that they're doing more than they are.

MR. OKRENT: I'm a little bit reluctant to go talk to the Commissioners based on that list of things on that set of instructions. I happen to know that they're trying to get these resident inspectors all through the simulator course, for example, because I was there a week ago and there were six inspectors, BWR inspectors, resident inspectors, taking the course. I think that's an indication of the fact that I&E wants them to know something about how plants are run and so forth, and not just do auditing of paper.

So I really think if the Committee is interested in this it ought to learn more.

MR. BENDER: I don't quarrel with that. I think there are a couple of points that we need to take into account. First of all, the inspection staff is not all that big, and expecting them to know everything is equivalent to expecting them to know nothing because they can't absorb everything and if they can't get too much on them as a burden they won't know where to concentrate their attention. I think that's inherent.

MR. SIESS: One comment, one recommendation. I think those instructions have evolved. The first stage was simply transferring inspector duties to the resident inspector. Then I think post-TMI they became concerned about the role of the NRC in an incident, and a lot of stuff about how you report, et cetera.

1 All you have to do is read the Kemeny or Rogovin Commission part
2 on NRC response to see what inspired that.

3 But I think it would be worthwhile exploring the evolu-
4 tion of this, the philosophy of it, what I&E thinks they're doing
5 as compared to what Congress wanted, or what we think they want.
6 And the appropriate way, to me, would be to start with the
7 appropriate subcommittee reviewing it in some depth and then get
8 somebody from I&E in here to talk to the full Committee. But I
9 don't think starting with the Commission is the right place.

10 MR. KERR: I would like to endorse Dave's suggestion
11 that we at least express our interest in the direction in which
12 the Commission as a whole is going in these rulemakings. There
13 appears to me to be an indication that the staff may want to go
14 into the rulemaking to find out what the rules should be, and as
15 recently as this week we heard a high NRC official say that this
16 was different from the ECCS situation; that there had been some
17 experience with ECCS and there was some indication of how the
18 ECCS system should work, and the rulemaking was simply to formal-
19 ize. But that a degraded core situation was one with which
20 nobody had had very much experience, and the implication was that
21 the rulemaking was being held to find out what the rule should be.

22 Now, if this is what is -- I hope I misunderstood him,
23 so I give him the benefit of the doubt. But if this is what the
24 NRC has in mind, it is difficult for me to see how any coherent
25 rule is likely to occur. I don't know how to say this in a way

1 which does not sound derogatory to the Commission. That's my
2 concern. But I would be interested in hearing them comment on
3 what they have in mind, or if they have some idea of the direction
4 in which they're going because I think it's an extremely important
5 question.

6 MR. MOELLER: Could we discuss the responsibility of
7 state and local governments regarding emergency planning. What
8 exactly was it that we wanted to discuss? We had expressed a
9 question in our letter, and we're simply asking them to answer
10 that point.

11 MR. FRALEY: But the other point I wanted to make was
12 that in the Appropriations Act, you will note that the Congress
13 expressed that concern about this same problem; that you might
14 have a completed plant which could not be run because the state
15 and local officials have not prepared an emergency plan. And,
16 in effect, it seemed to suggest that in that situation, the
17 utility could prepare an emergency plan, though I'm not sure how
18 one would implement such a plan, and that may be something also
19 worth discussing with the Commissioners.

20 MR. MOELLER: One other item that applies to this
21 discussion is that the staff has sent the Commissioners a memo
22 updating the status of the proposed statement on emergency planning.
23 I have the ACRS copy which I'll give back to Peter Tam. I think
24 it's something we should run off for all the members prior to our
25 meeting with the Commissioners.

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MR. BENDER: I'd like to get a point of clarification. I don't have any objection to taking the inspection and enforcement business off the agenda with the Commissioners, it doesn't bother me a bit. I don't think I'll get a very good answer from them even if I asked. I only wanted to call their attention to the fact that the responsibilities weren't defined very well and an inspector might get into trouble with as many duties as they're putting on him.

I'm concerned about what seems to be something here like -- we're going to decide whether we can discuss with the Commissioners something. It looks to me like if the members want to ask the Commissioners something, that they shouldn't have to ask the Committee's advice on whether they can ask something. And I've become concerned with the fact that that's exactly what we're doing.

MR. PLESSET: I was just going to say the statement you started with is just ideal for bringing up to the Commissioners, so let me indicate to you that our chaos will continue to be well organized.

(Laughter.)

MR. SIESS: I don't understand Mike's point. When we meet for an hour with the Commissioners, are we all then going to have a chance to bring up anything we want? Are we going to go around the table?

MR. PLESSET: No, no.

1 MR. SIESS: It seems to me that that's what Mike is
2 suggesting; that we should not have an advanced agenda, or that
3 anybody can put anything on the agenda that they want, which is
4 a way of doing business if you want to do it that way.

5 But I'd like to remind you that the Commissioners in
6 the past, every Commission we've ever dealt with, -- our meetings
7 were not very effective when we brought things up that they had
8 not previously been informed of and briefed on. You throw a
9 question at them that they weren't expecting and you don't get
10 anywhere.

11 MR. LAWROSKI: They're expecting this. I told them about
12 this on the 19th.

13 MR. SIESS: Yes, but if the idea of having an agenda
14 is to brief the Commissioners and we don't decide on what it is
15 until we get here, Mike's point is if it's on there we shouldn't
16 take it off. And my question is, if it isn't on there, how do
17 we put it on. Are we solicited before the meeting as to what we
18 want to present to the Commissioners, and we get 20 items but
19 then we can't take any off?

20 MR. FRALEY: Each month when we discuss future agenda,
21 I indicate when we're planning a meeting with the Commissioners
22 and try to identify the items. I am not absolutely sure whether
23 this was identified last month or not. I think it probably was,
24 and I'll check the record on that, but that's the mechanism
25 for doing it.

1 MR. SIESS: That's helpful, because Mike's point is that
2 once it's on the agenda, once a member puts it on the agenda, the
3 Committee shouldn't take it off. And I want to know how to get
4 things on it.

5 MR. FRALEY: This morning is too late. You can't take
6 them off the agenda if you expect the Commissioners to be well
7 prepared to discuss that.

8 MR. SIESS: It's too late to be putting it on.
9 But I want to know what the deadline is for putting it on.

10 MR. BENDER: That's the only point I'm making. We
11 shouldn't be so constrained. If somebody wants to bring something
12 up, the Committee has to ponder over whether it's a major issue
13 or not:

14 MR. PLESSET: I agree with Mike on that, and I think we
15 all know there are going to be meetings with the Commissioners at
16 every full Committee meeting. And I think if you have something
17 you want to have brought up, there's no reason you can't.

18 MR. KERR: Yes, but it seems to me that those of us who
19 are wiser and more conservative have some responsibility to curb
20 the impetuous members of the Committee.

21 (Laughter.)

22 MR. PLESSET: That's the ideal.

23 MR. SIESS: I'm not sure whether Bill is being facetious
24 or not, but I do have a problem with bringing things up to the
25 Commissioners almost ad hoc, even though they've been our piece of

1 paper for a month. And bringing up something there that we really
2 don't know the background of, we haven't discussed with the staff,
3 and sort of tossing it at the Commissioners pretty much without
4 any thorough review by us. It tends to dilute our concerns, I
5 think. I think the things we take up with the Commissioners at
6 the face-to-face meetings should be the more important things.
7 And I think the only way we can decide on what's important is
8 what the Committee thinks is important. I don't agree with
9 Mike that if a member thinks it's important it should come up
10 to the Commission. We don't operate that way. We operate on a
11 consensus. I agree we can't talk to the Commission as a consensus,
12 but the alternative is to just go around the table and ask each
13 member what's on his mind.

14 MR. BENDER: Well, I've been on this Committee long
15 enough now to know that even though we say the Commissioners are
16 prepared, they usually aren't prepared even to deal with things
17 that are on the agenda very well.

18 MR. SIESS: I didn't say they were prepared. I just
19 said they'd be unprepared if it wasn't on the agenda.

20 MR. BENDER: But to always have ourselves in the position
21 where a member has to justify the question he's going to raise
22 to the Committee before he can raise it with the Commission puts
23 an impediment in the communications chain that I think is inappro-
24 priate for this Committee. When we write a letter we agree on the
25 position we're going to take, but in dialogue it doesn't seem to

1 me that we have that constraint.

2 MR. SIESS: We disagree. I think that the lack of that
3 restraint in the oral discussion is likely to get us into trouble
4 a lot quicker than if we had a similar lack of restraint in
5 written communications, because at least the people that are
6 talking think more about what they're writing. It would disturb
7 me. I'm not going to raise it as a substantive issue that we
8 haveto vote on, Mr. Chairman.

9 MR. PLESSET: I hope not.

10 MR. SIESS: Not at this meeting, but I may at a future
11 meeting.

12 (Laughter.)

13 MR. OKRENT: I'd like to repeat my original suggestion
14 that at this meeting we talk to the Commissioners in a preliminary
15 way to see if they have any comments on how they expect to approach
16 the rulemakings and, as I say, to find out what information they
17 think is needed for the decision process and how to get at it.
18 I think this is not a topic that's strange to the Commissioners.

19 MR. PLESSET: Rulemakings on -- ?

20 MR. OKRENT: On Class 9 accidents.

21 MR. PLESSET: Okay. Let me say, Dave, I must beg to
22 disagree with Chet, and I certainly hope that you'll feel free to
23 bring it up, and if you like, we can give them a little more.

24 MR. OKRENT: If you read what the Commissioners are
25 doing, this is not a topic that's strange to them and it shouldn't
be.

1 MR. SIESS: But I'm now completely confused because
2 I thought that there was some agreement with what Ray suggested
3 that this was too late to add something to the agenda. I think
4 the Chairman has ruled that it's too late to take something off
5 the agenda. Is it now clear that it's not too late to add some-
6 thing to the agenda?

7 MR. PLESSET: It's very easy. If you want to remove
8 something from the agenda, that's trivial, you just strike it.

9 MR. SIESS: That's what we tried and Mike objected and
10 you upheld it.

11 MR. BENDER: I objected to taking it off in favor of
12 something else.

13 MR. EBERSOLE: We're on the subject, I guess, of the
14 resident inspector's function, among other things here. One
15 thing that bothers me is the point of beginning of the resident
16 inspector's duty here as I see it described. You notice it says,
17 this is "in the operational phase." All of it begins at that
18 point.

19 You may recall that sometime ago we were talking about
20 an apparent void in the total design construction operating
21 process, whereby there was virtually no one who actually critically
22 examined the integral physical plant to determine, among other
23 things, inappropriate juxtaposition of equipment or whatever
24 that may exist in the actual three-dimensional plant; a matter
25 which has never been disclosed on drawings, and frequently never

1 picked up in the review processes because they're so channelized.

2 Somebody somewhere has to eventually go to the full
3 scale final three-dimensional plant and make judgments as to
4 whether it went together properly.

5 we pushed that off toward what was the former head of
6 I&E. He said he was going to invest something like 15% to 20% of
7 his effort to do that. That, so far as I know, fizzed out, but
8 it's not a dead matter. Before a resident inspector enters upon
9 the operational phase of his duties, he ought to go in and really
10 do a critical inspection of the plant as it, in fact, was built.
11 I think he's probably the only one that will do that. It's not
12 covered here.

13 MR. PLESSET: Let me try to summarize some of the ideas,
14 not that the Committee has but that I have. I would be a little
15 disturbed if we were to interfere with a member's right to bring
16 up something with the Commissioners that hasn't been printed out
17 in advance. I'd also be disturbed with not being able to remove
18 something unless it was given to them as a preparation for a
19 meeting with us, as at least helping to give a little more
20 efficiency. But as far as adding things, I think we should feel
21 free to do that, and I certainly think that, for instance, Dave's
22 point is well made and certainly we should get to that.

23 Now, I gather that Mike is quite willing to drop this
24 item for a little further consideration regarding the resident
25 inspectors. Is that correct, Mike?

1 MR. BENDER: Yes, I'm willing to wait a while and have
2 a subcommittee meeting and see what we're going to do. What I
3 was going to do was tell the Commissioners that I thought it would
4 be a good idea to find out what they were doing and if you'd like
5 us to do it, we'd do it. But if the Committee wants to just take
6 it off, okay.

7 MR. PLESSET: I think it may very well be that you'll
8 have a chance to just say that.

9 Is there anymore that you want to talk about in connec-
10 tion with the Committee members? I hope not.

11 Is it agreeable with you, Chet, for you to start in
12 advanced of the scheduled time, or would you rather have a break?

13 MR. SIESS: I've got a short presentation I'd like to
14 make, and then it was my intention to let Bob Budnitz take over,
15 and Bob can't be here until about 9:45. So what I think we might
16 do is let me start in and then we can take a break, and this will
17 give people time to get oriented and know what they're supposed
18 to be looking for.

19 You've been handed a great deal of paper that you're
20 going to have to keep track of. One thing you've got is a note-
21 book, a small notebook that has a lot of blue paper in it, and
22 blue will be the color for the Research report. Unfortunately,
23 we couldn't put all the handouts on blue and there's a lot of
24 background information that you have.

25 The notebook contains drafts of the various sections of

1 chapters of the report, and the report has been divided into two
2 parts; Part I, General Comments, and Part II, Specific Comments.
3 You won't find the Part II label in there. But the general comments
4 are something that was prepared by Dave, which does include some
5 general comments and some that you may not consider quite so
6 general, regarding the direction of the program, some of the back-
7 ground. The Subcommittee reviewed this and there are some things
8 that they discussed and much of it will need further discussion.

9 Then in Part II are Sections running 1 through 8, and
10 those sections or chapters in Part II coincide with the eight
11 decision units. That will be a basis for discussion today.

12 You also have on blue a table which represents the
13 worksheet, shall we say, for the 1982 budget request. It has
14 one page for each decision unit, and all of the subelements of
15 each decision unit listed. There are several columns in that
16 table, and let me refer to them just briefly so you'll know what
17 we're talking about.

18 There is another materials table by decision units and
19 Bob Budnitz will have some slides and we'll put them up as we
20 talk about them. But the first column is what NRC requested.
21 The second column you can ignore. It says "OMB Inflation." I
22 don't know what it is and it hasn't been discussed at all.

23 The third column is labeled PPPG, and that was
24 Research's allocation of the funds they were assigned by the
25 Commission in the program planning -- policy, program and planning

1 guidance. That was the low figure, and they decided if that's
2 all they could get, how they'd allocate it. Then they made their
3 request which was a significantly higher figure.

4 The fifth column is the EDO's preliminary mark as of
5 the 2nd of July, and the last column is the NRC -- it's
6 labeled NRC RECLAMA. On other documents you'll see it NRC Revised
7 because the RECLAMA is the difference between the last column
8 and the next to the last column. They're going back to EDO and
9 asking for something above what EDO gave them. That's their
10 appeal, if you wish. So you've got a lot of figures. And then
11 there are three columns out on the right for ACRS. If we reach
12 any decisions regarding recommended levels we'll try to keep track
13 of them here.

14 We expect to put in the report a table which would just
15 include two columns, like we did last year. One would be the
16 Research request, the second would be the EDO mark, which are
17 basically our levels of consideration at this meeting. I don't
18 think we want to put in the report a table of ACRS recommendations
19 item by item. If you wish you can, but we can decide that later.

20 I'd like to put something on the board just for back-
21 ground. For FY81, the staff doesn't know yet how much money
22 they're going to have. FY81 authorization bill I think has gone
23 through the Conference Committee, but the appropriations bill is
24 still being kicked around. Budnitz will tell you more about that.

25 But it looks like it will be on the order of \$180

1 million. Now, FY82 it looks like the allocation in the PPPG for
2 Research -- all of this is program support and it leaves out about
3 \$10, \$12, \$15 million for equipment and it leaves out the

4 . What we're talking about is program support.

5 This was \$207 million. What Research said they needed,
6 and this was essentially their original request, was \$269½ million.
7 The EDO initial mark came out at \$230, which is \$23 million more
8 than the minimum that was assigned in the PPPG. Research is
9 going back to the EDO with a RECLAMA, \$28 million, bringing
10 their total request up to \$258 million. There's the spectrum.
11 Whatever they get from the EDO, which will probably be somewhere
12 between here and here -- it's not usual that you get everything
13 you asked for on the RECLAMA, just like you don't get everything
14 you asked for to begin with -- whatever they get there is not
15 likely to be increased by the Commission; it's likely to be
16 decreased some, looking at the overall budget. It's certainly
17 not likely to be increased any by OMB, and the way things have
18 been going the past year, it's not likely to be increased by the
19 Congress.

20 So whatever they end up with in here is probably an
21 upper figure, and there will be decreases at various stages.
22 It may not go below this figure. So anything we recommend that's
23 above this figure we've got to consider includes funds that may
24 be deleted by one or more agencies between now and when it gets
25 back to Research. And Research has indicated that it would be

1 very helpful to them and to the Commission if for any amounts that
2 we increase above this level we indicate some priorities on;
3 where they are top priority they'd be the last thing to be cut;
4 where they are low priority, they'll be the first thing to be cut.

5 Those are overall figures. They all show an increase.
6 When you look at decision units or subelements, you will find
7 there are both increases and decreases.

8 At the Research Subcommittee meeting on Tuesday, we
9 had a presentation by Kevin Cornell who is Deputy EDO, and Kevin
10 has been running the budget review apparently. And incidentally,
11 there's no Budget Review Group. Last year, as you will recall,
12 at this stage we reviewed the BRG, Budget Review Group, mark.
13 And after our report was out, the EDO made his mark and that went
14 to the Commission. There are not two separate reviews this year.
15 The BRG mark and the EDO mark have been combined; it will all
16 be the EDO, and the next stage will be the Commission.

17 But what we're looking at when we look at any of the
18 figures is a preliminary EDO mark. The Research RECLAMA has not
19 yet been reviewed, it's being done today. That's why Cornell
20 cannot be here. They're hearing arguments for budget changes,
21 not just for Research but for others. And the final EDO mark
22 will go to the Commission by the middle of next week. Cornell
23 indicated that any advice they get from the ACRS prior to making
24 the final mark will be considered. So some of our comments may
25 influence the EDO mark and not just what the Commission does.

1 Cornell pointed out that in their review, EDO review,
2 they tried to reflect congressional views and actions by Congress
3 on the FY81 budget. He mentioned that the FY81 budget had been,
4 for Research, had been cut by approximately 20%, and they read
5 that as some indication from Congress that the research program
6 should be held down.

7 It also reflects Commission views. The EDO mark puts
8 in zero for fast and gas, representing the Commission's policy
9 on research on advanced reactors and converters. There was some
10 discussion on that as to just what the Commission's policy was
11 since they had said something difference in congressional hearings.
12 But I won't go into that now.

13 In the EDO review, there has been substantial consider-
14 ation of user needs. Each user office was asked to comment on
15 the research budget, right down to the subelements or lower.
16 There is documentation of those responses in some material that
17 was handed out to you this morning. It's addressed to Cornell
18 from Budnitz, and Budnitz' part summarizes the user office
19 recommendations and attached to it are some of the letters from
20 the user offices.

21 The NRR was most extensive in its comments because a
22 major portion of the research program relates to NRR needs. And
23 we had a presentation from NRR from Roger Mattson with slides,
24 et cetera, on the research budget. NMSS has reviewed it and
25 discussed it extensively with research staff and there is something

1 in writing. I believe what we were told was that after the
2 budget was submitted to the EDO, there were some meetings between
3 Research and the user offices to discuss priorities, coordination,
4 et cetera, and some revisions were made, minor revisions were
5 made.

6 But the user offices have reviewed the budget in detail
7 and have made, in some cases, very detailed recommendations.
8 NRR, for example, took the base budget, the PPPG figure, and
9 said this is how we think it should be allocated, which was
10 different than the way Research said it should be allocated in
11 some items.

12 Since then, NRR has taken the EDO figure, or they've
13 actually taken the PPPG plus \$25 million which is approximately
14 the EDO figure, and said if Research had this much money, this
15 is how we think it should be allocated. And in some cases, their
16 allocation of the additional \$25 million was different than the
17 EDO's or was different from the way Research would do it. These
18 are differences of opinion.

19 But there has been a very extensive review by the
20 user offices. In fact, Bob Budnitz somewhat resents this. He
21 says we don't get to look at their budget but they get to look
22 at ours and tell us where we should spend it. I can understand
23 his resentment, but I think there is a little difference there.

24 The EDO, Kevin Cornell pointed out that this preliminary
25 mark is by no means final. The final mark will not be until next

1 week. There is no decision yet on LOFT, although there's a mark
2 on LOFT. Just to remind you, under the PPPG Budget, Research
3 budgeted LOFT at \$35 million which means a phase-out in 1982,
4 only a couple of tests and a phase-out in 1982. For their full
5 request, they budgeted LOFT at \$48 million, which meant it would
6 go full speed through 1982 and the close-out would be in 1984.

7 Preliminary EDO mark is the \$48 million. NRR has
8 recommended something less. And that is still not settled.
9 Budnitz does not feel that LOFT is assured at \$48 million for
10 the EDO's mark. There's still concern about that because it is
11 a preliminary mark.

12 Cornell says they're still looking at the effects of
13 the rulemaking proceedings on the research needs, which is, of
14 course, at least part of what Dave had in mind I think by bringing
15 this up to the Commission. The degraded core and the other
16 matters.

17 In trying to evaluate the user need review, it turns
18 out, I believe from what I can read here, that about 87% of the
19 research request at the EDO level has been user endorsed. And
20 the remainder could be covered approximately with the 10%
21 initiative that has been given to Research.

22 That is not the way they expected to use that 10%.
23 That is, if they asked for \$48 million and somebody only gave
24 them \$44, they would use 10% more to build that 44 back up to
25 \$48. That was not the intent of the 10% initiative; it was to

1 take on projects more speculative or more exploratory, I think.
2 But on sort of a legalistic bookkeeping basis, people seem to
3 look at it and say well, only 90% of what you have has to be user
4 endorsed; the other 10% you can do. And this, I think, bothers
5 Budnitz and it certainly bothers me. And it is an approach
6 that I think rules at this stage of the bookkeeping game; it
7 may not really affect the program. I don't know. We might want
8 to explore that.

9 I've tried to tell you what I think Cornell would have
10 told you if he were here, without going into any detail.
11 And unfortunately, he's not here to answer questions.

12 The material you have -- you've got the budget sheets.
13 That one is easy to find; it's on legal size paper. It's not
14 easy to read, but those of you who weren't at the Subcommittee
15 meeting if you try to read it, the main thing you have to recog-
16 nize is that the righthand column is the EDO mark and the EDO
17 comments that have been superimposed on what was submitted,
18 about the right four inches. And the other thing that will help
19 you understand it is that the line of figures you see at various
20 places, budget figures, refer to the material that follows it.
21 Just figure whatever is logical and it's backwards from that.
22 And what we've been calling subelements are numbered in there as
23 planned achievements. We're using letters, they're using numbers.
24 We may change the numbers but don't worry about it. I'm not
25 going to change it until the final draft.

1 We have had given to us yesterday a package that looks
2 like this. It is addressed to Dirks from Budnitz, FY1982 Budget
3 Reviews, EDO Staff Recommendations, and this is the Research
4 RECLAMA. This is being presented to the EDO staff today. We
5 were given the figures and some discussion of it on Tuesday and
6 we'll get it again today as we wish. But this is what Research
7 is asking back. It amounts to \$28 million to bring the total
8 from \$230 up to \$258. And it's quite detailed, it has tables in
9 it by decision units and it has discussions of what would have to
10 be left out or what can be done with the additional money.

11 There are a couple -- Steve points out a minor error
12 on this budget thing. At the top of the page on each page it
13 says dollars in thousands; they happen to be millions. But
14 three orders of magnitude is within the range of the uncertain-
15 ties, probably.

16 (Laughter.)

17 The other material that you've got we'll try to identify
18 as we refer to it. Let me stop and see if there are any
19 questions.

20 MR. MCCRELESS: You might mention that Kevin Cornell
21 mentioned that this review of EDO is also going to include FY83.

22 MR. SIESS: Yes. They're committed to a two-year
23 budget process for 1982 and 1983, and there are outyears on the
24 budget. We have not been brought into this two-year picture,
25 and I told them that we were reviewing the FY82 budget and

1 weren't going to go beyond that at this stage of the game.

2 I read something that Congress was going to ask for
3 a two-year budget and that they would authorize on a two-year
4 basis, but of course, they will still appropriate on a one-year
5 basis, so I haven't the slightest idea what it means. I have
6 enough trouble looking ahead to 1982 without trying to look ahead
7 to 1983, and as I read things we've written, we can't get 1981
8 out of our minds when we're looking at 1982, and 1980 is still
9 with us, so I suggest that we forget about 1983 right now,
10 I've forgotten about it. And nobody was told to look at 1983 so
11 we're really looking at 1982 and that's what our report will say.

12 In the drafts you have in blue, you're not going to
13 find an awful lot about priorities, and priorities are going to
14 be very hard to assess, as we have known in advance. And we had
15 some discussion about this on Tuesday. But we cannot just tell
16 the Commission that we think the budget ought to be at \$240
17 million and be realistic about it. We may think it should be
18 \$240 million, but it's going to get cut, and if we want to be
19 helpful to our own cause or any other cause, we have to give
20 people some advice on where we think cuts should be made, or
21 where we think cuts should not be made. Now, this does not mean
22 we have to put a priority on every item, but LOFT is a good
23 example. LOFT is somewhere running between \$48 and \$35 million,
24 which is \$13, which is a pretty good chunk. Do we say taking
25 that out is our first priority, or is our last priority, or

1 taking \$5 million out is the first priority, et cetera.

2 Another area that is going to be somewhat of a
3 problem that we're going to have to think about is the fast and
4 gas. The Committee has, each year, said that there should be
5 research on fast reactors advanced converters. The staff has no
6 need whatsoever for this in licensing now, and they don't like
7 to look ahead more than a couple of years and they don't see any
8 need for it, except a little support for Fort St. Reign(?) maybe,
9 and they don't give it a user need classification; it just doesn't
10 fit in.

11 The EDO has cut it to zero saying that's Commission
12 policy. We can put it back in. I don't think it's going to end
13 up in the Commission's budget to OMB. If it is, I don't think
14 OMB is going to leave it in. But if we put it in and it's a part
15 of our total we need to keep that in mind; that it's going to be
16 taken out.

17 I don't know what consideration the Committee can give
18 to the fact that Congress is likely to put it back in, as they
19 have done in the 1981 authorization -- saying you should do so
20 much on fast reactors at a level of \$10 million and so much on
21 gas at a level of \$3.2 million, and then not put the money in.
22 Which means that if the staff does it, that's a \$14 million or
23 \$13 million reduction in something else. How we can take that
24 into account I don't know.

25 But we basically have two choices; to say what they

1 think they ought to spend and on what, and say well, if you don't
2 do it that's your problem; or to be fairly realistic and try to
3 indicate what we think is important. And if they're going to cut,
4 what we think they can cut or what we think they must leave in.
5 It's not easy.

6 Any questions? Mr. Chairman, I'd suggest we take a
7 break while people assemble the material they will need for this
8 review and push the rest of the stuff out to the middle of the
9 table.

10 MR. MCCRELESS: I would like to go ahead and mention
11 now that on all the future drafts that you receive, the para-
12 graphs will be numbered as well as the lines. We made a decision
13 yesterday not to do that because we thought it was preliminary
14 and we weren't sure we were going to get it all put together.
15 But the future ones will have them numbered.

16 MR. MURLY: That was an excellent summary. I think Chet
17 didn't leave anything out and it was exactly on target. There's
18 one piece of information for background that will color a little
19 bit of our thinking in 1982. That is, we have received -- I mean,
20 the Congress has passed the fiscal 80 supplemental this year.
21 And you'll recall that we had asked for \$26 million in Research.
22 Of that, \$3 million was for waste management and the rest was for
23 TMI-related research; ranging from a better understanding of
24 LOCA's to core damage research.

25 We have received \$10 million of the \$26 million that we

1 asked for. As near as I've been able to determine, there are no
2 requirements on that \$10 million, except that it can't be for
3 waste management. So that roughly, we've received \$10 million
4 of the \$23 that we asked for, roughly half of what we asked for.
5 And there were in there some plans for, let's say, upgrading semi-
6 scale and upgrading TLTA that may make it a little difficult
7 because we didn't get what we asked for.

8 So I just mention this by way of background for your
9 thinking.

10 MR. PLESSET: Let's have a 10-minute recess.

11 (A short recess was taken.)

12 MR. PLESSET: We can begin.

13 MR. SIESS: Gentlemen, two procedural announcements.
14 First, let me remind you that the reporter is hooked into the
15 microphone system and has plugs in her ears and unless you want
16 to be off the record you must use the microphones. She won't
17 even know you're talking. And second, addressed to those people
18 who are writing chapters, sections, parts of sections, et cetera,
19 anything you have that is to be typed that is to go into the
20 report should be given to Dot Zuker, not to anybody else. If
21 you want it in the report give it to Dot and she will see that
22 it's typed, reproduced and distributed.

23 I'd like to start off by having Dave present the general
24 comments that are incorporated into Part I. This was written
25 pretty much by Dave. I subdivided it, so if he has any objections

1 to my subdivisions he can bring them up as he goes through it.
2 This is the first few pages labeled, "Part I, General Comments,
3 1. Introduction." Dave?

4 MR. OKRENT: Chet asked me to try to write some intro-
5 ductory material, and after reflecting on it briefly I figured
6 this was going to be hard to get the Committee to set priorities,
7 so we ought to tell the Commission they should. I tried to start
8 out indicating that it will be useful if the Commissioners
9 themselves arrived at some tentative ideas as to what was really
10 most important from the point of view of the safety research
11 program where they needed information, let's say, for their own
12 responsibilities and where they think the staff should be going.
13 And then, that, in fact, the regulatory staff should take a broad
14 look at the safety research needs and develop recommendations
15 in terms of this broad look and not from the needs that arise
16 from what I would call specific or detailed requirements.

17 To some extent, you might argue that what Mattson
18 presented to the Subcommittee Tuesday, which I didn't hear but
19 which I looked at in terms of the viewgraphs, for example, might
20 be interpreted as NRR having given a broad look, which last month
21 we didn't have the benefit of. I'll have to hear from the Sub-
22 committee about that, and similarly, it may be that they feel
23 that Standards has given it a broad look now. In other words,
24 I would say as of last month, they have not. Maybe the Sub-
25 committee feels they have done this.

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I don't think that the Safety Research staff themselves have -- at least in anything I've read -- tried to re-evaluate the safety research program in terms of risk reduction potential. In other words, if you have \$200 million or whatever it is, should \$100 mil'ion or something like that be on LOCA and transients. Is that really \$100 million worth in FY82. Are there other things that have an increased emphasis if you think in terms of risk reduction potential?

I tried to indicate strongly that where research is confirmatory in nature, where there is reasonable reason or good reason to think that the current regulations are either adequately conservative or more than adequately conservative, that in a time when there are less dollars than one needs, research in these areas should be sharply reduced so that you can have money to either explore the areas where you need information or, in fact, to look in areas where you're not sure that you have a good handle on what's going on. Again, that gets back to the question of -- do you need \$100 million on LOCA. I don't want to pick on LOCA, it happens to be a big amount of money. The fuels work, in my opinion, calls for a similar situation. So that's sort of page 1 of the introduction.

Then I tried to elaborate on some of these things and gave some suggestions for what might provide bases for assigning, let's say, general areas of emphasis. So for TMI-related research needs I put down that for the most part, the Committee has already

1 emphasized with regard to operating reactors, and then again, for
2 reactors being constructed where you have some additional either
3 design flexibility or so forth, the areas important that one
4 would add here. So Item 2, which is headed TMI Research, I
5 think is largely a reiteration of things we've already stated.

6 Item 3 concerning re-evaluation of priorities of user
7 needs -- again, that was written a month ago. We may or may not
8 feel that the NRR and the other offices are doing this. So that's
9 a question that you have to think about.

10 Item 4 is the question I've already said -- Research
11 itself ought to look at its own program. I haven't seen that
12 they've done that in terms of risk reduction potential. In other
13 words, I can still remember only a year ago that we were being
14 told they had this legacy of the rulemaking hearing on ECCS and
15 that's why they had still had a lot left of ECCS.

16 I understand that on Item 5 there was some question
17 among some of the Subcommittee members on the way I worded
18 something. I think this is an important topic and we ought to
19 talk about it. What I wrote was, "The general subject of Class 9
20 accidents, including but not limited to the proposed rulemaking
21 on degraded cores and core melts, presents the single most impor-
22 tant research area for the next few years."

23 Let me comment on why I put that in. I think it's the
24 most important in the sense that somehow or other, the Commission
25 has to arrive at a decision on this. It may or may not be the

1 most important from the point of view of the effect on safety.
2 I don't know. That's what their decision is, and also what the
3 information is. But I think it's the most complex issue that
4 they face for operating reactors. I think it's the most complex
5 issue that they should decide before they really can provide any
6 kind of meaningful guidance on reactors to be constructed.
7 Depending on how they decide, it could have a minor or far-
8 reaching effects on reactors being constructed and so forth.

9 So in this sense, to me it is the single most important
10 and I don't see in the research program any sense of the needed
11 priority. I guess -- in fact, I'm inclined to think the Committee
12 in this report should recommend that the Commission establish a
13 task force within the NRC staff, people from Research, from NRR,
14 other groups as necessary, to try to lay out what information is
15 needed, how we're going to get it and on what time scale. And
16 in that sense, in other words, I think it's the single most
17 important.

18 MR. KERR: I would agree with almost everything that
19 Dave has said except I would substitute the words "difficult and
20 complex" for "important", and even he used "complex."

21 I also think I much agree with what he said about some
22 attention being given to, at least at this point, some proposed
23 program of activity which would also lay out the research needed
24 to answer the questions that are likely to be raised. I am a
25 bit concerned at this point at making the research program very

1 large when nobody knows what he's going to do with research.
2 And I think this needs to be said to the Commission in some
3 fashion. There has to be some preplanning of at least several
4 directions that could be taken. Then one says, here's the
5 research we think we're likely to need to answer the questions if
6 we go in one or more of these directions.

7 But from what we've seen so far, it seems to me that
8 the people in Research have done most of the thinking that has
9 been done, and I give them credit that they've gone ahead without
10 any guidance and tried to do something. But it seems to me very
11 important that the staff and the Commission also become involved
12 in the process.

13 MR. OKRENT: I didn't put in the idea of the task force
14 in this draft. I did indicate that I thought that the Commissioners
15 ought to give guidance. I'm inclined for us to recommend that
16 the Commission set up some kind of a joint group. I'm with what
17 Bill says so far. It seems like the Research has been trying to
18 propose something -- I don't think even in Research they have
19 given what I would consider to be the appropriate interoffice kind
20 of attention to this particular path they have set out.

21 But I'll go on, if I may, to tell you what else I've
22 put in here.

23 MR. EBERSOLE: Dave, before you leave that paragraph,
24 I had difficulty reading it in trying to sort out whether you
25 were primarily talking about handling the messy old problems with

1 the existing plants or whether you were really extrapolating to
2 new ones by trying to find the best ideas.

3 MR. OKRENT: If I wasn't clear, I'm sorry. I think
4 both have to be done and they're different questions, and
5 somehow you have to have some kind of policy guidance. I'm not
6 saying that the Commissioners should decide next month what is
7 to be done, but I think they should nevertheless provide some
8 kind of policy guidance to what kind of information do we want
9 to develop for existing plants.

10 With regard to new plants, I think I've indicated at
11 previous meetings-- we had a subcommittee meeting on NPCP's and
12 I tried to indicate -- we wrote a letter at that meeting --
13 that the staff has been spending really all of its time on
14 operating reactors and hasn't really thought, except in a perfunc-
15 tory way, about the NPCP's. Well, the next thing to think about
16 is what comes after, let's say, NPCP's. This is one of the topics
17 but the other main topic, you might say, is how do you design for
18 the future not in terms of the single failure criterion but in
19 some more general way.

20 Then I tried to pick out some -- I won't pretend to
21 have tried to include every area which I thought required
22 emphasis, and it didn't appear, at least in my opinion, in the
23 way it should in the research program that we had described to
24 us as of whenever, early June. So one area with regard to
25 operational safety I don't think the staff have a research program

1 on what I would call operational behavior, function design and
2 control. I still don't see that in what they said last month.
3 I think that's --

4 MR. KERR: Excuse me, Dave, I must confess that I
5 don't know what you're talking about. Tell me what it is you
6 mean by --

7 MR. OKRENT: All right, sure. There are a couple of
8 facets of this, at least. First, when you're designing a plant,
9 the designer has to make certain decisions -- how many relief
10 valves in the secondary, do I include a PORV or not in the
11 primary, things of this sort. He also puts in different types
12 of control systems.

13 These kinds of decisions impact quite strongly on
14 plant operation behavior if these things work the way they're
15 supposed to be working. They also impact in some ways where
16 they malfunction. You're running the plant, in effect, like on
17 a BWR; however, the turbine control is functioning, and if it
18 malfunctions this leads to a certain type of transient which
19 impacts, then, on --

20 MR. KERR: Could I say it by saying that the staff does
21 not have sufficiently detailed understanding of plant systems
22 behavior under dynamic conditions? This doesn't strike me as
23 being research necessarily; it's just trying to get detailed
24 understanding of how plants perform. Or am I missing something?

25 MR. OKRENT: But it's not only the way plants perform

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1 as they are currently designed, but how did the design affect the
2 performance, and if they were designed in some other way, how
3 would the performance be different. I think if the staff under-
4 stood more of this, it would assist them in a variety of ways.
5 So it's somewhat more than understanding how the existing plants
6 behave, but how do design decisions affect this, so how would --

7 MR. KERR: Okay, I understand what you're talking
8 about now.

9 MR. OKRENT: How would this change the behavior. I
10 think this is important to many of the things that we're interested
11 in, and it's not what's in the PAS. That's a different kind of
12 work that PAS does.

13 So anyway, that's what A is supposed to be.

14 The second item on the impact of control systems and
15 other nominally non-safety -- is something we lack. Again, I
16 don't see that in the staff's program. And I must say I happen
17 to have --

18 MR. KERR: It seems to me that B could very well be a
19 subsection of A.

20 MR. OKRENT: It could be, but I chose to pull it out
21 as a separate one for a variety of reasons because I think it
22 warrants, in fact, additional emphasis. A is very broad.

23 We got sometime ago, as some of you will recall, --
24 someone actually a few years ago raised the question about control
25 systems. It's somewhat interesting to me what the staff wrote

1 then which sort of indicated things were okay.

2 MR. KERR: Yes, but with all due respect, I think he
3 had a problem but he was being very specific and the staff was
4 replying to his very specific question rather than the more general
5 question perhaps, to which they should have been responding.

6 MR. OKRENT: Yes. It's somewhat interesting to me.
7 Some of the things he suggested be looked at, like damping
8 ratios and a variety of things, I'm not so sure -- at least, I
9 don't understand that they are the most important things. I'm
10 more interested in some myself, but we're interested in other
11 aspects of control systems.

12 MR. KERR: Eventually, you're going to persuade me
13 that we shouldn't separate control safety systems, if you keep on.

14 MR. OKRENT: I'm not trying to propose any position in
15 that regard. I am increasingly convinced that the staff ought
16 to know more about control systems and what's in the plant.
17 In fact, he did recommend that they do failure modes and effects
18 analysis early on. So part of the things that he suggested I
19 think, in fact, might have been looked at earlier with good
20 benefit.

21 So, I think this is one that's worth singling out and
22 I don't see it given proper emphasis. It may be buried somewhere.
23 Then again, on design errors, this is called out because --
24 they have a lot of money proposed and somehow this one aspect
25 is identified. And generally, the Item D is intended to meet

1 Jesse's question about future reactors -- should the Commission
2 develop some kind of guidance for their design. This would
3 include a variety of things including what kind of shutdown
4 system you have or whatever. In other, the general design system.
5 And again, that's not called out in the research program.

6 I think if you say to yourself what kind of research
7 would be needed or should be done in order to evaluate the design
8 criteria and see in what way we should change it for future
9 reactors, that would be a sort of a focus kind of program, and
10 you won't automatically pick that up by what they're currently
11 doing. You'd pick up parts of it.

12 MR. KERR: I agree with what I think is the spirit of
13 this but I'm not sure whether the message out to go to Research
14 or to perhaps Standards.

15 MR. OKRENT: Well, I think that NRR and Standards
16 should have developed a user need for this, and I'll bet there
17 isn't one, though I haven't read their latest list. Because
18 they tend to single out subsets of this, and I don't think this
19 is something Research should go out and do without very strong
20 direction, I agree. So that needs some kind of rewording in my
21 opinion but I had to put something down in a hurry to get it in
22 to Chet.

23 Anyway. So basically, what I tried to do here was to
24 single out the more general areas that I thought should be worked
25 on and what hadn't been singled out in what I'd read.

1 MR. EBERSOLE: Shouldn't there be something in here
2 about advanced reactor safety research needs, if we're looking
3 ahead in the energy program? Gas and fast gas and so forth,
4 LMFBR, in spite of the current administrative positions against
5 this.

6 MR. KERR: Yes, Research is suggesting a program in
7 fast reactors. Maybe not enough. Is that what you're saying?
8 That there isn't enough. Okay.

9 MR. SIESS: Jesse, keep it in the context of general
10 comments. There are four pages on advanced reactors in the
11 specific comments. And I think we need to keep this whole thing
12 in that context.

13 Gentlemen, we'll have other opportunities to look at
14 this particular material, but this is general and it has some
15 things that would tend to flavor what we do later on. And some
16 of the items Dave has listed are what people call crosscuts, like
17 the comment on the general design criteria. It's hard to define
18 that, although with a crosscut Research might be able to point
19 out or dig out the areas that address that, if there are any.

20 Let's take a quick run. Does anybody have any problems
21 with the five bulletin items on the first page?

22 MR. MOELLER: I wasn't sure I understood all of them.
23 In the second one -- am I interpreting it right that you say
24 the Reg Staff will have to re-evaluate its previous user requests
25 for research to assure that all the major issues are covered?

1 Is that what you mean?

2 MR. OKRENT: What I intended to say in a few words
3 was they have prepared a lot of user needs; in fact, they
4 tried to tick them off again for the research program. But it's
5 not clear to me, even now after I've looked quickly at whatever
6 it was that was written, that the Regulatory Staff has tried to
7 sit back and identify some kind of, let's say, a broad perspective
8 on research needs, and not only those that they think are current
9 problems, and that relates to LMFBR but that's only one, but what
10 are their needs, for example, for future LWR's and so forth, as
11 distinct from a set of specific things. I don't think they have
12 quite done this yet and I think they should. Because otherwise,
13 you get I think an improper set of priorities.

14 In fact, I think last year the staff could equally well
15 this year have said -- gee, we're going to need a lot of informa-
16 tion for these rulemakings. I don't think they had to wait a
17 year. If they just sat back and contemplated their navel, for
18 want of some better word, they could have sat back a year ago
19 and said we really had better start getting this information, and
20 what is the information we want and so forth.

21 MR. KERR: I understood bullets 1, 2 and 3 were a
22 sequence. The first thing it has to have is that the Commission
23 has to provide the policy guidance, and once that has occurred,
24 then 2 and 3 follow.

25 MR. OKRENT: But if the Commission doesn't, I hope the

1 NRR does that anyway.

2 MR. KERR: I would say that the NRR was to have evaluated
3 its user requests within some broad framework which they think
4 accounts for major issues. I'd hate to accuse them of not having
5 done that.

6 MR. OKRENT: I'm reluctant to give them credit for that.

7 MR. MOELLER: If this had had the thoughts that you just
8 expressed, such as anticipating rulemaking -- I understand it.
9 It might be useful to put in a few of those specifics.

10 MR. SIESS: The place for specifics is in Section 3.
11 Not all of these items are covered in the material that follows,
12 but that one is in Section 3. The next one is in Section 4.
13 If people have specific recommendations with changes and wording
14 on that first page, they should collect their ideas, we'll come
15 back to it. If it's simply word engineering, they can mark up
16 a piece of paper and give it to Dave or to me.

17 MR. MOELLER: Down in the last two bullets on the
18 first page he shifts to the NRC, and we first were talking about
19 the Commission and then the Regulatory Staff and then the Safety
20 Research Staff. Now I find I don't know who the NRC is in those
21 last two bullets.

22 MR. OKRENT: I guess I was somewhat deliberately vague.
23 By the way, I didn't mention the fourth bullet, let me come back
24 to that one. One of the things that came up during the discus-
25 sion at the Subcommittee meeting in June and it's one that came

1 up earlier, was were there things that the NRC is doing that
2 they really should be asking industry to do, in one way or another.
3 And was there at least some kind of decision process whereby this
4 question was raised. Is this something that the NRC should be
5 doing, and the answer was yes, and that's why they were doing it.

6 It wasn't clear at least to me and I think others
7 whether all the things that were being proposed fell into this
8 category or that there was such a decision process. I don't know
9 who NRC is here. Some of these things come up as user requests,
10 some of these things may come from the Commissioners themselves.

11 MR. SIESS: Yes, and some of them never get to
12 Research. Things get done by industry because the staff ask
13 questions. As to what the basis for decision is, I don't know.
14 Why is there a LOFT for PWR's but no LOFT for BWR's? Somebody
15 made that decision somewhere.

16 MR. EBERSOLE: It's easy, they don't need them.
17 I think the bulk of the money is going to PWR safety research.

18 MR. SIESS: Well, somebody is spending a fair amount
19 of money on BWR safety research, not all on the reactor vessel.

20 MR. OKRENT: I'm sorry. I think it's somebody way back
21 in 1962 or 1973 said yes, let's build a loss of fluid test, and
22 gee, we built some boiling water reactors in Idaho, let's make
23 this a boiling water reactor and we'll melt it down and see
24 where -- So we would have a boiling water reactor there if
25 that's what had been studied.

1 You know, the decision on LOFTing of PWR had nothing
2 to do with LOCA and transients and PWR's or anything like that.

3 MR. MOELLER: Are we looking at what industry
4 should do or are we looking at what other federal agencies would
5 logically be more responsible for doing than NRC? To me, that,
6 like DOE, is very important.

7 MR. SIESS: Well, there have been a number of directives
8 as to what NRC should do versus DOE; none of them have been all
9 that clear. There's been one from OMB on improved safety. But
10 I think the thrust of Dave's point here was industry versus
11 NRC, and there are some fairly specific examples other than LOFT.
12 There's safety relief valve testing, qualification testing,
13 things of that sort.

14 Let's go to page 2. Are there any portions of that,
15 of Section 2, that you'd like to see revised and can give Dave
16 some advice or can come up with some words, not necessarily at
17 this moment?

18 MR. OKRENT: Talking about words, if people -- for
19 example, Dade is suggesting a helpful elaboration -- if they
20 could either provide suggested words or at least give me a little
21 note that says it would be helpful to expand this thought or that
22 thought, I would then try to do it.

23 MR. SIESS: Yes, and that applies to everything here.
24 In Section 2, there's a division here between problems that
25 relate to operating reactors and those under construction, and

1 problems that relate to reactors to be constructed, an additional
2 list. I'm asking you for comments on the list and the division.
3 Are there any items in the list you don't understand and can find
4 words that make it clearer?

5 I think in the Subcommittee meeting there was some
6 question about repeat of the shutdown heat removal system in
7 the second paragraph. The first one talks about a highly reliable
8 shutdown heat removal system; the second for new reactors talks
9 about such as, a dedicated bunkered shutdown heat removal system,
10 and I think somebody raised a question about that.

11 MR. KERR: I have some suggestions which I'll pass on.

12 MR. SIESS: Fine.

13 MR. OKRENT: It's not clear to me that you can readily
14 provide a dedicated bunkered shutdown heat removal system in an
15 existing reactor, or at least not the way you would do it if you
16 were designing from scratch. So that's the logic for repeating
17 it in a somewhat different way. But I'd like to get Bill's
18 comments.

19 MR. SIESS: On Item 3, which is the user need priorities,
20 that's elaboration of one of the bulletin items on the first
21 page. Does that help you understand, Dade, and if you have some
22 words here would you pass them on to Dave?

23 In the last paragraph of 3, which is on page 3, the
24 comment, Dave, that you mentioned ONRR and Standards -- the
25 effort that they've done in reviewing the user needs and relating

1 them to the research program in connection with this budget is
2 something we had not previously reviewed and it's been fairly
3 extensive.

4 I would think that you need to add in NMSS in there.
5 I don't think there's that much difference among the offices.
6 And probably, there needs to be some recognition of the fact
7 that they've done something. It has been the case; it may not
8 have been as thorough -- you did elaborate a few minutes ago on
9 the kind of review and I think you need to think about that a
10 little bit.

11 MR. OKRENT: I agree.

12 MR. SIESS: The next item, 4, relates to the bullet of
13 the risk assessment methodology to the research program. That
14 was done late last year at one level. We had a memo I think
15 with Ray DiSalvo on that. We talked about that at the Subcommittee
16 meeting. You can't find it in the decision unit 8. Bob Budnitz
17 indicated that that was sort of an overhead staff function, and
18 I think he might want to comment on that. Would you like to hear
19 a comment on that now from Bob since it is addressed to research
20 and they're here?

21 MR. OKRENT: As you wish.

22 MR. SIESS: Yes. Bob, would you like to comment on
23 that? Do you know where we are?

24 MR. BUDNITZ: You're discussing examining the research
25 program from a risk perspective. Is your question trying to find

1 where that is in the budget?

2 MR. SIESS: Well, this is a general recommendation and
3 I guess we'd like to hear your reaction to it. The relation of
4 this to what was already done and whether it's a continuing
5 effort or should be in your opinion.

6 MR. KERR: Let me see if I understand the question we're
7 asking. Is it whether the research has been placed in priority
8 according to its risk reduction potential? Is that the question
9 we're asking?

10 MR. OKRENT: At least the results. Not that that's
11 the only basis but that has been used as a basis.

12 MR. KERR: Has that been used as one of the criteria?

13 MR. BUDNITZ: We believe that it has, and we believe that
14 the new program emphasis and the changing direction of the program
15 are a clear indication that things important to risk are being
16 looked at that weren't looked at before.

17 The only formal thing that's been done in that regard
18 to date is a memo that I suppose the Committee must have that Ray
19 DiSalvo did. It was actually a small report, which formed the
20 basis for some of the thinking we put into this year's budget.

21 But you must be aware that in many areas about the only
22 thing you can come up with in some of these things is whether it's
23 high, medium or low; that these sorts of things are not numerical
24 in their nature.

25 I believe that not only has that already had some impact,

1 but that in the next year or so it's going to have a larger
2 impact still. The ability of the staff to think affirmatively
3 about this without the kind of overwhelming psychological, shall
4 I call it overburden, of the horrible history of WASH-1400 is
5 just changing very rapidly. Not just in research but everywhere.

6 MR. SIESS: Bob, how do you evaluate research to
7 determine its risk reduction potential? It seems to me you have
8 to say if the results of the research are such and such, and if
9 they are implemented, then we have a potential for reducing risk.

10 MR. BUDNITZ: That's right, and you kind of can only say
11 a high, medium or low. I don't think that a numerical risk analysis
12 per se is of much use for a lot of what we do.

13 Let me give an example. We're beginning next year to
14 do some serious thinking for the first time about the whole issue
15 of control rooms. Now, until we even do some exploratory work, we
16 don't know which questions we will end up researching, or even
17 wanting to research. And it's only those specific questions that
18 you can ask about. So then you say, what are we doing it at all
19 for? It's because of a feeling we have which almost everybody
20 I suppose in the room will confirm, that that's got to be an area
21 where there's a vast potential.

22 But you really can't evaluate the risk reduction poten-
23 tial of the whole area called control rooms; you have to evaluate
24 specific things, many of which haven't been formulated yet
25 because we're still working on it. So while I don't think it's

1 necessary to apologize for what we've done today, I also think
2 it's fair to say that we haven't done enough, in large part because
3 many of the new areas we're in like plant operational safety
4 areas are hard to do.

5 Let me then give you another example. If you read
6 WASH-1400, just straight off the page, you come to the conclusion
7 that primary system integrity is not an issue of great concern.
8 I mean, the primary vessel doesn't break in any high enough
9 likelihood to contribute to those curves that everybody has seen.

10 Now, on its face, that would lead to the completely
11 inappropriate conclusion that that's low priority. I don't think
12 it's low priority. And the reason is because there are some issues,
13 important ones, that are nagging us, for whom the specific numeri-
14 cal risk contribution is unanalyzable. You know, it's just not
15 that sort. And there are other examples that come to mind, such
16 as seismic questions, where basically all we can do is high,
17 medium and low and that's sort of what we do.

18 I suppose we can be then open to the criticism that we're
19 not being -- that the judgments we're making are wrong. I would
20 be delighted to consider any such advice from the Committee.

21 MR. OKRENT: The Ray DiSalvo report was interesting,
22 but I think it hardly meets the comment.

23 MR. BUDNITZ: It was a first shot. I agree, it was a
24 pure first shot. It was not intended to be anything more.

25 MR. OKRENT: The use of WASH-1400 as the basis for

1
2 judging risk reduction potential is not something that you'll
3 find in these words, and I hope the staff intends to more and
4 more move away from using the sequences in WASH-1400. I think
5 you're making a mistake which you're repeating too frequently
6 in going to those sequences and using those sequences in arriving
7 at recommendations, et cetera, et cetera.

8 MR. BUDNITZ: Right, absolutely.

9 MR. OKRENT: And I've seen it frequently and in recent
10 months and in recent days, in fact. So, the term --

11 MR. BUDNITZ: Can you elaborate on that last comment?

12 MR. OKRENT: Yes. I think the comment that hydrogen
13 measures, in fact, that I've seen recently made have again
14 drawn heavily on what was in WASH-1400 and didn't ask what was
15 not in WASH-1400. Things that were done in Indian Point and Zion,
16 recommendations from PAS, were based too much on what was in
17 WASH-1400 and didn't reflect enough on what was not in WASH-1400,
18 and so forth.

19 So I think there needs to be a question of what paths
20 are not in WASH-1400 that are important to --

21 MR. BUDNITZ: I suppose on that last my only comment
22 can be that the PAS staff was asked to provide a risk assessment
23 of Indian Point in three weeks, and about the only thing that they
24 could do was to say well, the only thing we can do is this, and
25 that's what they did.

MR. OKRENT: I know. But they didn't have a list of

1 the things that might have altered the conclusions.

2 MR. BUDNITZ: It was plainly recognized in the intro-
3 duction to the report, in my view.

4 MR. SIESS: It's still a good example.

5 MR. BUDNITZ: It is a good example, and I agree.

6 MR. KERR: But what Dave said is you ought to quit
7 using the things in WASH-1400. What his example said was that
8 you should quit using it but you should use some other things,
9 too.

10 MR. SIESS: Yes, and not rely strictly on WASH-1400.

11 MR. OKRENT: Yes. But nevertheless, I think you should
12 use risk reduction potential in looking at your research program.
13 For example, your point on reactor vessel, what you said is there
14 are some nagging questions. To me that means there are some
15 areas where maybe the estimates that one will find in that
16 document, the probability, best estimate of 10^{-7} , for example --
17 maybe there's a big uncertainty band due to something. If there
18 is a big uncertainty band, in fact, then the expected value moves
19 quite a way away from the best estimate, and then there is a risk
20 reduction potential possibly. So in fact, just using those
21 very ideas says you need to do that work.

22 MR. BUDNITZ: Yes, and that's, of course, what we're
23 doing it for.

24 MR. SIESS: What's interesting to me is that the
25 categories that come to mind and that Bob mentioned when you

1 look at this are quite different than the categories we can find
2 by looking at decision units. That is, one category was primary
3 system integrity, one was seismic, one would obviously be siting
4 and demography and emergency procedures; another would be core
5 melts and containment. It's a different categorization there that
6 I find very interesting.

7 Let's go on. The next item is Class 9 accidents, and
8 we were beginning to get specific here. There was a question
9 raised as to the qualifications of single most important. Bill,
10 you said you had some milder words. Does anybody have any
11 problem with singling out Class 9 accidents as a section here
12 under the general comments?

13 MR. KERR: I can speak for no one else. I think it
14 probably needs singling out.

15 MR. SIESS: If no one else speaks, we will say you are
16 speaking for others.

17 In the other areas requiring emphasis, there are a
18 couple points that I think we should be clear we're making.
19 That's about two-thirds of the way down on page 4, Item 6.
20 It says, "Lacks sufficient emphasis. Many areas where there
21 are either large uncertainties or there's reason to expect that
22 a significant improvement in safety may be achievable." That
23 partially addresses what we were just talking about, the risk
24 assessment for assessing priorities. But I assume that that's a
25 qualification that applies to the A through D items on the next

1 page. Is that intended, Dave? That's the basis for the list
2 that appears on the next page.

3 MR. OKRENT: Yes.

4 MR. SIESS: Then there is an admonition here that the
5 FY82 program that we're reviewing should be reoriented to provide
6 appropriate emphasis on these topics, and also, the FY81 program.

7 Now, the four items that are on page 5 you discussed,
8 were there changes that you want to make in those? I know there
9 was some lack of understanding. Do you understand them now or
10 have words you want to submit to Dave for changes?

11 MR. OKRENT: If you want elaboration indicated, I
12 can easily add another sentence.

13 MR. KERR: I'm sure I'll write something on this. But
14 I think that the whole Committee as well as Dave need to be more
15 specific than just to say that the program should be reoriented
16 to provide appropriate emphasis, because it's a fairly tight
17 program and I think -- unless we just aren't going to give any
18 guidance -- we need to say what should be dropped or pick this up.

19 MR. OKRENT: I'd like to try that.

20 MR. SIESS: It was intended, implied anyway, that if
21 we accept that as a guide, we would provide the more specific
22 guidance and specific comments that occur in Part II. Now,
23 we can't cross-reference this, but if we say that, we ought to
24 provide it. And we need to keep that in mind, then, as we go
25 through the more specific recommendations.

1 Dave did not go into the last item which is just sort
2 of something I drafted that up to just introduce the next part.
3 If anybody has any comments on that, they can pass it on to me.
4 This was just simply to set the stage for what follows.

5 MR. MOELLER: Did you explain your last sentence a
6 little better? I don't understand it.

7 MR. SIESS: The last sentence of Section 6?

8 MR. MOELLER: At the bottom of page 5. Yes, the last
9 sentence at the bottom of page 5.

10 MR. SIESS: That's not mine, that's Dave's. I'll let
11 him explain it.

12 MR. MOELLER: You're saying that the needed large
13 shifts in programs or priorities will be made in the program
14 description provided to us during our review. I didn't quite
15 understand.

16 MR. OKRENT: You notice I didn't put a dollar figure
17 in because I didn't know where the Committee was going to come out.
18 And I didn't know whether the Committee was going to try to say
19 do everything you said and then do these things in addition, or
20 was going to try to say, and therefore propose the larger amount,
21 or was going to say, it's going to be necessary to reduce emphasis
22 in certain areas in order to provide the necessary emphasis here.

23 As of June, I don't see the appropriate emphasis on
24 these topics, and as somebody was just saying, if they were going
25 to build up in these areas and not change the total, then they

1 would have to shift their programs and priorities from what it is
2 that's in the stuff they sent to the EDO in some way.

3 MR. MOELLER: Okay, I see now, I just misread it. I
4 read it as you saying that the needed large shifts would be made
5 by RES. You mean that we will recommend shifts. You're talking
6 about in the program description provided to us by RES. I took
7 it as the RES.

8 MR. OKRENT: N . I think it would be nice if we
9 recommended shifts. I don't know if we'll accomplish it or not.

10 MR. SIESS: I would suggest that Research Staff try
11 to address some of these items, as to whether they are in the
12 budget anywhere, and if so, are they in at what level? That is,
13 if they're not in at the PPPG level, then we would have to
14 recommend shifts. If they're in at the EDO and revised level,
15 where they are, in which case we wouldn't have to talk about that.

16 Gentlemen, I would suggest that we now hear from Bob
17 Budnitz. He'll give us the overview. Bob, we have your
18 RECLAMA document. Attached to it are the figures you used with
19 the Subcommittee which were very helpful. In what Budnitz will
20 present, there are certain areas where the personnel allocations
21 are particular problems, and he'll bring those out and if we
22 haven't got comments about those in there, we'll decide whether
23 we need them. The two or three areas where the requests for
24 personnel had been changed considerably from what Research asked
25 for, and in some cases from what we previously recommended.

1 MR. BUDNITZ: Let me begin by saying that we have had
2 discussions with the Deputy Director since we met with you the
3 day before yesterday, as part of our RECLAMA to him. And we
4 have had some success in some parts and some they're thinking
5 about. So I'll try to indicate where that is, but the preliminary
6 mark that you had before you on Tuesday is not quite right
7 anymore, but the overview is still pretty reasonable.

8 MR. SIESS: Have there been official changes in the mark?

9 MR. BUDNITZ: No. He has said well, I guess you're
10 right on that one --

11 MR. SIESS: That was just a procedural question.

12 MR. BUDNITZ: I want to start with a slide that I guess
13 I showed the other day and which Tom Murly put together a month
14 ago. I think that's the most important thing. That slide tells
15 the overall story; the details are, of course, vital, but that
16 slide I did show.

17 MR. SIESS: This is only Reactor Safety Research;
18 this isn't the whole program.

19 MR. BUDNITZ: Furthermore, not all of Reactor Safety
20 Research is on the slide. Risk assessment isn't on the slide.

21 But this slide tells a good deal of the story, and I
22 think demonstrates clearly that we are paying attention to your
23 bullet which says that -- the bulletin says we're supposed to
24 pay attention to those areas that have substantial impact on risk.
25 And the notion that we should have considerable growth in areas

1 related to operational safety, and the notion that severe
2 accident phenomena and mitigation require extensive new work,
3 and the idea that areas where we are deeply involved on a
4 decade-like timescale; that is, the top one, should get less
5 emphasis.

6 MR. EBERSOLE: The line on LOFT is a little confusing.
7 Couldn't you characterize it with two lines on LOFT, one of which
8 might be dotted and another one solid so that you could tell what's
9 being done differently with LOFT now?

10 MR. BUDNITZ: Yes, I could. This, by the way, is our
11 own budget requests; the reality is surely different, and in
12 detail it might even be different in growth. The other thing is
13 that the numbers in 1983 and 1984 don't have inflation in them,
14 so LOFT is level. That's a level effort, inflation, that we're
15 asking for, and the next level by definition afterwards by
16 definition.

17 MR. EBERSOLE: But it's a different kind of work.

18 MR. BUDNITZ: Yes, sir. I'll come to that.

19 I suppose that that overview then demonstrates several
20 things that are both important and troublesome. The thing that
21 I have calls for substantial shifts, which I think we have begun.
22 On the other hand, it also points out, and in some cases correctly,
23 that we haven't moved as rapidly or as fully as the Committee
24 would like. And I need to emphasize to you that we have also
25 not moved as rapidly or as fully as I would like. And thereby

1 hangs the whole pail. And when I say I, it's also true of Tom
2 Murly and Bob Bernero and Frank Arsenault who's not here and
3 of Wongsun Tong and Charlie Calvert and so on.

4 Generally, the amount of motion and reprogramming in
5 shift that we are capable of accomplishing is not as great as
6 we would like. And while frustrating, that's a reality which
7 I hope the Committee can recognize. That doesn't mean that we
8 aren't open to specific criticism which if you would offer, or
9 advice or whatever you would offer, we would try to take into
10 account.

11 But the fact is that even where we want to move rapidly
12 we cannot in some cases, and in some cases moving rapidly has
13 a strong negative value which, in terms of disruption, which we
14 try to avoid because the research community with whom we deal
15 requires a measure of stability in order for it to remain
16 effective over the longer haul.

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1 MR. BUDNITZ: All right. Secondly --

2 MR. OKRENT: Excuse me, if I can interrupt, Bob.
3 That is the same song you sang the last time.

4 MR. BUDNITZ: It is still true.

5 MR. OKRENT: I will say the same thing. I spent a
6 lot of time in the national laboratory, and I have seen the
7 problems there when you have ongoing programs. In fact, it
8 is even harder when they are good programs and they are
9 doing good work. But I do not think we have the luxury in
10 the safety game of continuing momentum on things when there
11 are really important new needs.

12 MR. BUDNITZ: Yes, sir.

13 MR. OKRENT: I think one at least should try to
14 say what is it we would do if we had absolute flexibility.
15 What is it we really want to do next year, FY 81, let alone
16 FY 82, and then from that position move to what is the
17 absolute minimum that we cannot change. But I do not see a
18 sign myself of that approach having been taken.

19 I think in the safety game that is the way it has
20 to go. It is not high energy physics.

21 MR. BUDNITZ: I can just reply I believe that is
22 exactly what we have done. I would like to ask you or
23 others on the Committee to point out specifically where we
24 think we have fallen short of that, but I believe we have
25 begun by asking what is needed, that we then have backed off

1 in some places because of a series of realities, and that we
2 have gone in our plan about as far as I believe is sensible
3 in this very rapid reorientation.

4 Of course, some members of the Committee might
5 believe that LOCA and transients are not an issue any more,
6 or that our understanding is sufficiently good or the
7 regulations are sufficiently conservative. If I believed
8 that, LOCA and transients would be terminated in 1981 and
9 1982. I do not believe that.

10 I believe that the safety concerns that still
11 remain in the area of LOCA and transient phenomena and the
12 codes we are developing to deal with that remain amongst the
13 most important safety issues still outstanding in reactor
14 safety, and that the reason why the budget in 1982 is in the
15 \$50 million, \$60 million range is not mostly because of
16 inertia and momentum built up in the sixties and seventies,
17 but is, in fact, due to pressing and important safety
18 concerns still remaining in that area where research is
19 required to assist us in understanding, because, of course,
20 LOCA, transients and LOFT, that is the area we are dealing
21 with. That is the pot from which the others are taken out.

22 Plant operational safety, fuel damage and fuel
23 melt, the money for them comes out of the pot called the old
24 stuff, unless there is new money. Despite the fact that
25 that sums to higher, realistically we may not get as much

1 new money as we want. In fact, we may have less. I have to
2 defend this in the strongest possible terms. The reason why
3 these two things are as high as they are is not, except in a
4 very few areas, this question about inertia. It is because
5 pressing safety concerns remain.

6 If the Committee does not agree with that, it
7 ought to say so. We will listen very, very carefully. I
8 have the impression the Committee agrees with that. In
9 fact, just within the hour, Dr. Tong mentioned something to
10 me I had been aware of but had not focused on in quite the
11 same way. This is an aside but an important one.

12 Why do the low pressure injection systems in the
13 ECCS, the very large volume systems, come on at such low
14 pressures. Combustion? A couple of hundred psi, 500, 600
15 psi. Why do they come on at 1000 psi? I believe a lot of
16 it has to do with a concern that for a hypothetical -- I use
17 the word "hypothetical" -- double-ended guillotine break
18 with a rapid blowdown -- people said we can wait for the low
19 pressure, it is going to get there anyway, why inject the
20 high pressure when the issue about that is so important?

21 But today in 1980 we may understand something
22 about bypass that was not understood when those systems were
23 designed, and we may be able to modify that view and thereby
24 cope with the sort of small breaks, a range of which are not
25 well coped with when the low pressure system comes on at

1 atmospheric or a low atmosphere, 10 or 20 atmospheres.

2 The fact is that the understanding of the
3 phenomenon of the small break regime, transient-induced
4 LOCAs and the like, bears on design questions of that sort
5 whose posing is not illegitimate, it is vital. And that is
6 only one example of a series of questions that this line and
7 that large system are intended to address (indicating).

8 If the Committee thinks those are lower priority,
9 not just because of safety but because of pressing other
10 concerns having to do with the research community, then
11 great, say so and we will listen carefully. But I am not
12 there yet, and that is meant to be a pretty strong defense
13 of this mix, which by itself, even with this very large
14 program -- those are still the largest things in town -- is
15 a substantial redirection.

16 The stuff is not on a curve like risk assessment.

17 MR. LAWROSKI: Dave, I think you would have to
18 temper the extent to which you do this because pretty soon
19 the flexibility of telling your contractors that you can
20 drop what you are doing now and pick up something new,
21 pretty soon you will find a limited choice of contractors.
22 Mostly the ones willing -- though willy nilly -- have very
23 cyclic-sized funds.

24 MR. EBERSOLE: I guess everybody else understands
25 this; I don't. I can take the LOCA and transient and LOFT

1 curves up there, and I have to take the sum of LOCA and
2 transient and LOFT and take a big, flat brush and say that
3 is a totality, and I don't understand the component parts of
4 it in such a way that I can understand a budget expenditure
5 for it.

6 MR. BUDNITZ: The subcommittees, of which there
7 are a couple, that think about this carefully have been
8 through all that, and I would be willing, if the Committee
9 desires, to go into that in some detail so you can see what
10 is in there. But I think I have to make the point just as
11 an overview that if I broke this apart into large LOCA and
12 then small LOCA and transients, and LOCA-induced transients
13 -- transient-induced breaks, I mean -- and then LOCA-induced
14 other problems, the large break LOCA here is a minor
15 component in 1981 and almost negligible in 1982. It is down
16 in 1983.

17 MR. EBERSOLE: It just does not show.

18 MR. BUDNITZ: If I had to break this apart, it
19 would be quite small. It is not quite gone because of some
20 international commitments, but it is very minor. This work
21 is now small break studies, operational transients and the
22 like, and then code development and assessment for
23 understanding those phenomena, with some of the large break
24 stuff still continuing on.

25 We have come to the conclusion that we understand

1 enough about large breaks so we don't have to do too much
2 more about it. Again, I am completely in accord with, for
3 example, what Dave Okrent said, that understanding severe
4 accident phenomena and ways to mitigate them are vital.
5 They are more vital than other stuff precisely because we
6 are in the process as an agency of trying to modify the
7 whole regulatory structure to cope with that.

8 That makes them all the more important because we
9 have to support the agency's ability to regulate, and that
10 accounts for this very rapid increase in our work, and it
11 also accounts for the mix of what we are doing. That is a
12 sensible research program that had as its operating
13 procedures -- we did not need all the answers until 1987.
14 It is perceived differently than one that deals with ongoing
15 reactors that run every day.

16 The mix is of such a way that would not be so if
17 we did not have ongoing regulatory decision-making going
18 on. You have to understand there is a lot of that in there.

19 MR. BENDER: Are you saying the programs are now
20 being set up to answer different questions than they were
21 last year?

22 MR. BUDNITZ: Oh, yes, sir.

23 MR. BENDER: How can we tell what those questions
24 are?

25 MR. BUDNITZ: They have been explored in some

1 detail with the subcommittees. I can go into them area by
2 area.

3 MR. BENDER: I know we don't have time to do that
4 today.

5 MR. BUDNITZ: I would be happy to. Just to pose
6 one key area of questions, it has to do with containment
7 response. There are questions about containment response
8 that were not asked in the research program two years ago
9 that are now being asked. The area of containment response
10 contains a whole lot of subparts.

11 MR. BENDER: I agree.

12 MR. BUDNITZ: That is a broad area. Just to cite
13 another one, there are questions of the phenomena that are
14 involved when a core goes further than TMI-2 went. Had
15 TMI-2 not been cooled at two hours and so many minutes, the
16 phenomena involved in what would have happened have not been
17 explored, and that whole area is a whole question not asked
18 in the 1980 budget deliberation.

19 MR. BENDER: The curves up there that you have,
20 could I tell how much of it applies to new stuff? I almost
21 inferred from what you said previously that almost
22 everything that is going to go on after 1982 is going to be
23 something addressing questions that have not been addressed
24 before.

25 MR. BUDNITZ: That is a decent overview. In

1 detail it cannot be right. That is generally so. The way
2 to tell is to look at the specific sub-elements. For
3 example, just to cite one, the whole question about fuel
4 melt behavior, fission properties and transport and
5 containment response is, in sum, as well as in detail,
6 practically brand new.

7 On the other hand, some questions in the LOCA and
8 transient area and in LOFT were on our agenda years ago for
9 1983 and 1984. LOFT always had small break tests for some
10 of these transients. You accelerated them, changed the
11 references, deleted and added in order to integrate a
12 program. That probably would not have been so well
13 integrated had not --

14 MR. BENDER: The LOFT work is primarily directed
15 to improving computational codes. I guess there is not much
16 else you could say about it.

17 MR. BUDNITZ: It is directed towards uncovering or
18 understanding phenomena that you cannot uncover at small
19 scale.

20 MR. EBERSOLE: Do you break down each of these
21 curves?

22 MR. BUDNITZ: I do not have it on curves.

23 MR. EBERSOLE: Curves are great visually.

24 MR. BUDNITZ: You are right.

25 MR. EBERSOLE: I mean even multiple colors or

1 something.

2 MR. BUDNITZ: Yes.

3 MR. EBERSOLE: It looks like that would --

4 MR. BUDNITZ: I don't want to be defensive about
5 this. I want to try to just be realistic about what we are
6 doing. But I feel all the things in here you have called
7 out have been responded to in one way or another. I don't
8 think we are derelict completely in all of them. On the
9 other hand, there are several of which we are up to. It is
10 different than what you are thinking. We ought to go
11 through those.

12 For example, I read here the potential impact of
13 control systems and other normally non-safety systems is
14 important. You bet. Our answer is we are working on that,
15 and we can show you in detail what we thought, and we can
16 show you in detail the budget --

17 MR. OKRENT: What have you got in the FY 1981
18 budget on that topic?

19 MR. BUDNITZ: Let me find it.

20 (Slide)

21 A lot of it is in instrumentation, electrical, and
22 some of it is in what we call man/machine interface.
23 Together it is about \$6 million.

24 MR. OKRENT: I don't want to see dollars.

25 MR. BUDNITZ: That represents programs.

1 MR. OKRENT: I have read the listings of what --

2 MR. BUDNITZ: We are asking for a substantial
3 increase for next year.

4 MR. OKRENT: I did not see myself -- I may have
5 missed it -- I did not see a program that was focused in
6 this direction. You have a lot of things listed under
7 instrumentation and electrical, a lot of environmental
8 qualifications, a range of stuff. I think it was not really
9 aimed at this topic. I may be wrong. Show me the specific
10 thing that is aimed at this topic.

11 MR. BUDNITZ: We have a program that has not been
12 focused in a coherent, solid way yet for two reasons. The
13 first, the most important, is we do not have experts in that
14 field in the Office of Research or anywhere else in the
15 agency.

16 MR. OKRENT: That is the key point.

17 MR. BUDNITZ: And we cannot hire them. We cannot
18 hire them because of bureaucratic Mickey Mouse.

19 MR. OKRENT: I think the research program quite
20 naturally reflects the people in the Research Office. A lot
21 of people who know LOCAs and transients and so forth can
22 think of good work to do in that area. They can think of
23 things to do with it. They can think of things to change it
24 and so forth. If you do not have somebody in these other
25 areas, it is hard to develop a program.

1 MR. BUDNITZ: You are absolutely right.

2 MR. OKRENT: This is a root cause. But I find it,
3 unfortunately, not an acceptable situation even for FY 81.

4 MR. BUDNITZ: We gathered together in the winter a
5 group of one-half dozen people within our office, with some
6 advice from the others, to try to put together a program
7 plan for 1982 and then backing into 1981 to see what we
8 wanted to do in 1981 that would be longer range.

9 Those people were drawn from such interesting
10 places as Sam Bassett, the Deputy Director of SAFIR. Why Sam
11 Bassett? Because he knew something about it from a previous
12 incarnation. That is fine. In fact, Sam had enough, he had
13 a half-dozen people, he put together a decent program plan,
14 and now we are trying to figure out how to staff the thing,
15 both with experts from elsewhere in the agency and trying to
16 hire from the outside. But you cannot bootstrap in three
17 months when there is a hiring freeze.

18 Furthermore, we are contemplating, although we
19 have not really completed it, an organizational change that
20 would focus on all that stuff in a branch. We now have it
21 assigned to a branch that has other missions, the research,
22 and we are trying to figure out just how to do that. That
23 is involved in the personnel department and other things
24 which are vital to protect the interests of our employees
25 and all the other stuff.

1 On the other hand, it gets in the way of trying to
2 do something in just three months. It is hard. So what we
3 tried to do in 1982 was to put in the funds we think we
4 would cover that stuff. Secondly -- this is just as
5 important -- we have colleagues in other offices who have
6 not figured out where they are going, either, and who are
7 trying to follow us while we are trying to follow them.

8 I really have to say it in a funny way. They do
9 not have explicit programs in these areas. They don't know
10 what they are going to be regulating. They don't know
11 where. They are asking Research for help. They are asking
12 us to lead them. Don't lead us too much because, remember,
13 you are supposed to follow us. There is nothing wrong with
14 that. We are having a hard time --

15 MR. KERR: In defense of your position, it seems
16 to me it does not take research to try to decide whether the
17 control system is important to safety, and that is a
18 decision that has to first be made.

19 MR. BUDNITZ: That decision may never be made by
20 NRR, but it has been made by us and we are going to do
21 research on it, okay?

22 MR. KERR: You are not going to do research on that
23 question, I hope. You can answer that question in about two
24 minutes.

25 MR. BUDNITZ: We are not going to do research on

1 whether it is, but we are going to do research on those
2 specific aspects that will show us where and with what
3 emphasis what should be done. Now, if, having done the
4 research, our colleagues do not implement that in
5 regulations and branch technical positions and the like -- I
6 won't say that is somebody else's problem -- it is our
7 problem.

8 MR. KERR: Almost simultaneously, and maybe even
9 preceding that, there have to be some people within NRR --

10 MR. BUDNITZ: And I&E.

11 MR. KERR: -- who can make use of your results and
12 can help in trying to find out in what areas, if any,
13 research needs to be done. Control systems in reactors are
14 very primitive. It is not as if someone is developing some
15 new way of control philosophy.

16 MR. BUDNITZ: But Bill, as well understood as that
17 subject is around this table, that is, the core situation
18 there, it is in great shape compared to human factors. You
19 know, we have people in the agency who know about
20 instrumentation and electrical systems and power systems and
21 the like. They are scattered around. They are not focused.

22 MR. KERR: I am less convinced about human factors
23 because from what I have seen of TMI, I cannot believe human
24 factors had as much influence on what happened during the
25 course of an accident as I would be led to believe if I read

1 the reports uncritically. I think they might have some
2 influence on the next accident or some other.

3 MR. BUDNITZ: When I wanted to try to come up with
4 an office-wide -- which really means an agency-wide --
5 program, I could find a half-dozen people, scattered as they
6 were. I understand enough about that myself. Half of you
7 in the room probably worked in that professionally at one
8 time or another in your lives, and some of you still do. I
9 put something together I thought was decent. Human factors,
10 that is different. When I said let's gather every expert
11 into the Office of Research, nobody walked in because there
12 are none.

13 But I will say here what I have been saying for a
14 while. You remember what Steve Hanauer said. He said two
15 weeks ago I could not even spell human factors, and now I is
16 one. Now, for several months we have been trying to hire a
17 human factors expert, one. We found the guy. We had the
18 hiring freeze. We have been waiting. Steve is over there
19 trying to figure out what in the world to do, and he does
20 not have any experts either and he can not hire them
21 either.

22 You have to appreciate the realities of trying to
23 undertake a research program in an agency like this, tie my
24 hands and Tom's hands and Bob Bernero's hands and Franks in
25 a way that is inevitably less responsive than we would like

1 it to be. It is not just the lack of availability of
2 experts, but this funny system we have of planning two years
3 in advance.

4 If you want to reprogram more than half a million
5 dollars, you have to go to the Hill. I showed a slide once
6 that said that takes nine months. We are having budget cuts
7 at the same time, as you know, for 1981. So without
8 pleading innocence, obviously we are not doing it. There are
9 some realities which make it much more difficult than I
10 would have thought two years ago when I was still at
11 Lawrence Livermore and coming here bright-eyed and
12 bushy-tailed.

13 It is kind of depressing. It is kind of like
14 having cold water thrown at you.

15 MR. KERR: Go ahead and say it is depressing.

16 MR. BUDNITZ: It is not depressing, because I do
17 not get depressed. It is startling, which is different but
18 related.

19 Now, just to take another point, I will read here.
20 The proposed program includes considerable growth in areas
21 related to operational safety.

22 (Slide)

23 However, you go on that it still lacks significant
24 cohesive research in LWR plant design and control. It
25 does. You are right. I hope you not only say that, but

1 reinforce it. It is true. But it is not right to think
2 that we are not working in that area. Bob Bernero and his
3 colleagues have redirected the risk assessment efforts that
4 had been in place since WASH-1400. Maybe we are not doing
5 it quite the way we should because we have to begin with
6 what we have, but I think it is not fair to say -- and I
7 hope you do not believe we are not doing it -- the questions
8 about operational behavior as a function of design and
9 control, where such experts as Frank Rousen, who is an
10 expert in that, have been brought on board and been trying
11 to put something together.

12 On the other hand, I do want to agree with you
13 quite strongly on the idea which is over here somewhere.
14 The NRC may have to reduce sharply some research which is
15 confirmatory in nature where there is good reason to believe
16 that the current regulatory requirements provide adequate
17 protection to the public.

18 Yes, sir, that is right. We have to do that,
19 especially since there is not enough money and everything we
20 are asking for is not going to come true. The hard part is
21 to try to get a consensus on which areas those are. Large
22 LOCA is one. But there are others where we have sharp
23 disagreements with our colleagues in the other offices.

24 An example is pressurized thermal shock. The day
25 before yesterday, right here in mid-morning, Roger Mattson

1 said that that issue could, in his view and in the view of
2 his office, be put off, be deferred. Pressurized thermal
3 shock studies in the primary system need not be funded in
4 1982 because, considering all the other priorities, their
5 delay would not impact safety. We do not agree. We do not
6 agree because we think that beginning in 1983 and getting
7 answers in 1985 -- 1983 would be the earliest you could
8 begin -- it too late. We do not agree.

9 That is an example where our colleagues in the
10 other office believe where there is good reason to believe
11 that the current regulatory requirements provide adequate
12 protection. He thinks so; we do not think so. This budget
13 is full of those issues, specific technical disagreements
14 about where adequate protection is compromised or may in the
15 future be compromised or where deferrals are acceptable in
16 the light of severe budget constraints. That is where we
17 are stuck with the judgments that inevitably end up on my
18 desk.

19 MR. EBERSOLE: Bob, could you say something about
20 unpressurized thermal shock? I am saying pressurized
21 thermal shock is worse. We have an ongoing think on
22 unpressurized thermal shock, post-LOCA thermal shock.

23 MR. BUDNITZ: Suppose I could back up the
24 following statement, which I really can't do, with numbers.
25 Suppose I could back up the statement that accidents leading

1 to a pressurized, high pressure thermal shock are of high
2 probability or somehow meaning they will occur more
3 frequently than many other accidents, and they are worse
4 when they do for some vessels, especially vessels that
5 become aged over their lifetime.

6 Then that would force us, if it were true, to go
7 ahead and do this work. We are not sure that that is so,
8 especially on the probability, but we do not think it is
9 responsible to rely on the possibility that it ain't so.
10 There we are having, as I said, a specific disagreement with
11 our colleagues, but in the nature of taking the reductions
12 that we will have to take because that big request is not
13 going to come through.

14 I want to insist that I think what we are going to
15 try to do is use this criteria, which is to reduce that work
16 where there is good reason to believe the current regulatory
17 approach is adequate. Adequate to do what? You said it.
18 Adequate to provide protection to the public, absolutely
19 right.

20 In detail, then, with that as a kind of criterion
21 for our research program, we have to look at each thing and
22 see whether it is. That is where we want your advice.

23 MR. OKRENT: On this pressurized thermal shock
24 question, it seems to me you ought to be able to make a
25 rough estimate of the likelihood of the event occurring.

1 That does not strike me as being harder than the estimates
2 you are making every month.

3 MR. BUDNITZ: We have done so, and we kind of
4 believe it is bad enough to be of concern.

5 MR. OKRENT: If that is the case, then it seems to
6 me --

7 MR. BUDNITZ: Is that fair, Bob?

8 MR. BERNERO: Yes. It is not rigorous.

9 MR. BUDNITZ: The statement that it is real low
10 probability just does not hold water.

11 MR. OKRENT: I don't know what is rigorous.

12 MR. BUDNITZ: I can compute the WASH-1400 method.

13 MR. OKRENT: Can I continue?

14 MR. BUDNITZ: That is a rigorous calculation.

15 MR. OKRENT: Let's assume, in fact, this might be
16 a number that is not small. Possibly there is a different
17 question. What is the information that is important to
18 know, given one of these occurrences.

19 MR. BUDNITZ: The high pressure?

20 MR. OKRENT: Yes. In fact, is there research that
21 will give really important insight to this question that
22 will influence the decision, and what is that research?

23 MR. BUDNITZ: We think we have thought that
24 through, and we think the program we have planned does
25 that. Again, we can go into more detail here if you want.

1 MR. OKRENT: We don't have the time here.

2 MR. BUDNITZ: Paul Shewmon and others have already
3 thought about that with us.

4 MR. OKRENT: If this is the case, you should be
5 able to write down on a piece of paper, first, how you have
6 done your estimates on the probability, and what are the
7 important questions that you think should be answered by
8 research, and how the research will answer these.

9 MR. BUDNITZ: And then how it gets used.

10 MR. OKRENT: In fact, maybe you are prepared to do
11 that in this case, in which case --

12 MR. BUDNITZ: I think we are, and I think the case
13 is pretty good.

14 MR. OKRENT: All right.

15 MR. BUDNITZ: I kind of think the Committee will
16 generally agree with that.

17 MR. OKRENT: I would not be surprised if the
18 probability is significant. I have not seen anything which
19 says here is the information that can and should be provided
20 by research. I don't mean the office, but the doing of
21 research will provide not just information about the
22 subject, but the information that is needed. Those are two
23 different things.

24 MR. BUDNITZ: Just to reply, I think that
25 obviously -- you have not seen it. We have shared it with

1 the subcommittee at the ACRS that looks into this, and they
2 have gone into it in plenty of detail. So I think that is
3 an example where we thought it through and we did our
4 homework, and to me it is almost obvious. I understand why
5 the other office might come to the conclusion that other
6 things are more important because, you know, the probability
7 per year is smaller than one.

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1 I don't agree with them, but I understand them. So I
2 am just making the point that we -- let me try to reiterate --
3 that we try to emphasize the criterion that where work is
4 confirmatory in nature and we have a feeling it is in good shape,
5 we are going to drop that, give it lower priority because we do
6 not have enough money.

7 I am trying to reiterate that that is a judgment, and
8 people with the same information differ on that judgment. And
9 all too often our judgment is not sustained in the budgetary
10 process. I have to say thank god we now have a procedure that
11 enables us, at least procedurally, to go ahead when only we think
12 so. That was not true last year when we had to get endorsement
13 for everything.

14 We have a procedure this year. We can endorse some
15 of this ourselves, so some of this will get done if they don't
16 want it, and that is great. But there are problems in doing that
17 with, you know -- you cannot do it everywhere. You have to get
18 them on board because it is one agency. We also have to get them
19 on board because if they are not on board, they will not use it
20 and so on.

21 So I guess that I do not have very much pain with anything
22 in the introduction except one thing that really bothers, and I
23 will read it to you: "General subject of class 9 accidents is
24 not limited to proposed rulemaking on --"

25 MR. LAWROSKI: Where are you reading?

1 MR. BUDNITZ: -- "Represents the single most important
2 research area."

3 I don't concur personally that that is the single most
4 important research area. It is only one of three or four who
5 together are the most important research areas. And that is not
6 intended to say that we are going to do all we can there.

7 MR. KERR: You recognize you are looking at a draft.

8 MR. BUDNITZ: I understand, of course. Yes, sure.

9 I don't know what the Committee's view will be, but I
10 wanted to comment because what strikes me as being -- as providing
11 those who want an opportunity to give less priority to other things
12 which I think are of comparable importance, such questions as
13 operations and the impact of operations on safety, and such
14 questions as the phenomena involved in the priority systems,
15 primary system integrity, primary system compromises through
16 chemical interactions and the like -- these are things that are
17 of comparable importance.

18 MR. MARK: You could say the transients are the kind of
19 things that lead to class 9 accidents.

20 MR. BUDNITZ: Operations by themselves are different
21 than the whole general subject of class 9.

22 MR. KERR: Only if you don't do good research on them,
23 Carson.

24 MR. BUDNITZ: I wanted to recoil against that lest you
25 think that this growing area is something that we also think is the

single most -- I just do not think so.

1 Now, a couple of other things and then I will sit down.
2 Let me tell you what I want to add.

3 MR. OKRENT: Can I ask a question, not on the wording
4 there?

5 MR. BUDNITZ: Of course.

6 MR. OKRENT: How you think in FY 81 the research program
7 is responsive to whatever you yourself define as the need of the
8 Commission in the area of degraded cores and core melt mitigation --

9 MR. BUDNITZ: You want some technical detail. We have
10 initiated programs or modified those going on in fast reactors
11 to try to -- these are multi-year things -- to understand such
12 things as the coolability of a rubble bed.

13 MR. OKRENT: Have you identified the information that
14 the Commission is likely to need in various ways, not only for
15 the rulemaking, because it may or may not be making decisions on
16 specific reactors aside from the rulemaking -- do you think you
17 have identified the Commission's needs and the time scale in which
18 they will probably meet them?

19 MR. BUDNITZ: Not entirely.

20 MR. OKRENT: And laid out to the best of your ability
21 programs that try to meet these needs and propose them to the
22 Commission, even if it were a supplemental budget. Have you done
23 that for FY 81?

24 MR. BUDNITZ: I think that we have laid out a program
25

1 that contains all of the elements that will ultimately be needed.
2 But I think we are still inadequate in thinking through the mix
3 of experimental information that we have to get anew against the
4 mix of things that we can learn by analysis and just thinking
5 about information we already know. I don't think that has been
6 thought through fully yet, and therefore, we are not prepared to
7 say whether or not large, expensive -- large-scale test facilities
8 are going to be required in this area or whether we can -- I won't
9 say get by because that is almost denigrating -- but whether we
10 can adequately understand these phenomena without it.

11 That thinking through is still in the process. It has
12 occupied much of the time of not only our own staff but most of
13 the research community that is interested in this area for many
14 meetings. We have had meetings attended by two or three dozen
15 people, experts from all around, who have several times iterated
16 the plans and so on. And I think the thing, while not mature, is
17 in the process of becoming so. Nevertheless, we are faced with the
18 problem that in the summer of 1980 we have to put a budget request
19 in for '82 whose detail cannot be fleshed out; in fact, whose
20 major components cannot really be fleshed out, whether analysis
21 will be enough or what.

22 So I can only defend that by saying that, a) we are in
23 process, and b) we are still seeking all the advice we can get.
24 And it means it is going to be slower than if there had been a
25 substantial research community thinking about this stuff over the

1 years. There has not been. And that is a tragedy that resulted
2 from the making -- from the view of class 9 in this funny agency
3 over the last decade or more -- I won't use the word "tragic" --
4 just grim.

5 MR. OKRENT: I guess the answer was no.

6 MR. BUDNITZ: Yes. The answer is in process but not no.

7 MR. OKRENT: I see.

8 MR. BUDNITZ: And by the way, I know that your subcom-
9 mittees -- a couple of them have thought about this in great detail
10 and have given us some nice guidance which is good.

11 By the way, the phenomena are not themselves the only
12 thing we are up against. We are thinking about mitigation, too,
13 such questions as bunkered heat removal systems, basemat penetra-
14 tion improvements, and filter vented containments and the like,
15 are part of our ongoing program or plan, or in some cases work
16 we are trying to kick DOE in the butt and trying to get them to do.
17 They are not responding in some cases, so we have an interagency
18 problem.

19 MR. OKRENT: At least as far as I am concerned, the
20 question of pace, I have no doubt that you are moving in directions --

21 MR. BUDNITZ: I share the statement that you would make
22 if you said your next sentence, if you said that the base work is
23 inadequate. Yes, it is inadequate.

24 MR. OKRENT: May I quote you?

25 MR. BUDNITZ: Yes, you may. And yet, our '82 request

1 is very unlikely to become the '82 budget expenditure in '82.

2 MR. MARK: Any more than '81.

3 MR. BUDNITZ: Any more than '81, as Carson says. You know,
4 it is a harder game.

5 MR. PLESSET: Can we go beyond the introduction, Chairman
6 Siess? Is the Committee ready for that?

7 MR. SIESS: Bob, do you have any more general --

8 MR. BUDNITZ: I have a couple more general points. With-
9 out them the Committee will not have the background that I shared
10 with the Subcommittee before. Let me try to make them brief.

11 I want to explain the difference between our request and
12 our PPPG number.

13 MR. PLESSET: Will you tell us what the initials mean?

14 MR. BUDNITZ: Program Planning and Policy Guidance. Maybe
15 I got the order wrong. We will call it PG now in deference to
16 Professor Kerr.

17 MR. PLESSET: How about P'sG?

18 MR. BUDNITZ: P'sG is slightly longer than PG.

19 We came up with a number which on the summary slide is --
20 it was 283 million counting -- here it is -- 283 million counting
21 equipment. Here it is.

22 (Slide.)

23 269 and some change in program support. Then we asked,
24 the Commission says 217. If you want to know where they got that
25 number, it is this year's number. It is '81's number. The

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1 Commission said 217, so we cut that 10 million at a time in half
 2 a dozen chunks, and we have given you our priorities where we would
 3 do that in order to get 217; but 217 does not represent a budget
 4 that is rational, per se. It only represents that you can cut and
 5 cut and cut until you get to 217. 217 is not a budget we prepared
 6 by any rational approach.

7 MR. SIESS: Did you ever try starting with zero and
 8 seeing if you would end up at 207 or 217?

9 MR. BUDNITZ: That is the same thing as coming back, I
 10 think.

11 MR. SIESS: Not at all.

12 MR. BUDNITZ: So that 283 represents a program that we
 13 believe -- I must say I believe because I ended up with the
 14 responsibility to bring it together -- is adequately responsive
 15 to the agency's mission. And I remember saying to the subcommittee
 16 I believe I have a statutory obligation to recommend that to the
 17 Commission, and I am doing that. Not that this is going to stand
 18 all the way to the end. In fact, in the last three or four weeks
 19 we have backed off a little bit on it. That is where we started,
 20 the PG of 217 which is not on here, is it -- but anyway it repre-
 21 sents -- we just got back to that.

22 Now, the budget people who are looking at this have
 23 generally started the other way. They have said well, 217 is
 24 the number we are working from, and we may give you a nickel above
 25 it or even a dime; but that nickel or dime has to be defended the

1 other way, which starts out by saying that they admit that the
2 thing we started with is either politically unrealistic or
3 technically not defensible. Those are the only two explanations
4 I can think of. And things above that then have to be really
5 urgently needed by the agency, or else it will not be included.

6 And I need to explain that difference so you will under-
7 stand what their mark is. Kevin said that the day before yesterday.

8 MR. SIESS: Bob, in that procedure they are also accept-
9 ing that everything up to that limit is essential.

10 MR. BUDNITZ: Well --

11 MR. SIESS: Right?

12 MR. BUDNITZ: I think they psychologically accept it.
13 The stuff above it is, too, but realistically they cannot expect --
14 they probably think they cannot sell it, so they will stop there.
15 Maybe they will give us some more.

16 I just had to contrast the way we put our budget together
17 and then cut back from the way they are deliberating --

18 MR. SIESS: There is such a thing as zero-based budget.
19 I do not know what you call yours.

20 MR. BUDNITZ: I guess I thought about it in the context
21 that I said.

22 MR. SIESS: Needs.

23 MR. BUDNITZ: Satisfy my statutory obligation to recom-
24 mend to the Commissioners a research program that is adequate
25 for its needs. Just think about it that way.

1 MR. SIESS: You look at it as needs. I think they may
2 look at it as desires.

3 MR. BUDNITZ: Secondly -- and this is the second of the
4 two points -- I want to point out that the process of putting the
5 budget together suffered from inadequate interaction with the other
6 offices, inadequate because of a number of questions of timing and
7 getting attention and rapidly changing priorities during the budget
8 preparation process. And therefore, when we went to get their
9 endorsement, or concurrence, or comments they all -- NMSS and NRR
10 and Standards all did not have the time or the resources to do the
11 sort of job that we and they both would like.

12 That will be better next year because next year we will
13 put together a five-year plan in the winter, February or some time,
14 that will be the basis for arguing amongst ourselves, and by the
15 time we get to June there will be three or four months of discussion
16 between user offices and us that will result in a much better
17 considered budget than this.

18 The reason I have to make that point is so that you will
19 have a context for the sort of comments that the other offices
20 have offered, and I suppose we shared with you. Mattson was here,
21 but there are letters from all the other offices that --

22 MR. SIESS: We have them all.

23 MR. BUDNITZ: You have them all. That is important to
24 understand.

25 MR. OKRENT: I would like to follow up a thought that

1 Chet raised and pose it in a different way, but it is the same
2 idea. Suppose tomorrow somebody out in Idaho notices there is
3 a big crack in the LOFT pressure vessel, and you review the situa-
4 tion and you decide you cannot run any more transients with LOFT
5 as it is. You will have to --

6 MR. BUDNITZ: We would can the facility --

7 MR. OKRENT: You have not heard the question. You cannot
8 run it the way it is, and so the question then is what is the
9 information that you would have gotten had you been able to run
10 LOFT in FY '80, '81, and '82 that you will now not be able to get
11 that you must have. Why must you have it? And, of course, if you
12 must have it, how will you get it?

13 So now it seems to me that if this is essential --

14 MR. BUDNITZ: A very good question.

15 MR. OKRENT: If this is essential, you would be able to
16 answer these questions. I will pose a similar question to some of
17 the other big items. Can you in fact defend the things you are
18 going to do that way and say yes, I must have this information and
19 here is why?

20 MR. BUDNITZ: Yes, we believe so.

21 MR. OKRENT: I am glad to hear --

22 MR. BUDNITZ: Would you like me to address the LOFT
23 thing right here or are we going to go through this later, Mr.
24 Chairman?

25 MR. PLESSET: We will go into it later. You will both be

1 here.

2 MR. BUDNITZ: We are prepared on all of that, and further-
3 more, we can defend the sort of time scale that drives us like in
4 LOFT to a phaseout in 1984, not earlier, not later. And whether
5 you concur is quite important to us because your advice is going
6 to be one of the key things we will use in deciding what we really
7 end up doing.

8 Yes. You know, I ask that question sometimes about the
9 research community, too. As I said, we are naked in the human
10 factors area. Suppose instead the hiring freeze prohibits us from
11 hiring any human factors people for a year.

12 MR. SIESS: And consultants.

13 MR. BUDNITZ: What can we do? We have thought about it
14 because it has been so frustrating to us. Okay.

15 Now, I just want to conclude the thought about the user
16 offices in the following way. The other offices tend as a matter
17 of psychological frame of mind to be shorter term in their thinking.
18 They know it, too, and therefore, almost to a man I think they
19 would say, as I would say, thank god Congress had the wisdom to
20 establish an independent Office of Research. They generally agree
21 with that.

22 But some of the endorsement clashes that have resulted
23 over the years and are in fact present in our present budget
24 deliberations are of that sort. I want you to be careful to
25 recognize where that is, and I will try to point it out.

1 And there is a general view that things that are not of
2 concern today can be deferred, and while we agree in some cases,
3 we do not in others. We want you to be aware of that lest we
4 mortgage the future too greatly for the present despite the urgent
5 needs of today.

6 Now, just to comment on that let me put it in the
7 context of the rulemakings. We have rulemakings either underway
8 or about to begin in several areas. There is the siting rulemaking;
9 there is the class 9 degraded core cooling rulemaking; there is
10 the NEPA class 9 issue; there is the emergency preparedness business
11 which is now well along, etcetera. And accompanying these rule-
12 makings will be development of branch technical positions in the
13 other offices on a whole range of subjects.

14 Now we have the obligation to support those as best we
15 can, but we have a different obligation to do the sort of long-
16 range work that will help us out in 1985, '86 -- work that cannot
17 be accomplished in a year and a half. And I must point out that
18 that tension of two different time scales of response for the
19 research program is responsible for some of what looks like a
20 less than coherent effort in some of these areas.

21 We have lot of shotgun stuff that we are going to have
22 to do to support those that would not be done in that order or
23 perhaps not done at all for that urgent need.

24 Now I am done.

25 MR. SIESS: Okay. Gentlemen, I propose we go through

1 decision unit by decision unit.

2 MR. BUDNITZ: I can probably do it personally.

3 MR. SIESS: I will ask Bob to lend us his slides.

4 MR. PLESSET: There has been a hint that we should have
5 a short break, Chet.

6 MR. SIESS: Let me just outline what I want to do. Put
7 the first decision unit slide up there, will you, Bob?

8 MR. BUDNITZ: Let me find this. It is this.

9 (Slide.)

10 MR. SIESS: This is the way I would like to proceed.
11 We have a draft chapter with comments on the nine items I believe
12 or eight items, eight subelements in this decision unit. I am
13 going to ask the Chairman of the subcommittee to comment on that
14 item by item and start off with the overall, go to the items.

15 MR. BUDNITZ: Or whichever.

16 MR. SIESS: Recommendations are quantitative. We will
17 explore them as you wish. I am going to ask them to be quantified,
18 and I am going to sit here with this blue table in front of me and
19 try to understand what recommendations mean in terms of dollars.
20 Whether or not we make recommendations in terms of dollars, I want
21 to see how they add up to ultimate recommendations.

22 Now, the man that wrote the chapter will present it.
23 If it is a subcommittee position, fine. If it is not the subcom-
24 mittee's position, he can present it as his position, because when
25 we get through it will be the subcommittee's position; I don't care

1 where it originated. Let's proceed that way.

2 MR. BUDNITZ: Mr. Chairman, you have copies of all these
3 vu-graphs.

4 MR. SIESS: We have copies of all those in the reclama
5 document I mentioned earlier. All of these vu-graphs are in there.
6 You have much of the same information on the blue table that was
7 in your notebook. In fact, I think you have practically all of it
8 except the '81 in there.

9 MR. BUDNITZ: One comment. The '81 column means '81
10 President's budget.

11 MR. SIESS: The '81 we are not putting that much weight
12 on.

13 MR. BUDNITZ: I wanted to call your attention to the
14 fact that our '81 budget is going to be reduced from that somewhere
15 between, I don't know, \$25 million or so instead of the 207 or so.
16 Where those cuts will be sustained is partially under direction
17 from the Hill and partially at our discretion, okay?

18 MR. SIESS: As you go through this you will have the
19 figures. You will have an '81 figure. You will have the Research
20 '82 request which is also on this form. You will have the EDO
21 staff mark and the reclama. People from Research will be able to
22 tell you, if you do not already know it or if the subcommittee
23 chairman does not know, what is involved in going from one figure
24 to another.

25 If you want to know what is involved in going from the

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end tp
2

1 EDO staff mark to the revised Research request -- that is, the
 2 reclama addition -- that is in the reclama letter that I just
 3 cited. It is very well described, and the subcommittee chairman
 4 should look ahead at that because they just got it this morning.
 5 This says what they will leave out of their proposed program if
 6 they do not get the reclama, what they will put in if they do get
 7 it, okay?

8 Those of you other than Milt need to be looking at that
 9 in advance. That is the way I would like to proceed. We will
 10 go through it section by section.

11 Now, if you want to break, Mr. Chairman.

12 MR. PLESSET: Let's have a ten minute break.

13 (Recess.)

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1 MR. SIESS: We have a new Chapter 3 and a new
2 Chapter 7, gentlemen, and the procedure is, whenever you get
3 a replacement chapter, it is a complete replacement. It is
4 stapled together. You can take out everything in there, put
5 the new piece in. You don't have to count pages or
6 anything. It will be a finished report.

7 Milt?

8 MR. PLESSET: Okay. If you look up there, you
9 will see the first item, semi-scale, and what we were
10 proposing is that the research request be supported. Let me
11 see. There are a lot of other things that they are
12 considering that would make the costs considerably higher
13 than they have there. A lot of words about some of those
14 are very fine. They are still evaluating them.

15 For example, MOD-5 of semi-scale is not included
16 in that budget. That is right, isn't it? But what we were
17 recommending is that 7.5 -- I don't know if I put the number
18 in specifically, but I should have. I will see that it is
19 in there.

20 MR. SIESS: Let me mention something to other
21 chapter authors. There will only be two numbers in a
22 table. One will be the request, the research request. And
23 the other will be the EDO mark, and you need to use language
24 that indicates which it is.

25 MR. PLESSET: In that case, what we are supporting

1 is a research request. Let me go on to 1.3.

2 MR. MATHIS: Is that the first request or request
3 plus reclama?

4 MR. PLESSET: That seems to be the same as the EDO
5 mark. It is the same. Take my word for it.

6 MR. MATHIS: Chet, you made a statement. Are you
7 going to use the request or EDO?

8 MR. SIESS: You can use anything you want. The
9 only numbers you can talk about -- there will be a table in
10 the report that will have the request and the EDO mark in
11 it. If you want to say we support the requested figure or
12 we support the EDO mark, we can. Those are the numbers that
13 somebody can look up.

14 You have to use the right kind of language.

15 MR. MATHIS: You said request. Which of those
16 columns are you talking about. Which has the reclama in it?

17 MR. SIESS: No, no, no. Nobody will see the
18 revised request.

19 MR. MC CRELESS: That is going to be their latest
20 request.

21 MR. PLESSET: It is the second column.

22 MR. SIESS: The budget we will be reviewing will
23 be that one. On here it is the first column.

24 MR. MATHIS: That is what I am trying to get
25 straight.

1 MR. SIESS: That is what I am trying to tell you.

2 MR. BUDNITZ: You can use either, of course, but I
3 think you ought to be aware we are no longer supporting
4 Column 2.

5 MR. SIESS: Oh, you are not?

6 MR. BUDNITZ: We are supporting the revised
7 request. In some areas we have backed down slightly from
8 our original request. For example, we are now requesting
9 57, the total at the bottom, rather than 59.9.

10 MR. PLESSET: I was just pointing out they were
11 the same in this particular case.

12 MR. BUDNITZ: But you notice in some cases our
13 reclama seeks full restoration, like in 3-D. In others the
14 reclama is only partial, like the separate effects. You can
15 do either.

16 MR. SIESS: If you want to say, as some people
17 have, we support the research reclama, you can say that, but
18 they shall say reclama of \$1.2 million.

19 MR. BUDNITZ: Or whatever. Right.

20 MR. SIESS: I think it will be cleaner if we talk
21 about the research request. The second column on that
22 table, the first column in the table that you have been
23 handed as a quick sheet, and the EDO figure, which is the
24 fourth column, EDO 7/2/80 -- EDO is the third column. Is
25 that clear?

1 MR. MATHIS: It is clear, but I don't agree with
2 it. There have been too many iterations since then.

3 MR. PLESSET: Why not use the reclama figure, Chet?

4 MR. SIESS: Use anything you want. How many would
5 like to use the reclama figure, the higher figure?

6 (A show of hands.)

7 MR. SIESS: How many would prefer not to use that?

8 (No response.)

9 MR. SIESS: Okay, we will use the reclama figure.
10 Don't refer to it as the reclama figure. Refer to it as the
11 revised request -- What is the date of your revised request?

12 MR. BUDNITZ: Yesterday.

13 MR. SIESS: July 9.

14 MR. BUDNITZ: You have the memo, and I think it is
15 yesterday.

16 MR. SIESS: Okay. You deal with the last two
17 columns.

18 MR. MATHIS: How do we designate the last column?

19 MR. SIESS: Call it the NRC request. July 9. It
20 will be in the table. It will be in the table as the
21 research group request. The amount requested by research.

22 MR. PLESSET: Okay, got it.

23 The next item, I think I have it spelled out.

24 MR. OKRENT: On the semi-scale then, I just want
25 to understand what it is that is being said when you talk

1 about the second modification.

2 MR. PLESSET: Mod 2-A is essentially finished.
3 That is just summarizing the present status.

4 MR. OKRENT: No, MOD-5.

5 MR. PLESSET: We encourage it, but there is no
6 money. They are making a study of this to see whether it is
7 really cost effective. If it is, they will cut back in a
8 year or two and ask for it. That is just a statement of
9 interest.

10 MR. OKRENT: I see.

11 MR. PLESSET: It is not in the budget. Isn't that
12 right. MOD-5 is not in the budget.

13 MR. BUDNITZ: Correct.

14 MR. PLESSET: Let's go on.

15 MR. OKRENT: If I could ask one more question,
16 some previous reviews, your yourself had some reservations
17 about the usefulness of the semi-scale information as it was
18 then being obtained.

19 MR. PLESSET: I think if you look at it, what was
20 questioned was the use -- abuse, I would say, by NRR of
21 semi-scale data. They were using it as if it told us
22 offhand without much reservation the behavior of a
23 full-scale system.

24 I think research recognizes this point adequately,
25 and they should not be blamed for it. What was intended

1 before was that NRR should not, for example -- a few of the
2 hearing boards and licensing boards with data from
3 semi-scale -- I think that situation is improving. Is that
4 right?

5 Let me go to the next item. We can come back to
6 some of these points, Dave.

7 Separate effects and model development. There is
8 an error. If you look on Page 1-4, that should be \$7.8
9 million. That is the figure we recommended. It was 6.8
10 here, but that was a mistake. The revised research request
11 for 1982 is 7.8, and we supported that figure.

12 There was a lot of talk about the 3-D program.
13 Here we did not go along with the research request, but
14 endorsed the EDO mark number of \$5 million.

15 MR. KERR: Do we agree that stronger support is
16 stronger than strong support? Are we going to have
17 gradations?

18 MR. PLESSET: I think Chet has put his finger on
19 the right figure. Do we support the number they asked for,
20 research asked for, or what EDO has said they should have,
21 or something else?

22 MR. KERR: Are we consciously putting in
23 gradations, so that "strongly support" means --

24 MR. PLESSET: I would hope so, yes, if that is
25 what you are getting at.

1 MR. SIESS: I was intending to raise the question
2 of priorities, either in terms of units or subelements. We
3 may only be able to come up with high, medium, or low, but
4 we are going to try.

5 MR. PLESSET: Now, let me go through this the
6 first time around. We can come back for --

7 MR. BENDER: Am I supposed to know how much this
8 \$10 million is for --

9 (General laughter.)

10 MR. PLESSET: It is still under consideration.
11 That is all.

12 MR. BENDER: What I have been doing is reading the
13 narrative. You had better tell us.

14 MR. PLESSET: Okay. All right. I will go back
15 and fix it up.

16 MR. BENDER: I have to say, well, look, is there
17 money in that budget?

18 MR. PLESSET: There isn't. I should make it more
19 clear. Let's see. Code improvement and maintenance.

20 MR. BENDER: 3-D?

21 MR. PLESSET: 3-D was the EDO mark-up. We can fix
22 that. Anyway, it is a typo. It should be CCTF. That will
23 help you. It has already been indicated in the text.
24 CCTF. That is a typo. Page 1-5, the top line, SCTF should
25 be CCTF.

1 Now, I am getting confused. Show me where we talk
2 about SCTF there.

3 (Pause.)

4 MR. PLESSET: It is not a typo. It is lab core
5 test facility.

6 MR. MOELLER: On the previous page, you do say
7 that there are two large facilities, and you talk about the
8 first one, but you never tell us what the second one is.

9 MR. PLESSET: It is now spelled out.

10 MR. MOELLER: You say CCTF will be completed
11 shortly. Then both facilities are limited to low pressure.

12 MR. PLESSET: One is CCTF. One is SCTF. Okay.
13 That can be fixed up.

14 MR. OKRENT: This section, 1.3, as I read it,
15 there is something that you are suggesting, that something
16 is phased out, some new facilities are built, and something
17 that is support, and then you end up supporting the RES
18 request. I cannot tell whether the things you are
19 commenting on are the things that they are proposing to do,
20 or you are supporting the amount of money, but you are
21 proposing that different things be done.

22 MR. PLESSET: Well, maybe that is not clear. It
23 could be made more clear. This facility is somewhat
24 critically discussed. It is a German facility, a \$160
25 million facility.

1 MR. OKRENT: This is on 1.3 now, not 1.4.

2 MR. PLESSET: Oh, oh, I see. Okay. You are going
3 back now. What page?

4 MR. OKRENT: You talk about the TLTA and this
5 should be shut down and changed, and then the SSTF should be
6 phased out, and you know, there are several different
7 things. You talk about doing more research at University
8 Laboratories, which I think I read elsewhere. There are
9 people suggesting that this be reduced.

10 My impression is that you have several comments
11 here. You end up supporting their specific number, but I am
12 not sure you are saying, do the same program they are
13 saying, are you?

14 MR. PLESSET: No, no. The distribution within
15 that item is something that is not spelled out, and they are
16 free to do what they want if they get that much money, but
17 this is presumably something they will pay attention to. It
18 is not broken down to the extent that the discussion is.

19 MR. OKRENT: A different question. I am pretty
20 sure, in some previous report, we indicated that we did not
21 think there would be needed any new facilities for BWR's,
22 and here you are saying --

23 MR. PLESSET: I think the opposite. I think we
24 said -- this is not the first time we mentioned this. Am I
25 right about that? I think that is right.

1 MR. OKRENT: It depends on whether you go back one
2 or two reports, I suspect.

3 MR. PLESSET: Oh, well.

4 MR. OKRENT: I asked you, and you said no, we have
5 the facilities we need now.

6 MR. PLESSET: I know for the last couple of years
7 we have said the same thing.

8 MR. OKRENT: What are we talking about on 1-3 with
9 regard to this BWR facility?

10 MR. PLESSET: It is not in the budget.

11 MR. OKRENT: It is not in the budget, so in effect
12 we would be supporting here, and possibly in the previous
13 section 1.2, something that would lead to an increase in
14 future years in our work in LOCA and transient research.

15 MR. PLESSET: That is right.

16 MR. OKRENT: What I cannot tell is whether we need
17 to do some of this research because we have big
18 uncertainties and we need these experiments to really tell
19 us if they are real or whether we are not sure whether we
20 are being too conservative or what.

21 MR. PLESSET: I would not say it is a matter of --
22 that we are too conservative. I think that we just do not
23 have enough information.

24 MR. OKRENT: Enough information for what -- for
25 what purpose?

1 MR. PLESSET: As Carson has said, there is an
2 uncertainty here, and we do not have a good way of improving
3 our code description for BWR's. Presumably, this improved
4 facility would contribute to that.

5 MR. OKRENT: Well, again, I can take those words
6 and justify essentially every program proposed. I think
7 those words would be applicable, and I would have no basis
8 for discriminating among them, and in fact, I could propose
9 a program twice this size and use those words.

10 I am not trying to -- In other words, I am not
11 disagreeing with those words. I think they are too
12 generally applicable, and they do not give me any basis for
13 discriminating among the different proposals, either that
14 are here or might be here.

15 MR. PLESSET: Well, your comment has two aspects.
16 One, you are questioning something that is proposed for
17 study, for future consideration, for future expenditures.
18 Do you want to discuss that, or shall we --

19 MR. OKRENT: Well --

20 MR. PLESSET: Right now this is not in the budget.

21 MR. OKRENT: In other words on the semi-scale,
22 naively or otherwise, I am assuming, based on my brief
23 reading, that they are observing some phenomena that at
24 least they did not have in their existing models. It is not
25 clear to me that they could not have been in their existing

1 models had they asked themselves, are our models okay, but I
2 am under that impression. If I am wrong, somebody should
3 tell me.

4 So -- an also, since I have the impression that
5 they can do a lot of different kinds of experiments on
6 semi-scale, and any single experiment is not a huge
7 investment, I am somewhat more willing myself to support
8 semi-scale because it is versatile and so forth.

9 MR. PLESSET: That is all that is in the budget.

10 MR OKRENT: All right, but as we go through these
11 things, I want to have, if I can, a feeling for either an
12 ongoing program or a new program in particular, if you are
13 suggesting one. Do we need it, and why? And on some more
14 or different basis than the general term that it will
15 provide us some -- you know -- more knowledge than we now
16 have, which, as I say, hopefully, is always true, almost
17 always true.

18 MR. PLESSET: The present TLTA is quite
19 unsatisfactory for tests, just as some of the older models
20 of semi-scale were, and this is at least the second time
21 that this has been mentioned, that that was our feeling,
22 that this should be -- be a BWR facility -- the same
23 facility for BWR's as semi-scale is for PWR's.

24 This is not in the budget. They may not want to
25 do it, but it seems to me it would be a desirable thing. We

1 said that last year, and we are just saying it again, but it
2 is not a small item. Certainly we get a lot of discussion.
3 You will certainly have an opportunity to veto it if it is
4 brought up.

5 Yes, Bob?

6 MR. BUDNITZ: Mr. Chairman, two comments, the
7 first on TLTA. We have had discussions with Milt Levinson
8 and Walt Lowenstein about whether together or together with
9 GE we might want to support a new facility or a dramatically
10 upgraded TLTA, or whatever, and those discussions are still
11 under way. Dr. Tong can elaborate on that if you like.

12 Milt, you may know some of that as well.

13 MR. PLESSET: I am familiar with it.

14 MR. BUDNITZ: Secondly, in response to a comment
15 just made about the phenomena, it is a fact that we are
16 doing experiments both in semi-scale and in LOFT that are in
17 front of the codes, whereas in the best of all worlds the
18 codes would be or could be written. Then the phenomena
19 would be studied to see whether they confirmed what the
20 codes had predicted.

21 That is an unfortunate situation that arises from
22 the fact that especially in the high pressure regime
23 involving some of the transient small breaks, we do not have
24 codes that are yet in the sort of shape we would like, and
25 yet we do have the facilities. We are not going to sit

1 around with LOFT for five years or even three or even two
2 awaiting the code development effort.

3 So, you ought to be aware that that is a little
4 out of logical whack, but it is required by the exigencies
5 of the situation.

6 MR. PLESSET: Can we go on? If you want these
7 things deleted, it is your --

8 MR. OKRENT: I am trying at the moment to
9 understand what it is we are recommending or not
10 recommending, because --

11 MR. PLESSET: Okay. Now, the 3-D program, there
12 has been a lot of talk that it be eliminated, but we ended
13 up with endorsing the EDO mark-up, which is \$1 million less
14 than the research request. I want to go through the numbers
15 first to see if there is any reaction either way.

16 Now, on the code, Item 5, code improvement and
17 maintenance, there we endorse the level which is the same
18 for the original request, the EDO mark-up and the revised
19 request.

20 MR. BENDER: I want to ask about something in the
21 statement here. The previous section, where you say we have
22 for some time urged the development of new and improved
23 instrumentation that could be installed in operating power
24 reactors, present instrumentation in 3-D is not so directed,
25 I do not know whether I can read that as saying, well, we

1 should put some money in there for that purpose, or that is
2 just a comment that does not involve budget.

3 MR. PLESSET: It does not involve budget. Let me
4 say that this program, the 3-D program, most of the money
5 has been spent, and it is all pretty well tied down by
6 international agreement.

7 MR. BENDER: Okay, that is all right. I am
8 looking for things to assess the budget.

9 MR. PLESSET: That is fine.

10 MR. BENDER: These things aren't covered by the
11 budget, but we ought to pay attention to them.

12 MR. KERR: Are we working on Draft 3 or Draft 2?

13 MR. SIESS: You should only have one.

14 MR. PLESSET: Draft 3 is all you are supposed to
15 have.

16 MR. KERR: Thank you.

17 MR. PLESSET: Yes?

18 MR. TONG: This related redirection of UPTF --

19 MR. PLESSET: Hopeless, I know.

20 MR. TONG: This is their money. They have
21 definitely a goal to run this test; however, we do need
22 information from that facility. Item 1, steam binding, this
23 is not solved in licensing evaluation. If release truly
24 steam binding, then hot leg or upper plenum injection is good
25 for small break. We like to have water from the top when

1 core is uncovered. So, we do need information to firm up
2 whether steam binding is there or not there.

3 Second item, EEC bypass problem was deferred. You
4 remember, in last few meetings here we said, if we wait for
5 3-D to have full scale ECC bypass information to answer
6 question -- but it is not -- if it is not -- there is no
7 bypass as licensing assumed in Appendix K. Then the
8 accumulator activation pressure could be increased, which is
9 good for small break, like CE today is 200 psi accumulator.
10 It is too low for small break.

11 If we had a high pressure accumulator at 800 or
12 1,000 psi, we would not have Three Mile Island, because this
13 accumulator automatic water go in. If at high pressure
14 during small break will be much less risky. However, today
15 we cannot do it because Appendix K.

16 So, that UPPF is important to solve the ECC bypass
17 problem, to readjust accumulator pressure.

18 Thank you.

19 MR. PLESSET: Thank you.

20 MR. OKRENT: Are those accumulators designed for
21 1,000 psi?

22 MR. TONG: The pressure now is --

23 MR. OKRENT: The combustion engineering
24 accumulators, are they designed for 1,000 psi?

25 MR. TONG: I do not know. 600 psi is.

1 MR. PLESSET: I think it is a little bit -- the
2 discussion is, if I can use a legal word, moot in the sense
3 that I disagree. I do not see how UPTF is going to
4 contribute essentially to anything except to -- my feeling
5 is, it will be a selling point for German type reactors for
6 salesmen, not for technical people. It cannot tell you what
7 their behavior is going to be for an ejection for an
8 accumulator at 1,000 psi because it will not operate at
9 those pressures.

10 I am sure, maybe the code developers can make
11 predictions on the basis of it. They might be able to make
12 predictions without it. And I am willing to leave this out
13 if it is too offensive, because it is a rather difficult
14 thing. They have not built the thing yet. They are
15 committed to it. It is \$160 million.

16 I thought that somebody ought to give them the
17 word that it is not worth it. That is just my view.

18 MR. KERR: To which line should I refer if I
19 wanted to --

20 MR. PLESSET: Oh, Page 1-5.

21 MR. KERR: Thank you.

22 MR. PLESSET: It is about Line 101. This may be
23 just talking in the wind.

24 MR. KERR: What statement in there is presumed to
25 be offensive?

1 MR. PLESSET: An implication, pretty much an
2 indication that the thing is no good.

3 MR. BUDNITZ: Lines 8 and 9.

4 MR. PLESSET: Those are offensive, right?

5 MR. OKRENT: Is it your opinion that we know what
6 is needed technically on the ECC bypass question?

7 MR. PLESSET: I would say so. It is not a very
8 fundamental question any more.

9 MR. OKRENT: And so one is able to predict how
10 much bypass there will be as a function --

11 MR. PLESSET: They might be able to be a little
12 more precise. This is going into the direction of being a
13 little more conservative. Appendix K is quite
14 conservative. We know that. How far down you can screw
15 things to eliminate this item -- hopefully, LOFT is supposed
16 to tell us a little bit about that, and the point -- Dr.
17 Tong has a point about the accumulator set point. That is a
18 different point for the bypass. It is related in a way.

19 MR. EBERSOLE: Do these things have a monetary
20 rather than a safety goal, an aspect of driving the pins
21 harder? Some of these things are not oriented toward
22 safety. They are aimed at driving the core harder.

23 MR. PLESSET: I think that is true of most of the
24 ideas that relate here, except the one point that Dr. Tong
25 mentioned about the accumulator set point, which is a

1 legitimate point. The rest of them, the ECC bypass, for
2 instance, is --

3 MR. EBERSOLE: Every time you raise an accumulator
4 set point, you invite spurious discharge on other kinds of
5 transients, which is the --

6 MR. PLESSET: I do not think -- I am not convinced
7 it is the thing to do.

8 MR. EBERSOLE: The UHI is a high pressure system.

9 MR. PLESSET: That is right.

10 MR. EBERSOLE: And that has the potential for
11 introducing nitrogen into the closed systems after a
12 secondary transient.

13 MR. PLESSET: So do the accumulators, of course.

14 MR. EBERSOLE: Every time you go up, you invite it
15 that much more.

16 MR. PLESSET: With higher pressure gas.

17 MR. EBERSOLE: Yes.

18 MR. PLESSET: Well, I do not know whether you want
19 to spent the time -- I am willing to -- you know -- take
20 these things out. I am willing to -- it is your report, as
21 Chet always says. If you find things that are unpleasant,
22 why not make them pleasant?

23 Yes, Dade?

24 MR. MOELLER: Going on a little bit, I find in
25 1.8, the first paragraph, and 1.9, the first paragraph --

1 MR. PLESSET: We are not that far yet.

2 MR. SIESS: You are on 1.4 as far as I know.

3 MR. MOELLER: All right.

4 MR. PLESSET: It is a question of whether we want
5 to fight for going back up to the \$5 million or leave it at
6 the \$4 million. Really, that is the point -- \$6 million
7 versus \$5 million. EDO cut it to five. The request was six.

8 MR. SIESS: What is the --

9 MR. PLESSET: Nothing. They are committed to
10 doing this in the long term.

11 MR. TONG: The German minister signed it.

12 MR. PLESSET: There is a pretty strong legal
13 commitment. This will be a stretch-out. It will not change
14 things in the long run very much.

15 MR. TONG: The only thing this \$1 million
16 reduction will affect the Japanese instrumentation. That is
17 tough one, because Japanese contracting is on schedule.

18 MR. PLESSET: That is the test facility -- this
19 facility represents about, what, \$30 million, \$40 million?

20 MR. TONG: The fabrication is \$40 million.
21 Operation is not in the budget because the government
22 employee does not have a budget. A government employee just
23 hires. So the manpower added together will be \$60 million,
24 but the construction, about \$40 million.

25 MR. PLESSET: This is all Japanese money. There

1 has been a tripartite agreement in this area, as you know,
2 for some time, and if what -- I can sympathize with Dr.
3 Tong's concern here. If it prevents the instrumentation of
4 a facility which is finished to which we promised, why did
5 not EDO give it to you?

6 MR. TONG: I did not have a chance to talk with
7 them. They just marked it off.

8 MR. PLESSET: Oh, really?

9 MR. TONG: I have no chance to present.

10 MR. PLESSET: Bob wants to make a comment.

11 MR. BUDNITZ: You are asking why th \$5 million
12 instead of six?

13 MR. PLESSET: Right.

14 MR. BUDNITZ: We had given up \$1 million there
15 ourselves when we took this \$60 million reduction or
16 whatever from our original request down to the PG mark, and
17 in that area --

18 MR. PLESSET: You had already cut a million?

19 MR. BUDNITZ: When we marked our own budget down
20 from the \$233 million, where it started, to the PG mark,
21 which is not shown there --

22 MR. PLESSET: You had started at --

23 MR. BUDNITZ: We took a million out of there, and
24 they bought that because it did not have strong NRR support.

25 MR. PLESSET: You have accepted the cut.

1 MR. BUDNITZ: No. We never thought the PG mark
2 was right.

3 MR. PLESSET: Oh.

4 MR. BUDNITZ: We put that in when we made those
5 big cuts. We thought if you were going to get down to 207
6 for program support, we would take a million out of there,
7 but when they went along with that, which we did not like,
8 we are asking for it back. We do not accept it. We think
9 it is not right. We have a commitment there inter alia with
10 international signatures all over it.

11 MR. OKRENT: If I understand correctly, the
12 subcommittee does not have a technical reason for
13 recommending the --

14 MR. PLESSET: I will tell you the subcommittee's
15 psychology, if I can presume to. They did not mind seeing
16 these things stretched out. We did not have the precise
17 nature of the impact of this million which we did not have.
18 I did not have it before. What is your pleasure? I am
19 inclined to put it back myself.

20 MR. OKRENT: Apparently, research felt that the
21 legal commitments were not so strong that they had to keep
22 this \$6 million in, even if it meant cutting money elsewhere
23 to meet the PPPG.

24 MR. BUDNITZ: I will bet you a nickel that if we
25 end up with that low number, we would still put that million

1 in from elsewhere, because those legal commitments are
2 probably pretty binding. We don't know.

3 MR. OKRENT: Well, I --

4 MR. BUDNITZ: I am not going to be here to call
5 that nickel. Okay.

6 MR. PLESSET: I am inclined to put it back, I must
7 say, and anybody else who wants to express an opinion --

8 MR. OKRENT: I will. Somewhere in this document,
9 either the committee or I will make a statement that if a
10 lot of money on LOCA, transients, and LOFT -- it is not
11 clear from the overall perspective it is in balance. Each
12 time we add a million here and so forth, we just perpetuate
13 that situation.

14 I do not care, let's say, how this thought gets
15 in. You can do it by cutting a million out here and there,
16 or you can try to make a comment, or you may feel this is
17 the right amount of money, and other things should starve
18 because of it.

19 I don't know. This is not the first year you
20 heard me say it. I do not see any real change. You know,
21 we saw two curves. It is the bulk still, and I think next
22 year we will be talking about LOFT in 1985.

23 MR. BUDNITZ: Wait a minute. LOFT has been in
24 1984 for two or three years now.

25 MR. SIESS: I can suggest a compromise. Put in

1 the one million, but it in at a low priority. After this
2 much debate, if it goes in, I think it is automatically at a
3 low priority.

4 MR. PLESSET: Tell me what to write, and I will
5 just write it.

6 MR. SIESS: Am I acting chairman?

7 MR. PLESSET: Yes.

8 MR. SIESS: All right. How many would like to see
9 this figure at the \$5 million mark? Indicate by raising
10 left. At the EDO mark, indicate by raising --

11 MR. KERR: Could we have a little bit more
12 discussion?

13 MR. SIESS: Yes.

14 MR. BENDER: If we are going to vote on it, I
15 guess I would have to say -- I don't want to single out this
16 one item as being the way to address it. I think Dave's
17 point s correct, that we probably need to collectively ask
18 ourselves -- to vote on whether this \$1 million belongs in
19 or out does not make any sense to me.

20 MR. PLESSET: Do you want to vote on the whole --

21 MR. BENDER: I am not sure what we are going to do
22 about it.

23 MR. SIESS: Let's leave it at the second
24 recommendation of the subcommittee, and go on down the list
25 and see what we have and come back.

1 Go on to the next item, Milt.

2 MR. TONG: I have a problem related to -- 1-5,
3 Line 108, the cancellation of this facility. If you want to
4 say, redirecting of this problem, is fine, but if -- we have
5 a difficulty.

6 MR. PLESSET: I have changed it. I have changed
7 it.

8 MR. TONG: Okay.

9 MR. SIESS: Did someone note your change?

10 MR. PLESSET: Yes.

11 MR. SIESS: The next item. The next item.

12 MR. PLESSET: Which is code improvement and
13 maintenance. We endorsed the level indicated in the revised
14 research request. There is no change.

15 MR. SIESS: No change. Any comments, other than
16 those that have already been made of a generic nature?

17 (No response.)

18 MR. SIESS: Next item.

19 MR. KERR: Is TRACK going to continue at this
20 level for the next 40 years?

21 MR. PLESSET: He wants to know how long TRACK will
22 go.

23 Next item is code assessment and applications, and
24 I think --

25 MR. OKRENT: Isn't this a lot of money between the

1 two of them, 1.5 and 1.6

2 MR. PLESSET: Yes, a lot of money.

3 MR. OKRENT: Is it all in the area of TRACK and
4 RELAP, or most of it in the area of TRACK and RELAP?

5 (Pause.)

6 MR. PLESSET: Andy has just reminded me that there
7 is well over \$2 million from NRR really in TRACK. Isn't
8 that right? So it is not -- This is -- This money that they
9 are getting here actually is \$2 million, something over \$2
10 million. It is actually new money to research. So, if you
11 take -- There is a lot of money there. If you take \$12
12 million something, what the total is actually is \$10
13 million. That is still a lot of money. But this is the
14 objective of the whole thing, to get a code you can use to
15 tell you what is going to happen.

16 MR. OKRENT: What the justification -- advanced
17 development of computer codes, et cetera.

18 MR. PLESSET: You are reading from something
19 different.

20 MR. OKRENT: I am reading from the formal
21 submission, and I am just trying to understand what this is
22 all about.

23 MR. MOELLER: I do not follow, reading just the
24 1.6. You say, RELAP has indicated greater promise with a
25 smaller effort than TRACK.

1 MR. PLESSET: That is a little bit of an
2 overstatement. It is kind of personal.

3 MR. MOELLER: Then you do not justify to me the
4 next sentence that both TRACK and RELAP, the support be
5 continued. If RELAP can do the job --

6 MR. PLESSET: There is a big investment in TRACK.
7 I think they have gone a fair way. The RELAP effort has
8 been small, but they have done a very good job, and this
9 year we want that to continue.

10 MR. SIESS: You would not want to say drop TRACK
11 and increase effort on RELAP?

12 MR. PLESSET: It is --

13 MR. SIESS: That is implied by what you said in
14 the sentence Dade quoted.

15 MR. PLESSET: I said, we recommended both TRACK
16 and RELAP be continued. That is Line 136.

17 MR. KERR: Is it separated into two parts, so the
18 amount of money will not look as big?

19 (General laughter.)

20 MR. PLESSET: Actually, RELAP 5 has been -- the
21 funds have come from semi-scale and LOFI, not in the code
22 development -- code assessment program.

23 MR. KERR: There is one called code assessment,
24 and one called code application. Is there some difference?

25 MR. MURLEY: They are different, and I think if

1 you notice the trends, the intention was that we are going
2 to phase down code improvement and maintenance in 1982, as a
3 matter of fact. I hope to be out of the code development
4 business and just be doing corrections to codes as they come
5 up.

6 That is, after all, a year and a half away. I
7 hope to be done both with TRACK and RELAP 5. The growth
8 comes in the assessment of the codes, and assessment means
9 testing them against experiments. You understand that. And
10 the applications.

11 It is growing from \$6.9 million to \$7.9 million.
12 We have in mind using it for things like -- What is an
13 example? The overcooling transients that we are starting to
14 look at very carefully. A bunch of transients we never
15 looked at in detail -- part of the work on severe accident
16 sequence analysis is going to be funded under this line
17 item, so the whole area of using the codes to elucidate
18 safety problems, that is what is intended in this element,
19 and it is going to grow.

20 MR. OKRENT: Is TRACK the right code to do
21 overcooling transient studies with?

22 MR. MURLELY: We don't know yet.

23 MR. OKRENT: I am not sure that is necessarily the
24 answer. I am not sure. I will try to find out by
25 exercising the code. If that is what was --

1 MR. MURLEY: Of course not. In that element is
 2 not just TRACK and RELAP 5. It is RETRAN, RELAP 3B, IRT,
 3 our whole panoply of codes that we will use, developed by
 4 anybody in the world, as a matter of fact.

5 The whole point of that line item is to use the
 6 codes to examine accidents, and by 1982 I hope TRACK is just
 7 one of the smorgasbord of codes that we can pick from and
 8 use.

9 MR. TONG: On Page 1-7, Line 2, RELAP 5 has
 10 indicated greater promise with smaller effort than TRACK has
 11 received. This greater -- It is hard to say RELAP 5 is
 12 one-dimensional code and TRACK is three-dimensional code.
 13 Some places we have to use three dimensional, so this
 14 comparison is very difficult to do.

15 I do not know the --

16 MR. PLESSET: Let me just say in some respects
 17 instead of many. All right. I am willing to do that.
 18 Change it to "in some respects," because that is right, wht
 19 you say. Right.

20 MR. TONG: Yes.

21 MR. PLESSET: Yes, that is right.

22 I would like to finish this Chapter 1 and then
 23 have a break for lunch. You do not need to break for lunch
 24 just because I do, but I think there are a couple of us that
 25 have another meeting here, right? So, if you look at what

1 the rest of this chapter is all about -- This is all Paul
2 Shewmon's, and he could not be here, and you will see he is
3 delaying some budgetary recommendations. He has been
4 marking in 1.7. Then he goes on to discuss some of the
5 other points in it.

6 MR. SIESS: You mean, we have no recommendation
7 from his subcommittee?

8 MR. MOELLER: That is what troubled me. Like in
9 1.7, it says there is going to be a subcommittee meeting in
10 August and we will tell you at that time, and in 1.8 the
11 last sentence of the first paragraph does not tell me
12 whether they supported it. The merits of participation in
13 this program should be considered carefully. And then in
14 1.9 we continue to believe its longer term usefulness will
15 depend on new roles it may find.

16 I do not know whether we are for it or against it.

17 MR. PLESSET: This is the first time that I have
18 seen this myself. I cannot give you any more information
19 than this.

20 MR. SIESS: Do your notes give you any information
21 from Tuesday?

22 MR. MC CRELESS: My notes do not.

23 MR. SIESS: Who else is on the subcommittee?

24 MR. OKRENT: I am on the subcommittee, but I was
25 not at the meeting.

1 MR. PLESSET: Let me read you what he told me over
2 the phone. He is going to call in later. Item 1-F, what is
3 1-F?

4 MR. SIESS: Fuel behavior and operational
5 transients.

6 MR. PLESSET: I cannot argue with the work on
7 operational transients. I think they have done well. That
8 is in quotes. "Well."

9 MR. SIESS: I do not have the slightest idea what
10 that means.

11 MR. PLESSET: I think he means to support the EDO.

12 MR. SIESS: EDO did not change the research
13 request.

14 MR. PLESSET: That is presumably what he is
15 talking about. On 1-G --

16 MR. SIESS: Where did he say, cuts the work?

17 MR. KERR: Compared to 1981.

18 MR. PLESSET: 1-G. I strongly believe the program
19 on clad ballooning in many element subassemblies should be
20 continued to a sound conclusion. The NRU program is the only
21 program addressing this now. The degree of ballooning and
22 blockage is a significant potential problem. The current
23 licensing extrapolation is not well founded in its
24 application to full scale cores.

25 MR. SIESS: According to the reclama, the \$1

1 million that is reduced by EDO is funding for the ESSOR. Is
2 that right? All of that \$1 million affects that?

3 MR. PLESSET: Maybe we should let Bob address this
4 point, or Tom Murley. Somebody.

5 MR. BUDNITZ: That is the ESSOR supersara thing.

6 MR. OKRENT: That was just about Number One, if I
7 remember correctly.

8 MR. BUDNITZ: We did not defend it as strongly as
9 other things, but we want it. I mean, you know --

10 MR. SIESS: It simply took research at the PPPG
11 level. Research had said the PPPG level there are three
12 items we will cut, and in each case EDO went along with
13 that. This was one of them.

14 MR. OKRENT: May I make comments on these two
15 sections. On 1.7, I remain to be convinced that this has
16 been a fruitful long-term program that has provided valuable
17 information for licensing, and I am unconvinced that in fact
18 the NRC staff should be doing what it says in its formal
19 handout with regard to planned accomplishment and
20 justification under this item.

21 In fact, they claim that PBF testing plus other
22 tests will provide the data base required to predict fuel
23 failures and consequences during operational transients. I
24 say that is impossible. They may provide some data related
25 to the topic, and they go on to say, the data plus resulting

1 code refinements will provide licensing personnel with data
2 involving capability to assess the safety of nuclear
3 reactors, and so forth.

4 Again, I question that it will provide this, and
5 also, it is not clear just what is needed in this regard by
6 the NRC. So, I have had over the years and I still have a
7 question about how much return we are getting per dollar
8 from that program.

9 Now, 1.8 -- Let me leave the clad ballooning point
10 alone for a minute. The proposed new experiments on
11 overheating and severe core damage and so forth, at the
12 moment, as far as I can tell, there is some kind of division
13 within research where there is a program of this sort in one
14 decision unit. Then there is another program in the decision
15 unit on severe core damage and mitigation which starts at
16 the support plate of the vessel, or something like this, and
17 there is one -- It would appear based on what we heard there
18 is one group of experiments in PBF and another group that
19 does not have access to PBS planning experiments elsewhere.

20 That may not be the case, but at least that is the
21 way it came through. I have not seen myself -- somebody
22 write down what are the questions we need answered in this
23 area, and will these experiments, whatever they are, in
24 fact, answer them, or just supply information on the
25 subject, these experiments, and also the ones that are

1 mentioned in connection with this next decision unit that
2 relates to it on severe accidents -- they are not easy to do
3 in a way that you can get what I would call meaningful and
4 substantive information.

5 You can get information, yes, but I think they are
6 very hard kinds of experiments to do, and it is almost, I
7 think -- it is not too much exaggeration -- we are blessing
8 a pig in a poke at this stage, and I am reluctant to
9 continue blessing this program without the forcing of
10 something by research, where they say, in fact -- and with
11 NRR actively participating, this is what we need to know,
12 and these experiments in fact have a good chance of telling
13 us what we need to know, and not just telling us something
14 about the subject.

15 MR. PLESSET: Okay, Dave. I think your point is
16 clear. Tong and Budnitz both want to respond, I think. Let
17 Tong do it.

18 MR. TONG: Number 6, fuel behavior and operational
19 transients, these items exactly as -- strong support by NRR,
20 and day before yesterday, I was asked to strongly emphasize
21 these. The reason was, at present, all existing reactors'
22 radioactive release all come from clad -- clad interaction,
23 things like that. They say we need official understanding
24 and technical solution for that, and also need code to
25 predict the fuel behavior for licensing use, and in this

1 item in code -- fuel code, which is FRAP T, and those codes
2 are very successful, both this code and some other code.

3 I want to evaluate the fuel code -- very more
4 successful than --

5 MR. OKRENT: I am sorry. I follow what the FRAP
6 codes do, and they are not, in my opinion, useful for
7 predicting failure due to pellet-clad interaction. They are
8 just not -- I don't know codes -- those I have seen are
9 empirical in nature.

10 MR. TONG: You are right. Clad interaction part
11 should be incorporated in those two codes.

12 MR. OKRENT: I do not think you can do experiments
13 in PBS that are likely to be of much use here unless you
14 really have thought hard about what is a useful experiment.

15 MR. TONG: Please you note in writing it was P&L
16 and also as well as Oak Ridge -- as -- as argon.

17 MR. OKRENT: I read that before I made my comment.

18 MR. TONG: So this is the item which NFR strongly
19 supports and most common occurrence in current reactor.

20 MR. OKRENT: I agree that if you in fact had a way
21 of providing some fairly definitive information on failure
22 due to what they call ECI, analytical or experimental, it
23 would warrant serious consideration, but on the one hand, to
24 say that we need this, and on the other hand to say we will
25 do some experiments that may or may not contribute, I am not

3d T-4

1 myself willing to endorse the latter.

2 MR. TONG: May I answer this? This is research.
3 Research, I am 100 percent sure they have already done it
4 already.

5 MR. OKRENT: They should have a chance.

6 MR. TONG: Chance in our opinion, in whole staff's
7 opinion, in NRR opinion, yes, we do have a chance.

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1 MR. PLESSET: I wonder if we could not maybe --

2 Bob, I'm sorry.

3 MR. BUDNITZ: I wanted to respond to a larger question
4 than the narrow one on fuel that Tong just commented on. If you
5 are buying a pig in a poke, if you endorse this, as in much of
6 that work that I showed going up so rapidly in what we call severe
7 accident phenomena and mitigation, I indicated earlier that the
8 program is being formulated now. The formulation is not only not
9 complete but will not be complete for some time. In fact, much
10 of it depends on work that we have not done to formulate the rest.
11 It is a pig in a poke, but it is a pig; it is not a horse or a
12 donkey.

13 What I mean by that is we know some of its shape and
14 we know some of its characteristics, but we do not know all about
15 it. And I think it is a rather unfortunate circumstance that we
16 are forced in the summer of 1980 to propose and defend the budget
17 for fiscal 1982 in an area that is developing so rapidly, an area
18 where technical experts are sparse in number and weak in experience.
19 Even the real experts do not know much, and so we are just really
20 feeling our way.

21 If you concur that that approach is, as we believe, the
22 only approach to get from here to there, then your only other --
23 if you do, then your only other judgment is how much money is
24 about right. And I must say that is the sort of a judgment we
25 are having trouble with ourselves, in part because some of the

1 initial proposals from our staff involved planning for very large
2 expenditures for very major facilities, expenditures whose justifi-
3 cation was not apparent to us and which we have deleted.

4 I must say -- Charlie Kelber is not here -- he was dis-
5 appointed. We may be wrong. We may be a year late because of it.
6 So on that I guess -- without pleading guilty, I guess I will plead
7 kind of -- we are powerless to do anything else I think.

8 MR. KERR: Mr. Chairman, as I listen to these two comments,
9 both of which, it seems to me, seems relevant, it seems to me they
10 are commenting on different things. I hear Dave saying he has
11 some reservations about experiments planned for PBF, shedding
12 any light on a topic which both he and Dr. Budnitz have a great
13 interest. So I do not think Dave's question is about the general
14 topic to which you referred, Bob. He already expressed his support
15 for much more work in that area, I think.

16 MR. BUDNITZ: Yes, but there is a general frustration
17 that Dave expressed, I think, unless I misunderstood, in which
18 I share the frustration. He asked have we asked what the needs
19 are and then planned the experimental analytical program to address
20 those needs, and the answer to that is not completely.

21 All right. That was a more general question.

22 MR. MATHIS: I think it is unfortunate that we do not
23 have this thing put together in a better form. If you look on
24 page 1-9, recommendation number 10, I think it pretty much supports
25 Dave's comment. We just did not get that far.

1 MR. SIESS: Gentlemen, I do not know where we stand at
2 the point -- the point Charlie just made, the recommendation on
3 page 1-9 relates to section 1.7, item 1F, and I don't know what
4 it -- I am sorry. It is fuel behavior during operational
5 transients. That is item 1.7. Item 1.8 clearly states the sub-
6 committee's view that it supports the reclama, which would be the
7 \$12.1 million, and item 1.9 about PBF is not all that clear.

8 I think we should try to get some information back from
9 the subcommittee and report back to you later on that and discuss
10 it further.

11 Looking at page 1-8 I intended to ask Milt, but he left,
12 it seems to me that all the recommendations except number 10 are
13 simply repetitions of what was in the text. If that is so, I would
14 move to eliminate them. If it is not so, I would suggest they be
15 put in the text.

16 Recommendation 10 needs to be interpreted in terms of the
17 dollar recommendation for the item on fuel behavior and operating
18 transients and put in that section. I would propose that we try
19 to get the Chairman to get together -- that is, Milt -- and give
20 him whatever advice we can to summarize in the recommendations
21 this whole area or in two parts. You will want to separate it
22 into the LOCA transient code, the semiscale stuff, and the fuel
23 behavior stuff -- I do not know if that is a good place to
24 separate it -- and then try to reach some decision on priorities.

25 This is a big item, a big dollar item. It is an important

1 area. It is an area where budget is going down, and there are
2 arguments about how fast it should go down. At the moment we are
3 supporting a fairly significant level within about a million of
4 the total request. That is a \$3 billion increment over the EDO
5 mark and a substantial increment over the PPPG mark -- I am sorry,
6 PPPG and EDO are the same.

7 There needs to be a priority assigned to that, and from
8 what Dave said, I think he would be interested in assigning a
9 priority to some of the base figures. I do not know.

10 We have spent a lot of time on this. I propose we go
11 to lunch.

12 I am Acting Chairman, am I not, Mr. Vice Chairman?

13 MR. MARK: Yes.

14 MR. SIESS: When will Milt be back? When we come back,
15 Milt will be here. We will continue on this and go on to the LOFT.
16 If Milt is not back, we will go with chapter 3.

17 MR. MC CRELESS: He will not be available until after
18 3:30.

19 MR. SIESS: Oh, boy. Does anyone want to tell Mr. Ahearne
20 that he is not likely to get a report on this thing?

21 MR. MATHIS: Shewmon called this morning. I talked to
22 him on another subject, and he intends to get in touch with Milt
23 later today.

24 MR. SIESS: Milt does not know the questions. He is not
25 here.

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We will be back at 10 minutes after 2:00.

(Whereupon, at 1:10 p.m., the meeting was recessed for lunch, to be reconvened at 2:10 p.m., the same day.)

end tp 5

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AFTERNOON SESSION

(2:15 p.m.)

1
2 MR. SIESS: I propose that we might try and apportion our
3 time somewhat in proportion to the dollars; two minutes per million
4 dollars would be about right, I think.

5 (Laughter.)

6 MR. MATHIS: We'll be out by 5:30.

7 MR. SIESS: No, you won't.

8 Milt, turning to page 1-8, there are ten recommendations
9 there and on the following page, and the first nine of them relate
10 to the things in your area. Are any of those recommendations not
11 repeated in appropriate sections of the text?

12 MR. PLESSET: They all are, Chet. That section can be
13 deleted if you want.

14 MR. SIESS: Recommendation 10, Charlie Mathis commented
15 it is hard to --

16 MR. PLESSET: It is not mine.

17 MR. SIESS: It is hard to reconcile that one with the
18 statements that are made in section 1.7, fuel behavior and opera-
19 tional transients. It does not say anything. It says this has
20 been a fruitful longterm program which has been disagreed with.
21 It says the future has been of concern, but that over the next
22 few years NRC should review it. Then that the subcommittee is
23 still looking at.

24 Recommendation 10, you know, is pretty strong compared
25 to all the things that it does not say elsewhere.

1 MR. PLESSET: I gather that Charlie is going to be on
2 the phone with Paul Shewmon, is that right? Why don't we tell him
3 I think Charlie should repeat that concern. I think it is justi-
4 fied.

5 I think we could delete, as far as I'm concerned, all the
6 repetition.

7 MR. SIESS: I think we can delete all of the specific
8 recommendations. If Paul has something to say about that, we can
9 incorporate it into the section. Then I think we should have
10 a section called "Recommendations" in which we recap where we
11 come out in terms of dollars, the level on the whole decision
12 unit budget, and attempt to assign priorities to them.

13 As a minimum I think we should indicate whether the
14 increases -- whether the increase above the EDO mark is a minimum,
15 that that should be assigned some priority. The sentiment has
16 been expressed that maybe the EDO mark is too high if the total
17 budget is only \$207 million.

18 The subcommittee may want to have some words on that.
19 I do not know what the words are, but I want them to be thinking
20 about what priorities they would assign to this. If there are
21 only \$207 million -- could you put the slide back on, Tom?

22 MR. MC CRELESS: Yes, sir.

23 MR. SIESS: Maybe somebody thinks these cuts are too
24 broad. When will we hear from Paul? Later today sometime?

25 MR. MATHIS: Have you tried to get ahold of him?

1 MR. MC PHEARSON: Yes. We have put a call into him.

2 MR. SIESS: Let's look at LOFT. We got some material
3 from the staff on LOFT. It was passed out earlier today. It
4 is addressed to ACRS members from a Randy Bates. It has three
5 alternatives plus another.

6 There is attached to it an outline of the proposed LOFT
7 tests through 1984, and then some summary of test results, and
8 that summary --

9 MR. KERR: Where is that?

10 MR. SIESS: You would have found it on the table earlier
11 this morning. It was handed out. It is on an NRC letterhead with-
12 out ACRS on it, which I have not quite figured out. Have we run
13 out of paper? It makes it awful hard for me to sort my mail.

14 (Laughter.)

15 I give priority to stuff on ACRS letterhead, so remember
16 that.

17 The brief summary of results came from Research.

18 Milt, you can refer to this if you wish.

19 MR. PLESSET: I cannot find my copy. Can someone lend
20 me one?

21 MR. SIESS: I told Tom to have 15 extra copies of things
22 available for people who cannot find them.

23 MR. PLESSET: The LOFT, yes.

24 MR. SIESS: You can have my copy until he gets yours.

25 MR. PLESSET: All right. Okay. I have it.

1 MR. SIESS: Anybody else need a copy?

2 MR. PLESSET: I think I have seen most of this stuff
3 before, Chet.

4 MR. SIESS: I would hope so.

5 (Laughter.)

6 MR. PLESSET: At least once.

7 Now, I think there is a general point of some importance.
8 There seems to be a feeling that LOFT should not go on forever,
9 and as you know, Bob Budnitz indicated it was fiscal '84. What
10 I have done is -- and I did it with the subcommittee and consultant
11 help and with a lot of soul-searching -- I proposed a much earlier
12 date, the end of fiscal 82, no further testing of LOFT, the
13 facility should be shut down.

14 I think there are a couple of points to be made here.
15 There is a large group of able people associated with it, and some
16 of these should be absorbed in the NRC safety program. I hope and
17 think that many of them will. I hope so anyway.

18 Why should we try to do it earlier? Well, I felt that
19 the -- most of the important tests will easily be done by that
20 time. There are a lot more tests we can think of, and if you
21 would like to have them done, I'm sure it would be easy to do that.
22 To use Chet's words, it is a matter of priorities.

23 MR. SIESS: There are some vu-graphs that the staff has
24 prepared on some of these alternatives. I suggest you put the
25 first one up here.

1 MR. BENDER: I just wanted to comment for a minute on
2 what you just said. I am not the world's greatest enthusiast for
3 LOFT as a device that the Regulatory Commission ought to support,
4 but it does not seem to me unwise to suggest that maybe the industry
5 might consider whether they should support the thing.

6 MR. PLESSET: Absolutely. Actually, Mike, there is some
7 vague talk that some foreign contributions might be made, and
8 that, I believe, makes it more attractive for industry. I agree
9 with that completely. I just don't think from the point of view
10 of relative priorities that we can really justify running it much
11 longer.

12 There is another point that I just learned a few minutes
13 ago. I had to leave to talk to Ahearne briefly about the meeting
14 tomorrow. What he said is that he, of course, has been talking
15 a lot to the Congressional people. They were concerned about the
16 money that is going into the NRC budget, and he quite independently
17 of my own thoughts on the matter was pointing out that if we
18 waited too long to make a marked reduction in the research budget,
19 we would lose the money that would be saved if we volunteer a
20 fairly imminent termination date for LOFT. He thinks the chances
21 of keeping that money in reactor safety research are very good.
22 They will deteriorate rapidly with time if we let it go on.

23 I mentioned my personal date. It was just a personal
24 view of '82, and I must say I think he liked it quite a lot.
25 I do not think we can do it earlier. There are a few tests we

1 would like to have quite urgently, but I do not think you can shut
2 this thing off too fast without a lot of trouble of one kind or
3 another.

4 MR. BENDER: If we could say something in this report
5 about the fact that even though we think it is probably done its
6 job as an experimental facility, industry might find some value
7 in using it as a training device.

8 MR. PLESSET: That is not enough.

9 MR. BENDER: I am not suggesting that the government
10 support it. I am suggesting that industry take over the job of
11 keeping it going and develop its own priorities.

12 MR. PLESSET: I would welcome words to that effect. They
13 can easily go on. It is a very short chapter. That is my recom-
14 mendation which I am confident -- I think the staff will find this
15 a little painful; I do not think the Commissioners will for the
16 reason I mentioned, which I think is an important reason. It
17 sounds good to me from the point of overall balance and value in
18 the program.

19 I really do not have much more to say. If anybody wants
20 to have some more words --

21 MR. SIESS: We would be interested in knowing what the
22 implications are. This is what the staff says. Cases 1 and 3 --
23 case 1 represented what the staff said they would have to do if
24 they only had the PPPG level. That was the 35 million for '82.
25 And case 3 is what they asked for and what tentatively the EDO

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1 has granted, which is for an FY 84 phaseout -- 8 tests in the first
2 case, 9 in the second -- the third case, and in the second case
3 it is essentially what you proposed.

4 MR. PLESSET: No. I want the thing shut down at the end
5 of FY 82.

6 MR. SIESS: Shut down?

7 MR. PLESSET: Shut down, yes.

8 MR. SIESS: Is that what that means?

9 MR. PLESSET: That is a little bit more gentle --

10 MR. SIESS: It seems to me --

11 MR. PLESSET: I think there are a few more tests we want
12 run in '82.

13 MR. SIESS: The number of tests is up there.

14 MR. MC PHEARSON: I responded to the cases. I thought
15 I was expected to discuss the interpretation of what was written
16 in here. The draft report is case 2. Case 2 suggests phasing
17 out at the end of '82. I understood those words, but I do not
18 think it perhaps is understood by the Committee that to decommission
19 a nuclear reactor does require a significant amount of time. There
20 is a significant amount of analysis which would remain following
21 the final tests which would have to be done, and the fuel -- used
22 fuel would have to be examined, and so there would be some
23 destructive examination required during that year.

24 I have a backup slide which gives the breakdown of the
25 costs involved after the tests are completed.

1 MR. SIESS: Looking at what you have, if you begin the
2 phaseout -- what Milt is saying, it shows zero in '83.

3 MR. PLESSET: That is what I was hoping. We could have
4 a dramatic change in the expenditure level for '83.

5 MR. KERR: Couldn't you shift the \$39 million and call
6 it fuel analysis and decommissioning? You would do the same thing
7 but you would not call it LOFT any more.

8 MR. MC PHEARSON: That is exactly what I am saying. There
9 are no tests involved here.

10 MR. KERR: LOFT does not mean a reactor. It means a
11 loss of flow test.

12 MR. PLESSET: That helps him to keep a good piece of this,
13 but also what helps him is dollar change in this area which he
14 can keep. It is quite possible that 2 might still do it, particu-
15 larly if you change the description, because it is really not LOFT
16 testing any more.

17 Either 1 or 2 -- well, I like 2 because I think there is
18 some value --

19 MR. SIESS: Your section 2.2 is headed "The LOFT Test
20 Program." You could add another section that talks about the LOFT
21 program, LOFT decommissioning test results analysis. That is what
22 Bill was suggesting, I think.

23 I guess I do not understand item one, begin phaseout in
24 FY 82. How many tests would be made in '82 then?

25 MR. MC PHEARSON: In '82 there would be two tests.

1 MR. SIESS: And then you would start the phaseout and
2 finish it in '83.

3 MR. MC PHEARSON: That is correct.

4 MR. SIESS: And on the second one you begin the phaseout
5 at the end of '82. You only get one more test in.

6 MR. MC PHEARSON: That is correct, yes.

7 MR. SIESS: Why?

8 MR. MC PHEARSON: Yes, that is correct, and I do have
9 additional information to give you discussing each case.

10 MR. SIESS: How many tests would you make in '82 under
11 case 2 would depend on what kind of tests.

12 MR. MC PHEARSON: Right.

13 MR. SIESS: It is conceivable if somebody thought that
14 the important tests were small LOCAs and transients that did not
15 involve fuel failure, then there could be more than nine made.

16 MR. MC PHEARSON: That is correct, yes, sir.

17 MR. PLESSET: If you let the number run up to much beyond
18 that, Chet, you would have trouble in stopping the program at the
19 end of the fiscal year.

20 MR. SIESS: I am trying to address or at least trying
21 to get the Committee to address, because I do not know that much
22 about it, something other than just dollars. It seems to me if
23 we are going to talk about 40 or 35 or anything else, we ought to
24 be interested in what those eight or nine tests are.

25 MR. MC PHEARSON: That is what I propose addressing.

1 MR. PLESSET: He has those fairly well listed.

2 MR. SIESS: Does the Committee want to hear it?

3 MR. PLESSET: I think for the most part they are fairly
4 interesting tests. I would like to see them. I think the whole
5 community would like to see them.

6 MR. SIESS: Why don't you go through that then?

7 MR. MC PHEARSON: You have in fact addressed them to a
8 degree throughout this morning's discussion. I think, therefore,
9 they would be interesting to you.

10 The first test, which is planned now in September, L3-5,
11 is the first in a series of pumps on/pumps off tests which NRR
12 has so urgently requested that we do. We have been able to bring
13 those up a little in time because we have just dropped a test
14 which I will refer to later, and it permits us to do it a month
15 ahead of schedule. It will give us the information that they
16 have asked for which is required to understand and improve those
17 codes which deal with this question of two-phase mixture.

18 Piggybacked on those two tests are two operational
19 transients, the first being the loss of steam load, the second
20 one, L6-2, the loss of primary coolant system flow.

21 We are currently studying the question of being able to
22 uncover the core during that test, uncover and recover the core
23 in order to give us the initial heat transfer data that is required
24 to plan subsequent severe core damage tests.

25 I emphasize this information because it relates so much

1 to what you discussed earlier this morning. If there are no ques-
2 tions on those tests, I will go on to the next one, L6-7 combined
3 with L3-3. This is a transient test running into a small break
4 test. It is almost Three Mile Island repeated but with some more
5 interesting quirks, I think.

6 The operational transient is a loss of feedwater. We
7 would delay the first scram. We would not permit the first scram
8 to cause shutdown. Therefore, it is a semi-ATWS.

9 Following that first scram we would let the steam
10 generators run dry so that we would cause a loss of heat sink,
11 where the heat sink has been shown by our first small break test
12 to be so significant. The steam generator just pulls all the
13 energy that is produced from decay heat out of the primary system.
14 If you empty the secondary side, that no longer happens. There
15 has to be --

16 MR. OKRENT: Excuse me. What do you mean that was
17 shown?

18 MR. MC PHEARSON: You are referring to the results -- I
19 was referring to the results of the first three small break tests.

20 MR. OKRENT: Isn't this something you can predict without
21 doing an experiment? What would be the surprise in the experiment?

22 MR. MC PHEARSON: The surprise in our experiments with
23 the steam generator filled, and secondary side filled, was that
24 even in two phase when the tubes were filled with steam or two-
25 phase water, the condensation is so strong as to cause a

1 continuation of positive flow through the primary coolant loop.
2 This is something that has been in question from the beginning
3 of small break studies; that is, what happens in the steam
4 generator when you go into two phase.

5 We demonstrated that we get a continuation of single --
6 of two-phase natural circulation. There is undoubtedly some fall-
7 back, but the overall coolant flow in the primary coolant system
8 is positive.

9 MR. OKRENT: I guess my suspicion is that if you really
10 have major uncertainties here before you, then this particular
11 experiment -- you cannot be sure that what happened here is
12 applicable to other configurations or larger plants or so forth,
13 and it would not be definitive.

14 I am surprised that if this was an important consideration
15 that one would not have tried to look at it in separate effects
16 experiments, you know, where you do a wide range of these and
17 get enough experimental information that the theoretician can
18 decide either to confirm what they thought or it told them how
19 to change their modeling.

20 So I am just trying to understand whether it was so
21 big a problem that this could not answer it or if it was -- somehow
22 this was the key thing, and this one experiment did it. I am a
23 little bit --

24 MR. MC PHEARSON: There are three experiments I am
25 referring to. These three experiments were requested by NRR to

1 understand what happens in a nuclear system -- not in the separate
2 effects system but in a nuclear system in which there is feedback
3 of system effects, including HPIS injection.

4 With all of those things going on, what is happening
5 in the primary coolant system in three cases, one where there
6 is a continual depressurization. That is where the break flow is
7 greater than the HPIS injection flow. The second case where the
8 two flows are equal, so there is a pressure hangup midway during
9 the depressurization. And third, when the HPIS flow exceeds the
10 break flow, causing the repressurization.

11 In taking this general study one was interested in
12 looking at all possible scenarios so far as the pressure variation
13 in the primary coolant system. Coincident with all of that was
14 the fact that the steam generator must empty on the primary side,
15 and unknown to us was how that steam generator would react as --
16 behave as a heat sink along with all the other heat sinks that
17 we have in the reactor.

18 There are four heat sinks, each of which can be dominant;
19 and our study was to determine the dominance, the performance of
20 each of those heat sinks during the three types of transients.
21 We have gained a great deal of information for which NRR has
22 indicated strong interest and claim that the information is indeed
23 very useful.

24 We have been able to support the -- to provide the data
25 needed to improve the small break codes, and the RELAP-5 code

1 in fact was used to predict the latest test very accurately. So
 2 we feel we have made a great deal -- great steps forward in the
 3 small break area.

end tp 6

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1 MR. EBERSOLE: It is my understanding when you get
2 in this mode in one particular case, the thermal load on the
3 primary coolant loop -- well, I guess I am thinking about
4 feed and bleed, but you were discussing the matter where you
5 have depressed water in the primary loop so there is a
6 partially-filled steam generator, and you are entering the
7 regime I think we have been calling reflux condensation.

8 Westinghouse has given us some preliminary
9 calculations attempting to show that there is no bind, there
10 is no lockup in reflux condensation such as you can reject
11 the K energy at an adequate rate by this counterflow
12 process. Are you able to show that in your tests?

13 MR. MCPHEARSON: Yes, sir.

14 MR. EBERSOLE: Have you done it?

15 MR. MCPHEARSON: Yes, sir.

16 MR. EBERSOLE: You do know that the steam vertical
17 flow upward, which must be matched by the water return, is,
18 in fact, an adequate amount of margin to handle an amount of
19 decay energy.

20 MR. MCPHEARSON: Except when there is nitrogen
21 present.

22 MR. EBERSOLE: That is the exception of interest.

23 MR. MCPHEARSON: We have come to two surprising
24 conclusions. One is that nitrogen probably -- from four
25 inches up in break size and one inch down in break size,

1 nitrogen cannot give you a problem. The reason is with the
2 larger break, larger than 4-inch break, there is a continual
3 depressurization because the break is so large you lose all
4 the energy. So the steam generator in fact becomes a heat
5 source. You are sucking steam from the secondary into the
6 primary. The presence of nitrogen would only benefit you
7 there.

8 In the second case, the pressure hangs up in a
9 one-inch break and lower. The pressure hangs up above the
10 accumulator injection pressure, and the temperature of the
11 primary slowly drops to the point where you can begin the
12 primary feed and bleed before you need the steam generator.

13 So once you get on the primary feed and bleed, you
14 do not need that same generator. Hence, nitrogen can no
15 longer be an important factor. So that is what we
16 discovered up to this point. Now the question remains, can
17 we have a nitrogen problem there?

18 DR. SIESS: How about the next slide? What do we
19 get for \$13 million?

20 MR. MCPHEARSON: The last two tests we would do
21 would be to compress the three large breaks we have in the
22 current plan into two, one with a loss of off-side power
23 initiated at power predicted to raise the temperature of the
24 clad to the alpha-beta. We want them to go on to do the
25 very final test after we change the center fuel module, put

1 in a pre-pressurized fuel module. We would do the same test
2 raising the temperature of the clad to the alpha-beta
3 transition, causing ballooning, and seeing how the fuel
4 performs when it does balloon.

5 This is something which NRR has been requesting
6 for some time, and they are very anxious that we do it.

7 MR. OKRENT: I would like to repeat the question I
8 gave to Dr. Budnitz. If I postulate the scenario that
9 tomorrow we find this crack in the reactor pressure vessel
10 at LOFT, and I will assume it is large enough that you
11 decide you cannot run that vessel, are those experiments as
12 you showed there so important that we should build another
13 LOFT to do that? If not, are they so important that we
14 should do them in some other way, and what is the way? And
15 if not, how important are they?

16 MR. KERR: How much money could we get for the
17 cracked vessel?

18 (Laughter.)

19 MR. MCPHEARSON: You might get something out of
20 Chuck's program.

21 MR. OKRENT: It would be just an expensive antique.

22 (Laughter.)

23 MR. PLESSET: I think the question is a little bit
24 unfair and maybe even rhetorical, Dave, because a large part
25 of the push for those particular tests that you question

1 comes from NRR, not from Research. Do you want them?

2 MR. BUDNITZ: It is true that they come from
3 there, but the motivation to do them is not merely or even
4 predominantly that NRR wants to license reactors because of
5 them. If that were the only motivation, there would be a
6 different order and many tests would be deleted. Don will
7 talk more. The motivation is to obtain some understanding
8 of some of the phenomena at full scale. By the way, that is
9 their motivation, as well.

10 MR. MCPHEARSON: I could emphasize that by saying
11 we have learned something from every test which NRR has
12 found extremely useful, which led to changes in our code and
13 our understanding of what is necessary in our code that we
14 did not have before. So we would not have these tests, to
15 answer your question, nor would we have these tests.

16 (Slide)

17 MR. SIESS: The difference between Case I and Case
18 III --

19 MR. OKRENT: This is still Case I.

20 MR. SIESS: These are the differences between Case
21 I and Case III, is that right?

22 MR. MCPHEARSON: Yes, sir. We would not have any
23 of the intermediate-sized breaks. Having done the large and
24 the small, having learned new things, having some surprises,
25 we feel it is important to consider doing intermediate-sized

1 break tests. We have not yet defined them, but if we do
2 recommend them, that will come after we have completed our
3 small-break test.

4 We will not have done any of the anticipated
5 transients without scram, tests which have been asked for by
6 NRR. We will not have done any of the LOCAs with steam
7 generator tube ruptures, tests which NRR has asked that we
8 do. We will not have done any of the alternate ECCS
9 injection tests, also tests which NRR has requested that we
10 do. We will not have done this one operational transient
11 with second failure leading to the cold criticality
12 accident, a test in which I think you indicated an interest
13 this morning.

14 We will not have done a rod withdrawal test. We
15 will not have done one of the large-break LOCAs at the
16 highest power. And we will have eliminated the possibility
17 of doing any core damage tests, which are now in the
18 planning stage in LOFT in conjunction with tests for the
19 severe core damage program.

20 But more than that, we will eliminate the
21 associated understanding of nuclear power plant performance
22 and advanced operator display systems which we will obtain
23 during these tests. These are systems information which are
24 coming out of the tests today.

25 MR. SIESS: Could you go back to slide 1?

1 MR. MCPHEARSON: Yes, sir.

2 (Slide)

3 MR. SIESS: Those are the tests that would be made
4 under Case III. That would extend LOFT through what?

5 MR. MCPHEARSON: To the end of fiscal 1984.

6 MR. SIESS: Actually it would be no more
7 expenditures after 1984.

8 MR. MCPHEARSON: Aside from the decommissioning.

9 MR. OKRENT: Which is \$39 million estimated.

10 MR. SIESS: What would that be in 1984? Do you
11 know?

12 MR. MCPHEARSON: I would just project the \$48
13 million on using --

14 MR. SIESS: Why not the \$53 million?

15 MR. MCPHEARSON: Well, I am just going to say I
16 would project that in the same way, using whatever inflation
17 we have at that time. That is simply an inflationary
18 projection.

19 MR. SIESS: The first two cases would have zero in
20 1984?

21 MR. MCPHEARSON: That is correct.

22 MR. SIESS: And this case would have, say, \$58
23 million in 1984 and \$39 million in 1985.

24 MR. MCPHEARSON: Yes.

25 MR. SIESS: Inflated by --

1 MR. MCPHEARSON: Ten percent, twelve percent.

2 MR. SIESS: Okay Now, that is the difference in
3 dollars and the difference in tests. Can you put on the
4 slide that shows us the difference in tests for Case I and
5 Case II?

6 MR. MCPHEARSON: All right.

7 (Slide)

8 MR. SIESS: All those are the same except one,
9 right?

10 MR. MCPHEARSON: That is correct, the L6-3 test,
11 loss of feedwater with a delayed scram. Stuck open relief
12 valve on the secondary side leading to a cold water
13 accident, including recriticality.

14 MR. SIESS: That is what we get for \$13 million.
15 Now, what Mr. Plesset has proposed is essentially that
16 program at \$13 million over the Case I program, which says
17 you and the subcommittee think that test is worth \$15
18 million.

19 MR. PLESSET: Yes. Well, there is someone
20 negotiating, Chet. I am reminded by Andy that still could be
21 made where we would substitute a different test for those
22 that they are scheduling now in 1982.

23 MR. SIESS: A different test or different tests?

24 MR. PLESSET: Different tests, just to give us
25 that much more elbow room.

1 MR. MCPHEARSON: You recommend that we do a test
2 of a ruptured steam generator tube.

3 MR. PLESSET: And one at 16 kilowatts per foot,
4 the last test that would most likely destroy the core,
5 hopefully.

6 MR. SIESS: Which is that?

7 MR. MCPHEARSON: L2-4 is, and we have eliminated
8 that in an effort to get to this pre-pressurized clad
9 ballooning test, which is so important also. They may not
10 be different from 16 kilowatts per foot. We don't know
11 yet. It may be only 14.

12 MR. PLESSET: That is right. Those tests seemed
13 instructive. I think the pre-pressurized fuel is also
14 instructive. I don't know if it can be worked out in a
15 program that would end in FY 1982 or not.

16 MR. MCPHEARSON: We certainly could not do the
17 steam generator tube rupture test at that point because that
18 does require some hardware changes, some funding and some
19 work on the facility that cannot be done by that time.

20 MR. PLESSET: We might have to give it up. You
21 know that is possible. But I am still very strong in my
22 suggestion -- I won't recall it recommendation -- that we go
23 to this Case II, which essentially means that testing ceases
24 at the end of FY 1982. I am a little bit bothered by the
25 continuing ongoing cost, but there is no way to avoid that.

1 I think Professor Kerr had a very excellent
2 suggestion as to how that could be treated. That should
3 happen no matter when you shut the facility down.

4 MR. SIESS: What did NRR want to leave out at its
5 \$43 million level?

6 MR. MCPHEARSON: They did not recommend leaving
7 anything out. Really, the recommendation --

8 MR. SIESS: That is a good trick.

9 MR. MCPHEARSON: They recommended we continue on
10 at the current test level schedule. That is really the
11 bottom line that they gave. In fact, I can read from their
12 --

13 MR. SIESS: That is all right.

14 MR. MCPHEARSON: They said at the highest
15 efficiency, in fact, which really means a higher level.

16 MR. SIESS: To continue beyond 1982.

17 MR. MCPHEARSON: Yes, sir. Plus if there is a test
18 which we have suggested here which cannot be done, we will
19 give it up. I think that would be a reasonable description
20 of our view. Go ahead, Dave.

21 MR. SIESS: You are planning to get more than one
22 test for the \$13 million.

23 MR. PLESSET: I hope so, yes.

24 MR. OKRENT: Without trying to offer any comment
25 on the three positions or a different position for LOFT, and

1 trying to get back to this question that I posed, I think
2 are many areas in the research program where you could pose
3 that kind of question, and I think you would be hard put to
4 say you must replace the facility. But I think there are
5 some areas in the research program where we really do not
6 have the information we need, and I will give just one
7 example.

8 I do not think we have the information we need on
9 which to even think in some deep way about what might be a
10 mitigated feature for a BWR containment or an ice
11 condensor. We just do not have the information. To me that
12 is a different step of knowledge than we have here.

13 Now, I think with any one of these, like, for
14 example -- I will pick one -- the experiment leading to
15 recriticality. I have little doubt that you will get a lot
16 of information, and, in fact, not everything will be modeled
17 correctly. It will not be definitive with regard to that
18 particular sequence. There are always different ways of
19 doing things.

20 Really, I think one could generate interesting
21 experiments that could go for, you know, four years beyond.

22 MR. PLESSET: No question about it, Dave.

23 MR. OKRENT: But you have this balance. That is
24 all I am trying to say.

25 MR. PLESSET: Let's look at the practicalities. I

1 think that the earliest we can -- we are talking about FY
2 1982 today, and I think the earliest we can stop these tests
3 is at the end of FY 1982. We cannot say stop yesterday. I
4 don't like to say that. You might. But there are 500
5 people there highly qualified.

6 MR. SIESS: Staff gave an earlier date on the PPPG
7 budget, \$35 million.

8 MR. PLESSET: Let them defend it.

9 MR. SIESS: Earlier than 1982, mid-1982.

10 MR. PLESSET: Do you want to end it right now?

11 MR. BUDNITZ: No. We can end it any time we
12 decide. It is just going to cost 30-something million
13 dollars to end it. It is a decommissioning cost and some
14 other stuff.

15 MR. PLESSET: More than that.

16 MR. BUDNITZ: It depends on how you count it, and
17 if you sustain substantial fuel damage and it becomes
18 radioactive, then it is more. But as a matter of practical
19 dollars and sense, you can end it any time. Dave Okrent
20 asked exactly the right question, and the judgment that you
21 have made, Mr. Chairman, is that the tests over the next
22 couple of years are somehow above the line, some line that
23 means that, yes, they are worth the expenditure, and that
24 after that, it goes below the line.

25 We have made a judgment that two more years of

1 tests are worth the expenditure, and we still have not come
2 to answering Dave's question as to how we arrived at that
3 judgment. But as a matter of principle, you could decide
4 that no further tests are needed today, and we would send
5 them a notice and they would have a terrible disruption.
6 You would not save as much that way because that eruption is
7 dependent upon the time delay and the warning and their
8 ability to recoil against it, of course.

9 MR. PLESSET: You are coming back to what I was
10 trying to say in the beginning. Of course, in principle you
11 could shut it off Saturday.

12 MR. BUDNITZ: Sure.

13 MR. PLESSET: But I think the chaos and the
14 disruption and the whole thing --

15 MR. BUDNITZ: It would be very costly.

16 MR. PLESSET: I think for an orderly shutdown,
17 this is about as early as you could do it.

18 MR. SIESS: The more warning you give them, the
19 sooner the key people start to leave.

20 MR. PLESSET: Also, the more time you have to
21 absorb them into other programs. I mentioned this as a
22 possibility to Dr. Tong. There is a whole analytical group
23 he wants to keep.

24 MR. BUDNITZ: For other purposes.

25 MR. PLESSET: That is true. He mentioned --

1 anyway, I don't want to argue with Dave. I think he has a
2 point. If the vessel would crack tomorrow, that would be
3 the end of it and we would survive.

4 MR. BUDNITZ: Wait a minute, Mr. Chairman. I
5 would like to respond to that specifically.

6 MR. PLESSET: There is no way you can, Bob; I warn
7 you. But you can try.

8 (Laughter.)

9 MR. BUDNITZ: I suppose that if the vessel really
10 cracked tomorrow, that we probably would not rebuild that
11 reactor.

12 MR. PLESSET: You can leave the "probably" off.

13 MR. BUDNITZ: I suppose we probably wouldn't;
14 right?

15 (Laughter.)

16 MR. BUDNITZ: I prefer to leave it in my own
17 phrasing for me, right. But you get the thrust. Let's
18 think about what we would lose. First of all, we are still
19 now in the process of developing codes, engineering
20 understanding of the phenomena for small breaks, for some of
21 the operational transients, and for some that are both, that
22 is, a transient that leads to a breach of the primary system.

23 As a matter of confidence in the viability of
24 those codes, I believe the codes we would develop without
25 LOFT would be flawed significantly because there would be

1 the uncertainty as to whether the analysts had correctly
2 modeled the behavior at the system level. What LOFT tells
3 us is a system-level understanding of phenomena that occur
4 and phenomena that do not occur. The confidence that we
5 have in the large-break phenomena and the large-break code
6 stems from having run a couple of tests already, having had
7 some codes before them that saw those phenomena.

8 MR. PLESSET: Tong puts a great deal of weight on
9 the upper plenum test facility which I do not think you
10 need. Fortunately, it is not our \$160 million.

11 MR. BUDNITZ: I do not think we would spend it.

12 MR. PLESSET: You bet you wouldn't.

13 MR. BUDNITZ: Okay.

14 MR. SIESS: Gentlemen, the recommendation of the
15 subcommittee --

16 MR. BUDNITZ: That is the point, right.

17 MR. PLESSET: Don't say too much, Bob, because I
18 have given you a lot of credit for what you are going to do
19 with the code development, with the model development, and
20 with Semiscale.

21 MR. BUDNITZ: Let Don talk about the effects of a
22 decision now to terminate by 1982

23 MR. PLESSET: It is up to Chairman Siess there.

24 MR. SIESS: Chairman Siess wants a decision. We
25 have a recommendation from the Subcommittee for a budget for

1 LOFT of \$48 million, which is what the staff requested, what
2 the EDO has at this time approved. But the \$48 million is to
3 be used to make different tests than are now proposed;
4 presumably from what Milt said, more tests than are now
5 proposed, although there was a head shaking up by the
6 Vu-graph, and that the close-out of the facility -- that no
7 tests be made after FY 1982. After FY 1983, there would be
8 no further expenditures, although you would spend money on
9 associated things.

10 Where is the Committee on this?

11 MR. PLESSET: Dave is for it, I think.

12 MR. SIESS: Dave has talked about it.

13 MR. PLESSET: I interpreted his remarks as
14 indicating he was for this suggestion. I am putting him on
15 the spot.

16 MR. OKRENT: I think I agree. It is probably about
17 the earliest you can gracefully conclude the program,
18 barring a rupture of the vessel or something like that.

19 (Laughter.)

20 In fact, I agree that the proposed experiments
21 should be examined since they are really expensive. There
22 ought to be an intensive early effort to see, really, will
23 the staff get as much as it thinks it will out of what it
24 now perceives as a red hot issue, but by the time you do the
25 experiment, it may not be that red hot any more, or it may

1 not be answered by the experiment.

2 MR. PLESSET: I meant to put some words to that
3 effect in, that the tests that are to be done, the tests
4 that should be done should be very carefully examined by all
5 concerned parties, Research primarily, ACRS, NRR. They
6 should be looked at very carefully.

7 MR. OKRENT: It would not hurt to put in something
8 saying if industry is interested --

9 MR. PLESSET: I have those words already. Those
10 are in.

11 MR. SIESS: Where are they?

12 MR. MOELLER: Just a question. It would help me a
13 little on the decision. In the first paragraph you talk
14 about the height relationship between the core and the steam
15 generators, about the interpretation of measurements of
16 natural circulation and heat transfer. I thought we went
17 through where Sequoyah was going to do this on a full-scale
18 plant.

19 Now, why do we need to even be concerned about
20 that in LOFT?

21 MR. PLESSET: We do not have the instrumentation
22 here.

23 MR. MOELLER: In Sequoyah?

24 MR. PLESSET: That is right. They cannot really
25 do it. They can show that it works.

1 MR. MOELLER: They cannot gather the detailed data.

2 MR. MCPHEARSON: Once we understand the two-phase
3 phenomena for a given height elevation, we can apply it to
4 other height elevations. I do not feel that is important.

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1 Remember, many reactors themselves are different from
2 one another. We looked to find a standard control room, and all
3 are standard by the very fact they are non-standard. They differ
4 from one another.

5 MR. SIESS: Somebody else?

6 MR. PLESSET: Bill.

7 MR. KERR: A couple of comments on why this would be
8 more of a factor now than it would at a later time of termination.
9 I recognize each of these is not necessarily going to occur in --

10 MR. MC PHEARSON: For many years now we have built LOFT
11 ending in '84, and so the personnel who are working on it are
12 planning their lives with that in mind. If we tell them -- if we
13 announce this year that it will terminate at the end of '82, of
14 course there will be an early exodus.

15 What I think is more important, though, is that there
16 is little flexibility in the program. If we do plan to terminate
17 at that point -- I have just given you my reason. For example,
18 I do not have the \$3 million to do all the various tests I mentioned
19 as early as '82, but all I can do are those tests that I have
20 indicated to you. There are some modifications, of course, but
21 there is some loss of flexibility.

22 Once we announce this I am certain that there will be
23 no chance of reversing the process once we go down --

24 MR. KERR: I don't question the validity of any of the
25 statements. It seems to me the statements have validity no matter

1 when --

2 MR. MC PHEARSON: I would like to see LOFT around for
3 a couple of years during which nothing new comes up in the
4 reactor industry. How long has it been since there has been a
5 crisis? They occur almost every other month. Until they go away
6 I think LOFT should be around.

7 MR. BUDNITZ: I want to think about it in a different
8 light. I do not think today that we would have the confidence
9 we have in the conservatism of Appendix K if we did not have
10 LOFT at all, so let me phrase that in Dave Okrent's metaphor.

11 If the LOFT pressure vessel had had a crack in 1977 in
12 the fall so that no LOFT tests had been done between then and now,
13 I do not think we would be as capable today of saying that the
14 large LOCA double-edged guillotin accident could be coped with;
15 and without that confidence many other expenditures in other
16 facilities would still be going in the subsequent years to obtain
17 that confidence.

18 That confidence is a combination of separate effects
19 experiments and integral tests and analysis. The substitution of
20 other experiments is in many ways of comparable expense -- maybe
21 not quite, but of comparable expense dragged out, and in the end
22 far less satisfactory.

23 And therefore, just thinking about that two years back,
24 1977, pressure vessel fails in LOFT as a scenario, that didn't
25 happen, of course. I think the money "saved" from LOFT would have

1 been spent and would continue to be required to convince the
2 community, this community of scholars and concerned people about
3 the efficacy of ECCS for large breaks. And I think we are going
4 to face that same situation in the mid-'80s with small breaks.

5 The phenomena involved in high pressure core uncovering
6 are quite uncertain. The complexity of different scenarios is
7 great. The possibility of phenomena occurring at systems scale
8 different from small scale or separate effects scale will continue
9 to nag the community. And the purpose of the LOFT program is to
10 explore as many of those as we can now think of in order to gain
11 the confidence that the codes have not left something out.

12 I think an early termination of LOFT will come back to
13 haunt the community in subsequent years when things come up, and
14 there is no place on earth to test them. When I say no place
15 on earth, I mean no place on earth because there is no --

16 MR. KERR: I am not sure you are right.

17 MR. BUDNITZ: But --

18 MR. PLESSET: With a reactor you want nuclear fuel.

19 MR. BUDNITZ: Many of the issues involve nuclear fuel.

20 A lot of them don't, but many of them do, and many of the issues
21 involve the interaction between the nuclear fuel and the rest of
22 the thermal hydraulic system -- the sort of things that you just
23 cannot do with separate effects.

24 I have to then plead to you that I am a recent convert
25 to this. I mean, there was not very many years ago when I thought

1 the whole thing could be done the other way as well. The sort of
2 insight we have gotten so far I do not think could have been
3 gotten in another way.

4 I have thought hard about how we would have gotten the
5 insight we have gotten, and I can only see a collection of less
6 expensive but in some comparably expensive ways of doing it.

7 MR. MC PHEARSON: I know I speak for the NRR people who
8 are sending out bulletins and orders continually on how to run a
9 reactor, how to get it into and out of unsafe conditions, what to
10 do if they think it is in a non-safe condition. And I know there
11 is a great deal of uncertainty on what moves should be taken.

12 We can demonstrate those. We can demonstrate what moves
13 should be taken. We are determining the paths out of unsafe
14 conditions and demonstrating that those are the correct paths or
15 that we were wrong. Without a LOFT we will not be able to do that.

16 MR. SIESS: Mr. Chairman, do you think we could take a
17 vote on these items? I have not heard enough arguments against
18 the stated position -- unless I hear a motion to the contrary, I
19 am going to assume that the committee is in agreement with the
20 position as stated in the draft.

21 (No response.)

22 So be it.

23 Mr. Mathis, would you like to introduce us to chapter 3?

24 MR. MATHIS: Not really.

25 MR. SIESS: Perhaps you would lead the discussion as

1 far as you can.

2 MR. MATHIS: Chapter 3 is a decision unit on plant
3 operational safety. We started out here with a little introductory
4 paragraph basically agreeing with the amount of money, and we
5 have outlined it here, which can be left in or taken out as we
6 decide later on; but at least we can assign which particular
7 number we are talking about.

8 In this case it is the RES reclaim or what we decided --
9 we decided this morning we were not going to use that term. It
10 would be the RES request. We go on and talk about the fact that
11 there are some items in here that may not be in the proper priority.

12 The subelements, the first one of which is man-machine
13 interface, the dollars came off the same table, and basically it
14 follows the outline of the program, what is going on, what we hope
15 to obtain from it.

16 We do point out that most of this comes out of user
17 requests directly tied in many cases to the TMI Action Plan. And
18 again, we point out that these are extremely important to plant
19 operational safety and should be continued and expanded with rea-
20 sonable manpower and equipment resources.

21 We put that particular phrase in there as a plus or
22 minus kind of thing. If somebody wants to say this is not enough
23 money or they want to cut it, I think there is an option here be-
24 cause I do feel the amount of manpower and kind of equipment that
25 you might get into the act as far as man-machine interface can be

1 a variable. It can be attenuated over years or hopefully it
2 will follow along the program as it is particularly scheduled at
3 the moment.

4 But anyway that was the basic thrust that we attempted
5 to put into this particular subsection. We went on to the next
6 one, which is instrument and electrical. Again, the funding level,
7 we talk about a number of things that will come out of this
8 particular program; and in particular here we do mention fire pro-
9 tection-fire suppression systems, and later on we get into the
10 fact that the idea that has been proposed for the replication of
11 cable trays and burning them in specific plant replicas sounds
12 like you are wasting a hell of a lot of money, and you are not
13 going to get a lot out of it.

14 Again, that is another variable that we have not attempted
15 to tie dollars to these variables.

16 We have also put in here the generic safety-related
17 instrument and electrical equipment problems that again go back
18 to basic design fabrication where aging and other things that
19 Bill has been interested in, fire replication I already mentioned.
20 And we went on, and I hope in not too subtle a way.

21 Bob mentioned the initiation of new programs, and again,
22 this goes into some verification and increased funding that would
23 apply to electrical supply design problems.

24 Jesse is not here. He should hear that one. This is
25 not covered in the present program, but it is one of the things

1 that in the subcommittee we talked about; and the general feeling
2 was that if we could find a few extra bucks, this would be a high
3 priority kind of item that should be put in the program.

4 Again, we will have to balance some of these things as
5 we get on into the decision as to how much money we are going to
6 have and where it should go.

7 Plant system behavior, this is a low-funded item, and
8 it is basically an on-line surveillance kind of thing used to
9 alert plant operators of anomalous conditions. And a lot of this
10 would hopefully come out of the TVA-Sequoyah demonstration, and
11 it is the kind of thing that by 1982 we should be in a position to
12 where we can really move on into a small program anyway to come
13 up with some assistance in the way of plant systems.

14 In here we have mentioned that there is some money funded
15 for noise diagnostics, and we kind of question whether the program
16 to continue that is going to be very helpful.

17 The next item is mechanical component safety, and Chet,
18 on that one we still have to decide where we get that seismic
19 safety margin research item.

20 MR. SIESS: Yes.

21 MR. MATHIS: I will go on. We will come back to that
22 later.

23 The second part is reliability and performance assistance.
24 This is mechanical, structural and general. The program here
25 seems to be pretty well laid out, but the feeling was that far too

1 much emphasis in that particular phase of the business has again
2 been on the seismic impact on mechanical components, and most of
3 the problems that occur do not involve earthquakes, but involve
4 other kinds of mechanical failure.

5 A second point that we make is that there is a great
6 deal of industrial experience in these particular areas, and why
7 isn't there more attempt made to gain that experience from
8 industry and then divert this particular expenditure into some other
9 kind of program.

10 The next item -- by the way, Shewmon called this morning,
11 and this is one of the items he was worried about. He felt this
12 program should probably be stretched out into '82 -- I mean '83 --
13 continued, if you will, because he did not feel -- and we put it
14 in here -- it was not clear how the amount of money here could
15 really be effectively spent in the budget year. Quite a bit of
16 money, I think about \$6 million -- closer to \$7, I guess, and
17 how you were really going to crank that up and put it into '82 was
18 a question. So there is some give and take in that one as far as
19 schedule is concerned.

20 On structural safety, here again we have gone through
21 the program. It is pretty well defined. The items are laid out.
22 There did not seem to be much problem there in particular, and
23 here again, we have attempted to differentiate between the over-
24 emphasis on seismic that we found on the mechanical part to the
25 need for the seismic considerations in the structural area.

1 The next item is fracture mechanics. This again is
2 laid out in terms of money. The program looks to be pretty well
3 laid out. However, the question of thermal shock which Bob men-
4 tioned this morning has not been included; and we said that we
5 felt that it should be pursued.

6 Here again we have made no attempt to say that you
7 should add this million and a half or whatever it is, but we just
8 laid out the idea, or shall I say the way we feel we should lean
9 on these things if you have to make some determinations.

10 The next item is the operating effect on materials, and
11 here again, we talk about operating environment, radiochemistry,
12 things of this nature, which really are not getting much attention
13 today, the Surry steam generator kind of things, and we do talk
14 about non-destructive testing and urge that the correlation, if
15 you will, of non-destructive testing indications and what they
16 really mean should be continued.

17 We are questioning somewhat the introduction by NRC of
18 any new techniques or new programs. This follows right into the
19 next item which is non-destructive testing. These two items
20 really go together; and even though they are set forth as separate
21 entities, it is a little hard to differentiate between them.

22 That is about as far as we have gotten. I think there
23 are some basic questions that we need to decide. One is do we
24 want to carry these funding numbers, and again, whether this is
25 the right column to use or something else. Perhaps that is something

1 we will have to settle later.

2 But then when we get into the priorities, the potential
3 reduction in programs or the potential introduction of new pro-
4 grams, I do not feel we are in a position where these things are
5 well enough defined that we could really hang a dollar sign on them.
6 And if we hang a dollar sign on something that we say we can give
7 up, you might just as well bid it goodbye because it is going
8 to be gone, and you probably will not get it back. At least that
9 is my feeling.

10 So I think we have a basic decision to make as to how
11 we want to present this and do we want to get into that kind of
12 detail, or do we just want to indicate which way we would lean
13 if there has to be an adjustment.

14 Chet, I know this is something you have been worrying
15 about. I just do not have an answer for you.

16 That is about all I have to present at the moment. I
17 am interested in any comments or questions or suggestions.

18 MR. OKRENT: I got a note from Dot Zucher today that
19 asked me to prepare a paragraph for you on the SSMRP.

20 MR. SIESS: You really need two. One for the structural

21 MR. OKRENT: Can we do it in one place and reference
22 the other? Would that be acceptable?

23 MR. SIESS: Probably.

24 MR. OKRENT: All right. I have been assuming I was
25 supposed to do it. I have not done it yet, but I will try to.

1 MR. MATHIS: It was just one of those things.

2 MR. OKRENT: It may look strangely like the last comment
3 we made. Anyway I will try to do that, okay?

4 MR. MATHIS: Okay. By the way, as we went through
5 this thing we tried to be consistent with what we said in the
6 last report, or if there is a difference it is specifically spelled
7 out here as shifting gears.

8 MR. OKRENT: If I can make a different comment, in the
9 general section that we talked about first thing this morning
10 there were two items that in my mind would fall in this decision
11 unit.

12 One was this matter of plant operation behavior, and
13 the other was the impact of control systems and other nominally
14 non-safety systems. Maybe you envisage it falling in some other
15 safety unit, but this one does talk about electrical, and it
16 does talk about plant system behavior and so forth.

17 So I think if my guess is correct that these fall in
18 here, presumably if we think these should receive some substantive
19 effort either in addition to what's going on there or instead of
20 something that was proposed -- now, in fact in one case you did
21 suggest they not do work on prior mock-up. I don't know how much
22 money is involved there -- a million dollars, two million dollars,
23 something. That can be turned around in another direction, and
24 if you are going to attenuate something else. But we might want
25 to call out -- in other words, the basis for supporting the

1 proposed level might be that there were some things that were
2 slowed down or dropped and other things substituted. That would
3 be one basis for what I am saying. I do not know what you have
4 in mind in that regard.

5 MR. BENDER: One point about the fire test thing. I
6 think it would not be a bad idea to note that such tests are
7 normally done by industry participants as a means of showing
8 fire protection adequacy. And if the NRC feels it's appropriate
9 to do these things, maybe they should encourage the industry to
10 finance it.

11 We are going to have to do more of that kind of thing if
12 we are going to get the program directed to things that the NRC
13 properly ought to be doing. That is just one in my mind.

14 MR. MATHIS: This one in particular seemed to us to be
15 going overboard, because what they want to do is replicate cable
16 tray rooms from specific plants and then set them afire. Hell.
17 So they are going to burn, but it costs an awful lot of money
18 to replicate one of those rooms.

19 I do not know what you are going to learn from it that
20 is worth the expenditure. You are talking about a lot of money.
21 This is the impression the subcommittee got.

22 Again, I am listening.

23 MR. BENDER: It costs a lot of money to run those tests.

24 MR. MATHIS: But your point is good. Why not rely more
25 on industry?

1 MR. MOELLER: I heard Dave say he was going to write
2 the SSMRP section. I notice in part two under mechanical component
3 safety on the first page you say that far too much emphasis is
4 being placed on seismic events.

5 I assume we will want to discuss that aspect. And your
6 next sentence clearly --

7 MR. SIESS: That is Paul's statement.

8 MR. MOELLER: Clearly the great majority of reliability
9 problems do not involve earthquakes, and those that do are covered
10 by another program. What is the other program?

11 MR. MATHIS: It is the --

12 MR. OKRENT: In the back.

13 MR. BUDNITZ: We do not agree with that notion about
14 emphasis on seismic. In fact, Jim Richardson wants to make some
15 comment about it.

16 MR. RICHARDSON: I am Jim Richardson. Currently I think
17 I would agree with your statement that in FY 80 and to some
18 extent in FY 81 there is a large emphasis of our budget toward
19 the seismic programs. I would take strong exception that in FY 82
20 that is the case. In fact, out of our budget of \$9 million that
21 we have requested, if you subtract off the \$2 1/2 million for the
22 SSMRP, which would leave about \$6 1/2 million, only about \$1 million
23 of that is directed towards seismic research. And in my view
24 that is not an overemphasis of seismic; in fact, the trend has
25 been quite reversed from 1980 and '81 where it constituted a

1 majority of the budget.

2 In FY 82 it will be about one-third of the budget total,
3 and in the non-SSMRP area only about one-sixth of the --

4 MR. SIESS: How can you leave out the SSMRP?

5 MR. RICHARDSON: Where this year it is two-thirds of
6 the budget. I think the trend has been reversed. We certainly
7 recognize that we needed to emphasize the non-seismic areas,
8 and we recognized that several years ago, and we are just -- since
9 the organization is relatively new, something over two years, we
10 felt 1982 was probably the first year we could really get into
11 the non-seismic areas in the depth that they needed to be addressed.

12 And that brings up the other point, your last statement.
13 It is not clear to us that we can effectively spend the greatly
14 increased money budget. I would point out that we essentially
15 started from zero, and we had to build up to some level. We
16 feel that the 1982 level is about the level where we should be
17 leveling off, and we had to ramp up to that level for some time.
18 We took about four years to do it.

19 And part of that budget is inherited from another
20 branch, specifically the relief and safety valve program, and
21 with it will come some manpower. So I would disagree that we
22 do not have the capability of sustaining that level of budget.

23 MR. MATHIS: This is what Shewmon called me about this
24 morning. I was not familiar enough with the details. We got
25 concerned about this terrific shift in gears and all of this kind

1 of information. That is why we are talking about it now.

2 MR. SIESS: Incidentally, a little bit depends on how
3 you interpret some words. The words in the report say, "Currently
4 far too much emphasis is being placed on seismic." "Currently"
5 is FY 80. At this time the current and existing program --

6 MR. BUDNITZ: 1980.

7 MR. SIESS: Maybe '81.

8 MR. MATHIS: We could even go so far as to say that
9 this program would be accelerated to that extent in '82.

10 MR. BUDNITZ: That would help a great deal. I must
11 say that the last sentence may say something different than what
12 is implied. What it says to me -- it is not clear to us we can
13 effectively spend the money. That statement means to us that we
14 should cut it and that if you want to say that, you ought to say
15 that, and then say because you don't think we can effectively
16 spend it.

17 I wanted to point out to you if that result comes
18 about, it is highly likely that the SSMRP component will continue
19 without as much cut as the other because it is ongoing and we
20 feel it is a program of some duration and scope that is well-
21 formulated and requires finishing. And what that means is with
22 less money it is the other that will not be picked up as rapidly.
23 As a matter of practical effect that is what would result, and
24 if that is the effect you desire, fine. If it isn't, you ought
25 to realize what the impact would be.

1 MR. MATHIS: Bob, in that connection, when we make
2 this comment about industrial experience, are you really planning
3 to replace a lot of your ongoing activities with information from
4 industry?

5 MR. RICHARDSON: As much as we possibly can, realizing
6 industry has not done a lot of work in the failure area, as much
7 as industrial work has been in the qualification area. But not
8 looking at where components fail, what are there failure modes,
9 at what level will they fail, and what qualification tests do we
10 need to impose on industry to assure components will perform their
11 function.

12 But certainly we will -- I think your suggestion is
13 very valid, that we need to take advantage of what information
14 exists in industry, and all these years of history on similar
15 components. Yes, we do intend to do that.

16 MR. MOELLER: I need clarification again on what Chet
17 was saying: far too much emphasis is on seismic events. You
18 mean relatively speaking within this category, or do you mean
19 period?

20 MR. SIESS: That is what Paul says.

21 MR. MOELLER: You said you knew how to word it so it
22 was okay.

23 MR. SIESS: It says "Currently far too much emphasis."
24 "Currently" to me is FY 80.

25 MR. MOELLER: He means the total amount of money being

1 spent on seismic problems are related to mechanical component
2 safety today is too much.

3 MR. SIESS: Let me try to interpret what Paul means. I
4 think Paul believes that the probability that an earthquake will
5 cause trouble in a plant is just a heck of a lot smaller than
6 the probability of trouble from somewhere else, and he wants to
7 see the other things worked on more.

8 I am not sure that is a view --

9 MR. BUDNITZ: That is what we are doing. That is the
10 direction we are going in.

11 MR. MATHIS: I think what we are talking about is there
12 are a lot of things that are going to fail that you are not going
13 to find out by putting it on a shaker table. There are other
14 things that are more important.

15 MR. OKRENT: I think the probability that an earthquake
16 will cause trouble is probably larger than a large pipe break,
17 so if I take that logic, I should be spending more on earthquake
18 research than on the large pipe break. So if you tell me how
19 much we spent on the large pipe break in the last ten years, I
20 would say that would -- you know, how do you do this?

21 MR. SIESS: The probability an earthquake will cause
22 a large consequence accident I think is not to be ignored. The
23 risk is greater although the probability may be smaller.

24 Now, this PORV failure has nothing to do with earthquake.

25 MR. OKRENT: Actually, I would find it unacceptable to

1 have the existing wording -- I would find much more preferable
2 something that said the need to build up the appropriate work
3 in other aspects of the mechanical program --

4 MR. SIESS: That might be --

5 MR. OKRENT: All right.

6 MR. RICHARDSON: That goes against the last sentence you
7 make. If our budget is cut because the ongoing seismic program
8 must continue, the non-seismic stuff will have to be cut.

9 MR. MATHIS: Nice balancing act we have to perform
10 here.

11 Other comments?

12 MR. SIESS: We don't have to leave the last sentence in.

13 MR. OKRENT: I have a question. Are there other areas
14 besides the mock-up that are currently proposed in this decisional
15 unit that at least should be scrutinized as to whether they are
16 suitable things for the NRC to do vis-a-vis the industry?

17 MR. MATHIS: I mentioned one other one, and that is
18 the consideration for the development of new techniques for non-
19 destructive testing. This one are questioning whether industry
20 should do this, should NRC be doing it. We did not have any problem
21 with the confirmation of that work they are doing now to make
22 sure what non-destructive test results they get are reliable
23 and meaningful.

24 You may want to comment on this.

25 MR. SERPAN: One specific item that we have in the

1 non-destructive examination program has to do with acoustic
2 emission, and the staff has come out with a branch position already
3 on the use of acoustic emission and hydrotest and leak detection.
4 And there really is not sufficient information for them to put
5 that out, but they put it out anyway, and now they are after us
6 to get the research done so that the criteria in there can be
7 validated or changed so it can be effectively used.

8 So that falls within the category of the new techniques,
9 so that is what the new techniques are getting into.

10 MR. KERR: Explain to me how you can have a staff position
11 on something you don't know whether you can do or not.

12 MR. SERPAN: I cannot --

13 MR. BUDNITZ: The branch technical positions in NRR
14 are often based on incomplete information, and they often turn
15 to us to help them back it up. This is not necessarily the
16 best technical approach, but sometimes they are forced into it
17 by their own perceptions -- by their own perceptions of where
18 regulatory development is required.

19 MR. MOELLER: Could we have a comment -- I may be mixing
20 two things up, but Charlie, you mentioned -- is it the neutron
21 diagnostic effort or the noise -- neutron noise? You know, I
22 sat in on that subcommittee meeting, and I know nothing about
23 this area, but they had a very convincing argument, at least as
24 I sat and listened, that this was the wave of the future. They
25 really had something here that was going to be very beneficial to

1 us. So I guess I would like to hear the staff's reaction to
2 this.

3 MR. MATHIS: As I remember the discussion, there was
4 a lot of emphasis being placed on this noise diagnostic thing.
5 Basically what it amounts to is a neutron signature for a reactor,
6 and the question arose as to whether or not this was of any value,
7 particularly in an accident. And if you assume the reactor is
8 down immediately with an accident, you have lost your diagnostics.

9 MR. KERR: I would have guessed that the value of the
10 signature is to keep you from getting into a very degraded situation
11 rather than telling you what to do after you get there. It should
12 be able to get you some information on anomalies and reactivity
13 that might be occurring in principle. Whether it can be made to
14 work or not --

15 MR. EBERSOLE: It was directed toward reactor noise
16 while it is in operation. We have adequate instrumentation to
17 overstep reactor transients while it is operating and get the
18 reactor shut down. Then we would not need whatever this step
19 provides. It certainly did it as soon as the reactor tripped.

20 Now, whether the need is in fact with us to intercept
21 reactor transients or power distribution problems or rates of
22 change, to the extent we need this program I don't know. Surely
23 this equipment is no good once the reactor tripped. That's when
24 life begins, after the reactor has tripped.

25 MR. MOELLER: I guess my question is to learn a little

1 bit more about it, which you have certainly helped me with.

2 The second comment was that Mathis, as I understood it,
3 was not too much sold on it, and yet the text of the chapter
4 certainly does not condemn it. It is rather praising. You know
5 it is in response to user request. These programs illustrate
6 and develop diagnostic tools which will contribute to reducing
7 the incidence of accidents. It is quite a favorable statement.

8 MR. MATHIS: Poor editorship or something.

9 (Laughter.)

10 MR. EBERSOLE: I cannot understand how badly the user
11 needs it. It sounds like a technical toy to me. If it is noise
12 analysis in the post-trip regime where you are going to use
13 signatures of noise to verify equipment performance after trip,
14 that is an entirely different state of affairs. It is still
15 called noise analysis or signature analysis. That is a different
16 ballpark.

17 MR. MATHIS: We will do some rework.

18 Other comments?

19 Dave, I don't know I answered your question.

20 MR. SIESS: What item are you on or off?

21 MR. MATHIS: I have gone through the whole thing.

22 MR. OKRENT: I am not sure which question you are
23 referring to.

24 MR. MATHIS: You asked me if we had other examples in
25 here of things like the replication of the fire.

1 MR. OKRENT: I did not know where there were other
2 kinds of components or something that might just as well have
3 the benefit of industry doing it based on NRR saying they need
4 to be done.

5 MR. MATHIS: Nothing that I remember.

6 MR. SIESS: There was an example in the structural
7 branch of a project a year or so ago that I put in that category,
8 but I think they have reformed.

9 MR. OKRENT: If I could mention one small subitem, in
10 the area of the research control system I am a little bit uneasy
11 about our state of knowledge about some central processing units
12 that are proposed for some of the future solid state control
13 systems.

14 It has been suggested by one or more of our consultants
15 that you have to be careful about tricky failure modes. You
16 might have a failure mode where -- at one and the same time you
17 lose main feedwater and sign off the auxiliary feedwater and so
18 forth.

19 I was chatting with a friend who is in the computer
20 business, and his feeling is that it is really a very difficult
21 thing to try to anticipate the kinds of subtle faults that may
22 occur in the new computers. In fact, he could not think of a
23 person who could serve as a consultant. That was the question
24 that I posed. Somebody who could really tackle this and come
25 up with a good review.

1 I do not think any of our current consultants are
2 again in that area. That suggests to me there is need for some
3 research here. I do not know that it is easy, but I did not see
4 it in what was being proposed. And maybe some modest beginning
5 at least is relevant because one or more of the vendors are
6 trying to move in that direction. In fact, there was a letter in
7 our mail from Westinghouse about the subcommittee meeting we were
8 holding while Three Mile Island was overheating.

9 (Laughter.)

10 Or something like that.

11 MR. KERR: I remember that.

12 MR. ERBERSOLE: I understand some of the modules
13 (inaudible).

14 MR. OKRENT: I think we might suggest some kind of a
15 new initiative here.

16 MR. KERR: You remind me that some organization has
17 proposed something called a nuclear data link which will have
18 something to do with reactors. That might be relevant to that.

19 MR. MATHIS: This introduces another topic I think we
20 have to look at, and I have not gotten into this yet, decision
21 unit 8, systems and reliability analysis, and it covers systems
22 analysis, consequence analysis, and that falls in this same
23 general category.

24 MR. OKRENT: We can ask the staff if they were to look
25 at modern control systems, in what decision unit they would do

1 their research. I do not know. My impression of what the system
2 reliability analysis people are proposing to do and so forth,
3 they do not at the moment propose getting into that depth into
4 how a computer being used for control and safety functions might
5 have problems.

6 MR. MATHIS: Do you want to comment on that, Bob?

7 MR. BERNERO: I do not even envision us doing it in
8 the operational safety. There is a program for -- I guess you
9 could call it a safety computer, the diagnostic tools for operators
10 to use to trace the cause of an accident and figure out what to
11 do and to monitor the thing. That would not be something done in
12 SARA.

13 Ray DiSalvo has a program that appears in the operational
14 safety unit for that purpose. I cannot remember which subelement
15 it is in.

16 MR. MATHIS: I don't know about that particular program
17 addresses the question that Dave had as far as reliability of
18 a computer, that sort of thing.

19 MR. BERNERO: It does not go in that deeply. I would
20 agree with you on that. We are exploring the use of such things.
21 I might add it is in FY 81 in LOFT.

22 MR. OKRENT: That is a different thing. It sounds to
23 me like it would fall in this decision unit.

24 MR. MATHIS: I think you are right, but I don't think
25 there is anything really that goes into the depth you are

1 considering here now. Maybe that's what we need to put in.

2 MR. OKRENT: What decision unit would work on dedicated
3 shutdown heat removal systems?

4 MR. BERNERO: We originally had it in PAS, as you know,
5 and that goes to plant operational safety. That is really the --
6 well, let's see if I can put this right. Yes. We generated a
7 specification which has gone to DOE or is going to DOE for design
8 and costing. They are to be doing it in FY 81 and I think in
9 the new decision unit structure -- I thought it was plant opera-
10 tional safety. I have to beg off. I would have to look it up.

11 MR. SIESS: It is not up on the board, I bet you.

12 MR. OKRENT: I did not --

13 MR. BERNERO: It is out of the old improved reactor
14 safety decision unit.

15 MR. OKRENT: What is it that NRC expects to do on
16 dedicated shutdown heat removal systems and so forth in FY 81
17 and '82?

18 MR. BERNERO: In FY 81 we have a specification for
19 typical dedicated shutdown heat removal system, and by that I mean
20 a separate unit, separate tank, separate pump, separate feed
21 control system -- the sort of thing you would add on to a plant.
22 That is turned over to DOE, and they have pledged to do a design
23 and cost analysis of it as part of their interagency agreement
24 with us on improved reactor safety in FY 81.

25 MR. OKRENT: That is for a PWR?

1 MR. BERNERO: Yes. I believe it would serve for a
2 BWR as well.

3 MR. OKRENT: I would think there might be differences
4 like primary and secondary system or something. Has NRR reviewed
5 your specifications and said gee, this is what looks right or
6 something?

7 MR. BERNERO: Not to my knowledge.

8 MR. OKRENT: I am a little bit interested in the process
9 by which you are working. But in FY 81 then you don't have a
10 very active program.

11 MR. SIESS: If it is anywhere, it is in our severe
12 accident mitigation in the next decision unit. That is where
13 the staff said it was, and I find it mentioned here. I see
14 vent filter system component separate effects tests. In the
15 budget document you want pages 31 and 32, and I think we can
16 defer it. If it is anywhere, it is there. If it is not there,
17 we can do something about it.

18 MR. OKRENT: I would like to know from the staff where
19 they think it is. I heard the suggestion it might be in operational
20 safety.

21 MR. BERNERO: There is a crosscut. I would have to
22 find that. It was in improved reactor safety. It may be in
23 that severe accident decision unit. I would have to dig it up.

24 MR. SIESS: I just told you what page to look on.

25 MR. KERR: Go ahead. I will look some more.

1 MR. OKRENT: On page 32 they talk about containment --

2 MR. SIESS: Separate effects test, on vent filter
3 system components, value impact assessment design requirements,
4 cost estimates for each of the mitigation feature concepts.

5 MR. OKRENT: Those are not -- that is not it.

6 MR. BERNERO: Permit me to track it down. I will get
7 ahold of Ray DiSalvo. That is the best way to do it. A lot of
8 these writeups were truncated, and traces get left out.

9 MR. OKRENT: What bothers me a little bit in fact is
10 that the staff seems to have not given this a high priority in
11 its programs for FY 81 or FY 82, and in fact, we are having trouble
12 finding it, I guess. It may be here.

13 MR. BUDNITZ: The fact you have having trouble finding
14 it means we have screwed around with the budget. The project
15 exists and is ongoing. It is there. It is of sufficient priority
16 to fund it properly.

17 I think that the funding is financially adequate. The
18 management is in good shape. It is just that we are not sure
19 which decision unit it went in because we fooled around a lot
20 with changing definitions of the decision units at the last
21 minute. It was not clear which one of them it ought to fit in.

22 MR. OKRENT: You used the words it is adequate, it is
23 in good shape, but --

24 MR. BERNERO: In our meetings with DOE they agreed with
25 us that it was better for them to do that design costing study

1 for whatever reasons you might not agree with, but we did in fact
2 say to them that that should be their highest priority thing,
3 and if they did not do it, we would. And so they have given us
4 the pledge that that is definitely their highest priority thing
5 and would indeed be covered and funded in FY 81. We are very
6 anxious to get that done.

7 MR. OKRENT: I don't know what that is. A moment ago
8 I asked for a BWR and a PWR, which EWR, which PWR.

9 MR. SIESS: We have the information. It went to DOE.
10 I can get you that.

11 MR. BUDNITZ: We are prepared to go into this in as
12 much detail as required by the committee. My view is that we
13 have committed ourselves either to do it or get it done, and we
14 are hoping that we will get it done by them, okay?

15 MR. OKRENT: I guess it will be.

16 MR. BUDNITZ: I don't know what else to say.

17 MR. KERR: Don't try to get the last word.

18 MR. BUDNITZ: I won't. Enough said.

19 MR. OKRENT: Check if you think we have documentation
20 that describes what the NRC program in FY 81 and '82 is and
21 what the DOE program is --

22 MR. SIESS: Sam is looking for it now.

23 MR. OKRENT: I would like to get it today. Research
24 thinks they have information that we don't have. I would like to
25 have them get it to us today. I don't want to have to wait until

1 Saturday and interrupt their vacation or something.

2 MR. SIESS: According to the crosscut I tried to work
3 out, it is 8C, systems analysis. I'm not sure that's where it
4 is any more. I worked out a crosscut. Staff gave me a crosscut.

end to 8

5 MR. MATHIS: Is there anything on decision unit 3?
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1 MR. SIESS: Chapter 4, gentlemen, you can actually
2 divide it into three parts. The last two items are the fast
3 reactors, and advance conversions, and they are in
4 completely different categories. It may be that we will not
5 get the last two in this next half-hour, but we will see how
6 far we can get.

7 We will take a short break. There is a lot of
8 demand for a short break, so let's take a short break.

9 (A short break was taken.)

10 MR. SIESS: We are going to take the decision
11 unit, and go as far as we can before we have to break.

12 MR. MOELLER: It is item 7, but it includes 8,
13 precise biology and geology, they called for a reduction.
14 Meteorology and hydrology, there is very little if any
15 consequence there, except we did leave in a little bit of
16 controversy in the paragraph 5.3 on page 2.

17 You will notice in the first paragraph there we
18 say that we endorse a careful review and evaluation being
19 conducted by the Site Safety Research Branch of the ERAC
20 system. There seems to be a push on, particularly from
21 higher levels in the government, meaning above NRC, to
22 quickly put ERAC into operation at several of our commercial
23 nuclear power plants.

24 The drift and the impression that the subcommittee
25 received was that it is not ready for implementation without

1 first having a more detailed review and evaluation, so we
2 simply stated that.

3 The third page under 5.4, airborne effluents, we
4 found in the middle of the first paragraph that there were
5 two projects that seemed very close together Regulon and
6 half-way analysis, and the effects of inhaled
7 radio-nuclides. We recommended that they be combined. As
8 we say here, we saw no need to do this work twice.

9 Aquatic effluents, we brought in some criticisms
10 of the research that instead of looking at sediments alone,
11 to look at the sediment bio interface. We said that on top
12 of page 4.

13 Paragraph 5.6 on occupational exposure and its
14 effects, we did not endorse the dosimetric study of LARA
15 because it was not clearly defined. We did not understand
16 the types of data that it was going to generate. So we
17 said, until this is done, we will do endorse this study.

18 Socio-economic impacts as described in the
19 sub-element, we did not review at all because they did not
20 involve safety.

21 On designing alternatives, page 5, as we said the
22 other day the way the subcommittee viewed siting
23 alternatives was different than the staff views them, so we
24 took the liberty of putting a pitch there for looking at
25 advantages and disadvantages of multi-unit sites.

1 Video and cancel, put this down to zero finding,
2 and we suggested that if the staff would do what we asked
3 for on multi-unit sites, then the \$400,000 that was
4 originally proposed would be appropriate.

5 Emergency preparedness, item 5.9, we called for
6 certain work in that area. Obviously, there is plenty to be
7 done. We particularly wished to caution them about the
8 monitors that they are developing, and the monitors that are
9 in operations. I mean, there are going to be a lot of
10 decisions made on the basis of the data coming out of these
11 post-accident monitors, and we want the quality of these to
12 be improved, and research done.

13 MR. SIESS: On that item, you supported the
14 original NRC request, and that started at \$1 million, but
15 cut to half. They have not put in a RECLAMA on that.

16 MR. MOELLER: Right.

17 MR. SIESS: Do you still think that it ought to be
18 increased?

19 MR. MOELLER: I felt that the million should be
20 there, and the subcommittee did. This is if they do some of
21 the things that we are calling for. We are calling for
22 slight different work than was itemized.

23 MR. SIESS: I think you should change that to say
24 to ensure adequate support for these additional studies, and
25 we recommend the funding level of \$1 million is not the

1 research but the funding level.

2 MR. MOELLER: Right.

3 MR. SIESS: If you want them to do more things,
4 and spend more money, say so.

5 MR. MOELLER: What should we said?

6 MR. SIESS: Funding levels higher than they have.

7 MR. KERR: To what does the subcommittee refer
8 when it is talking about trade offs in accepting the
9 possibility of a higher dose later? Who is going to do the
10 trading?

11 MR. MOELLER: We asked to do some studies so they
12 would have a basis on which to make decisions related to
13 that, whether you purposefully release, say, a gas from
14 containment with probability of one of research dose, or sit
15 around and wait.

16 MR. KERR: Is this research to be used by the
17 general public for a survey, or by governors?

18 MR. MOELLER: It is to be used by the NRC in
19 making regulatory decisions on this, and used by the
20 regulators in terms of proposed actions.

21 MR. KERR: Would the research be to try to
22 evaluate public response to such a decision, the risk
23 implied in such a decision?

24 MR. MOELLER: I would see it as involving some of
25 what would be socio-economic aspects.

1 MR. KERR: Is this a defined study, or are you
2 suggesting, or the subcommittee is recommending that such a
3 study be undertaken.

4 MR. MOELLER: This was an example of the types of
5 problems that might be considered within that category, if
6 they would move along the lines of those types of studies
7 These are just two examples.

8 MR. KERR: I wish I had a better understanding of
9 what is being proposed.

10 MR. MOELLER: We were asked to make the decision
11 on the venting of the TMI-II containment. A number of
12 people on the committee said, "Well, if we don't vent it,
13 and fix it so that people can enter the containment, and
14 repair the instruments."

15 MR. KERR: It was a tough decision. What kind of
16 research would have helped us make that decision?

17 MR. MOELLER: I am not sure. I don't do that type
18 of research, but I am sure there are people who can. I
19 don't claim to know how to do it.

20 MR. KERR: I know research will solve our problem.

21 MR. MOELLER: I agree, too. I don't know how else
22 I would develop the basic information for making such
23 decisions unless I do it by research. Is there some other
24 way to do it?

25 MR. KERR: One makes decisions on the basis of

1 information and on judgment.

2 Are you asking for some ways of developing the
3 judgment? If it is information that you are trying to
4 develop, what sort of information are you looking for?

5 MR. MOELLER: It may be research on public
6 attitudes, and how they view such problems. I don't know if
7 you would call that research to gather that kind of
8 information.

9 MR. KERR: A sociologist would.

10 MR. MOELLER: A sociologist would, right.

11 On the last page, page 7, paragraph 5.10, we put
12 in a couple of commentary items. The first one is generic,
13 in that we found a number of RSR projects that we thought
14 were similar to TAP, technical assistance projects. We
15 found a little confusion in which was which.

16 The second one, though, is not generic -- It may
17 be generic, too, but at least --

18 MR. SIESS: Stay with that first paragraph. In
19 the first place, what is an NRC operating division, do you
20 mean the licensing staff? Is an operating NRC division
21 meaningful?

22 MR. MOELLER: I guess we meant there the groups
23 that were arranging for technical assistance projects to be
24 conducted. It may be that those are not the right words.
25 Maybe we should express it specifically.

1 MR. SIESS: Why don't you say that these be
2 conducted as technical assistance projects.

3 MR. MOELLER: Fine.

4 MR. SIESS: My first thought was --

5 MR. BUDNITZ: Do you mean RSR here, or do you mean
6 RES?

7 MR. MOELLER: We meant RES where we said SRS.

8 MR. SIESS: How did you get into PAS? Has PAS got
9 work in here?

10 MR. MOELLER: They must. They are doing work on
11 emergency preparedness.

12 MR. VILLAFRANCO: I was just going to say, I read
13 that sentence to refer to PAS, and by operating division, I
14 presume you mean NRR.

15 MR. MOELLER: Yes.

16 MR. VILLAFRANCO: I was not sure what you meant.
17 We are aware, and have spoken with Roger Anthony who spoke
18 of it here the other day. The liaison between Manson's
19 division and PAS on IREP, INREP, and other kinds of REPs for
20 reliability evaluations in general, there is in addition in
21 the emergency planning, siting, degraded core cooling
22 consequence analysis, class 9 accident consequence analysis,
23 a close coordination between Roger Wand of my staff, and
24 standards, Wayne House's branch over in Reactor regulation,
25 and people like that.

1 We are aware, and we are closely threaded with
2 each other, but I was not sure what you were driving at.

3 MR. MOELLER: We were driving here to particularly
4 what Bill and his group are doing.

5 MR. VILAFRANCO: It is more than what Roger is
6 talking about.

7 MR. MOELLER: Don't limit it to PAS or even
8 probabilistics.

9 For example, Bob Krueger on the spur of the moment
10 brought his three sub-chiefs down and we went over the
11 things they were doing, and we did find what appeared to be
12 duplication and overlap.

13 MR. SIESS: Then you need to change these words.

14 MR. MOELLER: If we have not said right, then we
15 should correct.

16 MR. SIESS: You definitely said PAS.

17 Will you try to find some better words?

18 MR. MOELLER: What should we say for Bill
19 Krueger's group?

20 MR. BUDNITZ: Why don't you just say, research
21 efforts of PAS and NRR in the area of. If we say what the
22 areas are, it will be explicit enough to be of use. We
23 agree that there is some overlap here.

24 MR. SIESS: Bob, if it is commented on only in
25 this decision unit?

1 MR. BUDNITZ: This is the area that Dave Moeller
2 is apparently illustrating on here, the consequence modeling
3 and the like.

4 MR. SIESS: Dave, why don't you try to get
5 together with Bob and try to come up with better words.

6 MR. MOELLER: Thank you, I will do that.

7 MR. BENDER: Is that a good example?

8 MR. MOELLER: Jesse brought that up. In a sense,
9 I would prefer that he comment on this.

10 Jesse, on feed and bleed, where you were pointing
11 out that in order to save a reactor we were losing the
12 population to unknown doses.

13 MR. EBERSOLE: This is the particular kind of
14 feeding where we might have the option of, for instance, of
15 opening the containment.

16 MR. MOELLER: Right.

17 MR. EBERSOLE: Which would be a small release of
18 reactivity, but have the benefit of avoiding a wholesale
19 exposure.

20 MR. BENDER: I understand it, but I think that we
21 ought to put a qualifier on it.

22 MR. EBERSOLE: That is not a good phrase for that.

23 MR. BENDER: Put a phrase in there that would
24 suggest the process that we are talking about using. I
25 think that ought to be looked at.

1 The second point that I wanted to make is that
2 item b in the commentary bothers me. I don't know whether
3 that is the staff position, but it does not look to me like
4 to we need to make about the staff problems. We have enough
5 problems with the staff of ACRS. I think that we ought to
6 let the staff fight its battles without our help.

7 MR. SIESS: I disagree. I think there are certain
8 places where we ought to comment on the staff problems
9 because the limitations on staff are completely unrealistic
10 in research.

11 MR. BENDER: If you are going to do it in a
12 general way, and do it everywhere, fine.

13 MR. SIESS: I don't think that it deserves it
14 everywhere. There are some places where they have asked for
15 more, and they have gotten it. There is one place where
16 they got one more man than they wanted, so we told them to
17 take him out

18 MR. BENDER: When we start digging at the one and
19 two-man level in determining what they need, we are making
20 some judgments that are not based on enough understanding,
21 considering the amount of time that we have to look at some
22 of things.

23 MR. SIESS: I cannot get excited whether it is one
24 man or ten. But one does bother me when it is very specific
25 as to a discipline. We have written some reports saying

1 that you needed some chemists in this lab.

2 MR. KERR: How many meteorologists do we now have
3 in this branch that we need one more.

4 MR. MOELLER: I think they have one. I know they
5 have one. I just hated for him to be alone.

6 MR. HARPER: Jerry Harper, Safety Research
7 Branch. We have one meteorologist in the entire Office of
8 Research

9 MR. MOELLER: Thank you. There are no physicians
10 in the NRC.

11 MR. HARPER: That is right.

12 MR. KERR: Do you have a radiation biologist?

13 MR. SIESS: What are you?

14 MR. HARPER: I am a geologist.

15 MR. SIESS: I thought we had a physician.

16 MR. OKRENT: Are we going to hear something from
17 Jerry Harper on this question of seismic siting studies?

18 MR. MOELLER: Maybe we should.

19 MR. SIESS: Let me ask the committee if they think
20 what they think. A major item in this budget was a
21 reduction by the EDO of the request for the seismology and
22 geology unit from \$5.3 down to \$3.5. That was a very
23 significant reduction. Dave Moeller has recommended and
24 urges that the requested level be provided.

25 Does anybody need any justification for that

1 recommendation, or want any justification, or want to make
2 it stronger?

3 MR. KERR: What will the \$1.8 eliminate in terms
4 of studies?

5 MR. SEISS: I don't think he knows which programs
6 will be eliminated to get down there.

7 MR. HARPER: It would cause a reduction and
8 elimination in the overall effort of the regional seismic
9 hazard siting studies. We would probably start with those
10 areas where we perceive seismic hazards in the Indiana and
11 Ohio region.

12 MR. MOELLER: Dave, have reviewed this particular
13 category or subelement.

14 Do you have a comment?

15 MR. OKRENT: At the time I wrote the paragraph, I
16 was not aware that there was a controversy about the level
17 and I assumed it was talking about a static situation, and
18 that was the situation when we held the subcommittee
19 meeting. I don't think we talked about the matter at the
20 subcommittee meeting.

21 MR. SIESS: EDO had a reason for doing this, what
22 was it? They wanted to limit it only to sites.

23 MR. BUDNITZ: The rationale is that there is not
24 much prospect of new sites. The planning basis for the
25 whole NRC budget was that there were no new applications in

1 the next couple of years. That is what NRR's planning
2 basis. Therefore, the seismic studies of these new areas
3 where there are no reactors, but where some day there might
4 be, are not necessary. That was the rationale.

5 Our feeling is that the general study of these
6 seismic and geological tectonic issues around the country
7 is required over the long haul. To dismantle those networks
8 is shortsighted.

9 MR. SIESS: Of course, the investigation of the
10 sites where there had been earthquake activity -- That is
11 exactly what this is. You are looking at those areas where
12 there have been activities, trying to see if you can
13 localize the earthquakes in those areas. If you can't, it
14 is going to affect every site east of the Rocky Mountains,
15 every existing site east of the Rocky Mountains as well as
16 the potential sites.

17 MR. BUDNITZ: Just yesterday, I was preparing this
18 RECLAMA before the Executive Director, and I was trying to
19 defend that \$1.8 million in the RECLAMA. Bob Oakley from
20 the Office of Standards Development said that he could not
21 support it. He saw the whole thrust here support of siting
22 rulemaking, and he thought that it was a key part of that.

23 I tried to defend it on the basis that it is
24 useful for site selection in general, and also to understand
25 the source term for earthquakes at site that already exist.

1 MR. SEISS: You think the words we have here are
2 sufficient to make clear that we have a reason for restoring
3 this?

4 MR. BUDNITZ: I think that your words are nice,
5 but they could be expanded a little, if you saw fit, and
6 explain a little more forcefully.

7 We are, I want to acquaint you, in dire danger of
8 losing that money, your words aside. I think that we are in
9 real trouble on this.

10 MR. SEISS: Do you think that you could come up
11 with some words that would make clear that this is not just
12 new applications we are concerned with?

13 MR. OKRENT: If you wish.

14 MR. SEISS: I think that it would be helpful.

15 MR. OKRENT: I should note that this program was
16 started because of committee recommendations.

17 MR. BUDNITZ: Yes, sir.

18 MR. OKRENT: We wrote a couple of letters that
19 there as an absence of such studies.

20 I do agree that it relates to the operating
21 reactors as much as it relates to new sites because, in
22 fact, if and when NRC gets some type of quantitative risk
23 basis for existing reactors, they are going to have to
24 decide how they are going to, in fact, prevent earthquakes.
25 It is not going to be easy. I don't know whether this will

1 help, though.

2 MR. BUDNITZ: We have developed the existing
3 networks, and now we are going to throw them away.

4 MR. OKRENT: I think that you are going to use
5 judgment whether you have this data or not, in all honesty.

6 MR. SIESS: Dave, try to come up with some words
7 that are a little stronger.

8 MR. BUDNITZ: I want to give a little insight as
9 to how the other argument is going, so you will know what I
10 think we are up against. I will try to paraphrase it.

11 Jerry Harper and his group have done excellent
12 work, and that was said, but by that year they would have
13 had enough of this data, and they won't need any more. I
14 don't agree with that, but that was the general thrust of
15 the counter-arguments as to why they are cutting it.

16 MR. SIESS: We said in our first report to
17 Congress that it would be at least five years before we
18 would know the real direction of this. This is too basic
19 work to talk about in that short-term.

20 MR. BUDNITZ: That is exactly right.

21 MR. MOELLER: That is what we should say.

22 MR. OKRENT: Again, if you want me to prepare
23 words, I will.

24 I have two more questions on this chapter. In the
25 area of siting alternatives, the only topic that you have

1 identified is multiple unit matters needing study. I have
2 the impression that the Commission plans to go through some
3 kind of a rulemaking. Is there not any research needed in
4 FY-82 in connection with this rulemaking?

5 If there is, is it addressed elsewhere? If not --

6 MR. MOELLER: We can add it.

7 MR. OKRENT: Then one last point on 5.9, emergency
8 preparedness. You say, "There is need for reliable and
9 accurate," and so forth. I noted that they did show a
10 research program. I guess I am a little disappointed that
11 we still need to be doing research in FY-82. I had hoped
12 that before the end of FY-81 there was enough done here so
13 that implementation of such instrumentation would be
14 underway. It might even be attached to the nuclear data
15 link, if you have one.

16 MR. MOELLER: You are correct. It is difficult to
17 say how much of the problem here is simply a failure to
18 implement what we know. Should this not be given sufficient
19 priority, the fact that you finish it before FY-82, unless
20 you have a surprise and need new information?

21 MR. OKRENT: My question is to the staff, why is
22 this still in FY-82?

23 MR. HARPER: I would say that the reason why it is
24 still in FY-82 is that we know what instruments are
25 available, and we know more or less what their capabilities

1 are. We don't know enough about what the capabilities are,
2 and what instruments are in the process of being developed,
3 and the proposed research here is to look at new instruments
4 that may be employed which would provide extra benefits.

5 MR. OKRENT: I have to agree that there could well
6 be new instrumentation that looks useful as a result of
7 studies done under other decision units.

8 MR. HARPER: These British monitors are probably
9 slightly different than those that we are investigating
10 under other decision units.

11 MR. OKRENT: I guess my own interest is that we
12 have appropriate information that enters before you get out
13 into the field. It is not clear to me that that exists. I
14 still don't see in your program anything that says, it will
15 try to decide when a release has occurred, or how much has
16 been released, where it was released from.

17 Again, I am looking at the question from the point
18 of view of what is going on inside the containment building.

19 MR. KERR: I want to share my ideas about picking
20 one or two positions to recommend of this unit, what I think
21 we have not done for other units. If we do decide to stick
22 with this recommendation now, I would suggest that we
23 request a radiation biologist position because I think that
24 a British biologist is what they are looking for.

25 MR. MOELLER: Can we come back to this after

1 looking at the events that we want to discuss now?

2 MR. SIESS: I am sure we will.

3 Are there further comments?

4 If not, then I guess we are ready to go on to
5 something else. I would like to announce that we are
6 half-way through in terms of decision units, and two-thirds
7 of the way through in terms of dollars.

8 At 6:30 or sometime thereafter, we will continue
9 the process.

10 MR. PLESSET: Let's go on to operating experience,
11 and the first item is the Hatch/Brunswick nuclear plant.
12 But we are going to Three Mile Island venting of containment
13 release Kr-85.

14 Mr. John Collins will make the presentation.

15 MR. COLLINS: The last time I was here, Mr.
16 Lauroski make the comment that I did not bring my TV
17 cameras, but I notice that they are available today.

18 Since we have received the invitation to come down
19 and discuss the problems that occurred on the first day of
20 the venting, we have achieved today a milestone, and that is
21 that we have nearly completed purging all of the Krypton
22 from the containment building.

23 The purge was interrupted last evening at about
24 1:45 at which time we had achieved a flow rate of 18,500 for
25 the previous hours, or during the hour in which we were up

1 to 18,500, we only discharged 6 curies of Krypton-85, so it
2 was quite clear to us that we were reaching the end point.

3 During the evening and morning hours from 1:45
4 this morning until about 9:00 o'clock this morning, the
5 licensee proceeded to take samples from the containment
6 building on a two-hour basis to make sure that we did not
7 have either pocketing or stratification of Krypton in the
8 building.

9 We had four samples that showed us at the present
10 time to be in good relationship. The concentration in there
11 at the present time is approximately 1.7 times ¹⁰
12 microcury per cc. If you calculate that out, there remains
13 about 12 curies of Krypton-85.

14 Then about noon time today the licensee initiated
15 the purge again, and will continue to purge for about 12
16 hours at which time he would be somewhere a tenth of mpc per
17 Krypton-85.

18 The venting operation, then, will be concluded,
19 and the plant will sit in a stable -- The containment will
20 be isolated. Samples will be drawn by the licensee on a
21 four-hour basis over the next week to make sure, or to
22 determine whether or not we have any diffused Krypton 85
23 coming off the equipment, out of the hatches, the
24 stairwells, or even off the water because there remains some
25 dissolved Krypton still in the water.

1 I just wanted to briefly go through the purge, and
2 the purging system that was used. There were two systems.
3 One was the modified hydrogen control system, which it was
4 modified in that normally the fan at this point here would
5 normally read at about 150 CFM, that fan was replaced with a
6 fan that had a capacity up to 1000 CFM.

7 Unfortunately, in design or specification of the
8 fan, the licensee failed to recognize all of the pressure
9 drops that occurred inside the building. The maximum we
10 were able to achieve off of the fan was about 540 CFM.

11 There was a radiation monitor down stream of the
12 fan, which is referred to as HPR 229, which many of you have
13 seen if you have been reading and following in the
14 newspapers or the PNs that I have issued from TMI. This
15 monitor was not used to calculate the amount being released
16 out of the stack, but it was being used to control the
17 release rate from the building out to the stack.

18 The values that you saw, or were reported by us,
19 were based on the radiation monitor that is the final
20 effluent monitor. What they were doing was calculating the
21 total curies released on a daily basis based on this
22 radiation monitor, and not based on the building
23 concentration, nor was it based on this radiation monitor
24 here.

25 This was here strictly to control the release rate

1 such that we would not exceed -- the licensee had set an
2 administrative limit off-site in any one sector in
3 accordance with the Commission order.

4 The other system, of course, is the regular
5 building purge system which was modified such that the flow
6 rate could be controlled from 1000 CFM up to 25,000 CFM.
7 There are two trains, each having a capacity of 25,000.
8 Only one train was modified. As I indicated, we never
9 really had to reach 25,000, but we did achieve 18,500.

10 With respect to the amount of Krypton 85 that was
11 released, there will be some as to what value one wants to
12 use. In all of the reportings since the venting started on
13 the 28th, none of the values have been corrected for any of
14 the errors associated with either the detecting devices or
15 the analytical errors.

16 So last evening, when it was quite evident that we
17 were approaching the end point, Metropolitan Edison and our
18 own staff met until the wee hours of the morning, and we took
19 all of the errors associated with the sampling, with the
20 building volume, with the detector itself, and the corrected
21 value when you include all of the associated errors is
22 43,800.

23 Why is that lower than what the staff used its
24 environmental assessment -- we used the value of 50,000
25 curies, that was based on a sample or building concentration.

1 of 1 microcurie per cc. That actually was an average value
2 of many, many samples that had been taken from January, up
3 until and including the day before purging was started.

4 Again, that did not include any of the errors that
5 one has to include such as the error on the detector itself,
6 the analytical reproducibility, the counting efficiency of
7 the building detectors, the error in the calculation of the
8 building volume itself. It did not do that, so it was not a
9 refined number.

10 Just prior to the staff briefing the Commission on
11 the final environmental assessment, the staff itself
12 analyzed samples taken from the containment building. There
13 were two samples. One was 0.8 microcuries per cc, and the
14 other one was 0.78. If you average them out and assume a
15 two standard deviation, and calculate it, you get a high
16 value of approximately 50,000 curies, and a low value of
17 38,000, which then envelopes the value that we are now using
18 of 43,800. So we erred, but we erred on the conservative
19 side.

20 The important thing to recognize, no matter what
21 the actual curie value released is, the off site doses were
22 well below those that were predicted either by Med Ed, or by
23 the NRC. The highest off-site skin dose as a result of
24 purging operations -- I must qualify that these are values
25 that we have not gone back and reevaluated. The cumulative

1 skin dose is 0.3 millirem.

2 Med Ed calculated their maximum off-site skin dose
3 to be 3.4 millirem based on the number of curies released.
4 Their technical report to us estimated 5.0 millirems. The
5 staff in its assessment set the value at being probably in
6 the neighborhood of 11 millirem. So you can see that we
7 were well below the predicted estimates.

8 The Environmental Protection Agency, the community
9 monitoring program, which is operated by the State of
10 Pennsylvania, Med Ed's monitoring program, all of the data
11 correlated very, very well.

12 MR. LEWIS: To what does the number of millirems
13 you call refer?

14 MR. COLLINS: It is the skin dose.

15 MR. LEWIS: Of an individual?

16 MR. COLLINS: To maximum individual in any one
17 sector.

18 MR. LEWIS: Thank you.

19 MR. COLLINS: Overall, we were very pleased with
20 the way the purge proceeded. Certainly, the weather
21 cooperated very nicely with us for this time of the year.
22 There were very few days that we actually had to terminate
23 the purge due to the meteorology.

24 It had its normal problems, as one would
25 anticipate dealing with a mechanical system, but overall I

1 know I was very pleased, and the licensee was very pleased
2 with the conduct of the purge.

3 One error that I would like to discuss that was
4 not recognized by the licensee nor the staff was an error
5 that came to light by the fact that in the TMI stack the
6 probe is about at the 150 foot level, and then the sample
7 line drops down approximately 100 or 120 feet to the detector
8 itself, and then the pump, of course, pulling the air
9 through the detector.

10 At the point in the stack, of course, the sampling
11 point, you are at atmospheric pressure, or even slightly
12 above atmospheric pressure. Now you have got a pump now
13 pulling the air through that probe down into the sample pump
14 through that line where you have developed the negative
15 pressure. The negative pressure was measured to be
16 approximately 3.0 psi.

17 There was never any calibration or correction
18 factor made for the difference in the densities created by
19 the difference in those pressures. If you take a simple
20 ratio that is approximately a 20 percent error. That was
21 part of the error that came to light last night during the
22 discussions.

23 The vendor's manual did not discuss it, nor would
24 you have found out through calibration, because in the
25 calibration scheme, you charge the detector itself with a

1 known source at atmospheric pressure.

2 I don't know if this problem is similar at other
3 plants, but I think that it is something that deserves some
4 consideration because what you are really saying, then, is
5 that we are estimating, or that the values being recorded
6 going past that monitor are low by 20 percent. You are
7 actually releasing 20 percent more.

8 I think that that is an item that does deserve
9 some consideration.

10 MR. MARK: Does that affect the statement about
11 43,000?

12 MR. COLLINS: No, that is taken into account.

13 MR. BENDER: How do you measure the volume of gas
14 going in and out?

15 MR. COLLINS: There is flow measuring device in
16 this line here. There is a flow measuring device, and there
17 is also a flow meter up the stack, too, so you know the
18 maximum flow, so you know the flow rate going up the stack
19 all the time. That is required by our tech specs. There is
20 a flow meter in here, too.

21 MR. BENDER: What kind of meter is it?

22 MR. COLLINS: I really can't tell you that right
23 now. I don't have that information here.

24 MR. BENDER: It is a matter of trying to
25 understand what the accuracy of measurement was.

1 MR. COLLINS: The accuracy of measurement on this
2 was plus or minus 10 percent on the calibration of the flow
3 device. That was calibrated as part of the modification to
4 the system.

5 We asked them also to go back and recalibrate the
6 flow meter on the stack.

7 MR. BENDER: One other small piece of
8 information. How do you determine the amount of Krypton in
9 the gas?

10 MR. COLLINS: The amount of Krypton in the gas, of
11 course, you are sampling the concentration in the reactor
12 building off the normal sample system, which pulls it out
13 the probe in the dome area here, and also at the 357 level
14 here. So you are sample that in a Marinelli flask, and
15 running a gamma scan on it, or a beta scintillator .

16 MR. BENDER: You are determining by difference,
17 then?

18 MR. COLLINS: No. In this radiation monitor that
19 is in here, there is a beta scintillation calibrated for
20 Krypton 85.

21 MR. BENDER: All right.

22 MR. LAWROSKI: How well did the flow rate check as
23 measured in the meter between the filter and the fan, and
24 that stack?

25 MR. COLLINS: They are not going to be the same.

1 The flow meter in the stack here sees all of the building
2 ventilation, so the flow up here is approximately 100,000
3 CFM. The flow in here, of course, varied anywhere from 10
4 cubic feet a minute up to 18,500, which is the maximum we
5 got.

6 MR. LAWROSKI: But if you had estimated only from
7 the stack, from what you learned in the stack, how would you
8 check the other?

9 MR. COLLINS: It tracked very well.

10 MR. MARK: If I understand correctly, you
11 calculated 11 millirem.

12 MR. COLLINS: That is correct. That is what the
13 staff estimated in the environmental assessment.

14 MR. MARK: And the measurement was 0.3.

15 MR. COLLINS: That is the measurement that was
16 measured by the Environmental Protection Agency as of this
17 morning.

18 MR. MARK: Is that the same person?

19 MR. COLLINS: This is the maximum dose of any
20 individual any one of the 16 sectors. The maximum
21 individual. It is a hypothetical person, but in this case
22 it is a measured dose.

23 MR. MARK: But it is calculated for the same
24 person.

25 MR. LEWIS: He is saying are these numbers

1 comparable.

2 MR. COLLINS: Yes, they are.

3 MR. LEWIS: Is there a factor of 30 in the way you
4 test these things?

5 MR. COLLINS: No.

6 MR. LEWIS: Is that factor of 30 meteorology?

7 MR. COLLINS: I would think that the factor of 30
8 came in the conservatism that was built into the staff's
9 model to begin with, and the fact that we used conservative
10 meteorology, whereas here you are using real time
11 meteorology, and you are also using real time dose measuring
12 device in the field.

13 MR. MARK: I am fascinated to wonder, though, if
14 it is also in all the estimates we make in risk assessment.
15 Presumably it is.

16 MR. COLLINS: I can't answer that. I would
17 probably think it is. We always seem to err on the
18 conservative side.

19 MR. LEWIS: I can answer that, but I will not at
20 this time.

21 MR. COLLINS: One of the questions that you did
22 ask of us was what was the reason for the immediate
23 start-up, and then the immediate shut-down of the purge, and
24 what happened to the monitor.

25 I gave you a picture of the diagram of the

1 Eberline instrument. This particular instrument, we started
2 to purge at 8:00 o'clock, and about two minutes into the
3 purge, the licensee, or this monitor received an alert
4 alarm, and almost subsequent to that a high alarm. The
5 procedure for immediate temporary shut-down at any time we
6 received a high alarm.

7 In investigating why that received a high alarm,
8 it was back to the detector, and its response to the high
9 concentration of Krypton at the time the purge was
10 initiated. The three detectors, the gaseous detector, which
11 is a beta scintillation; you have a fixed particulate
12 filter, which is also a beta scintillation; then you have a
13 sodium iodide crystal looking at the charcoal for iodine.

14 This detector here, of course, was calibrated per
15 Krypton-85. The particulate was calibrated for strontium
16 90. Both of them have energies very close to each other.
17 When it was charged with that high concentration of Krypton
18 85, the detector alarmed because it felt that it was seeing
19 particulate, when actually it was seeing Krypton 85.

20 The monitor is built with the capability --
21 Eberline has a computer program built into this thing where
22 you can take the Krypton calibrated off of here, the
23 measurement off of here, and subtract it from the particular
24 channel, so that all of your contribution from Krypton-85 is
25 being taken away, and what is left, then, should be the

1 particulate.

2 That program was not programmed into the computer
3 at the time this purge was initiated. As a result of that,
4 it was programmed. As a result of thi alarm, the licensee
5 began a 15 minute sampling program of pulling the
6 particulate filter off, and analyzing it. EPA analyzed the
7 same sample. Our own mobile laboratory out of Region I
8 analyzed it after that. At no time did we see any
9 detectable quantities of particulates on that filter.

10 Recognizing the limitations of this particular
11 channel, the licensee then installed a multi-channel
12 analyzer which could then discriminate the particulates. It
13 was hooked into this system, and that is what he has been
14 using after coming back up on the line.

15 The multi-channel analyzer, as you can see, does
16 have a channel for gross count. It then discriminates the
17 C-G and 137 background, then counts the C-G and 137. It
18 also counts the Krypton 85.

19 The sodium iodide crystal here, the air comes down
20 through here, so that this sodium iodide crystal looks at
21 that filter paper all the time. It takes that signal to the
22 photo-multiplier and down into the various counters.

23 This instrument worked very well. It gave
24 excellent results. Again at no time did we see any
25 particulates on that particular channel.

1 This is the system that is still in place at the
2 present time.

3 This, again, may be a generic problem. Normally,
4 in power plants we are not dealing with a concentration of
5 Krypton 85 as high as what we were purging from the
6 containment in the initial purge. It may be that that is
7 another issue that we are going to have address, or take a
8 look at and monitor, certainly under accident condition.

9 A similar occurrence happened right after the
10 accident, if you will remember. The effluent monitor became
11 saturated due to the high amount of xenon that that monitor
12 saw.

13 So for normal operations, certainly, it works very
14 fine, but when you see high concentrations that one would
15 normally see in the range that we had in the early purging
16 or under accident conditions, one man would have to take a
17 look at that to make sure that that would not occur.

18 Are there any questions?

19 MR. MOELLER: I have a couple of comments. One
20 was, I found it of interest that your major problems were
21 with the detector, and then later you had a sample pump on
22 one of your monitors which failed.

23 As I recall, when the ACRS did a review of LERs on
24 air monitoring and air cleaning systems a year ago, we found
25 that upwards of 50 percent of the failure occurred in the

1 instruments that measured the performance of the system as
2 contrasted to failures of the system itself. Your
3 experience there simply bears that out.

4 In terms of your initial remarks, I was pleased to
5 hear the explanation of the quantities of Krypton released
6 versus the residuals still in the containment because if one
7 took your daily reports and added the amount released to the
8 amount remaining, you had a constantly declining total
9 inventory which you could interpret as indicating you were
10 releasing about one and a half times as much as you
11 thought. You, of course, have explained it today.

12 Thank you.

13 MR. MARK: Are you able to say what the problem
14 has been with the entry?

15 MR. COLLINS: With regard to the entry, it was
16 approximately a week ago that Med. Ed was successful in
17 drilling through the bulkhead and freeing up the safety lock
18 that was engaged. It was, indeed, engaged. It appeared
19 also to have some corrosion on it.

20 We are not really sure at this time what caused
21 the safety lock to stay in the sub position, whether it was
22 caused by the transient immediately into the accident, or
23 whether it was some other mechanism that caused it. But
24 once the safety pin was freed up, the exercise of the wheel
25 through its full evolution with a come along on the door so

1 that it would not pop open, it did go through its full
2 evolution.

3 The current plan now would be that within about a
4 week to two weeks, we will make an entry into the
5 containment building for the initial survey of the area.
6 Following that there will probably be, perhaps, two or three
7 more entries to gather additional technical data needed to
8 go on with the recovery program.

9 MR. SIESS: Is the containment still being kept up
10 at sub-atmospheric pressure?

11 MR. COLLINS: Yes, it is. It was maintained
12 during the whole purge operation at 0.1. At any time the
13 pressure got up to 0.1, then they secured. That is why you
14 saw on this slide --

15 First of all, the building had to be at about 0.5
16 psi before you could initiate, and at no time did the
17 procedure allow the building to go greater than 0.1. How
18 they did that was to control the supply air, so that the
19 supply air was never on all the time until we got to the
20 fast purging.

21 MR. PLESSET: Any other questions?

22 MR. SIESS: How much water is there?

23 MR. COLLINS: It is 7.8 feet, so it would be
24 approximately 650,000 gallons. The leak rate has been very,
25 very low over the last several months. Of course, we have

1 reduced the pressure in the primary system to about 93
2 pounds, so the leak rate has decreased.

3 The next major evolution that would occur as far
4 as the reaction system itself is that we would hope to
5 activate the mini-decay heat removal system in several
6 areas. The high steam thermo-couple rate now is about 193.
7 It varies depending on the cyclic nature of the steam
8 generator burping?

9 MR. MOELLER: Why the several weeks now before
10 entry?

11 MF COLLINS: What they would like to do is to
12 leave the building isolated to see how much diffusion of
13 Krypton would come off of, say, some of the motors, the
14 equipment, or even out of the water, and see if the building
15 does come to an equilibrium. That is primary the reason.

16 MR. EBERSOLE: Have measured the electrical
17 circuits in there to determine the degree of failure of
18 these inside, and do you intend to capitalize on the fact
19 that you had a rather harmful environment?

20 MR. COLLINS: Ever since the accident, the
21 licensee has had a program of meggering all of the
22 electrical components in there, and that is how we were able
23 to tell when we did see the water build up in there which
24 valves had to be opened immediately before we lost the
25 ability to open them.

1 If you remember, this is why DHB 2 was the first
2 one that was opened because that was at the low point, and
3 we were able to tell through meggering. We continue to
4 megger on a weekly basis.

5 The next two valves that will have to be opened
6 are DHB 1 and DHB 171 which are the DKE valves and the
7 bypass. They are about a foot away from the water level
8 right now. We are doing meggering on them every week.

9 MR. EBERSOLE: You are suggesting that if they
10 stay above the water line --

11 MR. COLLINS: No, I am not. The licensee has
12 requested permission of us to open those valves because he
13 is really concerned that even though they are above the
14 water line, the fact that we have been in a 100 percent
15 humidity environment for some time that the meggering may
16 not be too active itself.

17 We are going to proceed with opening them up. The
18 reason that we have not it to date is because we, the NRC,
19 have requested the licensee to have a contingency plan in
20 the event that we open those valves and the H33 leaks, what
21 is their contingency plan because we are not going to sit
22 there and leak the primary water out of that building. So
23 we should be go on that system within the next several
24 weeks.

25 MR. PLESSET: Thank you, Mr. Collins. I think

1 that we have to move on to the other items, the
2 Hatch/Brunswick Nuclear Plants, and the SCRAM discharge
3 volume question.

4 Ed Jordan, are you going to make the presentation
5 of that?

6 MR. JORDAN: Bill Mills is a system specialist for
7 boiling water reactors, and he is going to review this. He
8 was instrumental in putting out the bulletin on the
9 instrumented volume on the boiling water reactors, and then
10 was involved with the Browns Ferry, and the examination of
11 that problem, and the problem as we understand it with the
12 control rod drives.

13 It is a two-part presentation.

14 MR. MILLS: As Mr. Jordan said, I have a two-part
15 presentation on recent operating experience related to the
16 control rod drive SCRAM function of the VWR.

17 MR. BENDER: Would you identify yourself please?

18 MR. MILLS: My name is Bill Mills, a member of the
19 IE staff in Technical Programs.

20 The first part is on multiple failures of SCRAM
21 discharge by level switches which occurred at Hatch and
22 Brunswick. These events led to the issuance of IE Bulletin
23 80-14, Degradation of SCRAM Discharge Volume Capability on
24 June 12, 1980. The second part of the presentation will
25 cover the failure of 76 of 185 control rods to fully insert

1 during reactor SCRAM at Browns Ferry 3 on June 28, 1980.
2 That event led to the issuance of Bulletin 80-17 on July
3 3rd, 1980.

4 Before I discuss those two events, I will briefly
5 describe the normal operations of the VWR function.

6 The major components are the control rod drive
7 assembly, the SCRAM outlets, the SCRAM inlet valves, the
8 SCRAM discharge volume, which drains to the instrument
9 volume with its associated level switch, the SCRAM discharge
10 volume drain, and vent valves.

11 The function of the SCRAM discharge volume is to
12 receive exhaust water from the above piston area, the
13 control rod drives during reactor SCRAM. The SCRAM
14 discharge volume typically contains two to four times the
15 amount of treat volume needed for complete reactor SCRAM.

16 The SCRAM discharge volume drains into the
17 instrument volume. The function of the instrument volume is
18 to detect the presence of water in the SCRAM discharge
19 volume. The associated level switches are indicated here to
20 the lowest level to provide an alarm. The highest level
21 switch provides reactor SCRAM signal, while sufficient
22 volumes still remain in the SCRAM discharge volume for a
23 complete reactor SCRAM.

24 The vent and drain valves are open during normal
25 operation and provide for continuous draining. During

1 normal operation, the system is empty, free of water, and
2 the level switches on the instrument volume are there to
3 detect the presence of water.

4 During reactor SCRAM the SCRAM outlet and inlet
5 valves open. The SCRAM discharge volume vent and drain
6 valves close. As the control rod drive is forced upward
7 toward the core, water is forced into the SCRAM discharge
8 volume, and over a period of time the pressure rises in
9 volume to primary system pressure.

10 The level switch failures that occurred at Hatch
11 and Brunswick were these switches here. At the Hatch event
12 it was two of the high level SCRAM switches, and at the
13 Brunswick event it was the alarm and rod lock switch.

14 This slide shows a typical SCRAM discharge volume
15 level switch assembly. It is a float switch. It has a seal
16 welded float chamber, and a float stem which then extends
17 upward into the switch area. The failures observed at both
18 Hatch and Brunswick were all at this portion of the switch
19 here, the float assembly portion.

20 The Hatch and Brunswick events raised concerns
21 which led to the issuance of IE Bulletin 80-14. Both of
22 these events involved multiple SCRAM discharge instrument
23 volume level switch failures, and raised the concern that a
24 common cause of failure existed.

25 These events are described in the bulletin, and I

1 will answer the question that was raised previously, and say
2 two things more about these events.

3 In the Hatch event on June 13, two inoperable high
4 level SCRAM switches were. The cause was bent stems on each
5 of the float assemblies. The licensee believes the float
6 stems were bent prior to installation, and the modification
7 on the switches, which had been performed with the reactor
8 shutdown shortly before the surveillance, caused the
9 inoperability of the switches.

10 In the Brunswick event --

11 MR. KERR: Are the switches periodically tested?

12 MR. MILLS: Yes, the switches are periodically
13 tested as required by technical specifications on the SCRAM
14 switches. I believe that it is quarterly for functional and
15 calibration.

16 MR. KERR: They had not been tested since the
17 modification to which you referred?

18 MR. MILLS: They did the modification while they
19 were shut down, then tested the switches before they went
20 back up

21 MR. KERR: They tested okay, apparently?

22 MR. MILLS: They found the problem when they did
23 the test. So the test in this case did turn up the
24 problem. The test was satisfactory.

25 MR. KERR: Thank you.

1 MR. OKRENT: How do you do a functional on those
2 high level switches when you are running? What does that
3 mean?

4 MR. MILLS: It may be done different ways in
5 different plants. One way you can do it is close the
6 isolation valves on those switches, and insert pump water
7 into the switch until the float comes up, and it will
8 actuate the switch on top. That would not be a complete
9 calibration because it would not involve putting the water
10 in the instrument valve.

11 In the Brunswick event in November of 1979, the
12 alarm switch was found inoperable and the rod block switch
13 was also found inoperable. Again, the cause was damage to
14 the float assemblies. In this case, the damage was
15 apparently caused by a water-hammer event which had occurred
16 previously during a reactor SCRAM.

17 Following that apparent water-hammer event some
18 damage to the SCRAM discharge volume drain line support was
19 noticed. The reason for having potential for a water-hammer
20 on slow-valve closure rather than long-valve closure in this
21 particular case --

22 MR. KERR: Is there a diagram to which you can
23 point to show the valves in question. You had a previous
24 diagram which was very good, can you show it on that one?

25 MR. MILLS: Let me put that back up.

1 MR. LEWIS: You are not talking about
2 water-hammering on the water which was floating?

3 MR. MILLS: I will discuss that.

4 As I said, the SCRAM discharge valve will close
5 on the SCRAM signal. The SCRAM outlet, and the SCRAM inlet
6 valve is open. The operating temperature of the control rod
7 drive will be somewhere in the range of 200 degrees or
8 less. At the Browns Ferry event, for example, they ran
9 about 170 prior to the SCRAM there. So the initial water
10 that would be flowing into the instrument drive should be
11 relatively low temperature.

12 So these vents close and the water comes in. The
13 entering water should be lower temperature than the primary
14 system. However, if you left the vent and drain valves open
15 for an extended time period, the system would tend to heat
16 up into a higher flow rate and flow through the system.

17 At Brunswick they were observing a valve closure
18 time at around five minutes for that time. The normal
19 closure valve is on the order of seconds, maybe up to 30
20 seconds.

21 Following the water hammer event, the restraints
22 on the drain line were repaired. The licensee did a visual
23 examination of these switches and found no evidence of
24 damage to the switches, and did not perform a functional
25 test at that time.

1 MR. LEWIS: I am still not sure of what water
2 hammer happened.

3 MR. MILLS: The water hammer potential will be
4 part of our determination when we review the responses to
5 the bulletin.

6 MR. LEWIS: Is the water that hammered on that
7 diagram?

8 MR. KERR: What about showing us what water hammer
9 that occurred.

10 MR. MILLS: It would flow from the reactor vessel
11 into the SCRAM discharge volume through this system down
12 which goes to a drain thing, heating the system up. It
13 would be putting thermal loads onto this piping that it
14 would not normally have because normally it is insulated,
15 and the flow is stopped relatively shortly into the event.

16 Also the event that they observed, and the problem
17 with these switches, the switches, the rod block and SCRAM
18 switch, are a little bit different. The bottom tap on these
19 two comes into the drain line. As far as the level switches
20 are concerned, the hammer there might have been an increased
21 flow, but that actually ties in on this side of the vent
22 hole.

23 MR. EBERSOLE: Is it part of the design to close
24 the vent rapidly in order to provide a pneumatic cushion to
25 prevent an abrupt hammer?

1 MR. MILLS: No, because the valves may take up to
2 30 seconds to close.

3 MR. EBERSOLE: Are they deliberately delayed?

4 MR. MILLS: That is my understanding. The
5 specification for those valves allows them to take up to 30
6 seconds to close.

7 MR. EBERSOLE: It is intentional.

8 MR. MILLS: Yes, that is my understanding.

9 MR. EBERSOLE: For what purpose are they delayed?

10 MR. MILLS: There is air initially in the system.

11 MR. EBERSOLE: I know that.

12 MR. MILLS: I am not sure that I can answer this
13 question.

14 MR. EBERSOLE: All right.

15 MR. CARBON: Why did it take from November 1979
16 until June 1980 to issue this bulletin?

17 MR. MILLS: The Brunswick event with these two
18 switches was not a reportable occurrence at the time because
19 the switches are aligned with rod block switches rather than
20 the SCRAM switches. The significance that was placed on the
21 switches was less than had they been SCRAM switches.

22 MR. CARBON: When did the staff become aware of it?

23 MR. MILLS: We became aware of this event through
24 the operations center when it occurred, the Brunswick
25 event. Then the Hatch event, we picked up later during our

1 normal review of LERs. Then when we saw the Hatch event,
2 and coupled it with the Brunswick event, we had two events
3 each of which involved multiple failures of the switches.
4 So it raised a concern for common mode failure.

5 Maybe a water hammer is not really the correct
6 term for what happened to the switches, but with the drain
7 valve remaining open, apparently high flow went through the
8 switches, and they were damaged. The floats and the
9 switches were cracked, and they did receive a significant
10 amount of force during that event.

11 MR. PLESSET: This system is not designed to have
12 the --

13 MR. MILLS: To my knowledge, I can't say that they
14 are, because these vents and drains are designed to close
15 within a short time period.

16 MR. PLESSET: But they did full of the reactor
17 water?

18 MR. MILLS: Yes.

19 MR. MOELLER: You said in the first case that the
20 stem was bent, and you attribute that to the errors during
21 installation. Have you confirmed that that could not occur
22 during operational use?

23 MR. MILLS: I think what happened there is the way
24 that it normally happened, modifications on that switches,
25 those kind of switches, would be performed with the unit

1 shut down, or that system would be taken out of service.
2 After the modification, it would be tested prior to return
3 to operation.

4 MR. MOELLER: I don't think that you have answered
5 my question.

6 You stated that the valve stem or float stem was
7 bent in the case of the first failure, and you stated, I
8 believe, that the licensee said that the bending was done
9 during repair and reinstallation of the unit. Do you concur
10 with that, or could the bending have occurred due to binding
11 in operation?

12 MR. MILLS: There is the potential that it could
13 have occurred due to binding in operation. This is why we
14 are going to review how many bent stems have occurred
15 throughout the industry on discharge level switches, and see
16 if that has occurred elsewhere.

17 MR. MOELLER: Does that tell you if that is due to
18 a operational error or a design error?

19 MR. MILLS: It doesn't, but it is one of the
20 pieces of the puzzle to look at the operational performance,
21 the design, and the potential for water hammer.

22 MR. PLESSET: Can you tell us what the wall is,
23 and the clearances?

24 MR. MILLS: I know that the size of the chamber is
25 in the order of 10 inches.

1 MR. PLESSET: I am interested in the clearance.

2 MR. MILLS: I don't believe I have a clearance
3 number.

4 MR. PLESSET: Because it looks like it might be
5 very tight. It might have heated up and just stuck, and
6 then let go.

7 MR. MOELLER: Is that float with guides, or is it
8 sort of free floating. Does it float in subvertical guides?

9 MR. MILLS: The float part is normally empty.

10 MR. LEWIS. I am now confused by your answer to an
11 earlier question. I thought you said that these two
12 particular switches had been taken out, modified, and then
13 on the reinstallation test they were found to have been bent
14 stems, but that in normal operation they were tested
15 quarterly and, therefore, were working fine before they were
16 modified, in which case it is ambiguous that it was done
17 during the modification. Is that rong? That is the
18 impression I had from what you said earlier.

19 MR. MILLS: Let me double check.

20 My understanding is that the modification had been
21 performed on that shutdown, and the switch was tested prior
22 to going back up in power.

23 MR. LEWIS: The quest'on is that they were
24 undoubtedly damaged in modificacion, and I am trying to find
25 out for sure.

1 MR. MILLS: It is a combination. When they
2 inspected the switch, they did find wear marks on the side
3 of the chamber where the float head rubbed on the side of
4 the chamber. So even without knowing the design value of
5 the clearance in this case, the clearance did not exist
6 because the stem was bent, and the float was rubbing.

7 MR. LEWIS: It is a different story because now it
8 appears that the stems were bent before modification, and it
9 was a reinstallation that made it hang up because of the
10 bent stems. That is what it sounds like now.

11 MR. KERR: That is what he said the first time.

12 MR. EBERSOLE: On your diagram, you only show the
13 charge -- My understanding is that in addition is that
14 excess to the primary coolant check valve, to complete 50
15 percent of the stroke, that would be of some interest later
16 on when you talk about the half-failure, as to whether that
17 was a contributing cause --

18 MR. OKRENT: Can you tell me when in this thing
19 the water hammer may have occurred?

20 MR. MILLS: Brunswick had a reaction SCRAM in
21 October, I believe it was October 29. Following that SCRAM
22 is when they observed the damage on the drain pipe.

23 MR. OKRENT: I mean for the Brunswick reactor?

24 MR. MILLS: It was following that reactor SCRAM on
25 October 29.

1 MR. OKRENT: In what part of the system do you
2 think the water hammer occurred, and due to what?

3 MR. MILLS: I think that it occurred in the drain
4 piping because the piping may not have been designed to
5 accommodate water temperature not necessarily equal to the
6 primary temperature, but water to the temperature to which
7 was exposed in that event.

8 MR. SIESS: What we learned earlier about water
9 hammer is not what we mean by water hammer, and that is the
10 source of some confusion. I think that I am right about
11 that.

12 MR. JORDAN: I think I can try to help.

13 There was a hydraulic disturbance there and there
14 was a collapse of the stem board which caused movement of
15 fluid. We can postulate that having steam water in the stem
16 line which was not normally designed for that temperature
17 water and then stopping, we could have had a steam pocket
18 which could have condensed and then rattled the system.
19 Those things, as you know, are very --

20 MR. OKRENT: I am trying to understand the
21 following. I am assuming somehow that the water hammer is
22 associated with the valve marked 37A.

23 MR. JORDAN: The drain valve.

24 MR. OKRENT: When this closes in five minutes,
25 does that mean that it took five minutes to close, or

1 shortly before five minutes on the clock?

2 MR. JORDAN: It was fully closed in five minutes.
3 I don't know what happened.

4 MR. MILLS: The valve closed slowly. It was
5 closing over a period of five minutes.

6 MR. OKRENT: That is your interpretation.

7 MR. MILLS: The valve is controlled by -- It is an
8 air operated valve, and the solenoid up here which bleeds
9 the air off each of these valves, and the air was bleeding
10 off slowly, and the valve was closing slowly.

11 MR. OKRENT: If there was some kind of a steam
12 pocket collapse, where did you visualize this was, and when
13 did it collapse? If it was below the drain valve, why were
14 the instruments affected?

15 MR. MILLS: I can answer that.

16 Since the restraint damage was observed down here,
17 even though I don't know the mechanism of the water hammer,
18 definitely there were large forces applied in this area
19 right here. The switches are piped into the drain line. In
20 this case the valve stayed open, so there may have been a
21 large amount of flow through these switches as the valves
22 opened as compared to the normal case.

23 MR. OKRENT: You are suggesting that the water
24 hammer occurred with the valve open.

25 EBERSOLE: The solenoid valve in the discharge

1 line to the valve leading slightly, would it be hot water
 2 going into the valve here?

3 MR. MILLS: If the valve leaked slightly?

4 MR. EBERSOLE: Would it be hot water steaming?
 5 Could they be filled with steam, even if they appeared empty?

6 MR. MILLS: It would depend on the size of the
 7 leak. If you have a leak through one of these valves, the
 8 control rod drive temperature will increase depending on the
 9 size of the leak.

10 There is a very slow flow rate on the order of
 11 less than a gallon a minute, and maybe less than a half a
 12 gallon.

13 MR. EBERSOLE: Several of them?

14 MR. MILLS: If you had enough of them leaking,
 15 you could cause an increased temperature in this area.

16 MR. EBERSOLE: The vapor would not be detected as
 17 a level?

18 MR. MILLS: That event would not go undetected in
 19 my mind because the control rod drive temperature are
 20 printed out in the control room. In the Browns Ferry event,
 21 I looked at recordings of these temperatures, and they were
 22 all very low. They were less than 170 degrees, none of them
 23 were up over 200 which would indicate any kind of potential.

24 --
 25

NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

in the matter of: ACRS - 243rd Meeting.

Date of Proceeding: July 10, 1980

Docket Number: _____

Place of Proceeding: Washington, D. C.

were held as herein appears, and that this is the original transcript thereof for the file of the Commission.

Suzanne Babineau

Official Reporter (Typed)

Suzanne Babineau

Official Reporter (Signature)

NUCLEAR REGULATORY COMMISSION

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Date of Proceeding: July 10, 1980

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David S. Parker

Official Reporter (Typed)



Official Reporter (Signature)

NUCLEAR REGULATORY COMMISSION

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were held as herein appears, and that this is the original transcript thereof for the file of the Commission.

Patricia Minson

Official Reporter (Typed)

Patricia Minson

Official Reporter (Signature)

ALTERNATIVE LOFI
TEST PROGRAMS

CONSIDERED FOR ACRS
JULY 10, 1980

<u>CASE</u>	<u>BUDGET</u>		<u>NUMBER OF TESTS</u>
	<u>FY 82</u>	<u>FY 83</u>	
1. BEGIN PHASE-OUT IN FY 82	35	39	8
2. BEGIN PHASE-OUT END FY 82	48	39	9
3. CONTINUE TESTING THROUGH END OF FY 84	48	53	20

CASE 1 ASSUMPTION

\$35M IN FY 82, TO TERMINATE MID FY 82

<u>DATE</u>	<u>TEST</u>	<u>REMARKS</u>
9/80	L3-5/L6-1	4-IN SMALL BREAK, PUMPS OFF/LOSS STEAM LOAD
11/80	L3-6/L6-2	4-IN SMALL BREAK, PUMPS ON/LOSS OF PCS FLOW CORE UNCOVERY - PERHAPS
3/81	L6-7/L3-3	OPERATIONAL TRANSIENT (LOSS-OF-FEEDWATER) WITH LOSS OF FIRST SCRAM & FOLLOWED BY SMALL BREAK WHERE SG. RUNS DRY.
CONTAINMENT VESSEL LEAK TEST		
7/81	L2-5	LARGE BREAK LOCA WITH LOSS OF OFFSITE POWER INITIATED AT POWER PREDICTED TO RAISE CLAD TEMPERATURE TO α - β TRANSITION.
CENTER FUEL MODULE CHANGE OUT		
1/82	L2-6	LARGE BREAK LOCA WITH LOSS OF OFFSITE POWER, PREPRESSURIZED FUEL, PREDICTED TO CAUSE CLAD BALLOONING.
REMOVE CORE TO AWAIT INSPECTION BEGINNING LATE FY 1982		

CASE 1

TESTS ELIMINATED BY TERMINATING TESTING MID FY 82

ALL (2) INTERMEDIATE SIZED BREAKS

ALL (2) ANTICIPATED TRANSIENTS WITHOUT SCRAM

ALL (2) LOCAs WITH STEAM GENERATOR TUBE RUPTURES

ALL (3) ALTERNATE ECC INJECTION TESTS

ONE OPERATIONAL TRANSIENT WITH SECOND FAILURE LEADING TO COLD RECRITICALITY
ACCIDENT

ONE OPERATIONAL TRANSIENT

ONE LARGE BREAK LOCA AT HIGHEST POWER

POSSIBILITY OF CORE DAMAGE TESTS

PLUS

ASSOCIATED UNDERSTANDING OF NUCLEAR PLANT PERFORMANCE AND
ADVANCED OPERATOR DISPLAY SYSTEMS DURING THESE TESTS.

CASE 2 ASSUMPTION

\$48M IN FY 82, WITH DIRECTION TO TERMINATE AT END FY 82

<u>DATE</u>	<u>TEST</u>	<u>REMARKS</u>
9/80	L3-5/L6-1	4-IN SMALL BREAK, PUMPS OFF/LOSS STEAM LOAD
11/80	L3-6/L6-2	4-IN SMALL BREAK, PUMPS ON/LOSS OF PCS FLOW CORE UNCOVERY - PERHAPS
3/81	L6-7/L3-3	OPERATIONAL TRANSIENT (LOSS-OF-FEEDWATER) WITH LOSS OF FIRST SCRAM & FOLLOWED BY SMALL BREAK WHERE SG. RUNS DRY.
CONTAINMENT VESSEL LEAK TEST		
7/81	L6-3	LOSS OF FEEDWATER WITH DELAYED SCRAM, STUCK OPEN RELIEF VALVE ON SECONDARY SIDE LEADING TO COLD WATER, RECRITICALITY ACCIDENT.
9/81	L2-5	LARGE BREAK LOCA WITH LOSS OF OFFSITE POWER INITIATED AT POWER PREDICTED TO RAISE CLAD TEMPERATURE TO α - β TRANSITION.
CENTER FUEL MODULE CHANGE OUT		
3/82	L2-6	LARGE BREAK LOCA WITH LOSS OF OFFSITE POWER, PREPRESSURIZED FUEL, PREDICTED TO CAUSE CLAD BALLOONING.
REMOVE CORE TO AWAIT INSPECTION IN FY 1983		

CASE 2

TESTS ELIMINATED BY TERMINATING TESTING SEPT. 82

ALL (2) INTERMEDIATE SIZED BREAKS

ALL (2) ANTICIPATED TRANSIENTS WITHOUT SCRAM

ALL (2) LOCAs WITH STEAM GENERATOR TUBE RUPTURES

ALL (3) ALTERNATE ECC INJECTION TESTS

ONE OPERATIONAL TRANSIENT

ONE LARGE BREAK LOCA AT HIGHEST POWER

POSSIBILITY OF CORE DAMAGE TESTS

PLUS

ASSOCIATED UNDERSTANDING OF NUCLEAR PLANT PERFORMANCE AND

ADVANCED OPERATOR DISPLAY SYSTEMS DURING THESE TESTS.

A DECISION IN 1980 TO TERMINATE TESTING MID OR END FY 1982 MEANS:

PROBABLE EARLY EXODUS OF KEY PERSONNEL
LITTLE FLEXIBILITY REMAINING IN TEST PROGRAM
LOW PROBABILITY TO LATER REVERSE DECISION DUE TO TEAM
BREAKUP AND LOSS OF FUEL SUPPLIER.
LOSS OF THE WORLDS ONE NUCLEAR FACILITY TO TEST
NEW & UNRESOLVED ISSUES
NEW TECHNIQUES

FY 83 BUDGET REQUIREMENT IF TESTING
TERMINATED IN FY 82

	\$M
DECOMMISSION	25
EXAMINE DAMAGED FUEL	5
DISPOSE OF SPENT FUEL & REPLACE USED U235	5
COMPLETE ANALYSIS OF RESULTS	<u>4</u>
TOTAL	\$39M

July 2, 1980
GDM

FY 1980

FY 1981

FY 1982

FY 1983

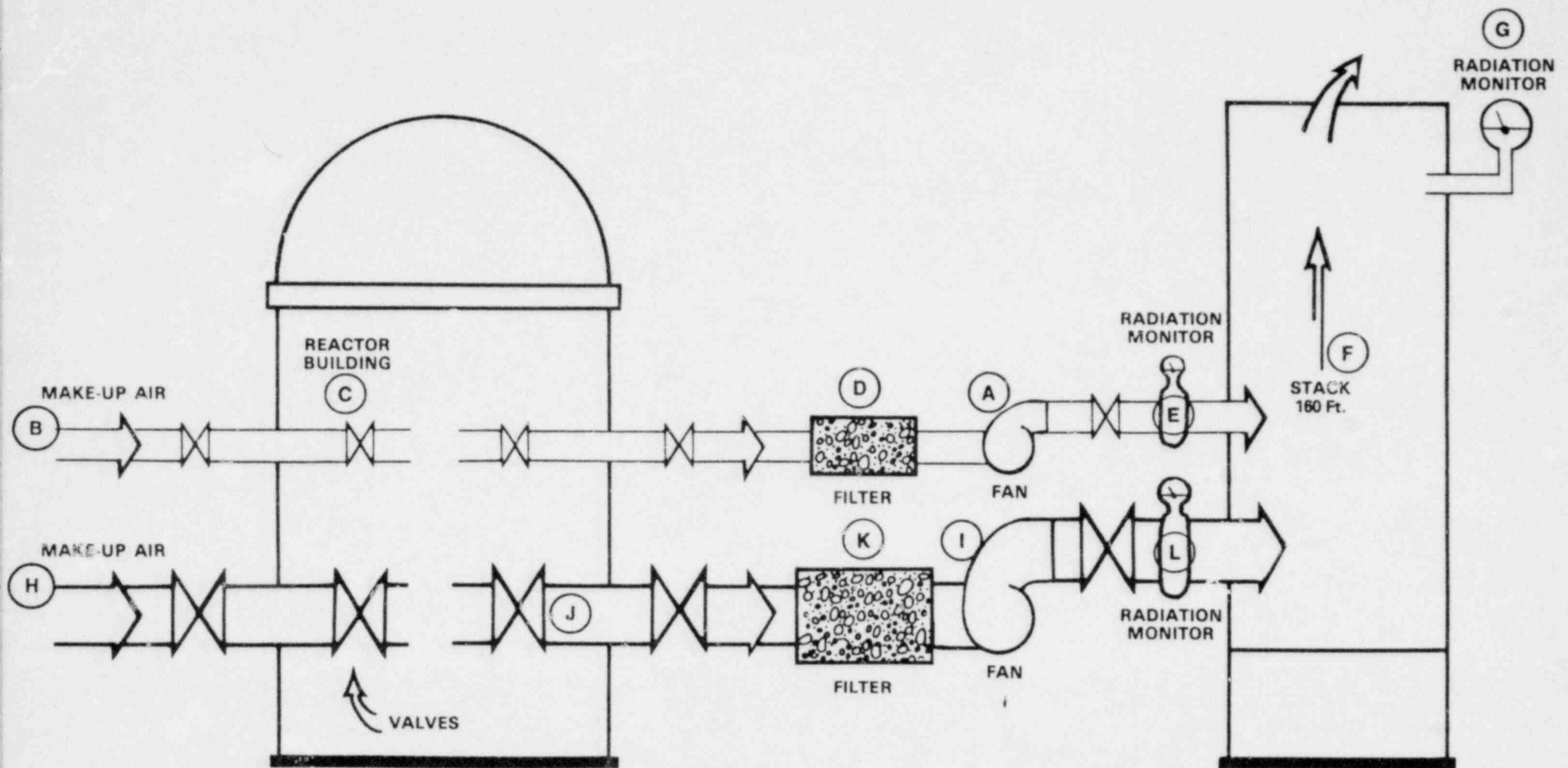
FY 1984

Date	Large Break	Small Break	Alternate ECCS	Intermediate Break	Transient	Break with SG tube rupture
Nov		Cold Leg, Break Flow greater than HPIS Flow (L3-1)				
Dec						
Jan						
Feb		Cold Leg, HPIS Flow greater than Saturated Break Flow (L3-2)				
Jun					Operational, Loss of Feedwater (L6-5)	3
Jul		Cold leg, HPIS Flow greater than Saturated Break Flow (L3-7)				
Aug						
Sep		Power Operated Relief Valve (L3-4)			Operational, Loss of Steam Load (L6-1)	3
Oct						
Nov		Intact Loop Cold Leg, Pumps Off (L3-5)	2		Operational, Loss of PCS Flow (L6-2)	3
Dec						
Jan		Intact Loop Cold Leg, Pumps On (L3-6)	2			
Feb						
Mar						
Apr					ATWS, Loss of Feedwater, delayed scram (L6-7)	3
May		Cold Leg, HPIS Flow approximately equal to Break Flow (L3-3)				
Jun						
Jul		CV LEAK TEST				
Aug					Operational, Excessive Load Increase (L6-3)	3
Sep				unspecified at this time (L5-1)		
Oct						
Nov		DECLB, Simulated pump coastdown due to loss of commercial power (L2-5)	4			
Mar		CENTER FUEL MODULE CHANGEOUT				
Apr						
May					Operational, Rod Withdraw (L6-4)	3
Jun				unspecified at this time (L5-2)		

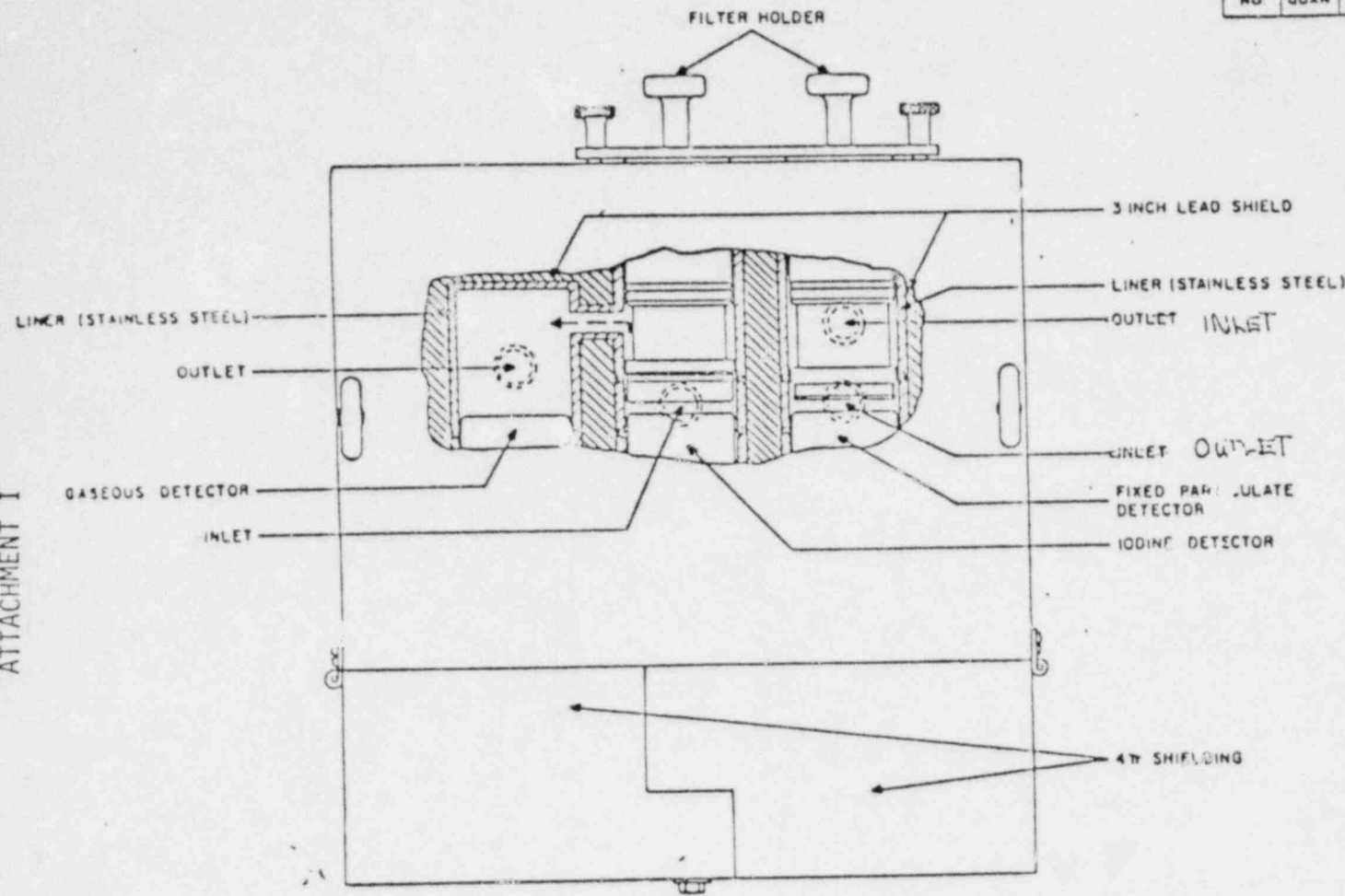
1. TESTS REQUESTED SPECIFICALLY BY NRR FOLLOWING TMI, FOR GENERAL UNDERSTANDING OF SMALL BREAKS. SUPPORTIVE OF TMI INVESTIGATIONS AND NRC ACTION PLAN.
2. TESTS REQUESTED BY NRR FOLLOWING TMI TO RESOLVE QUESTION OF PUMP OPERATION DURING SMALL BREAK LOCA. NRR HAS REQUIRED L3-6 BE PREDICTED BY UTILITIES, IN SUPPORT OF NRC ACTION PLAN TASK I.C.
3. AGREED BY NRR VENDORS, UTILITIES AS NEEDED FOR TRANSIENT CODES, AND NRC ACTION PLAN TO IMPROVE UNDERSTANDING OF OFF NORMAL PLANT BEHAVIOR AND INCLUDE THIS IN OPERATOR TRAINING.
4. TO COMPLETE OUTSTANDING COMMITMENT REGARDING NRR'S NEED FOR LARGE BREAK LOCA DATA.

Jul					ATWS (L6-8)	
Aug						SGTR/LOCA (L7-1)
Sep					ATWS (L6-9)	
Oct						SGTR/LOCA (L7-2)
Nov						
Dec				Downcomer Injection (L4-1)		
Jan						
Feb						
Mar				Upper Plenum Injection (L4-2)		
Apr						
May				Combined Hot & Cold Leg Injection (L4-3)		

VENTING SYSTEMS FOR TMI 2 REACTOR BUILDING



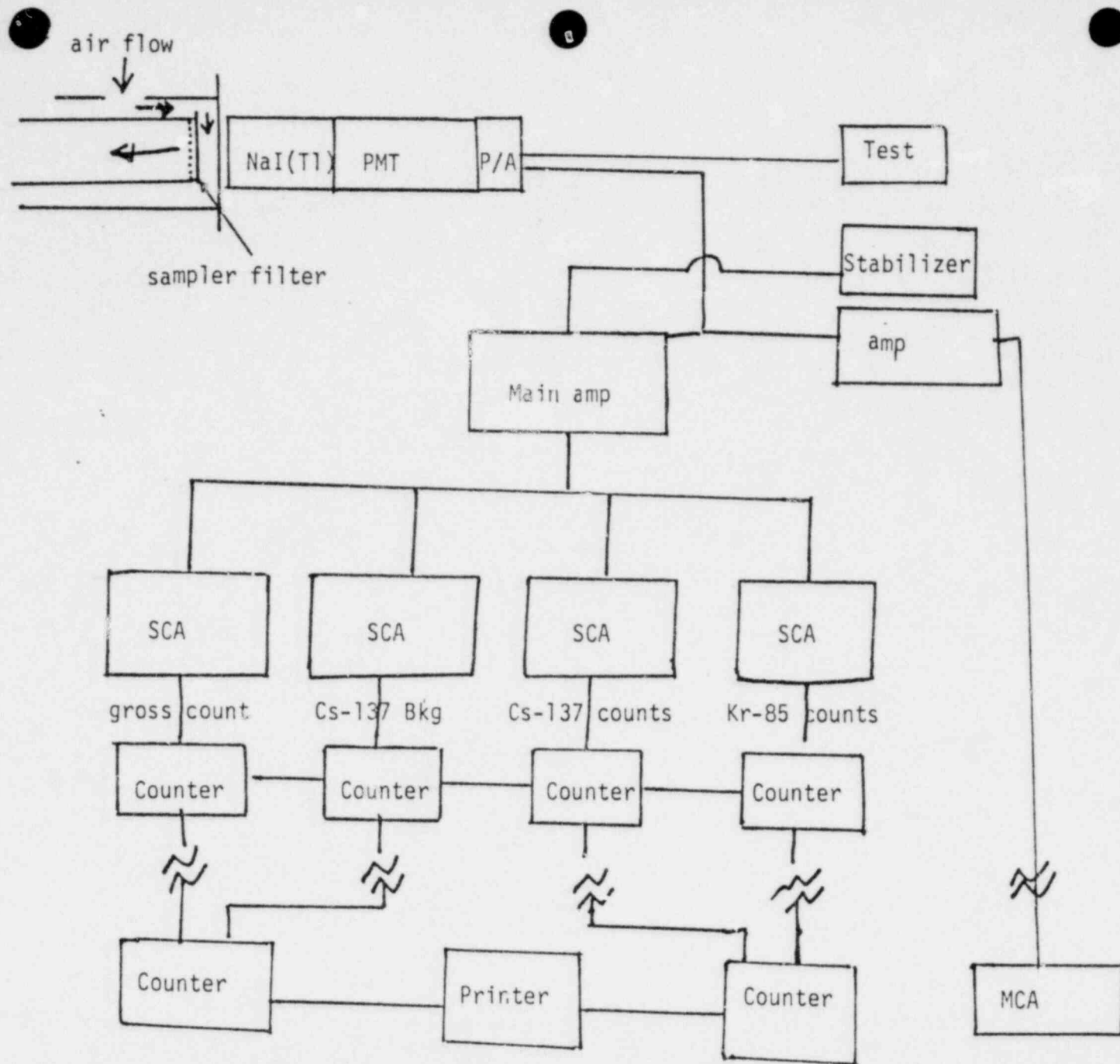
ATTACHMENT I



MULTIPLE DETECTOR
PARTICULATE - IODINE - GAS
SA-6

NO.	QUAN.	PER.	DESCRIPTION
-----	-------	------	-------------

CHKD	APP	DATE	DESCRIPTION	DATE	BY	CHKD
			EBERLINE INSTRUMENT CORPORATION SANTA FE, NEW MEXICO			
DR	M. C. ...	9/1/52	MULTIPLE DETECTOR PARTICULATE-IODINE-GAS SA-6			
CHKD		9/1/52				
PROJ	H. J. ...	9/1/52				
APP	T. S. ...	9/1/52				
DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED						
FRAC	DEC	ANG	SCALE			
± 1/64	± .001 - DIA	± 1/2				



ATTACHMENT 2

TWO-PART PRESENTATION ON RECENT OPERATING EXPERIENCE
RELATED TO THE BWR SCRAM FUNCTION

--IE BULLETIN 80-14 - DEGRADATION OF SCRAM DISCHARGE
VOLUME CAPABILITY, ISSUED JUNE 12, 1980

- MULTIPLE FAILURES OF SDV LEVEL SWITCHES
AT HATCH AND BRUNSWICK

--IE BULLETIN 80-17 - FAILURE OF CONTROL RODS TO
INSERT DURING A SCRAM AT A BWR, ISSUED JULY 3, 1980

- FAILURE OF 76 OF 185 CONTROL RODS TO FULLY
INSERT DURING SCRAM AT BROWNS FERRY 3 ON
JUNE 28, 1980

BULLETIN 80-14

DEGRADATION OF SCRAM DISCHARGE VOLUME CAPABILITY

THE CONCERNS WHICH LED TO ISSUANCE

--TWO EVENTS INVOLVING MULTIPLE SDIV LEVEL SWITCH FAILURES
RAISED CONCERN THAT A COMMON CAUSE OF FAILURE EXISTED.

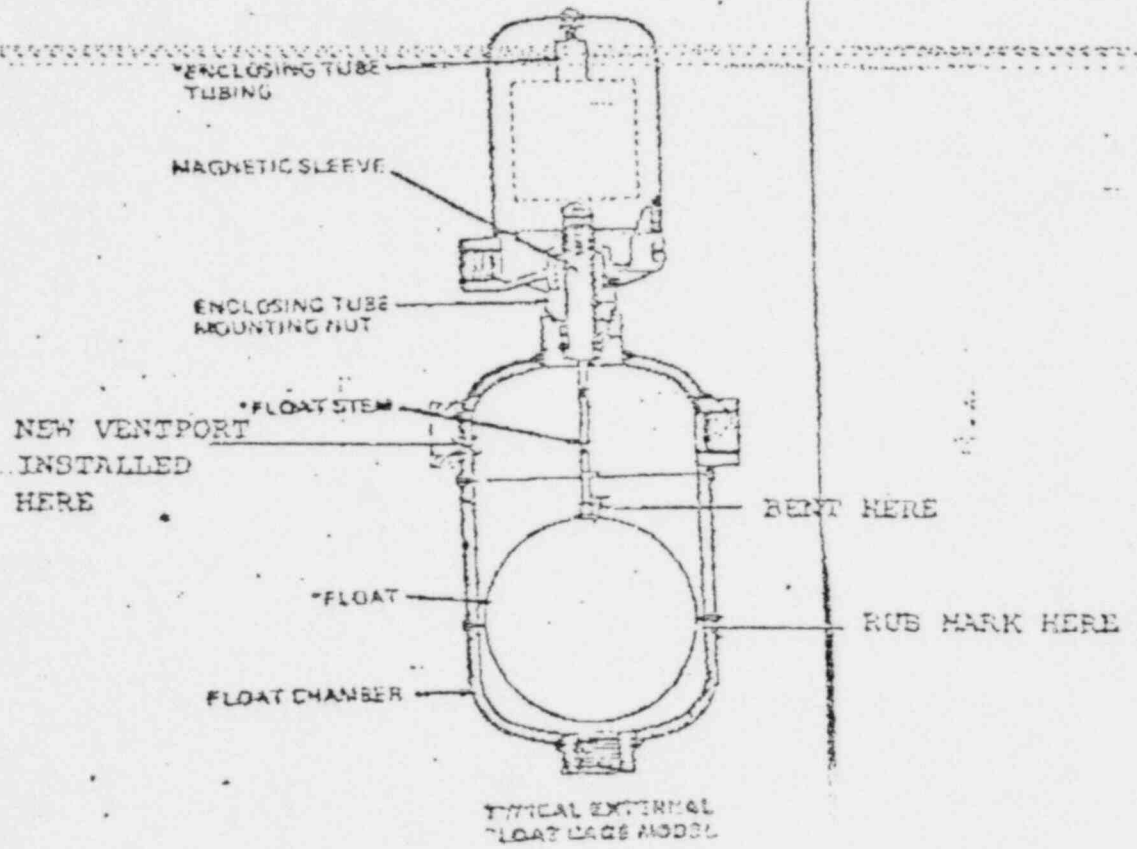
HATCH 1, JUNE 13, 1979 FOUND TWO INOPERABLE
HIGH LEVEL SCRAM SWITCHES--CAUSE WAS BENT
STEM ON FLOAT ASSEMBLIES

BRUNSWICK 1, NOVEMBER 1979 FOUND INOPERABLE ALARM
AND ROD BLOCK SWITCHES--CAUSE WAS DAMAGED FLOAT
ASSEMBLIES

--REACTOR OPERATION WITH SDV VENT AND DRAIN VALVES CLOSED

BRUNSWICK 1, NOVEMBER 1979 REACTOR STARTUP WITH
CLOSED SDV VENT AND DRAIN VALVES DUE TO UNAVAILABILITY
OF REPAIR PARTS

TYPICAL SDV LEVEL SWITCH ASSEMBLY



BULLETIN 80-14

DEGRADATION OF SCRAM DISCHARGE VOLUME CAPABILITY

OBJECTIVES OF BULLETIN 80-14

- REQUIRE OPERABLE SDV VENT AND DRAIN VALVES
- REQUIRE OPEN SDV VENT AND DRAIN VALVES DURING OPERATION
- REQUIRE PERIODIC TESTING OF SDV VENT AND DRAIN VALVES
- REQUIRE OPERABLE ROD BLOCK AND ALARM SWITCHES
- REQUIRE PERIODIC TESTING OF ROD BLOCK AND ALARM SWITCHES
- OBTAIN FAILURE DATA TO EVALUATE POTENTIAL FOR LEVEL SWITCH MALFUNCTION, ESPECIALLY FROM COMMON CAUSE

BULLETIN 80-14

DEGRADATION OF SCRAM DISCHARGE VOLUME CAPABILITY

FINDINGS TO DATE

--IMMEDIATE SURVEY OF PLANTS DETERMINED VENTS
AND DRAINS OPEN ON ALL PLANTS

--45-DAY REPORTS DUE JULY 27, 1980

--REPORT OF INOPERABLE (STICKY) ROD BLOCK AND
ALARM SWITCHES AT BROWNS FERRY

SEQUENCE OF EVENTS

BROWNS FERRY 3

FAILURE TO COMPLETE SCRAM 6/28/80

<u>Time</u>	<u>Event</u>
01:31	Manual Scram from 400 MW (~30% Power) All rods on west side fully insert - on east side 13 rods travel full in, 5 rods were already fully inserted - 18 rods on east side fully inserted, 76 rods partially inserted after scram
01:36	Reset Reactor Protection System (RPS) and initiated manual scram - rods on east move 12 inches average - 34 rods fully inserted
01:37	Reset RPS and initiated manual scram - rods on east move 7 inches average - 56 rods fully inserted
01:43	Reset RPS and move Scram Discharge Volume (SDV) switch to "Normal" - received auto scram on high discharge volume. All east rods fully inserted.

NOTE: SDV vents and drains opened between scrams but drain times were not sufficient to completely drain system.

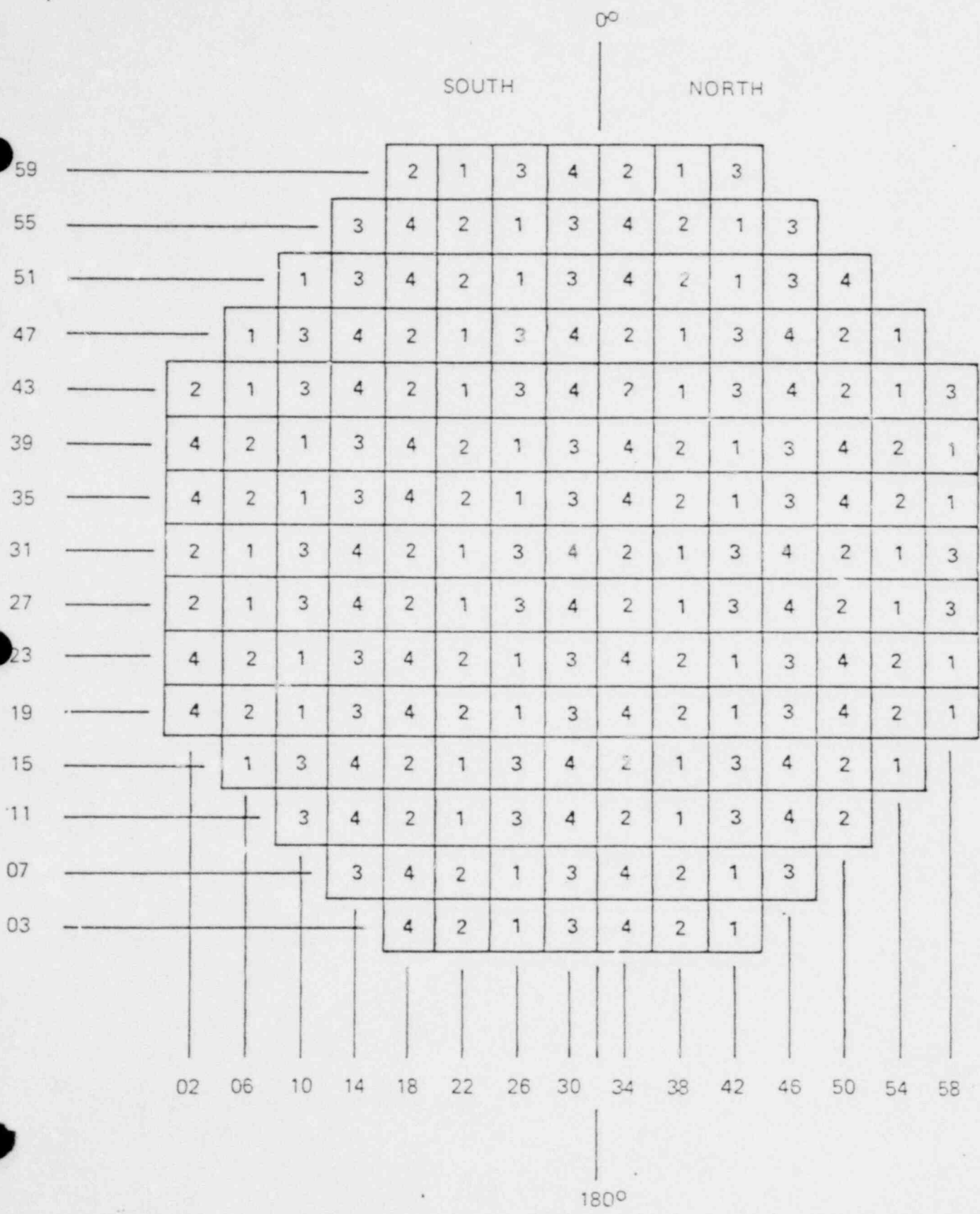


FIGURE 7.1-3 Control Rod Scram Group Assignment

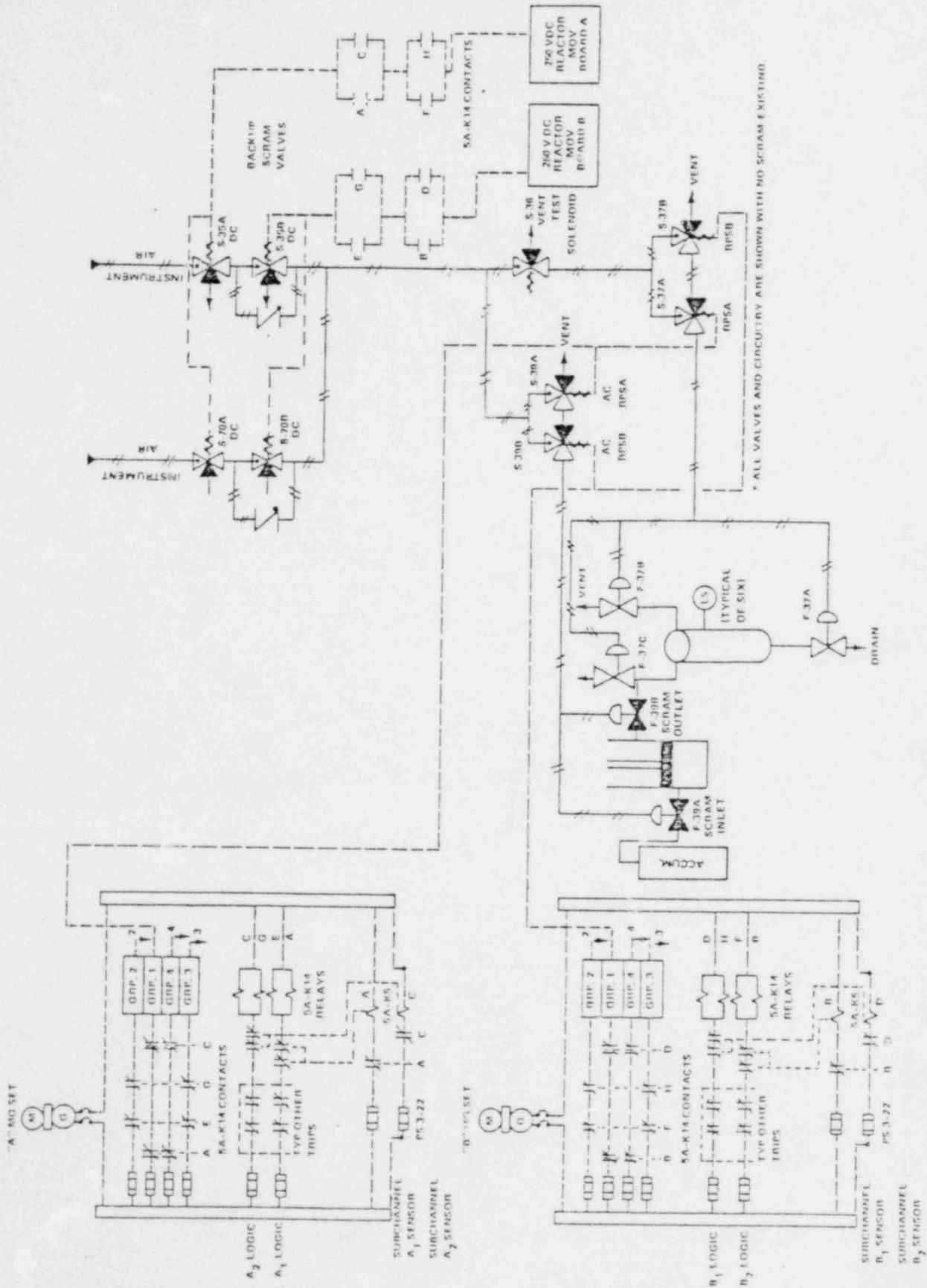
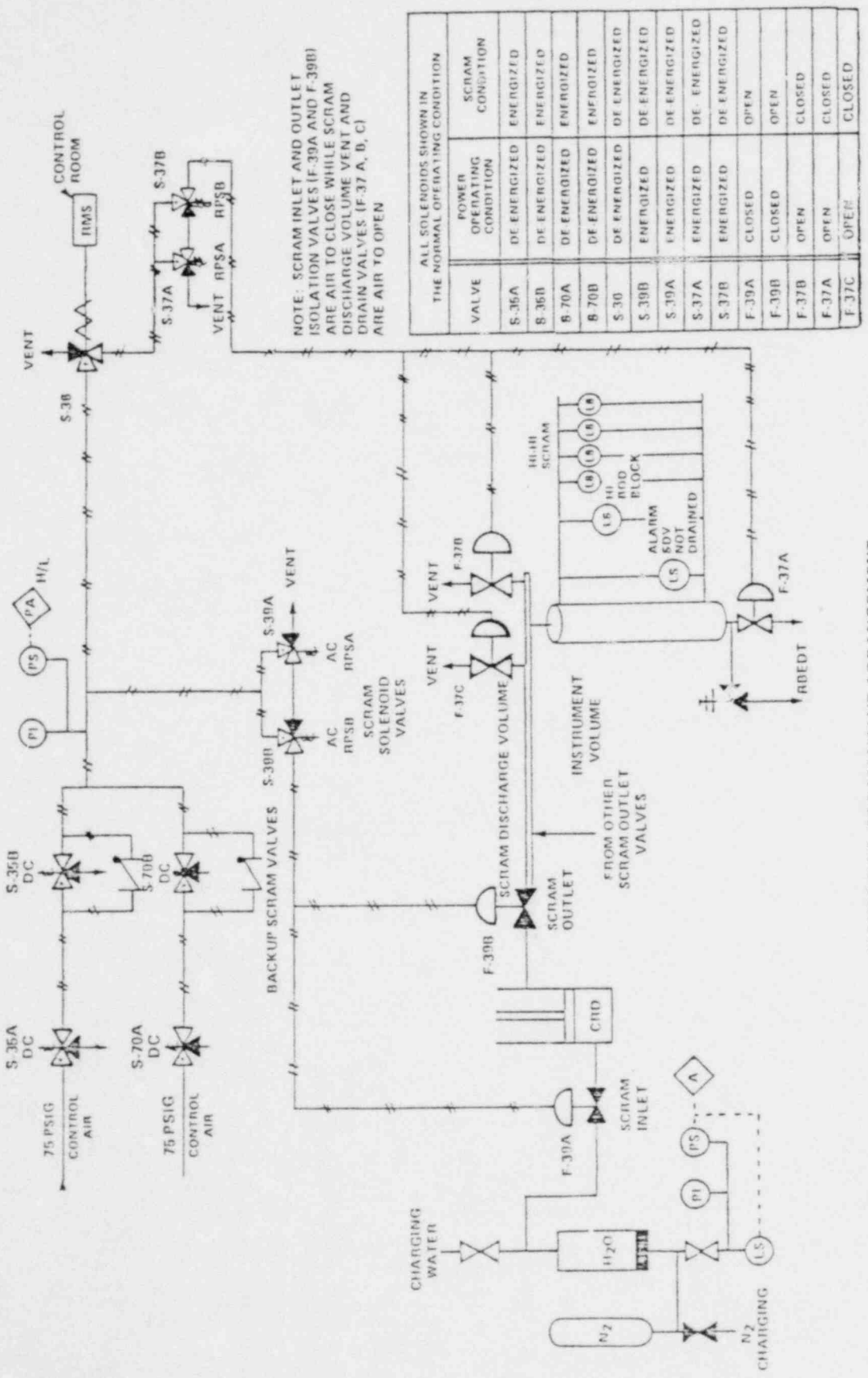


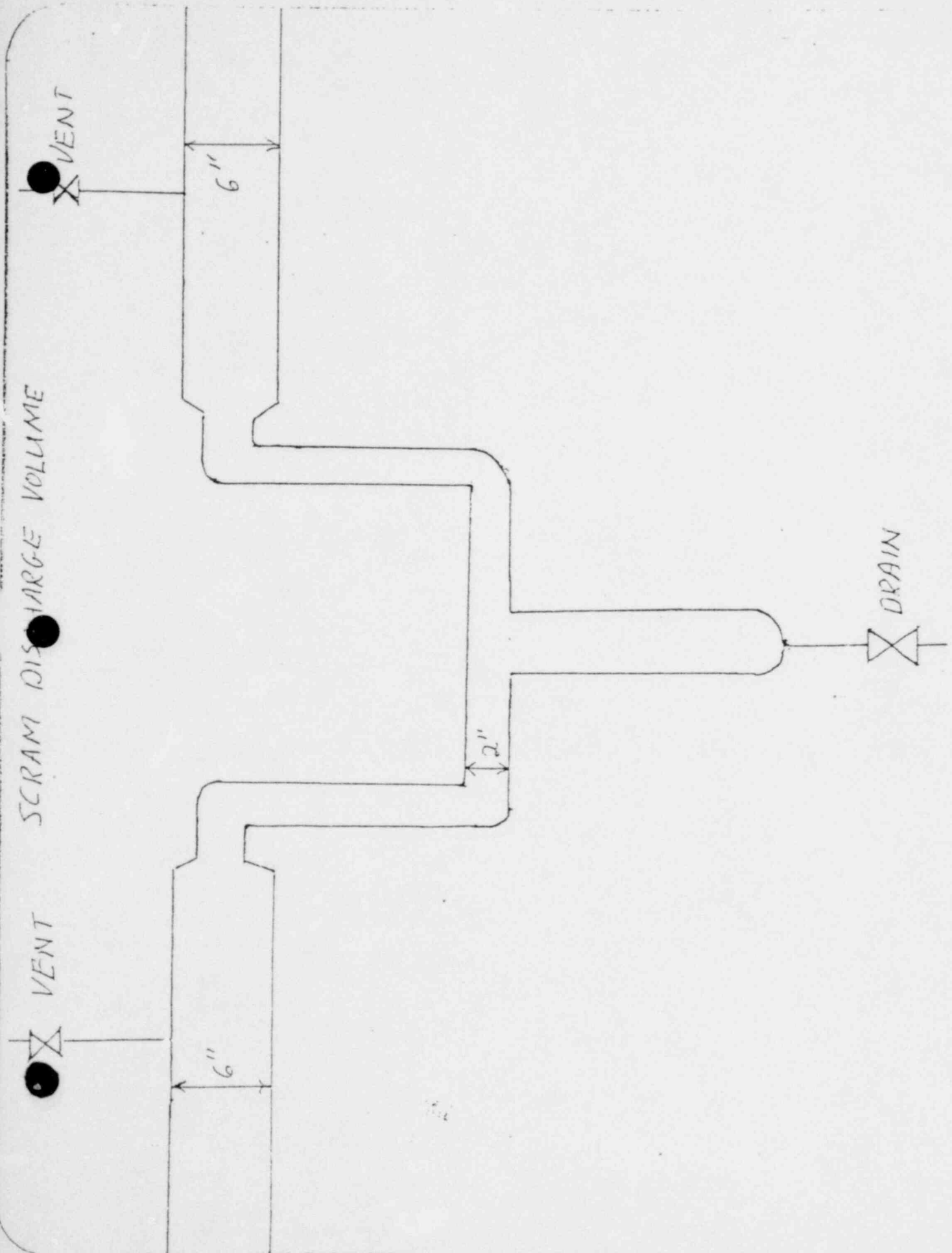
FIGURE 7.1-6 RPS FUNCTIONAL DIAGRAM



*WHEN SOLENOID IS ACTUATED THE DOTTED PORT AND THE CLOSED PORT WILL SWITCH POSITIONS

FIGURE 7.1-4 SCRAM VALVE ARRANGEMENT

SCRAM DISCHARGE VOLUME



BROWNS FERRY
INVESTIGATION INTO CAUSE
(ITEMS COMPLETED)

1. Hydraulic Control Valve Alignment Verified
2. East Bank Vent Valve Verified Operable
3. Friction Tested 35 Rods
4. Verified Calibration of 3-Gallon, 25-Gallon, and 50-Gallon Level Switches on Instrument Volume
5. Completed Radiation Survey of Drain Lines to Determine if Hot Spots Exist Indicating Blockage
6. Completed Radiation Survey of #3 Equipment Drain Sump
7. Sampled #3 Equipment Drain Sump
8. Sampled Reactor Coolant System
9. Verified that Off Gas Radiation Levels Were Normal
10. Completed Visual and Mechanical Inspections of Vents and Drains in Scram Discharge Volume
11. Verified that No Maintenance or Modification Performed that Would Affect Control Rod Drives
12. Reviewed Scram History for Previous Failures
13. Performed Pressure, Flow and Drain Time Testing on East and West Headers

INVESTIGATION INTO CAUSE (CONTINUED)

14. Performed Evaluation and Inspection to Assure Electrical Separation and Diversity
15. GE Engineers Performed Extensive Evaluations and Inspections
16. Scram Actuators Tested to Ensure Zero Voltage to Each Group Pilot Solenoid Valve
17. Cut and Inspected 2-Inch Line Vent Header Piping With Boroscope
Inspection of 6-Inch Headers and Scram Discharge Instrument
Volume

No Anomalies found as a result of the above tests and inspections.

BROWNS FERRY

SUMMARY STATEMENT OF ELECTRICAL EVALUATION

Electrical Fault/Malfunction - This area has been evaluated by TVA and NRC. The following verifications have been made:

1. Response times of initiating a scram to de-energization of scram pilot valves were acceptable.
2. Verified that the scram groups (4/channel; 8 total) are not divided East and West but are dispersed among East and West hydraulic control units.
3. Scram valves for each control rod operated as verified by blue lights indicated in the control room.
4. Immediate inspection of the scram group fuse cabinets for jumpers or alternate power supplies - found none.

CONCLUSION: Based on the preceding tests it is concluded that an electrical malfunction could not have created the West only scram.

BROWNS FERRY

PLANNED TESTING

1. Fill Verification Testing - Determine the adequacy of ultrasonic testing to measure water level in Scram Discharge Volume 6-inch headers.
2. Vacuum Hold Test - Determine if a blocked vent path will prevent drainage of the 6-inch Scram Discharge Piping.
3. Drain Test - Demonstrate that the system will drain in a predictable manner from a normal alignment.
4. Friction Test - Demonstrate normal insert - withdrawal operation of the drives in the east bank.
5. Scram Testing
 - a. Full scram test at rated conditions from zero position to verify proper operation of electric components and hydraulic control units.
 - b. Individual rod scrams at various conditions from position 48 to verify scram capability within Tech Specs times (east bank rods).

BROWNS FERRY - ALL UNITS

NEAR TERM ITEMS IMPLEMENTED

1. UT check of scram discharge volume piping for water after each scram.
2. Instruct all shift crews how to respond to an event of this type.
3. Perform surveillance of each scram discharge instrument volume level switches at least once/month.
4. Visually check the CRD valves at least once/shift.
5. Unit 3 to remain shut down until investigation is completed and NRC concurs in restart.

BULLETIN REQUIREMENTS

1. For BWR's That Are Operating
Within 3 days of bulletin perform prescribed surveillance tests on the Scram Discharge Volume System.
2. Within 20 days, unless otherwise directed, perform one automatic and one manual scram at normal operating temperature and pressure with more than 50% of the rods fully withdrawn.
3. At the conclusion of scram tests, verify the operability of the Scram Discharge Volume System.
4. Review emergency operating procedures (include those prepared by the NSSS) to ensure that required specific operator actions for the occurrence of this type of event are adequate.
5. Develop surveillance procedures to monitor the Scram Discharge Volume for water accumulation.
6. Take specified actions to mitigate the consequences of an ATWS event.
7. Results of completed tests to be submitted to the NRC within 5 days of the performance of each test.
8. Those BWRs that are currently in a shutdown status will perform these tests prior to power operation.

BWR STATUS AS OF 7/3/80

<u>Facility</u>	<u>Status</u>	<u>Shutdown Date</u>	<u>Restart Estimate</u>	<u>Comment</u>
Fitzpatrick	S/D	5/6/80	7/19/80	Torus Mod.
* Millstone 1	oper.			
* Nine Mile Point 1	oper.			
Oyster Creek	S/D	1/5/80	7/8/80	Refuel
Peach Bottom 2	S/D	3/21/80	7/24/80	Refuel
Peach Bottom 3	oper.			
Pilgrim	oper.			
* Vermont Yankee	oper.			
Browns Ferry 1	oper.			
Browns Ferry 2	oper.			
Browns Ferry 3	S/D	7/2/80		CRD
Brunswick 1	S/D	5/26/80	7/7/80	Refuel
Brunswick 2	S/D	3/1/80	7/8/80	Refuel
Hatch 1	oper.			
Hatch 2	oper.			
* Big Rock Point	oper.			
* Dresden 1	S/D	10/1/78	Long Term	Chem Cleaning
* Dresden 2	oper.			
* Dresden 3	oper.			
Duane Arnold	oper.			
La Crosse	oper.			
Monticello	oper.			
* Quad Cities 1	S/D	7/2/80	7/5/80	Feedwater Check Valv
* Quad Cities 2	oper.			
Cooper	oper.			

*RCP Trip Not Installed