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NUCLEAR REGULATORY COMMISSION

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Quarterly Source Term
Briefing

(Public Meeting)

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1 UNITED STATES OF AMERICA
2 NUCLEAR REGULATORY COMMISSION

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4 QUARTERLY SOURCE TERM BRIEFING

5 ***

6 [PUBLIC MEETING]

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8 Nuclear Regulatory Commission
9 Room 1130
10 1717 H Street, Northwest
11 Washington, D.C.

12
13 Monday, November 4, 1985

14
15 The Commission met in open session, pursuant to
16 notice, at 10:10 a.m., the Honorable NUNZIO J. PALLADINO,
17 Chairman of the Commission, presiding.

18 COMMISSIONERS PRESENT:

19 NUNZIO J. PALLADINO, Chairman of the Commission
20 THOMAS M. ROBERTS, Member of the Commission
21 JAMES K. ASSELSTINE, Member of the Commission
22 FREDERICK M. BERNTHAL, Member of the Commission
23 LANDO W. ZECH, JR., Member of the Commission
24
25

1 STAFF AND PRESENTERS SEATED AT COMMISSION TABLE:

2 S. CHILK

3 H. PLAINE

4 W. DIRCKS

5 H. DENTON

6 M. ERNST

7 D. ROSS

8 T. SPEIS

9

10 AUDIENCE SPEAKERS:

11 Z. ROSZTOCZY

12 J. MITCHELL

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P R O C E E D I N G S

CHAIRMAN PALLADINO: Good morning, ladies and gentlemen. We meet today with representatives from the Staff to discuss the present status of the Staff's source term assessment and anticipate future source term program actions.

Work on source term has been a long range and multi-pronged effort. We've had previous public discussions with representatives of the Atomic Industrial Forum, the American Nuclear Society, the American Physical Society and other interested groups and the NRC Staff, the most recent being the discussions with the Staff on July 24th, 1985. The draft NUREG 0956, the draft source term technology report was issued for comment in July of this year.

Today's discussion with the Staff will focus on current status and future actions with respect to the Staff's forthcoming final source term report, which is to assess the body of new information with respect to the validity and potential applicability of this information to the regulatory process.

Of particular interest to the Commission at today's meeting are the advances that have been made in improvement of the source term computer model and the present Staff thoughts on the development of a methodology for application of current source term data to specific cases.

Last week I attended the opening session of the IAEA

1 source term symposium at Battelle Columbus, Ohio. It's
2 worth noting that 29 countries were represented at this
3 meeting. It's encouraging to know that we're not alone in
4 this difficult and important effort.

5 I would like to spend the last 10 minutes or so of
6 today's meeting discussing the amount of work remaining to be
7 done and the Staff's schedule. I believe it's important to
8 have a clear understanding of critical issues and the
9 prioritization which is afforded to them.

10 I understand that Region II has requested to listen
11 by telephone, and I believe they are connected.

12 Do any of my fellow commissioners have any
13 additional comments at this time?

14 (Chorus of nos.)

15 CHAIRMAN PALLADINO: All right. We had expected
16 Mr. Dircks to be here. He's been delayed due to traffic, but
17 I suggest we get started. I'll turn the meeting over to
18 Mr. Denton, and then when Mr. Dircks come here we can have him
19 make any remarks he'd like to make of general content.

20 MR. DENTON: Thank you, Mr. Chairman. We have a
21 two-part presentation this morning. Themi Speis will discuss
22 the structure on how we intend to implement the results that
23 are coming out of the Research program. And Denny Ross and
24 Mal Ernst will discuss the status of some of the research and
25 bring to your attention some of the more recent findings and

1 issues.

2 I did want to spend just a moment setting the stage
3 for this discussion. A lot of research work has been
4 completed. You've heard from the APS earlier this year about
5 their views on the research, and it's clear that we've reached
6 a plateau of some sort in our understanding of severe
7 accidents. These reactors were never designed to cope with
8 severe accidents, but a lot of work analyzing their ability to
9 do so has been completed.

10 Most of the science about severe accidents is
11 contained in 0956. That document is now out for peer review
12 and public comment. And the comment period was recently
13 extended.

14 So to some extent, the agency's final views on 0956
15 will form the scientific basis for whatever we do in
16 implementing your severe accident policy statement and
17 implementing changes due to the new source term.

18 There's also important confirmatory work now in
19 process. And Denny will talk about some of the confirmatory
20 work that is still going on and may have to go on for some
21 time.

22 Finally, a very important bit of activity that's
23 still going on under Research's direction is the integrated
24 assessment of the results. That is, the application of the
25 sciences in 0956. That document is called 1150. That's where

1 they take for a spectrum of plants, they recalculate both the
2 core melt frequencies and the off-site consequences for a
3 class of plants. So that's a very important plan.

4 Ideally, before making changes on any plants or
5 changing our process, one would like to have 1150 in hand,
6 peer reviewed and fully understood and all the issues
7 resolved. But that is off in the future somewhat.

8 What we're proposing today is a more pragmatic
9 approach. We'll be trying to separate the issues that relate
10 to these important aspects and the short term things that we
11 might do before 1150 is out. For example, containment spray
12 additives. That little slice of technology doesn't really
13 depend on 1150.

14 We'll talk about the things that we can do, sort of
15 in the intermediate term and the things that we think should
16 be deferred until after 1150 is out.

17 So we plan about a 25 minute presentation by Themis
18 setting the structure. He'll talk about the process for
19 implementing the results, the expected outcomes from some of
20 this. He wants to cover the potential issues that we think
21 could upset our apple cart and change our schedules. And then
22 finally, close with giving you our present views on the
23 schedule for such implementation.

24 Then Denny Ross from Research would describe the
25 latest technical results and the status of the documents that

1 I described. And Bill is here, so let me ask Bill if he'd
2 like make an additional comment.

3 COMMISSIONER ASSELSTINE: Harold, just before Bill
4 does that, let me raise a broader question that comes to mind
5 from what you just said. As I understand 0958 is basically
6 the statement of the science as we understand it now. And I
7 understand 1150, which are the analyses of the reference
8 plants.

9 It does seem to me that particularly, if as you say,
10 1150 is down the road a ways that it might be useful to have
11 something that falls in between. And that is, a detailed
12 statement of how it is that we propose, or that the Staff
13 proposes to go about implementing source term work. What the
14 approach is, a specific discussion of what the outstanding
15 technical issues are, how the Staff proposes to resolve those
16 technical issues.

17 And if the Staff proposes to start making
18 decisions in the interim, how the Staff thinks it can make
19 decisions in the interim until those technical issues are
20 addressed. And while I found the viewgraphs helpful, they're
21 very summary. And it strikes me that perhaps what we need is
22 a paper that addresses the Staff's proposal to implement this
23 whole thing and get comments on the approach, to make sure
24 that we're on the right track.

25 MR. DENTON: I think that's exactly what we'd like

1 to do and Themis was going to address it. And I think after we
2 get some guidance from the Commission on how we're going we
3 could be prepared to do that.

4 But basically Themis was going to do hopefully just
5 those kinds of things. And the charts are summary because I
6 keep telling them five lines per slide so that we can read
7 them.

8 COMMISSIONER ASSELSTINE: That's fine.

9 MR. DENTON: Let's let Themis give a 20, 25 minute
10 presentation on what we think the structure is for those and
11 identify the issues. And then at the end of that decide if
12 that's acceptable or if we want to go some other way.

13 MR. DIRCKS: I think we are working on a Staff paper
14 to the Commission that tries in narrative form to bring all
15 this together and identify where we've been, where we are
16 now. And identify certain areas that look like we could --
17 would be potential for action in the future, and lay out some
18 sort of a time line.

19 So we are working on that. And I think as a result
20 of some of these meetings that we're having now with the
21 Commission we can get a better idea of how you might want to
22 proceed along these lines.

23 So it's in the formative stage. More than that.
24 I've drafts of the thing. So it looks good.

25 COMMISSIONER ASSELSTINE: Good, okay.

1 CHAIRMAN PALLADINO: This is in addition to 1150?

2 MR. DIRCKS: In addition to 1150 This is a
3 Commission paper that we're preparing. More -- it's a very
4 detailed Commission paper, and it's more than just a few lines
5 of summary. It's got detail.

6 MR. DENTON: I think we are at that point. A lot
7 depends on the level of resources you wish to put in that
8 area. I recently cut Themis's resources when Congress cut our
9 budget. I had to find someplace to take it out of, and that
10 was the place that gave.

11 I might also mention too, there are several
12 utilities who are pressing us or more be pressing us for
13 changes and our present regulatory basis for that plant.
14 Several utilities talk about submitting changes in emergency
15 planning zones for example, and so forth.

16 It wouldn't take very many individual cases to swamp
17 our resources, especially if they are controversial changes
18 that individual utilities wish to pursue. We're not
19 discouraging that. In fact, I guess we'd encourage people to
20 come in with changes. But if they get too far out in front of
21 the total process here it has the potential to take a lot of
22 resources.

23 But, Themis, why don't you cover the plan
24 implementation process. And this is the process both for the
25 severe accident policy statement and for the new source term

1 scientific information.

2 CHAIRMAN PALLADINO: Let me interrupt just for a
3 moment. Bill, we just got started shortly before you came
4 in. I didn't know if you had any other general comments you'd
5 like to make before we get into the details.

6 MR. DIRCKS: No, I don't. I think we'll get some
7 reaction, I think, from the Commission when you look at the
8 schedule here. I know it looks like they've been stretched
9 out a bit, but I think Harold covered those points. The
10 difficulties we face because we bump into the severe problem
11 of unique plants. We have to do it plant by plant almost so
12 it takes awhile.

13 I think the other -- the problem that we have
14 though, we're working in tandem with the IDCOR group. It is a
15 group that has been formed up by the industry. They're doing
16 a lot of good work. But if we -- but as they see our
17 schedules drag out, I think they're losing some incentives to
18 keep funding that organization.

19 We recognize that, but right now we don't have any
20 great solutions to that problem. I think what we're trying to
21 do is just plug away and do our job from our mission
22 perspective and hope that they'll continue to fund that
23 organization and continue to work with it.

24 CHAIRMAN PALLADINO: Harold, you had said that you
25 extended the comment period for NUREG 0956, or who had?

1 MR. ROSS: We sent the notice to the keeper of our
2 rules and records, and in due course it will show up in the
3 Federal Register.

4 CHAIRMAN PALLADINO: And how long?

5 MR. ROSS: January 7th.

6 CHAIRMAN PALLADINO: Until January 7th. Okay.
7 Them.

8 MR. SPEIS: Thank you. May I have the next
9 viewgraph?

10 [Slide.]

11 MR. SPEIS: As Mr. Denton said, my presentation will
12 address the severe accident implementation program and then
13 elaborate on the possibilities and character of potential
14 changes in rules and regulatory practices as a result of the
15 use of new information regarding source term.

16 The next viewgraph.

17 [Slide.]

18 MR. SPEIS: What in those two areas -- in the area
19 of implementation of the program, I will address, summarize
20 the action items that stem from the policy statement. I will
21 discuss the development of guidelines and procedures for the
22 examination of individual plants, which is a key part of the
23 Commission's policy statement.

24 I will discuss the industry participation that Bill
25 already mentioned, the expected accomplishments, and some of

1 the potential issues that may come up, including a summary of
2 the outstanding technical issues that require continuing
3 attention.

4 And then I will elaborate on the source term related
5 changes and discuss this potential changes in rules and
6 regulatory practices where we have split them up in short
7 term, intermediate term and long term ones.

8 Let me start with the Commission's severe accident
9 policy statement. Let's go to the next viewgraph, please.

10 [Slide.]

11 MR. SPEIS: This is just a kind of a summary to see
12 where we're starting from. If you recall the August 8th
13 policy statement provides criteria and procedural requirements
14 for licensing on new plants, and sets goals and a schedule for
15 the systematic examination of existing plants, which is an
16 important part which we'll dwell more on it.

17 For new applications the Commission will issue
18 guidance on the role of PRAs in severe accident analysis and
19 decision making, and development performance criteria for
20 containment systems. And also decide if we go ahead with such
21 a criteria, what form they should take.

22 COMMISSIONER ASSELSTINE: What's the schedule for
23 those two items, Them?

24 MR. SPEIS: It's 18 months following August which
25 would -- August '85. Would be August '87 I guess. Within two

1 years from the Commission policy statement.

2 COMMISSIONER ASSELSTINE: Okay.

3 MR. DENTON: We have a scheduled discussion at the
4 end of this. That's all sort of interrelated. And we'll try
5 to hold the schedule until we get to the implementation
6 program.

7 COMMISSIONER ASSELSTINE: Fine. At that point could
8 you also describe or tell us when we're going to get the
9 state-of-the-art PRA report?

10 MR. DENTON: Yes.

11 COMMISSIONER ASSELSTINE: Okay.

12 MR. SPEIS: For existing plants, if you recall the
13 policy statement discussed a plan to formulate an integrated,
14 systematic approach to an examination of each nuclear power
15 plant in operation for possible significant risk contributors
16 that might be plant specific, that might be missed if we don't
17 do a plant specific analysis.

18 If as a result of this examination we identify areas
19 that have to be modified, of course, the backfit policy will
20 be used to decide which cost effective fixes need to be
21 implemented.

22 The systematic examination will include the
23 development of guidelines and procedures which I would like to
24 talk next. Go to the next viewgraph.

25 [Slide.]

1 COMMISSIONER BERNTHAL: When is this process of
2 selecting plants and getting on with what I thought we were
3 going to do in this severe accident policy statement when it
4 was finalized, when is that going to begin?

5 MR. DENTON: It's begun. And the six plants that
6 have been selected are being reviewed by both IDCOR, and will
7 be covered in the 1150 research. So in effect, typical plants
8 are presently under review, and schemes to extend those
9 results to all other plants are what's -- what will take some
10 time.

11 And I think once we get to that point in Themi's
12 discussion we'll show you where it stands.

13 MR. SPEIS: This is the important part. In this
14 next viewgraph I'll try to discuss the essence of the program,
15 which is basically based on the reference plants studies which
16 both NRC and IDCOR is doing. What type of --

17 COMMISSIONER BERNTHAL: But the premise for -- I
18 don't want to jump ahead too much here -- the premise I
19 thought that was to underline the plant specific analysis was
20 your instincts about which plants most needed that kind of
21 evaluation.

22 MR. SPEIS: Exactly.

23 COMMISSIONER BERNTHAL: And instead it looks like
24 based on these six at least we're looking at a cross-section
25 of some of the most modern -- well, Grand Gulf is in here.

1 MR. ROSS: Let me comment --

2 COMMISSIONER ASSELSTINE: The intent is to try and
3 pick one of every type.

4 MR. ROSS: Let me comment. There are two main
5 criteria to select a reference plant. You needed a PRA, and
6 you wanted a broad spectrum of plant types. So you have all
7 three boiler type, the containment for all three types of
8 BWRs, ice condenser, a large dry containment, and a
9 subatmospheric.

10 COMMISSIONER ASSELSTINE: Right.

11 MR. ROSS: Surry and Peach Bottom are actually quite
12 old.

13 COMMISSIONER BERNTHAL: But it seems to me that the
14 idea that I thought was behind the severe accident policy
15 statement, in part at least, was the -- this is -- I mean, I
16 strongly support an effort like this. And maybe it gets down
17 to research -- or rather to resources.

18 But what about the part that says, which plants do
19 we think most need looking at today, whatever type?

20 MR. SPEIS: I will discuss this in this viewgraph.
21 Right now I will discuss that. I'll tell you which plants
22 -- we are developing criteria to decide how far to go for a
23 plant that doesn't have a PRA that was built 20 years ago.
24 And that's what your concern is.

25 COMMISSIONER BERNTHAL: Yes, you see what I'm

1 saying.

2 MR. SPEIS: Yes.

3 COMMISSIONER BERNTHAL: They might all be one type.
4 They may have nothing to do with a cross-section of different
5 plant types.

6 MR. DENTON: Well, and just in case the slide
7 doesn't show, let me read off the plants, Themis, and then you
8 can describe -- let me tell you what IDCOR is doing.

9 They've got three large dries, Zion, Oconee and
10 Calvert Cliffs. So that gives you one by Westinghouse, one by
11 B&W and one by CE. They have Sequoyah as an ice condenser.
12 Then for GE designs they've got Peach Bottom for the MARK I,
13 Susquehanna for MARK II and Grand Gulf for the MARK III.

14 Now six of those plants are also being analyzed
15 independently by Research, and they will be in 1150. So it
16 was through that mechanism that we hoped to define the
17 methodology for doing each type of plant and then that would
18 be extended.

19 And it is true that the results vary with the dry
20 well underneath the reactor vessel, for example. And so
21 patterns A through K have been identified and each plant will
22 have to modify the results of these six ones to fit their own
23 particular case. But that work is all ongoing now and it
24 seems to be more or less on schedule.

25 COMMISSIONER ASSELSTINE: So IDCOR's not looking at

1 a subatmospheric?

2 MR. DENTON: Let me ask -- I don't think they are.
3 I think Surry is being done by us.

4 COMMISSIONER ASSELSTINE: By us, okay.

5 COMMISSIONER BERNTHAL: But the timetable then, is
6 it first we have to develop the criteria for the PRA for each
7 of these several types? And then you're picking up on saying
8 that plant and that plant are ones that have troubled us for a
9 long time and we want to have a look at them? Or waits then
10 for Research to finish that? Is that how the thing is going
11 to work?

12 MR. DENTON: Something like that. I think we're
13 going to get there -- and I don't want to give Themis whole
14 presentation -- but he was going to try to say how we're going
15 to get there.

16 MR. SPEIS: Let's talk about some of the things.
17 Let's talk about the goal of this program. Basically the goal
18 of the program is to assure that severe accident
19 vulnerabilities would be found and would be corrected,
20 assuming that the site's vulnerabilities exist.

21 Now the approach being used attempts to take full
22 advantage of similarities among plants of a given type. Thus
23 plant dependent vulnerabilities would be identified in a
24 detailed review of these reference studies that we talked
25 about, while plant specific weaknesses would be the subject of

1 a limited plant specific analysis performed on each individual
2 plant.

3 MR. DENTON: So it would be a different sort of
4 analysis. That we'd agree on the methodology to be done, then
5 each utility would have to examine its own plant and look at
6 the differences between the generalized plant and its own.

7 COMMISSIONER BERNTHAL: Yes, that's logical enough
8 but when will it start? That's the question.

9 MR. SPEIS: Okay, we'll talk about that. Now the
10 purpose of the reference plant evaluations -- which Mal and
11 Denny will talk in more detail later on and they'll describe
12 the effort as well as the studies -- is to not only to
13 evaluate the performance of these plants with respect to
14 severe accident, but to develop guidance and criteria for the
15 systematic examination of individual plants for plant specific
16 accident vulnerabilities.

17 Now as Mr. Dircks said, substantial work in this
18 area is being done by IDCOR. And these efforts, both IDCOR
19 and our efforts are being meshed and will culminate in the
20 development of these guidelines.

21 Now the purpose of the guidelines is to specify
22 conditions individual plants must meet to adopt the reference
23 plant analysis, the extent of a plant dependent examination
24 which licensees need to conduct, and acceptable methodology to
25 search for plant specific vulnerabilities.

1 CHAIRMAN PALLADINO: Will this mean that each of the
2 plants then eventually has to make a PRA?

3 MR. DENTON: I asked Cordell Reed that question and
4 he pointed out that most -- that many plants have PRAs now.
5 Now if a plant is sufficiently identical to one that does have
6 a PRA, maybe they don't have to do one. But to the extent
7 that they differ they may have to do a partial analysis of the
8 differences.

9 And I think that's about the best I can say what the
10 IDCOR program is. That they would hope that their program
11 would cover a broad class of plants but are not discounting
12 the possibility of some unique design sitting out there, might
13 have to do a PRA all on its own in order to come into the
14 fold.

15 MR. SPEIS: The way we're thinking right now is that
16 plants with complete PRAs -- and when I say complete PRAs,
17 both the front and the sequences leading to core melt,
18 containment performance and ultimate consequence evaluations
19 wouldn't have to do any analysis.

20 Plants with partial PRAs -- if for example their
21 PRAs only cover the front and the sequences leading to core
22 melt, they'll have to do a containment evaluation and so on.

23 Let me give you an example of what we mean by this
24 containment performance guidelines. We have found out in --

25 COMMISSIONER ASSELSTINE: Just before you do that,

1 Them!, how many plants have done a complete PRA from the back
2 end?

3 MR. DENTON: I think it's around --

4 MR. SPEIS: Twenty-five.

5 MR. DENTON: But I don't know for sure.

6 MR. ERNST: Yes, it's around 20, 25.

7 COMMISSIONER ASSELSTINE: And are they all basically
8 consistent in their assumptions and their approaches? Are
9 they all over the board?

10 MR. ERNST: No.

11 MR. DENTON: Depends on how you look at it. They
12 all are outgrowths of WASH-1400, but they differ quite a bit
13 in their treatment of external hazards, for example. Some
14 didn't treat consequences and some didn't treat things like
15 fires very well. I think when you get down to the details
16 they vary widely.

17 COMMISSIONER ASSELSTINE: Don't we have to
18 understand the thing that was on the previous slide, which is
19 the guidance on how to do a PRA such that we have confidence
20 in the results of it before we can make a decision about
21 whether we can accept these various -- even the complete PRAs?

22 MR. DENTON: Well, we have raised all these issues
23 with industry and I'm very pleased with IDCOR's
24 responsiveness. So far they are the ones taking the ball and
25 saying, we will demonstrate to you why our program can be.

1 And we raised a number of issues and Themis will get to the
2 issues we have with them.

3 But basically, they're undertaking to convince us
4 that they can show how each plant complies with a severe
5 accident policy. And we've not had to issue any rules or
6 regulations in that area yet. And the hope is that we'll come
7 to agreement. But there are, I think, at last count some 18
8 major differences of opinion between us and IDCOR.

9 But that -- if they don't do an adequate job, then
10 it would then become an issue.

11 MR. SPEIS: I was going to give some example what we
12 mean by performance guidelines. Let's take the containment.

13 We have found out that what is important in
14 containment is not only the ultimate strength or ultimate
15 capability, but whether the penetrations will last or will
16 stay in place or will prevent release of fission products as
17 the severe accident conditions increase.

18 So the guidelines will say that -- let me go back.
19 So we have analyzed this, we have evaluated those
20 penetrations. You know, what type of materials, how much
21 pressure, temperature they can take, whether they will give in
22 instantly the moment you exceed design basis conditions.

23 So the guidelines will say that from this program we
24 have found out some penetrations are very weak or are
25 susceptible to severe accident conditions so -- and the

1 guidelines will identify which penetrations are what materials
2 they are made of and things of that sort. Instead of going to
3 -- and then every plant will got to their files or to their
4 drawings and see and decide, you know, if indeed they have
5 such penetrations, you know, that are weak.

6 Another thing that the IDCOR program and we are kind
7 of concluding is that for all plants probably you will need an
8 assessment of the front line systems and the support systems.
9 You know, systems that are important to preventing and
10 mitigating accidents. They all have to be looked out.

11 MR. DENTON: Quite a bit has been published on this
12 area and we've had monthly meetings with IDCOR. So this
13 process has had a considerable development and seems to be
14 running reasonably smooth. Although the time frame keeps
15 moving out as more and more issues get discovered and put into
16 it.

17 MR. SPEIS: So in essence, this methodology is to
18 define the differences and assess the impact of those
19 differences, either in the core melt probability or in
20 containment performance, or in the risk framework itself.

21 COMMISSIONER ASSELSTINE: Tremi, before you leave
22 that slide, you say uncertainties will be assessed and
23 quantified. In your implementation document that you're
24 working on now are you going to be able to spell out what your
25 guidance is on how uncertainties are going to be considered in

1 making decisions?

2 Not just, you know, here's what we think the
3 uncertainties are, but the second part which is, and here's
4 how we plan to deal with those uncertainties as we try
5 to make decisions either in terms of the six reference plants
6 or in terms of extrapolating those results to the other 89 or
7 so.

8 MR. SPEIS: That's an important part of the program
9 and Mal will address how we're going to be treating
10 uncertainties.

11 COMMISSIONER ASSELSTINE: Okay, but it's going to be
12 spelled out in the document you're working on now?

13 MR. SPEIS: Yes.

14 MR. DENTON: IDCOR is addressing that issue and so
15 is Research. And among the issues that have to be considered,
16 first off the normal uncertainties in doing core melt
17 probabilities, and so forth and how big they are for different
18 sequences.

19 COMMISSIONER ASSELSTINE: Correct.

20 MR. DENTON: Second, whether or not to include
21 seismic. In fact, we're leaning at the moment not to include
22 seismic because it's such a difficult issue to deal with.

23 And then sabotage, for example. So anyway, both
24 groups, industry and the Staff intend to deal explicitly with
25 uncertainties in this process. But it's going ahead on these

1 six plants now without dealing with seismic.

2 MR. SPEIS: Next viewgraph, please.

3 [Slide.]

4 MR. SPEIS: I will again summarize the industry
5 participation even though it has been discussed to some extent
6 already. IDCOR has analyzed four of the six reference plants
7 and presented the analysis to us.

8 Basically we look at these analyses as being an
9 integral part of the reference plant evaluations and the
10 development of the guidelines that I talked earlier. The
11 plants that IDCOR has analyzed is Zion, Grand Gulf, Sequoyah
12 and Peach Bottom.

13 Based on the IDCOR presentations and the extensive
14 interactions that we have had with them over the last two
15 years and our understanding from the severe accident resource
16 program and all the other information that has been developed
17 in this area, not only in the United States but throughout the
18 world, we have identified 19 technical issues that have been
19 treated differently by NRC and by IDCOR and could have a
20 significant effect on the results.

21 COMMISSIONER ASSELSTINE: Can this document that
22 you're going to send down to us describe in detail each of
23 those 19 issues and why you think it's significant? Or can
24 you give us a paper that does that?

25 MR. DENTON: We can sure do that. They have been

1 identified already in a report that was published mid-summer

2 COMMISSIONER ASSELSTINE: 0956?

3 MR. DENTON: No, an IDCOR document where they
4 undertook to deal with the ones that we had identified.

5 COMMISSIONER ASSELSTINE: Okay.

6 MR. DENTON: So they're essentially the same 18 or
7 19 issues. But we can send that down and our analysis of it.

8 They're the issues that we're now trying to close
9 and Themis's going to get to them and class it in a moment.

10 COMMISSIONER ASSELSTINE: Okay, line.

11 MR. SPEIS: We have basically discussed this with
12 IDCOR and have agreed on an approach to resolution, but
13 not agreement on the resolution, but on an approach to
14 resolution. And both we and IDCOR are presenting pursuing the
15 resolution. As Harold said, we have received a report from
16 them suggesting or proposing their own way of resolving these
17 issues.

18 COMMISSIONER ASSELSTINE: Yes, I would think it
19 would be useful to have, you know, in one place in this --
20 perhaps in the paper that you're working on now -- a statement
21 of what the issue is, what the significance is for purposes of
22 this approach, how you propose to resolve the issue. And if
23 you propose to do things in the interim until they're
24 resolved, what the basis is for being able to do that.

25 MR. DENTON: I think we're getting a lot of mileage

1 out of the IDCOR program and they are undertaking to deal, I
2 think objectively with a lot of these issues because we
3 haven't made any yet. We're still moving toward a decision.

4 And they have identified all of these issues in
5 their proposal on how to deal with them in the future, and
6 that's what we presently have under review and discussion.

7 COMMISSIONER ASSELSTINE: Okay.

8 MR. SPEIS: We are very sensitive to the issue of
9 uncertainties. And as you see, it's right there, item three
10 on the slide. In fact, we're saying that there are two areas
11 that have been brought up very extensively. The area of
12 uncertainties and we have separated the area of inclusion of
13 seismic events and other external events.

14 IDCOR is presently going through their uncertainty
15 analysis. And as Harold said, we're still looking over
16 whether it makes sense at this point in time to consider
17 seismic events in the total risk plant profile of the plants
18 that we're evaluating.

19 COMMISSIONER ASSELSTINE: If you're not going to
20 include seismic and sabotage, could you -- whether it's now or
21 in this document -- at least describe -- if you want to
22 separate those issues out -- how you propose to address --
23 what the significance of those issues is for severe accident
24 purposes, and how you would propose to address that, and
25 factor it into your overall judgment.

1 MR. SPEIS: In fact, we're planning to do just
2 that. Also we're thinking of doing a separate paper on the
3 issue of the seismic event because it's such an important
4 issue.

5 MR. DENTON: We'll do it. I've come to the
6 conclusion that seismic is tending to obscure real life
7 problems. And if seismic becomes dominant in some analyses
8 people then don't tend to focus on all of the other
9 contributors of risk.

10 And I guess an increasing number of us in the Staff
11 really don't think seismic is as large a risk as it's often
12 calculated to be. But it's very hard to find a reason to
13 change those numbers. But every time we visit an area or get
14 reports from Mexico or Chile or Alaska or Japan on
15 earthquakes, it doesn't seem that structures which were
16 designed less well than ours suffer some of the damage that
17 we might be projecting.

18 But that area in itself is worthy of a different
19 meeting.

20 COMMISSIONER ASSELSTINE: Okay.

21 MR. DENTON: And that's why it's very difficult in
22 our low seismic history in the U.S. to come to some definitive
23 conclusion about how big a contributor it is.

24 CHAIRMAN PALLADINO: How will you make this decision
25 as to whether or not you're going to consider seismic events

1 and other external events?

2 MR. DENTON: Well, I think the Staff view at the
3 moment is that we should not consider seismic in going ahead.
4 And I'll let Denny add some more background to that.

5 MR. ROSS: What Bill asked us to do jointly, NRR and
6 Research, was to prepare a Staff position paper that would
7 justify a proposed position. We've just started in the last
8 few days to try to develop in a conceptual phase what this
9 report would be.

10 And I suspect -- we don't have a rigid time
11 schedule, but I think it's something that ought to be done by
12 the end of this calendar year. So I hope we can do this in
13 the next two months.

14 In essence, it would be comparing or perhaps
15 contrasting our views with that of the ACNS. I think they've
16 given you some advice. It literally calls for, is this what
17 the agency ought to do. We ought to prepare a paper to
18 justify our course of action.

19 MR. DENTON: We could well meet again. What you
20 find when you look in the seismology, you know you start off
21 with the geology interpretations and the seismologists view of
22 the hazard, then the sole structure interaction, then the
23 civil engineer, then the mechanical engineer. And we look at
24 the results of our plants and compare them to actual
25 experience.

1 And I think we'd need a big meeting to get all those
2 specialties involved so that you could understand the entire
3 scope of seismic design. There are a lot of people who think
4 that it's not the dominant contributor to risk that it
5 often crops up to be in calculations.

6 COMMISSIONER ASSELSTINE: I get the impression that
7 some other countries when they begin to look at severe
8 accident questions, and particularly design aspects, have
9 tended to separate out the external contributors, seismic and
10 sabotage in particular, and basically follow a two-step
11 approach. Am I right about that?

12 Look at the internal contributors first, then look
13 at the external contributors. Now I gather some of the more
14 significant changes or evolutions in design actually relate to
15 the external contributors, most notably sabotage.

16 But am I right in the approach?

17 MR. SPEIS: That's true.

18 COMMISSIONER ASSELSTINE: Okay. You know, it might
19 be worthwhile for the Staff to think about that kind of an
20 approach and give us their thoughts on both issues, not only
21 seismic but sabotage as well when we talk --

22 MR. ROSS: Well, what we can do, because the timing
23 will be favorable, is we expect to be released in two weeks
24 the CS&I group of experts consensus report on severe
25 accidents, which as I recall, definitely has national

1 positions on such things as external threats.

2 I think that would be a useful -- either an appendix
3 or a reference document to the paper that we're talking about.

4 COMMISSIONER ASSELSTINE: It would be useful to me
5 though to understand the implications of the two different
6 approaches. The approach that we've been using, which I think
7 has been to try and consider everything in consolidated
8 fashion, and particularly Harold point, does that tend to
9 obscure perhaps significant internal contributors, as opposed
10 to the external ones. And it would be useful to get your
11 thoughts on the implications of the two different approaches.

12 MR. SPEIS: When we review PFAs that include
13 external events we usually don't lump the numbers together.
14 We look at them separately, you know, for whatever insights
15 they provide. Because both internal events and external
16 events they have their own characteristics, their own
17 uncertainties.

18 So, you know, we look at the whole picture, but
19 usually we also look at them separately. And that's the way
20 that --

21 COMMISSIONER ASSELSTINE: Okay.

22 MR. DENTON: In terms of our whole NRC review,
23 almost all the effort goes into preventing design basis
24 events. That's loss of main feedwater, loss of AC power. We
25 don't really do -- we're not focused toward preventing

1 hurricanes and earthquakes. We design for those but you don't
2 do much toward inspecting.

3 And so our program is shaped toward preventing
4 design basis events, and we design hopefully to exclude these
5 external hazards from being dominant contributors to risk.

6 COMMISSIONER ASSELSTINE: That's true. Although I
7 think if you approach it the other way around too what you get
8 is the same effect. That is, if you focus on the external
9 contributors and do things to change those -- at least when
10 you look at some of the changes that have been made to address
11 those, I think they also have benefits in terms of preventing
12 the design basis events as well.

13 MR. SPEIS: The last paragraph on the slide there
14 it's a recapitulation of IDCOR's effort. They are currently
15 developing methodology for the examination of individual
16 plants. As part of the development effort this methodology
17 will be applied to the four IDCOR reference plants as well as
18 to three additional plants.

19 This work is going on now and the methodology will
20 be submitted to NRC for review sometime in the next spring.
21 NRC approval will be issued as part of the guidelines that I
22 talked earlier.

23 [Slide.]

24 MR. SPEIS: Let's go to the next viewgraph where I
25 have tried to summarize in a capsule form the expected

1 accomplishments of this program. I put them in four
2 categories. Plant specific vulnerabilities will be identified
3 and fixed. And again, the backfit rule will be used as a
4 guidance to decide which fixes need to be implemented.

5 If generic vulnerabilities are identified,
6 appropriate design and operational changes will be required.
7 And there we'll follow a rulemaking approach if necessary.

8 Lessons learned will help development of improved
9 designs with safety benefits. And a new, more realistic
10 regulatory approach on source terms will be pursued, which I
11 will discuss later on in some more detail.

12 Next one.

13 [Slide.]

14 MR. SPEIS: I want to say a few things about
15 potential issues. Even though we are optimistic and I think
16 it is important that all of us are aware of the problems as we
17 go down the pike of implementation. We say here that large
18 differences could exist between IDCOR and NRC calculations and
19 we will have to decide where we go from there.

20 CHAIRMAN PALLADINO: Could you explain why these
21 large differences exist?

22 MR. SPEIS: Well, either interpretation of the same
23 information by different researchers or designers, or lack of
24 information sometimes makes you make some assumptions. And
25 different parties use different assumptions.

1 Let me give you an example. For example, there is
2 an issue that we don't see eye to eye. The issue of how much
3 hydrogen is produced following a severe accident. We come up
4 with a number, they come up with a number which is maybe twice
5 as smaller as our number. This would have an effect on the
6 failure of the containment or some other aspects of severe
7 accident decisions.

8 MR. DENTON: We're not saying that they won't get
9 resolved. We're saying that's a -- if they don't -- and at
10 the moment we have these 18 or 19 issues that we're still
11 working on, but we just wanted to flag. If they don't settle,
12 that's a potential. Hopefully they will settle.

13 So it's not a projection, it's just a potential.

14 MR. SPEIS: Based on the way they have analyzed and
15 the way they look at the world, have reached some decisions.
16 Now as we go down the pike and look at that information and
17 the other information that comes from our Research effort in
18 some of these areas we might reach different conclusions.

19 COMMISSIONER ASSELSTINE: Them, are the IDCOR
20 calculations consistent with our experimental program, the
21 Research effort, the results we've obtained so far? Or are
22 they not?

23 [Commissioner Roberts left the room.]

24 MR. DENTON: We've got -- we're about to hit the
25 issues that we see existing. But let me ask Denny if they're

1 consistent with Research. They try to be.

2 MR. ROSS I think reasonably so. I think where the
3 differences come in are outside the realm of experimental
4 data. For example, if you have a melt that progresses through
5 the vessel, and now you've got a big mess on the floor. It's
6 some fuel, some stainless steel, some ordinary iron or
7 pressure vessel steel, what's the geometry? Does it form a
8 nice coherent right circular cylinder contained in some kind
9 of cavity, or does it run like a lava flow?

10 Okay, these are assumptions. There's no
11 experimental data. Yet I think they make one assumption, we
12 make another, and it makes a big difference in the final
13 answer.

14 COMMISSIONER ASSELSTINE: Of those two, which is
15 theirs and which is ours?

16 MR. ROSS: Well, we tend to have a more compact
17 corium mixture which gives higher temperatures, which gives
18 more attack of the concrete and gives more fission product
19 gases -- I mean, more gases coming up, more aerosols.

20 And IDCOR recognizes it. In the end, they may just
21 get a prescription from us in several areas. If the jury is
22 out, there's no evidence either way, they may just have to
23 accept an NRC resolution. And they know it. And I think in
24 reasonable cases they're willing to accept it.

25 And I would point out another area that is amenable

1 to resolution, give an example. They take credit for certain
2 operator actions. We look at the same scenario and wonder
3 whether they should.

4 And our resolution is, we have -- we'll get a
5 technical team of experts of different sorts, go to the plant,
6 do a time and motion study, look at how the thing is on the
7 simulator. And if we can come to the same conclusion that the
8 operator would take the action we'll agree with it. That will
9 take care of some of the differences.

10 MR. SPEIS: Let's go to the next viewgraph, please.

11 [Slide.]

12 MR. SPEIS: Where we have tabulated some of these
13 issues in some detail. These 19 issues I have characterized
14 them under core melt issues and containment issues. I already
15 discussed the first one, differences between us and IDCOR on
16 in-vessel hydrogen generation.

17 Under containment issues, Denny just discussed the
18 issue of ex-vessel fission product and aerosol release and
19 deposition. Again, you know, why do we see things differently
20 there. Again, it's not only the science itself, but you have
21 to make assumptions about the composition of the material, the
22 initial melt temperature as Denny said, extent of core
23 dispersal, modeling of core concrete attack, and the
24 complexity of chemical mechanisms within the melt and things
25 like that.

1 And when you add them all up, you know, you come up
2 -- bound to come up with different perspectives and different
3 results sometimes.

4 Scrubbing efficiency of suppression pools. Studies
5 indicate that the effectiveness of suppression pools is quite
6 good, even when the temperature of the pool is saturated. The
7 question there is, you know, how about the bypass. There's
8 always a question of whether you can bypass the suppression
9 pool.

10 And even though studies indicate that, you know, you
11 can take factors of maybe 100, 10,000 or 1,000, you still have
12 to be very careful in assessing the question of bypass,
13 because that would cut down the effectiveness of the
14 suppression pools substantially.

15 [Commissioner Roberts returned to the room.]

16 Let's go to the next viewgraph.

17 [Slide.]

18 COMMISSIONER ASSELSTINE: Just before you do that,
19 let me say, in effect maybe as a lead in to the next few
20 viewgraphs, when I read the seven basic categories, and
21 particularly after hearing just your brief elaboration on
22 them, it strikes me that many of those are very fundamental
23 issues in developing a source term.

24 And I guess the biggest question that came to my
25 mind after looking at the viewgraphs is, if these are

1 reflective of the 19 issues that are still open, how can the
2 Staff say much of anything about regulatory changes until
3 you've closed out these issues. I mean, it doesn't strike me
4 that these are very fine, narrow, technical points within the
5 overall scheme of things. That some of these are really gut
6 issues.

7 MR. SPEIS: Well, I agree with you. But at the same
8 time, some of these issues, before we are able to say what
9 they mean we have to have the integral, the complete risk
10 profiles, because some of these issues on their own merits
11 they're important.

12 For example, let's take core concrete interaction.
13 It's important whether the lanthanide should be higher or
14 lower. But if containment retains its integrity during that
15 part of the process, then that is not an important problem.
16 But if containment fails during that time, then it becomes
17 important.

18 So you have to look at these issues, not only on
19 their own, you know, as science, but how they fit into the
20 overall picture, you know, of the integral risk profiles. And
21 that, we keep saying, you know, it's important that parallel
22 with this effort we complete the baseline studies that
23 Research is doing in 1150.

24 COMMISSIONER ASSELSTINE: But you know, it does
25 strike me that at least some of those, if there's a realistic

1 possibility of bypassing the suppression pool, if there's a
2 realistic possibility of bypassing containment, you've got big
3 trouble.

4 MR. SPEIS: But in our --

5 COMMISSIONER ASSELSTINE: And a major impact on the
6 source term.

7 MR. SPEIS: That's why we're not -- you know,
8 General Electric has proposed that we give them a reduction
9 factor of 10,000. And that's why I say, we can't accept that
10 because of our evaluation and assessment of the importance of
11 bypass. So all these things will be included.

12 MR. DENTON: Many of these same issues are embedded
13 in the final report of 950 or 1150, where they're being
14 argued out with IDCOR. And at the moment IDCOR is bringing a
15 lot of resources to bear to try to settle them. And we wanted
16 to flag them, but they're not settled today.

17 CHAIRMAN PALLADINO: But you will explore whether or
18 not the bypass capability is large or small and what its
19 probability is?

20 MR. SPEIS: Yes. That's an integral part of our
21 decision making process.

22 COMMISSIONER BERNTHAL: Let me ask a question about
23 0956. One of the issues that was raised, procedural issues I
24 guess, is whether we are going to attempt to resolve some of
25 these differences with IDCOR and/or whoever else we have

1 differences with before we issue this document.

2 Has there been some attention paid to that so that
3 we don't throw a rock out there that we end of having to issue
4 the first and second and third revisions on and never get done
5 with this whole process?

6 MR. ROSS: Our plan for the next six months is as
7 follows. We had hoped that the 0956 could be reissued in
8 final form on April '86. In order to do that we need to get
9 all of the public comments.

10 Now IDCOR and EPRI for example will comment. They
11 have not, but they will. Their original intention was to meet
12 the November 7th deadline. My guess is now that they know
13 that we've extended it may be some additional time.

14 We will then prepare a report which will be an
15 analysis and disposition of comments. And they'll either be
16 attached to or an additional volume of 0956. We did the same
17 thing with our Battelle codes, published the report on
18 comments.

19 I think what we do will depend on the nature of the
20 comments. So far we've gotten approximately eight letters
21 with technical comments. And they're reasonable things and
22 will require some analysis.

23 So unless some startling fact or some grave issue
24 develops, that's the scenario we'll follow. Nothing yet that
25 I've seen in the technical comments would persuade me that

1 we're fundamentally wrong.

2 MR. DENTON: We'll show in a moment how these three
3 things all inter-tie. That's the 18 issues, the 950, the
4 1150. I think they tend to have interwoven issues between
5 them.

6 MR. SPEIS: Next viewgraph, please.

7 [Slide.]

8 MR. SPEIS: Before we talk about the schedule, then
9 elaborate to some extent on the source term related changes in
10 rules and regulatory practices, I would like to start this
11 part of the presentation by saying what we mean by the source
12 term.

13 When we talk about the source term, of course we
14 mean the amount of radioactive material which is released from
15 the containment, or its accumulation within the containment as
16 a result of the postulated accidents.

17 As all of us know, at present we estimate source
18 terms to different users from a 1962 document titled
19 Calculation of Distance Factors for Power and Test Reactor
20 Sites which is more commonly known as TID 14844, which forms
21 the basis for 10 CFR Part 100, as well as those based on the
22 '75 reactor safety study or WASH-1400.

23 We have gone into the areas, into the issues where
24 source terms play an important role. And we have identified
25 at least 12 areas where new source term knowledge may lead to

1 some changes. The various regulatory uses of source terms
2 could require different forms of source terms, and that's
3 something that we have to come to grips with.

4 For example, the new forms of source terms could be
5 in the form of detailed calculations for individual plants.
6 We might have to come up with tables or procedures applicable
7 to plant types. Or maybe we might want to come up with a
8 simple bounding source term which could be applicable to all
9 plants. So that's something that has to go on. That part of
10 the work hasn't been done yet.

11 COMMISSIONER ASSELSTINE: How would you bound a
12 source term in that last item?

13 MR. SPEIS: Well, for example, for an issue like
14 equipment qualification, you know, when we look at all the
15 analysis for all different plants for all different sequences,
16 you know, we put the information on the table and we might
17 decide that, you know, we have enough -- we know enough about
18 this area to come up with a bounding number instead of for
19 every plant, for every component, for every equipment using a
20 separate source term. So that's what that means by that.

21 COMMISSIONER ASSELSTINE: Okay. In each of those
22 instances you'd also have to develop your method for factoring
23 in uncertainty, and also for modeling things like fuel,
24 coolant, concrete interaction, steam explosions, those kinds
25 of things, in each instance.

1 MR. SPEIS: That's part of it.

2 Next viewgraph.

3 [Slide.]

4 MR. SPEIS: I kind of show this same thing in a
5 graphic form. And on the left -- well, at the center is the
6 development of a new source term which I just talked about,
7 for individual plants or applicable to plant types or
8 applicable to all plants.

9 On the left is the information that has been
10 underway, or we are developing, the NUREG 0956, the NUREG
11 1150, the risk baselining of reference plants, the IDCOR NRC
12 issues, the resolution of them and all the work that is going
13 on. So it fits into the development of the new source term.
14 All this then will go into the potential changes in rules and
15 regulatory practices.

16 What I have shown on the right -- it is on my right,
17 I guess -- that an important part could be the appropriate
18 selection of some regulatory principle for a new source term.
19 As you know, the present approach is that we assume a
20 substantial core melt and we dump the activity into the
21 containment, but nothing happens to the containment.

22 You know, the only thing that we want the
23 containment is to be able to withstand the capability of not
24 exceeding some leak rate like .1 percent per day or something
25 like that. So basically, the severe accident has been split

1 down into its radioactive parts and the pressure and
2 temperature, which doesn't affect the containment in our
3 present rules.

4 But we might want to come up with something
5 different that would say, for example that we have a core melt
6 and some source goes into the containment, but there is no
7 early containment failure or whatever. But it's something
8 that we have to think more about, if you know the approach or
9 the basis.

10 COMMISSIONER ASSELSTINE: Do you have a time frame
11 for what you mean by early?

12 MR. SPEIS: Well, I have a schedule on the last
13 viewgraph which I'll talk about

14 COMMISSIONER ASSELSTINE: No, I meant where you say
15 no early containment failures, do you have a time frame in
16 mind?

17 MR. SPEIS: Could be 20 hours or 15 hours.

18 COMMISSIONER ASSELSTINE: Okay.

19 MR. SPEIS: And we might not be able to come up with
20 something uniform for all types of plants, for all types of
21 containment. So that's another thing that we have to explore.

22 MR. ROSS: I think if you say that four hours is
23 about a factor of 10 reduction time, after a couple of these
24 four hour periods, like eight hours, you should have gotten
25 maybe a factor of 100 or more in aerosol settling.

1 Early would be before eight hours in the way we used
2 it in 0956. Or in some cases, failure before melt. That
3 would really be early. And it does occur in some BWR
4 sequences.

5 COMMISSIONER ASSELSTINE: Yes.

6 MR. SPEIS: The next viewgraph.

7 [Slide.]

8 MR. SPEIS: I tried to list --

9 COMMISSIONER BERNTHAL: This looks like a --
10 everything we're talking about here sounds like a pretty tall
11 order, and a massive undertaking. I have to say I'm concerned
12 about the resources available and the organization available.
13 Do we have what it takes to do all of this?

14 You're sort of looking at many, many separate
15 important problems, each of which must be overseen, in the way
16 probably that steam explosions, for example, got great and
17 detailed attention a year or so ago. And coordinating somehow
18 in industry and within our own organization. Are we really
19 prepared to do that?

20 MR. DENTON: Well, it depends on the level of detail
21 that all this turns out to require. We have a -- in the new
22 NRR organization we have a branch that's dedicated to this
23 activity. And I guess they have seven or eight people --

24 COMMISSIONER BERNTHAL: Seven or eight people.

25 MR. DENTON: -- and three-quarters of a million

1 dollars. And that's about the most we've been able to find to
2 put into this.

3 Maybe we should put up the implementation schedule.
4 And it depends on how fast it moves and how thoroughly it
5 moves.

6 COMMISSIONER ASSELSTINE: And of course, that
7 doesn't include the Research effort.

8 MR. DENTON: It doesn't include the Research effort.

9 MR. SPEIS: Which would rely substantially --

10 MR. DENTON: Plus the other -- the point I want to
11 make is, if someone comes in, especially in an adjudicated
12 proceeding and asks for a major change on say, emergency
13 planning zones or something, many of the same people we've got
14 working this will be the ones who'd review such a proposal.
15 And we run the risk of being swamped.

16 But maybe we ought to talk about the schedule
17 because that's what drags resources a bit.

18 CHAIRMAN PALLADINO: Do you have much more before
19 that?

20 MR. SPEIS: Just a few minutes.

21 MR. DENTON: Well, we were just going to try to
22 outline some things that might be done in the short term and
23 long term. But resources -- the major resources at the moment
24 are being put in by Research and by IDCOR. They're not being
25 put in by NRR, but we're increasingly picking them up to turn

1 them into a plant by plant and license review.

2 COMMISSIONER ASSELSTINE: Harold, you mentioned a
3 couple of times -- you just mentioned, and you mentioned it
4 earlier as well -- that there were expressions of interest by
5 individual utilities in perhaps proposing on a plant specific
6 basis some different source term or proposing a change from an
7 existing regulatory requirement.

8 Which instances has that occurred so far, been
9 expressions of that kind of interest?

10 MR. DENTON: I'm not sure I know them all but I
11 think Calvert Cliffs has talked about it. Shoreham certainly
12 has talked about Seabrook --

13 COMMISSIONER ASSELSTINE: Calvert Cliffs for what
14 purpose? Emergency planning or other --

15 MR. DENTON: Yes, emergency planning, I think.

16 COMMISSIONER ASSELSTINE: Shoreham for emergency
17 planning?

18 MR. DENTON: In none of these do we have any formal
19 submittals from them, but I know, or have heard that they are
20 considering changes in either emergency planning or some other
21 aspect.

22 What I think has happened in the industry is IDCOR
23 has focused on severe accidents. They want to get each plant
24 reviewed for severe accidents. So that's their thrust.

25 A lot of the other companies out there who are also

1 members of IDCOR have other objectives. And they're always
2 threatening to break off and pursue their other objective.
3 But the main interaction at the moment is with IDCOR.

4 COMMISSIONER ASSELSTINE: Okay.

5 MR. SPEIS: In the next few minutes I will just go
6 through the potential changes in rules and regulatory
7 practices. I will list them, and because of the time factor I
8 will not go into any detail, either on present practices or
9 specific changes, whether in some of these areas the
10 requirements will have to be relaxed or maybe some tightening
11 up, as in the case with the containment, for example. Or the
12 potential cost and benefits of the changes.

13 This will be included in the detailed implementation
14 plan which we will be providing to you people before the end
15 of this year, as Mr. Dircks said earlier.

16 COMMISSIONER ASSELSTINE: I take it when you do that
17 -- you don't have to go through it now -- but you would
18 address in each instance why you think this can be considered
19 a short term item.

20 MR. SPEIS: Yes.

21 COMMISSIONER ASSELSTINE: For example, on removing
22 spray additives, why you think that the outstanding issues are
23 such that you can go ahead and make an earlier decision on
24 something like that.

25 MR. SPEIS: We will discuss the present practice and

1 what we plan to do in a backup sense.

2 MR. DENTON: Now actually there's no real industry
3 interest that I can tell in item one. I mean, we have found
4 very little industry interest in item one because it doesn't
5 appear the sprays that we used to require do all that much
6 good. We've got them in tech specs, we've got surveillance,
7 we've got LCOs, yet they really don't add that much to big dry
8 containments. Maybe we should reconsider them.

9 But that's something that we list as a short term
10 item, but they all take resources to do. And the more
11 thorough job we do the more resources they take.

12 MR. SPEIS: Well, I would like to add something.
13 This is an area that you can contaminate the plant
14 unnecessarily. You know, the way the system works right now,
15 you know, sprays come in, you know, following some
16 pressurization of the containment. A few minutes later
17 automatically you have the sprays, which are all caustics,
18 either sodium hydroxide or sodium pentemorate or hydrogen.

19 And I think two or three times in the past this has
20 happened inadvertently. So it's possible that if we don't
21 completely change, eliminate it, maybe we can do it manually,
22 okay, upon reading of some activity in the containment. So
23 that will be a big step forward, you know, and avoid
24 unnecessary, inadvertent contamination.

25 MR. DENTON: We show some of these to show there are

1 some items which you don't need to resolve all the issues.
2 And that they're so narrow that the technology apparently has
3 moved beyond that item. We show them as examples. Why don't
4 we go to the next slide.

5 CHAIRMAN PALLADINO: Let me suggest that we try to
6 give Themi a chance to finish his presentation, because I do
7 think we want to hear from Research as well. And then we can
8 pick up questions.

9 MR. SPEIS: Well, if we go to the next viewgraph we
10 talk about the intermediate terms.

11 [Slide.]

12 MR. SPEIS: The terms where work can proceed in
13 parallel with the NUREG 1150 effort. But rulemaking or other
14 concrete proposals cannot start till the issuance of the more
15 integrated risk profiles.

16 I have listed the emergency planning. I have listed
17 the containment leak rates, leak rate testing, undetected
18 breach of containment integrity, control room habitability,
19 environmental qualification of equipment, accident
20 indemnification and safety issue evaluation.

21 In all of these areas we're using now either TID
22 14844 or WASH-1400. Of course, emergency planning and
23 accident indemnification we're using information from
24 WASH-1400. In the other areas we're using the classical
25 source term, which is defined in TID 14844.

1 The next viewgraph.

2 [Slide.]

3 MR. SPEIS: We talk about some of the longer term
4 changes in rules and regulatory practices. And we have listed
5 off-site contamination recovery, which is presently based upon
6 WASH-1400, siting and accident monitoring and management.

7 And again, because of the press of time I won't go
8 into any details. Those details will be presented to you
9 before the end of the year.

10 If we go to the implementation schedule now.

11 [Slide.]

12 MR. SPEIS: See here, the first part is the work
13 that has been completed, the 0956 and all the other
14 information. And the dotted lines indicate the review, public
15 comments, improvements, confirmatory work and things of that
16 sort.

17 The integral planned analysis 1150 is presently
18 scheduled to be completed sometime in the summer of 1986, and
19 at that time it will go out for peer review and public
20 comments and Mal will discuss that in some more detail.

21 The method development for individual plant
22 examination is underway right now. And as I said earlier,
23 this work will be -- will be given to us sometime in the
24 spring of 1986. The next item I have listed based on that
25 work and the work that Research is doing will package all that

1 in the guidelines and criteria which we'll give to you people
2 sometime in the end of '86.

3 And the next line I indicate that the licensees can
4 start the examination of individual plants sometime in '87.

5 [Commissioner Asselstine left the room.]

6 MR. SPEIS: Industry has complained that there is a
7 large window between that date and the date that we will be
8 presenting to you the guidelines and criteria for the
9 individual plant examination. And you see I have shown kind
10 of a nine-month window between the completion of the
11 guidelines and the initiation of the individual plant
12 examination.

13 CHAIRMAN PALLADINO: Them, when will we be -- I
14 look at this schedule and I see it's out in the end of 1988.
15 When do we begin to see some possible changes in the way we do
16 business?

17 MR. SPEIS: Okay, the last viewgraph -- the last
18 line indicates the changes in rules and regulatory practices
19 which we plan to initiate early in '86. And as I said
20 earlier, there are some areas that we don't have to go to
21 rulemaking or any other more formal changes to the
22 regulations, you know.

23 CHAIRMAN PALLADINO: You say some of them we will?

24 MR. SPEIS: Some of them don't. The ones that I
25 mentioned earlier. You know, the elimination of spray

1 additives or whether we give credit to suppression pool
2 decontamination. Other areas will have to wait the completion
3 of the integral risk rebaseline studies in NUREG 1150 before
4 we go forward with some more formal proposals.

5 So it's a continuing effort that shows, starting in
6 '86 -- early '86 and going into '88.

7 CHAIRMAN PALLADINO: Well, just one follow-up.
8 We're now using information from 14844?

9 MR. SPEIS: Yes.

10 CHAIRMAN PALLADINO: We're using WASH-1400.

11 MR. SPEIS: Yes.

12 CHAIRMAN PALLADINO: We sort of treat them as
13 gospel, as though they had passed all this questioning and
14 were based on solid information. And we've got to recognize
15 that that's what we're doing in the interim.

16 So if we have better information, why shouldn't we
17 be using it somewhere along the line? And it seems like we
18 have a lot, and yet we don't even get started until -- well,
19 maybe we get started next spring.

20 MR. SPEIS: In some areas we're using -- for
21 example, under short term I had listed revised treatment of
22 severe accidents and your term environmental impact
23 statements. This would be done for the south Texas case. The
24 environmental statement will include new source information.

25 So our insights as to the actual risk imposed by a

1 plant would be derived by the use of new information. And
2 this is the first time that it would be done.

3 In other cases in prioritizing generic issues or
4 even in pursuing resolution of generic issues, we're using
5 part of the work, but not the whole thing.

6 [Commissioner Asselstine returned to the room.]

7 MR. SPEIS: For example, we know more about
8 containment performance for large dry containments. We're
9 using that information. But we're not using any physics or
10 chemistry, per se, yet in our evaluations, you know. Because
11 the source term is more than physics and chemistry. It's an
12 integral coupling of the behavior of the containment.

13 So in some cases, we are beginning to use the
14 performance of the containments, at least for large dry
15 containments where we know more about it.

16 CHAIRMAN PALLADINO: But I just to make the point
17 that, in the process, we're still relying on outdated,
18 unsupported bases which didn't go anywhere near into the
19 background that we have on many of these source terms now.

20 MR. SPEIS: That's true.

21 CHAIRMAN PALLADINO: So keeping putting it off means
22 that we're using old stock implicitly, and some of it may not
23 have any good basis at all.

24 MR. SPEIS: For example, regarding the question of
25 whether one should remove spray additives, you know, we're

1 assuming that the iodine is in the form of a gas. So if we
2 all are happy that iodine is not in the gaseous form but it is
3 cesium iodine, then we should go ahead and do this.

4 We're still waiting to make sure that 0956 has been
5 peer reviewed and any questions of any residual questions or
6 issues, you know, are settled before we can march forward.
7 But this is our planning, and as soon as some of the
8 information settles, we're ready to go forward, especially
9 with the short term issues that we have told you.

10 CHAIRMAN PALLADINO: Well, I suspect you're being
11 realistic. And maybe not realistic enough, but I feel that
12 you have to recognize what our basis is.

13 MR. ROSS: Mr. Chairman --

14 MR. DENTON: Let me finish this thought, Denny, and
15 I'll get back.

16 When we talk about these issues that we could do
17 with industry, I want to reiterate that they're largely in --
18 the industry's interest is largely in completing the severe
19 accident reviews of all plants. I don't sense that they're as
20 interested in the 13 items we've said where we may be able to
21 change our regulations.

22 Of course, they're interested in them, but what they
23 want to do is get the severe accident sweep through --

24 CHAIRMAN PALLADINO: That's IDCOR.

25 MR. DENTON: IDCOR. IDCOR is driving toward that.

1 Then there are these other individual things like containment
2 sprays that we are proposing to go ahead and start before all
3 this IDCOR work gets wrapped up, because it seems pretty well
4 put to bed.

5 Then there are some bigger items like emergency
6 planning that go to bigger policy questions than some narrow
7 question as to the form of the chemistry that will have to
8 come to the Commission in some form.

9 So what we want to lay out today is at least the
10 structure of how we get these things to the Commission. And
11 they do go back to these documents I mentioned. Completing
12 0956, which is sort of the science, completing the 18 issues
13 that we have outstanding with IDCOR in some form or another,
14 and then completing 1150. And those things, once they all get
15 completed, will allow us to go forward and have all those
16 things peer reviewed.

17 This process kind of builds them together and does
18 some of each one, with industry being mainly interested in
19 severe accidents, and some utilities mainly interested in
20 emergency planning. I'm not putting that much effort on
21 things like coarse sprays because I just don't feel the
22 pressure for industry to divert resources into that that would
23 come out of the severe accident review.

24 MR. ROSS: I just had two things. Recently when I
25 was giving the 0956 presentation to the ACRS I made these same

1 points that you just made, that if you reject the 1985
2 technology you take us back 10 to 20 years. And whereas we
3 admit we have uncertainties, we're still -- in some cases
4 undesirably large -- we believe that we're much better off in
5 '85 than we were in '75.

6 The other thing has to do with could we move
7 faster. The general tone of the comments we've gotten -- I
8 say the non-technical comments we've gotten from 0956 so far
9 persuades me that when we finally move into rulemaking space,
10 to make a generic policy change like the severe accident
11 policy statement said we can expect some rather vigorous
12 contesting of views.

13 We need a solid technical basis for rulemaking, and
14 I believe that 1150 should be looked on as the foundation for
15 any generic rulemaking. We need a solid technical basis.
16 Right now we don't have one. We may think we'd like to
17 modify Appendix J or Appendix E or 50.47 on EQ but we don't
18 have the technical basis in a form suitable for rulemaking,
19 and that's what's holding us up.

20 CHAIRMAN PALLADINO: Okay.

21 COMMISSIONER BERNTHAL: Question, when would you
22 guess that an examination of an individual plant, the last
23 line from the bottom, due to begin in the middle of 1987?
24 When would you anticipate that the first one would be
25 finished?

1 COMMISSIONER ASSELSTINE: Beyond the six reference
2 plants, because those presumably would be done by that point.

3 COMMISSIONER BERNTHAL: That's right.

4 MR. SPEIS: Could be a few months.

5 COMMISSIONER BERNTHAL: It takes a few months once
6 you've got your six reference plants done then to do an
7 individual plant? Is that what you're saying?

8 MR. SPEIS: Well, the reference plants will get the
9 methodology out of the way.

10 COMMISSIONER BERNTHAL: Exactly.

11 MR. SPEIS: The insights, okay. And then that
12 process will be in place, the criteria --

13 COMMISSIONER BERNTHAL: No, I'm not talking about
14 putting the process in place.

15 MR. SPEIS: Once all these things are done --

16 COMMISSIONER BERNTHAL: When is the first individual
17 plant analysis finished.

18 MR. DENTON: I guess we'd have to ask IDOCR that
19 question, but maybe one of the --

20 COMMISSIONER ASSELSTINE: It probably also depends
21 upon what the final methodology comes out to be.

22 CHAIRMAN PALLADINO: Yes.

23 COMMISSIONER ASSELSTINE: If you require an
24 extensive individual plant analysis, that's obviously going to
25 take a good deal longer than a narrowly focused one that

1 relies a lot on the six reference plants.

2 MR. SPEIS: We will know more in the spring because
3 the methodology, as I said, is being applied right now to the
4 four reference plants and to three additional ones to fine
5 tune it, to answer questions like that. Maybe, Zoltan, you
6 can --

7 MR. ROSZTOCZY: I think that's basically the answer,
8 what has been mentioned here in the last comment. Our
9 expectation is that some of the plants will have to do very
10 little work and others will have to do more. How much you
11 have to work will depend on what has already been done. If a
12 plant already had a full blown PRA, then because of that they
13 probably will have to do little work.

14 The other case when they will have to do little work
15 is if the plant is very similar to the reference plant which
16 has been reviewed. It's really a sister plant, it looks
17 almost exactly the same. Then they probably will be required
18 to do very little work.

19 So we expect to see a very broad spectrum, and
20 hopefully there will be many of them in the category which
21 have to do little work. And then there will be some that will
22 have to do more.

23 If it requires inspection, which requires going into
24 the areas that normally are not available, then you have to
25 tie into the methodology.

1 COMMISSIONER BERNTHAL: Well, realistically there
2 must be some sense of the plants that you, Harold, and others
3 here would focus on, as we spoke of six months ago when we
4 were talking about severe accident policy statement. You
5 would focus on a certain groups of plants, presumably as the
6 ones that you think most need looking at.

7 I have to say it sounds to me like we start in late
8 1987, and by the time you've completed all of your
9 negotiations with the utility and you get the people there and
10 you've done the analysis and write up the work, it sounds to
11 me like 1989 or '90.

12 MR. ROSZTOCZY: Once the guidelines would be issued,
13 which is shown on the chart to be issued in the middle of
14 1987, from there on it's the utilities work. The utility
15 would be doing this. We have not yet decided, and we don't
16 have a proposal how NRC would follow up. But the NRC
17 follow-up could be simply an audit at some later time.

18 So if little is required from a plant, and if they
19 go ahead and do it, it could complete -- could be completed a
20 few months and put into the files, and from there only just
21 subject to audit test we wish to do.

22 COMMISSIONER BERNTHAL: Which would take at least a
23 few months. It's 1989, isn't it, easily?

24 CHAIRMAN PALLADINO: This schedule only goes to
25 1988. And we shouldn't presume that all things stop there.

1 COMMISSIONER BERNTHAL: They clearly don't.

2 COMMISSIONER ASSELSTINE: The third list though --
3 the third item down there, if IDCOR is going to be finished
4 with their program on how they propose to do the individual
5 plant reviews by the first quarter of '86, is there anything
6 to prevent the other utilities from then proceeding to follow
7 that plan and start on the work?

8 MR. DENTON: No, they want us to approve it --

9 COMMISSIONER ASSELSTINE: Before they start?

10 MR. DENTON: -- before they start, so they don't
11 commit resources. And we figure that we will have to get ACRS
12 involved and maybe CRGR and perhaps the Commission involved.
13 So we've allowed time in there to approve their methodology.

14 COMMISSIONER ASSELSTINE: Okay.

15 COMMISSIONER BERNTHAL: Let me ask this question the
16 other way around. Suppose that today you were asked which
17 plants need to be looked at, and knowing what we do about PRA
18 today, and what we do about the reviews that have already been
19 done in some cases using current PRA technology, don't you
20 think that you could set out a program fairly quickly for the
21 eight, ten, dozen plants that you think need review?
22 Otherwise, they're going to wait until 1989 before any
23 decisions are made by this agency.

24 It's clear it will be '89, maybe '90.

25 MR. DENTON: We've talked to industry about

1 splitting say big dry containments from --

2 COMMISSIONER BERNTHAL: Exactly.

3 MR. DENTON: -- other containments. They weren't
4 too enthusiastic to split up. They want to all go down the
5 same street together. But let me ask Them to answer your
6 question.

7 MR. SPEIS: Well, again you know, we will have
8 reviewed and come up with guidelines sometime in the fall of
9 '86. It's possible at that time -- but again, we know from
10 reality, from the real world that, you know, you don't write
11 something and send it to your boss and, you know, there is
12 always a big window for the approval process. And industry --
13 once we get that approval process.

14 But I think it's possible that they can start the
15 examination then we show here, maybe early in '87. And then
16 completed by the end of '87.

17 MR. DENTON: But to answer your question -- I think
18 he was asking about which types of plants are most likely to
19 be outliers. And they're the ones who have a potential for
20 not containing radionuclides for the first day or so.

21 Whereas the APS said that there's a great deal of
22 credit that can be given when containments hold together for
23 these chemistry processes to take place. So I think it's the
24 ones that have the potential for bypass or high leakage.

25 COMMISSIONER BERNTHAL: Exactly.

1 COMMISSIONER ASSELSTINE: Is that a function just of
2 the containment design such that you could say, the ones that
3 we're most worried about are the ice condensers and the
4 boilers? Or is it the design of the plant, such that you have
5 to look at each one to be able to --

6 MR. SPEIS: We look at each one because the
7 guidelines will focus not only in how much activity leaves the
8 containment given a core melt, but what can you do more to
9 farther reduce the probability of a core melt. So it's a
10 prevention and mitigation.

11 COMMISSIONER ASSELSTINE: So it's both types.

12 MR. SPEIS: It's both types.

13 MR. DENTON: But to look ahead a bit, it seems to me
14 at least, that boilers -- at least the MARK I's are going to
15 have to do something to their plant, because otherwise they
16 run the potential for early containment failure.

17 The kind of thing that's being talked about is some
18 sort of venting.

19 COMMISSIONER ROBERTS: Some sort of what?

20 MR. DENTON: Venting. Venting of the noble gases in
21 the space above the water.

22 COMMISSIONER ASSELSTINE: To prevent early failure?

23 MR. DENTON: To prevent early failure.

24 COMMISSIONER ASSELSTINE: Before you get to core
25 melt.

1 MR. DENTON: And what that turns them into then is a
2 filtered containment vent.

3 COMMISSIONER ASSELSTINE: Without the filter.

4 MR. DENTON: But with water as the filter in their
5 scheme. So the boilers turn around and argue that actually
6 they have a filtered containment vent already, if they were
7 to install a vent out of the air space above the water. So
8 it's this sort of detail --

9 COMMISSIONER ASSELSTINE: As long as you don't
10 bypass the suppression.

11 MR. DENTON: So long as you don't bypass the
12 suppression, exactly. So no one as yet -- we haven't
13 identified anyone yet as being the obvious outliers. I mean,
14 once we move toward an outlier that one gets attention and
15 people to find a way to mitigate it if it is an outlier.

16 COMMISSIONER BERNTHAL: But, Harold, you know, it
17 seems to me the one thing that came out of the source term
18 discussions, to use a nice word here, that we had with the
19 various parties, was what I thought was a very refreshing
20 thing. I thought it was a new willingness to discriminate
21 among plants.

22 And I think if we're going to get anywhere in the
23 near term we almost have to do that. And in fact, one of the
24 -- although I'm not sure it made everyone happy -- at least
25 one of the representatives from a segment of the industry came

1 in here with a rather strong statement about large dry
2 containments. And as you know, the APS had some fairly good
3 things to say about large dry containments.

4 Now that's not to say there aren't good things to
5 say about other types of containments as well, or other types
6 of designs. But I'm just concerned that with this, what
7 appears to be move forward slowly on all fronts we lose sight
8 of this idea of discriminating among different designs.

9 And secondly, that instead of using engineering
10 judgment where it can be applied -- we talked about smart PRA
11 and nobody likes that word, but call it what you like, there
12 are some pretty good engineers around here and in the industry
13 that have a pretty good idea where the problems may be likely
14 to be found.

15 If we move ahead slowly on all fronts, we get there
16 in 1990 or beyond. If we just got to work today where the
17 engineers agreed that we need to get to work, it seems to me
18 we could cut some years off that. It's obvious.

19 MR. DENTON: This might be --

20 CHAIRMAN PALLADINO: We could discuss this at
21 length. I think you make a very important point.

22 MR. SPEIS: I want to add something. These are the
23 people who are working with IDCOR, the people who know where
24 the problems are, to come up with this methodology and
25 discriminate and focus in those areas that are important to

1 either core melt probability, or bypass in the containment, or
2 failure in the containment. You know, that's a very important
3 point to make.

4 You know we're talking about a truncated analysis,
5 okay, which is not going to be a complete PRA. But focused in
6 those areas based on what the engineers and the scientists and
7 the experience of the last 20 years has told us.

8 I think the other thing we have to be careful is
9 that, you know, sometimes on a simplistic basis you talk about
10 the dry containment but there are other considerations. You
11 know, boilers even though they have lower pressure
12 capabilities have other functional capability that have to be
13 taken into account. You know, they have a water suppression
14 pool, and if there is no bypass it serves an important
15 function.

16 So we shouldn't look at one type of plant in a
17 simplistic way and say, you know, it can go up to 150 psig and
18 --

19 COMMISSIONER BERNTHAL: No, I entirely agree. Look,
20 I'm entirely sympathetic. There are many very nice features,
21 with my relatively low level of understanding of nuclear
22 engineering, that clearly are embodied in the BWR design. And
23 many things about all that water are very nice to think about.

24 MR. SPEIS: But your idea does have merit, of
25 discrimination. But it has to be done --

1 COMMISSIONER BERNTHAL: Nevertheless --

2 MR. SPEIS: -- in a very erudite fashion so that we
3 don't make simplistic --

4 COMMISSIONER ASSELSTINE: It also strikes me it cuts
5 the other way. You could have a plant with a large dry
6 containment, which at least on its face looks pretty good.
7 And yet when you look at the accident prevention side you see
8 some real problems, either in the design of the safety systems
9 of the way they maintain them. Turkey Point comes to mind as
10 a real good example given what I've been reading lately of
11 what the Staff thinks about the way they maintain their plant.

12 CHAIRMAN PALLADINO: Let me suggest, with this point
13 being made, and I think a very good point, why don't we spend
14 a few minutes with Research and then recapitulate on the
15 schedule.

16 MR. DENTON: I think that's a good lead-in for
17 Research because they are doing these different types of
18 plants, and that will show the differences within them.

19 CHAIRMAN PALLADINO: Okay. Dennis, are you going to
20 make a -- or Ernst?

21 MR. ERNST: I have a few charts on NUREG 1150 and
22 the effort that's being expended on this document. If we can
23 have chart B-2, please.

24 [Slide.]

25 MR. ERNST: Just a brief rundown on what 1150 is

1 going to be. As mentioned there are six reference plants that
2 we are studying, all the way from accident sequences through
3 consequences. So the one important part of 1150 is giving the
4 risk and risk perspectives on these plants.

5 A second potential or second area of interest in
6 1150 is the risk reduction potential. Looking at the
7 resultant baseline risks of these plants, are there any
8 generic kinds of fixes or plant specific kinds of fixes that
9 might effectively reduce risk.

10 The third bullet I'd like to stress, and that's the
11 display and consideration of important uncertainties. We're
12 going to put a large amount of effort in trying to understand
13 and discuss and display the types of uncertainties that are
14 important to risk estimates.

15 Fourth, in this document we'll be trying to build
16 this bridge from the Research results, the risk insights, to
17 NRR pointing out the insights that we've gotten from these
18 analyses and considerations that might be important in making
19 plant specific extrapolations to other plants. Or also in
20 taking these results and using the results for generic
21 rulemakings or generic kinds of decisions.

22 The next chart.

23 [Slide.]

24 MR. ERNST: -- just is a brief reminder. The reason
25 why we're in this expanded program is that there were --

1 indications that we got from previous analyses are that we do
2 need to update the frequency information with care. In the
3 first place, there's been improvements in conducting PRAs over
4 the past few years. For example, how to conduct common cause
5 analyses.

6 Also there's been a number of plant and procedure
7 improvements since TMI. And we felt it very important to take
8 a fresh look at these plants considering these changes and
9 rebaselining the core melt frequencies and risk.

10 Secondly, the results from BMI-2104 indicates that
11 there can be situations where the source terms from some
12 accident sequences could be large. This made it very
13 difficult to extrapolate the BMI-2104 results to all accident
14 sequences that might be risk important at all plants. So this
15 again stressed the need for an expanded program.

16 COMMISSIONER ASSELSTINE: Mal, before you leave that
17 page, you talked about the improved insights from PRAs in
18 recent years, plant specific data and human reliability. How
19 do you propose to handle the point that Harold made after
20 Davis-Besse, about the failure on the part of PRAs to consider
21 the potential for widespread failures based upon such things
22 as poor maintenance practices?

23 MR. ERNST: Well, it is important to realize we are
24 doing a -- I heard the word truncated analysis used a few
25 minutes ago. We are doing a truncated analysis. To get at

1 all possible failure modes and interactions would take
2 considerably more extensive effort than we are doing. We're
3 trying to draw on the existing experience base, knowledge
4 base. We are looking at LERs and events, trying to factor
5 that information into this more truncated kind of analysis.

6 To that extent we're taking into consideration the
7 best way we know how of the available information. We
8 wouldn't find anything brand new. I think that's a fair
9 statement. So we aren't doing a full blown PRA. But I think
10 we are going to do a very good job at what one might call a
11 smart PRA based on existing information.

12 COMMISSIONER ASSELSTINE: But I guess the question
13 I'm trying to raise, it seems to me you could approach it from
14 two directions. On the one hand you could say, how reliable
15 are these results, given this kind of a potential problem, a
16 Davis-Besse kind of situation? How is that likely to
17 fundamentally change the results that we would otherwise
18 receive? It seems to me that question is one that's worth
19 asking.

20 Another question that's worth asking is, if the
21 results are likely to change rather dramatically if you have
22 this kind of a situation, then what does that say about the
23 importance of that kind of a problem? And what can we do to
24 make sure that that kind of a problem doesn't exist at any of
25 the plants, to ensure that these results that we're counting

1 on really are likely to be accurate predictors of plant
2 performance?

3 MR. ERNST: It's very difficult, as you well know,
4 in a PRA to predict a specific set of occurrences. You can
5 get occurrences similar to that and get a risk perspective on
6 that type of an occurrence, but to predict an exact set of
7 occurrences is too much for a PRA.

8 COMMISSIONER ASSELSTINE: Okay, I appreciate that,
9 but there's also a big difference between on the one hand,
10 assuming that the plant is adequately maintained and you have
11 a fully satisfactory maintenance program, on the other hand to
12 assume that you have a breakdown in something like maintenance
13 and the consequences of that.

14 There's a wide spectrum in between those two points,
15 and I think what experience is showing us is there's a wide
16 spectrum in the plants. Some are on the side where things go
17 very well and maintenance is done very well. And we've also
18 got a few out there where that's not the case.

19 CHAIRMAN PALLADINO: Well, I think it's up to us to
20 make sure that those people that are not doing proper
21 maintenance get it straightened out so that they do proper
22 maintenance.

23 COMMISSIONER ASSELSTINE: Well, I agree with that.

24 CHAIRMAN PALLADINO: But I think a lot of this,
25 these things that we're finding at plants just got to stop.

1 COMMISSIONER ASSELSTINE: That's right.

2 CHAIRMAN PALLADINO: I don't see why we have to face
3 some of the situations that we do. It's, I think, a challenge
4 that has to be put to the industry to look at the way we
5 operate these plants and get them so that they're operating
6 without the many little flaws that we note in the daily
7 reports every day.

8 But that doesn't settle this problem, except that I
9 think we have another avenue to settle that problem, and
10 that's the way I would --

11 COMMISSIONER ASSELSTINE: But I take it the
12 assumption is that's basically built into the PRAs is that
13 maintenance is done properly.

14 MR. ERNST: Yes, I would say that PRAs take a --
15 make a judgment on risk based on experience and other
16 analytical techniques for making these judgments. Whether or
17 not a particular plant performs up to those expectations is a
18 different question.

19 And I would submit a good reliability program is a
20 must. PRAs do not answer all regulatory questions by any
21 means.

22 COMMISSIONER ASSELSTINE: But it does seem to me
23 that, you know, one way or the other, either the PRAs have to
24 accurately reflect reality. Or on the other hand, we've got
25 to bring reality into conformance with what the PRAs are

1 relying on, which is good maintenance practices.

2 MR. ERNST: Clearly, the emphasis has to make the
3 PRAs come true.

4 CHAIRMAN PALLADINO: Okay, you want to go ahead? I
5 think that's an important point.

6 MR. ERNST: Next slide.

7 [Slide.]

8 MR. ERNST: I don't want to spend any time on this
9 detailed chart. I just wanted to illustrate that the job we
10 are about is complex, has a number of facets across six
11 plants.

12 One might look at the Peach Bottom list of events.
13 We are going to have an IDCOR meeting in early December, and
14 at that time -- on Peach Bottom -- and at that time we will be
15 through item nine on that list. So we will be ready to
16 substantively talk about the results of our rebaselining work
17 from the standpoint of accident sequence updating, source term
18 results, containment performance, and baseline risk for Peach
19 Bottom.

20 The next chart.

21 [Slide.]

22 MR. ERNST: -- takes one of the items on the
23 previous chart, namely item ten, which is the risk/risk
24 reduction tables and explanatory text. That milestone was
25 chosen because it represents the point in time that we will

1 essentially have all the technical information from the
2 rebaselining available to NRR for consideration.

3 There are two columns there. One is the estimated
4 completion of that task for all six plants as of the end of
5 the June. And the second column is the current estimated
6 date.

7 One can see that there are about one to two month's
8 worth of slips across the plants. However, these slips have
9 not affected the completion date for the draft NUREG 1150.

10 CHAIRMAN PALLADINO: Well, then what did he mean?
11 This says that in four months we slipped two months, two
12 months, one months, one and-a-half month.

13 MR. ERNST: That's correct.

14 CHAIRMAN PALLADINO: Now what does that mean then?
15 We're slipping at the rate of half the time that goes forward?

16 MR. ERNST: No, I have a chart on the kinds of
17 problems later on.

18 COMMISSIONER BERNTHAL: We're slipping as fast as we
19 progress.

20 MR. ERNST: No.

21 COMMISSIONER ASSELSTINE: Half as fast.

22 CHAIRMAN PALLADINO: That wasn't fair, Mal.

23 MR. ERNST: It deserves an answer though.

24 [Laughter.]

25 MR. DIRCKS: Keep talking. We're slipping even

1 faster.

2 CHAIRMAN PALLADINO: I agree.

3 MR. ERNST: The answer is, I established extremely
4 tight schedules, as we'll see on the next page to start with,
5 as the only way to try and get this job done, fully expecting
6 there would be some slips. The draft NUREG was scheduled
7 anticipating slips of a couple of months.

8 [Slide.]

9 MR. ERNST: The next chart does give some basic
10 assumptions on establishing the schedules. And the only point
11 I'd like to make is that essentially every task on that matrix
12 was on the critical path. Anybody who's run critical path
13 analyses knows that that's almost disaster right from the
14 start.

15 It also assumed that no problems would come up in
16 the analyses, no new insights that require perhaps more source
17 term code runs or additional analyses, things like that.

18 COMMISSIONER ASSELSTINE: What is code package
19 linkage?

20 MR. ERNST: This is the assemblage of the various
21 code packages into one, essentially what's called the source
22 term code package.

23 COMMISSIONER ASSELSTINE: Okay, putting them all of
24 these different codes together for one plant?

25 MR. ERNST: All the BM -- yes. Making them run a

1 little bit more efficiently and so forth.

2 COMMISSIONER ASSELSTINE: And making sure they're
3 internally consistent?

4 MR. ERNST: Yes. I don't want to spend a lot of
5 time on this. I just wanted to give a flavor for the fact
6 that we were taking on a very large task. And in my
7 estimation, it's coming together pretty well.

8 The next slide.

9 [Slide.]

10 MR. ERNST: There are -- have been some slips and
11 this is just a listing of problems that we have encountered,
12 which I would say would be expected kinds of problems.

13 I would like to highlight item five. We are getting
14 sequences and sequence frequencies that differ significantly
15 from the PRAs that have been previously done in the plants.
16 So we have to look closely at recovery actions and risk
17 reduction measures and things of that sort, get the insights
18 from those changes very carefully. This requires some extra
19 time because of these somewhat unexpected differences.

20 Item ten --

21 COMMISSIONER ASSELSTINE: Why have those differences
22 occurred? Do you think the PRAs weren't done right?

23 MR. ERNST: No, there's changes in the plant,
24 changes in procedures. To some extent, changes in
25 techniques. And if that's the case, you have to understand

1 the changes and see whether or not we agree with those
2 analytical techniques or not.

3 COMMISSIONER ASSELSTINE: Okay.

4 MR. ERNST: So it takes some time to get at the
5 answer to your question. And we think we have to do that in a
6 responsible manner.

7 COMMISSIONER ASSELSTINE: Were those changes picked
8 up by the existing PRAs or not?

9 MR. ERNST: No. What this is is a difference
10 compared to the existing PRA. A difference from our results
11 compared to the existing PRA on that particular plant.

12 COMMISSIONER ASSELSTINE: So that those original
13 PRAs were done, changes took place in the plant since then,
14 and those PRAs were never updated?

15 MR. ERNST: Yes, that's correct.

16 COMMISSIONER ASSELSTINE: Okay.

17 MR. ERNST: The item ten I think is important to
18 highlight also. And that is, we have been studying ways to
19 treat uncertainties in a more realistic and comprehensive
20 manner than has been in the past for the vast majority of
21 PRAs. And this has taken some time, and has added some time
22 to the overall schedule for conducting these plant uncertainty
23 analyses also.

24 [Slide.]

25 MR. ERNST: Next chart basically says what I've

1 already said. The bottom line is that at the present time the
2 draft NUREG 1150 is still scheduled to be published in
3 mid-summer of 1986, and we anticipating meeting that date.

4 [Slide.]

5 MR. ERNST: The next chart on consideration of
6 uncertainty. I have three charts on this, and I think it's
7 very important to spend some time.

8 In the first place, there are about six major areas
9 that contribute to uncertainty and risk predictions. The one
10 you typically see in PRAs is the first bullet, which is
11 basically your basic event data uncertainties on component
12 failure rates, human error failures and things of that nature.

13 There are five others that are extremely important.
14 One is that there are thermal hydraulic assumptions and other
15 kinds of success/failure criteria that I would call
16 phenomenological assumptions that are important to predicting
17 core melt frequency.

18 Another item is --

19 COMMISSIONER ASSELSTINE: Could you give an example
20 or two of that one?

21 MR. ERNST: Well, for example, whether one pump
22 versus two pumps need to be operated to provide sufficient
23 heating to prevent core melt. Many times PRAs will use a
24 rather conservative FSAR kinds of assumptions for this.
25 Lacking detailed thermal hydraulic calculations, one would go

1 with the more conservative number, as opposed to maybe one
2 less pump being a success criterion. That kind of a thing.

3 COMMISSIONER ASSELSTINE: Okay.

4 MR. ERNST: The third bullet says that there are
5 phenomenological considerations pertaining to containment
6 performance, which is the loads, failure modes, failure
7 likelihoods, things of that sort. Direct heating and hydrogen
8 generation might be a couple of examples in that area.

9 The fourth bullet talks about uncertainties in the
10 estimates of source term. Again, these are basically
11 phenomenological. Core concrete temperatures,
12 revolatilization, things like that would be important to that
13 particular bullet.

14 The fifth bullet talks about uncertainties in
15 consequence calculations as well as uncertainties in
16 meteorological conditions.

17 And the last bullet highlights the effect of
18 emergency response assumptions on risk, particularly the risk
19 for early fatality.

20 The problem is to take these six areas and do a
21 useful job -- what I call a pragmatic job of uncertainty
22 analysis.

23 If we go on to the next chart.

24 [Slide.]

25 MR. ERNST: The purpose of analyzing the risk

1 dominant uncertainties is to focus attention on the important
2 analytical assumptions and assess their uncertainties in terms
3 of -- and I stress this -- in terms of reasonable ranges of
4 mean estimates of core melt frequency and risk.

5 What this says is, you can get mean estimates if you
6 know data distributions, for example. You pretty much have to
7 know the distribution of the information you have to be able
8 to come up with means and 5 and 95 percentiles, things of that
9 sort.

10 When you get in the phenomenological area, not only
11 are these types of uncertainties very important to decisions,
12 but they also represent lack of knowledge. There really is
13 not a distribution associated with that lack of knowledge.

14 So what we are attempting to do in this particular
15 area is to identify the 10 or 15 parameters, mainly the
16 phenomenological parameters, that are most important to core
17 melt frequency and to risk. Taking these 10 or 15 parameters,
18 then try to determine reasonable, credible ranges where the
19 actual value of that parameter is likely to exist. And this
20 could be characterized as similar to a 90 percent degree of
21 belief, without paying a lot of attention to whether it's 90
22 percent, 80 percent, or 95 percent, because we don't know that
23 well. But just to have a comfortable degree of belief that
24 the value is in that range.

25 Then taking these ranges, calculate the range of

1 mean values that you would get using a statistical sampling
2 approach similar to a sophisticated Latin hypercube, or
3 sophisticated Mark Harlow approach.

4 I would like to stress that when we get this range
5 of mean values on risk, we will not have formal statistical
6 bounds that we can put on them. We can't claim they're 5 and
7 95 percentiles, for example. All we can claim is we've done
8 pragmatically, using good engineering judgment, a job of
9 assessing the likely range of the major driving uncertainties.

10 We feel this will be a step forward in the ability
11 to understand the uncertainties in PHAs, which will then help
12 you assess how to use these results more rationally perhaps in
13 decision making.

14 [Slide.]

15 MR. ERNST: Basically, on the next chart, this
16 requires what I would call issue closure for NUREG 1150. This
17 is a little different than what one might call issue closure
18 of a technical issue where everybody agrees, perhaps, that
19 this is the resolution.

20 What I feel we have to have in 1150 is at least an
21 NRC Staff position on the -- what one might call a best
22 estimate value for these phenomenological uncertainties, as
23 well as a reasonable range through which this value is likely
24 to be found. This is what I call issue closure for 1150.

25 So we're starting a process that identifies the

1 dominant parameters, performs sensitivity analyses over a
2 reasonable uncertainty range to get at the impacts on risk, a
3 process to develop a Staff position and a rationale on the
4 parameter values to be used in 1150.

5 And the typical issues that we're looking at are a
6 number of the issues of the 19 IDCOR issues, plus some
7 additional ones. So we're going to be taking a look at the
8 IDCOR issues and pick those that are most important to risk,
9 as well as some other issues that have come out of our
10 analyses, such as human errors in responding to ATWS
11 situations and things like that. Develop a Staff position and
12 then, as I mentioned, through this statistical process come up
13 with ranges of the resulting means.

14 That's basically what we're about, basically where
15 we sit today. I anticipate that this taking positions on the
16 dominant issues will take place over the next two to three
17 months. That's it.

18 MR. ROSS: We have just a couple of items. I think
19 we've covered or we've talked about 0956 comments. We've
20 gotten roughly 30 comments in. And we'll analyze them in
21 detail and report on them, is the only other thing really of
22 importance we wanted to say.

23 I think this concludes the briefing by both
24 offices. If there's further questions.

25 CHAIRMAN PALLADINO: I gather though that some of

1 the organizations that have important comments have not yet
2 submitted them.

3 MR. ROSS: That's correct.

4 CHAIRMAN PALLADINO: And so I think it is important
5 to encourage them to come in with their comments

6 MR. ROSS: I think there's one other thing that we
7 would like to bring up. There's been, what I would call, bits
8 and pieces of new research information has come up in the last
9 few months on radiiodine. And if you have a couple of
10 minutes, I'd like Jocelyn Mitchell to give you an update.

11 CHAIRMAN PALLADINO: All right.

12 MS. MITCHELL: Do you have the number of the back-up
13 slide?

14 MR. ROSS: Do you want it, or just talk?

15 MS. MITCHELL: I'd just as soon have it up, if I
16 could please.

17 CHAIRMAN PALLADINO: What's this?

18 MS. MITCHELL: Denny needs to look up the number of
19 the back-up slide for us.

20 MR. ROSS: It's back-up slide B-4.

21 [Slide.]

22 MS. MITCHELL: In NUREG 0956 in Section 3.5 we
23 indicated that there was some evidence that was accumulating
24 at that time that during severe accidents there could be
25 volatile forms of iodine formed. And we gave you in that

1 document a promissory note that we would keep our eye on this,
2 and that we would at least try a parametric analysis to find
3 out that if volatile iodine forms are found, what it might
4 mean for source terms off-site.

5 Since the time of publication of NUREG 0956 in July
6 there have been six pieces of information that have come forth
7 that indicate again that there may be volatile forms of
8 iodine. These six are listed here in this slide.

9 The first one is a Sandia experiment in which cesium
10 iodide and some steam were passed through a cobalt 60
11 radiation field, and they found that cesium iodide broke down
12 in this field. The cesium hydroxide that they believe was
13 formed was trapped in the apparatus, and hydrogen iodide came
14 through to the other end of the apparatus.

15 The second is the LOFT FP-2 test had some very early
16 information showing that I₂ and organic forms of iodine were
17 found inside the containment.

18 The third is that there's a very recently begun
19 experimental technique for looking for cesium iodide. This
20 was applied to some coupons, deposition coupons from the PBF
21 Severe Fuel Damage 1-3 test, and no cesium iodide was found.

22 The fourth one is an Oak Ridge experiment where they
23 are looking at formation of organic iodine experimentally in
24 sump water. And they find that it requires ionic iodine,
25 radiation field and organic materials. It is also very

1 strongly dependent on the sump pH.

2 An Oak Ridge experiment looking for cesium iodide in
3 separate effects test found none.

4 And finally a Battelle Columbus laboratory
5 experiment finding that cesium and iodine were released
6 separately in some fission product release experiments that
7 they were investigating using their mass spectrometer for
8 evaluation.

9 I just want to mention also that there was an iodine
10 conference in the United Kingdom in September at which the
11 volatile forms of iodine were something that was discussed.
12 It was the subject of the GREST meeting, the group of experts
13 on source terms in Paris in September. And it's a CS&I
14 subcommittee. And also mentioned last week several times at
15 the IAEA sponsored source term conference symposium last week.

16 So we are looking at it. We intend to have peer
17 reviewed all of the experiments that you see up here along
18 with the three that were mentioned in NUREG 0956 to try to get
19 a position on it, and also to perform as quickly as we can the
20 parametric analysis which we did promise in 0956.

21 CHAIRMAN PALLADINO: Okay, thank you.

22 COMMISSIONER ASSELSTINE: Well, what does all this
23 mean?

24 CHAIRMAN PALLADINO: That's what I was going to --

25 COMMISSIONER ASSELSTINE: I mean, in lay terms, do

1 these experiments at least raise questions about this
2 assumption that the cesium and iodine forming or what?

3 COMMISSIONER BERNTHAL: Is it good or bad?

4 MS. MITCHELL: Well, I found out in this business
5 that there's always good news and bad news in exactly the same
6 fact. I think it's a little early to try to tell what it
7 might mean because we don't know yet what kinds of volatile
8 iodine are coming out and what might happen to them

9 COMMISSIONER ZECH: Well, were we surprised by the
10 results? Did you have some assumptions on these things ahead
11 of time?

12 MS. MITCHELL: We had the assumption in the
13 calculations in BMI-2104, and that were reported in NUREG
14 0950.

15 COMMISSIONER ZECH: Yes, I know, but I don't
16 remember what all those said.

17 MS. MITCHELL: They said that there was cesium
18 iodide. They said it was cesium iodide. However --

19 COMMISSIONER ASSELSTINE: And these contradict that
20 assumption?

21 MS. MITCHELL: Yes.

22 CHAIRMAN PALLADINO: This introduces new
23 uncertainty.

24 COMMISSIONER ZECH: So this is different from what
25 our assumptions originally were?

1 MS. MITCHELL: Yes.

2 COMMISSIONER ASSELSTINE: That's right.

3 MS. MITCHELL: Well, we recognized even then that
4 this might not be the case.

5 COMMISSIONER ZECH: But we don't know, even though
6 they're different from our assumptions, we don't know whether
7 this is a more conservative, a more dangerous, or we haven't
8 any conclusions in that regard, is that what you're saying?

9 MR. DENTON: Well, at the moment we assume for all
10 regulatory calculations that it's gaseous molecular iodide,
11 which is a very conservative approach. And that's the 15, 20
12 year basis we've been doing.

13 The report you heard from the American Nuclear
14 Society and APS and so forth said that was overly conservative
15 and it would really be cesium iodide. So for the past year or
16 so you've been hearing the fact that much less iodine would
17 get out than we normally assume. This then calls that into
18 question, perhaps, to some degree and will have to be looked
19 at.

20 MR. ROSS: I think we --

21 MR. DENTON: It doesn't undermine the present
22 regulatory system, but it is important on how it changes and
23 how we might go about changing our evaluation.

24 COMMISSIONER ASSELSTINE: It is important from the
25 standpoint that the one thing that certainly the industry was

1 arguing in the American Nuclear Society presentation, and to a
2 certain extent APS as well, was that, gee, there are some
3 uncertainties that may be left. But the one thing we can tell
4 you -- the good news is, cesium -- the iodine forms cesium
5 iodide and therefore you don't have to worry so much about the
6 iodine. And it's not that big a problem.

7 And I gather what you're saying now is, that's still
8 an open question.

9 MR. DENTON: There seemed to be a strong consensus
10 on that point a year ago, and I guess this is beginning --
11 these experiments have been done since that time.

12 MR. ROSS: Commissioner Zech, let me make this
13 point. In some of the sequences, the end reactor system
14 deposition was predicted to be very high. It would say the
15 reactor coolant system may trap as much as 90 percent of the
16 iodine in the form of cesium iodide, okay?

17 If that no longer happens, then the iodine would be
18 leaving the reactor coolant system. Now, it's in the
19 containment. And our containment modeling at present doesn't
20 have the chemistry to decide what might happen to the iodine
21 once it's in the reactor building.

22 What we have to do now, we -- our time scale, I
23 hope, short term time scale is about four months. We have to
24 decide what, if anything, can and should we do in the reactor
25 building if we have this free iodine, or if it's iodate and

1 ion, or whatever it is.

2 COMMISSIONER ZECH: So you're saying --

3 MR. ROSS: And I think we'll just have to say, we'll
4 let you know. If you adhere to your quarterly briefly, you
5 know, approximately, then I'd expect the next time we come
6 back to have some definitive answers. What you see on this
7 slide, the ink is scarcely dry.

8 COMMISSIONER ZECH: So what you're saying is that
9 you have -- this is rather new information. You really
10 haven't analyzed it yet, and you're not really sure.

11 MR. ROSS: That's right. We haven't even agreed
12 that these experiments are typical. Some of them, we may
13 decide by peer review that although it's interesting, it's not
14 dispositive in a reactor environment.

15 COMMISSIONER ZECH: Well, I'd be very --

16 MR. ROSS: We just don't --

17 COMMISSIONER ZECH: Your analysis and conclusions in
18 that regard will be very important.

19 MR. ROSS: That's right.

20 CHAIRMAN PALLADINO: It does emphasize though the
21 importance of making sure that we are based on good scientific
22 data.

23 MR. ROSS: That's correct.

24 CHAIRMAN PALLADINO: And that's another reason for
25 proceeding cautiously even though it's frustrating in the end.

1 Well. I think we've had a very informative
2 briefing. I know there remain a number of questions. I do
3 feel that one important that was developed was the fact that
4 we do need -- and apparently the Staff has already proceeding
5 -- on getting an interim document that identifies the
6 technical issues and the way that they're going to approach in
7 implementing them. This is interim between NUREG 0956 and
8 NUREG 1150.

9 I don't have -- I didn't get a good feel about when
10 that might be done, even though I gather it's underway.

11 COMMISSIONER ASSELSTINE: End of the year, wasn't
12 it?

13 CHAIRMAN PALLADINO: Do you have a rough time?

14 MR. DIRCKS: Well, I think we have to go back and
15 regroup. Because I did mention we wanted to get some
16 indications from some of the discussion here. There may be
17 other factors that we might want to put in the paper.

18 [Commissioner Roberts left the room.]

19 MR. DIRCKS: I've seen drafts of the paper. And I
20 think based on the discussion today we may want to add a few
21 more items in there.

22 CHAIRMAN PALLADINO: All right. Any other points
23 that --

24 COMMISSIONER ASSELSTINE: I had one other quick
25 question. I had gathered that the American Chemical Society

1 is setting up a symposium next year on source term chemistry.
2 I thought that that was kind of a good idea. And after
3 hearing about some of the Research results on this it strikes
4 me that it's even a better idea.

5 And I was just wondering, are we supporting that
6 effort and encouraging our folks, our contractors to
7 participate in it? It strikes me -- the chemistry is a fairly
8 useful part of all this and one that may not have gotten as
9 much attention in the past as was needed.

10 MR. ROSS: I just heard a little bit about that this
11 morning. Are we supporting it, if you mean financially, we
12 haven't --

13 COMMISSIONER ASSELSTINE: Or otherwise.

14 MR. ROSS: Well, financially we haven't been asked.
15 Or when we have a society that asks for a small grant to
16 defray publication costs, our tendency is to consider it
17 favorably.

18 COMMISSIONER ASSELSTINE: Okay.

19 MR. ROSS: Technically speaking, it sounded like a
20 good idea. And if we can get a lively group of speakers, I
21 think, sure we'd be glad to do it.

22 COMMISSIONER ASSELSTINE: Good.

23 MR. ROSS: We do get preoccupied with meetings
24 sometimes. And we usually lose the whole month of October for
25 one meeting or the other, and I'd hate to lose June also. But

1 it might be a good idea.

2 COMMISSIONER BERNTHAL: Is there any -- one last
3 question. I'm still concerned about the move forward on all
4 fronts broadly approach, that an infinitely broad front moves
5 infinitely slowly, I guess.

6 And I'm just wondering if there's any possibility
7 that this -- the whole NRC reaction to the source term
8 question and our programs to address the source term question,
9 whether those could somehow be organized and presented in a
10 way that they could be presented to the Congress with some
11 fairly well-defined goals, the number of people it's going to
12 take, separating the thing out problem by problem, how much
13 money we need. So that there is some prospect of public
14 understanding of how we're going about doing this and the kind
15 of resources it's going to take.

16 I'm concerned. This is an awfully big problem and
17 it's not clear to me we're going to have the resources to
18 solve it in a finite period of time. Maybe I'm --

19 CHAIRMAN PALLADINO: Well, I wouldn't be that
20 pessimistic, although I do agree it's taking a long time. But
21 I think it's very fundamental to our whole concept of
22 regulating nuclear power.

23 MR. DIRCKS: I think we started off -- of course,
24 it's been going -- the fact is that these source terms are
25 embedded in our regulations right now.

1 COMMISSIONER BERNTHAL: Yes.

2 MR. DIRCKS: They're in various places. And we've
3 been doing work on it for a number of years.

4 COMMISSIONER BERNTHAL: Yes.

5 MR. DIRCKS: I think when the American Nuclear
6 Society came in there was an impatience with the whole
7 process. They came in with their claims of factors of 10
8 reduction and --

9 COMMISSIONER ASSELSTINE: Or more.

10 MR. DIRCKS: -- maybe more. And at that point we
11 thought we could gear up some sort of an effort to confirm or
12 deny what they've claimed. But very soon we ran into the
13 complexities of the thing. Not only the science. We ran into
14 the individual plant problem that we face in this country.
15 Maybe other countries have less of a problem. I think the
16 French claim they really don't have a problem because they've
17 got this thing locked into their single plant concept.

18 And then at the same time along came the severe
19 accident work. And we've tried to bring the two things
20 together, so that we have source terms married to the severe
21 accident issues. And it is a very complex thing. And I think
22 we're all sort of disappointed it's taking so long and taking
23 so much money.

24 We can take a crack at -- in just gross terms --
25 outlining some of the efforts we are trying to make to bring

1 it together, to outline the objectives, give some indication
2 of the schedule, and maybe some indication of the resource
3 demands.

4 COMMISSIONER BERNTHAL: I mean, it's not necessarily
5 disappointment, Bill, in how much money it's costing. It's
6 certainly not that. That is not my concern. It's that
7 somehow it's going to take a lot of resources and time, and it
8 may. And if that's the way it is, so be it.

9 But one thing is sure, if we don't realize it ahead
10 of time and don't ask for the money and the resources ahead of
11 time we aren't going to be finished when we thought we were
12 going to be.

13 MR. ROSS: There is one document that will have, I'd
14 say, in terms of resources, about two-thirds of the
15 resources. We had obligated ourselves in Research to publish
16 a supplement to the severe accident research plan, which would
17 cover the Research resources and contractor resources. And we
18 had obligated -- and we've talked to the ACRS about this -- of
19 getting this out before the end of this calendar year. So
20 we've got about two months to go.

21 The scope of this supplement would be in detail
22 fiscal '86 and '7, and a prospectus of -- a preliminary
23 forecast for fiscal '88. And that would include -- this is
24 program support or contract dollars.

25 So we'll try to have that available -- I think

1 though in terms of critical path resources, the problem will
2 be in NRR. And that won't be part of this document.

3 MR. DIRCKS: I think what we'll try to do is extract
4 -- we're not going to try to -- we'll try to pull together in
5 maybe this one paper an attempt to lay out where we are and
6 where we're going, what it's costing and some projection into
7 the future. We won't give you all the detail that we've had
8 in these other documents, but we'll try to reference them and
9 at least give you an idea of where the whole thing is moving.

10 CHAIRMAN PALLADINO: But it does have to relate to
11 the state of knowledge.

12 COMMISSIONER ASSELSTINE: That's right.

13 CHAIRMAN PALLADINO: Because changing knowledge
14 could --

15 MR. DIRCKS: As we're finding out.

16 CHAIRMAN PALLADINO: Yes, could lead to changing
17 situations that we ought to be prepared to cope with.

18 COMMISSIONER ZECH: I think it's important though
19 that we, you know, continue the emphasis that you've placed on
20 this program. It seems to me that Commissioner Bernthal has
21 got a very good point though. And that is, and Harold
22 mentioned earlier in the briefing, that resources were
23 limited, at least in his organization.

24 It seems to me that I would, you know, prefer to
25 have some kind of a focal point between NRR perhaps and

1 Research that is considered our source term czar, if you
2 will. And try to bring the two organizations together. If
3 NRR needs more resources, I think we should try to find them.

4 You know, we're dealing in a very important matter,
5 and I think that it should be given a real priority. We're
6 talking about public health and safety. I think which is, you
7 know, the key issue of this Commission. It seems to me if,
8 for example, we found out that our reactors were for some
9 reason or other not operating as safe as we thought they were
10 and the plants weren't really as safe, that we'd have an
11 obligation to act.

12 By the same token, it seems to me, if we find out
13 that, as Commissioner Bernthal has also pointed out, that even
14 some of the plants are perhaps safer than others, and we have
15 enough information to go on -- and certainly we should have
16 sufficient and solid technical bases to make any decisions
17 like that. But if we did find that out, by the same token, I
18 do think we have an obligation to act on the public health and
19 safety.

20 The public should know if we have concluded with
21 solid bases that the plants are safer than we thought they
22 were, then I think that we have an obligation to make that
23 statement also.

24 And it seems to me that, for example, we're talking
25 about eventually perhaps consideration of moving the 10-mile

1 limit to two miles or something like that, or suggesting
2 perhaps it would be safer even to seek shelter than to
3 evacuate. You know, those are important decisions for the
4 public to know. And it seems to me if we do come to those
5 decisions we simply have an obligation to act.

6 And we're obviously not there yet. But you're
7 proceeding along those lines. And since the whole mission or
8 our agency is public health and safety, I think the public
9 does indeed have a right to know if we come to some
10 conclusions, even though -- as Commissioner Bernthal has
11 pointed out -- it may not be for a wide range of plants across
12 the board, but for certain ones of them.

13 So I think we should take a conservative approach.
14 Certainly use all the scientific, technical information,
15 research that we can. But if we do come to that conclusion
16 that we have an obligation to act. And that's why I think we
17 should focus a priority on it. And I think you are doing
18 that, but I'd feel a little more comfortable if you had, you
19 know, some kind of a czar, or at least could assure us that
20 you have all the resources that you need.

21 MR. DIRCKS: Well, we had a czar for awhile and it
22 worked out fairly well. It was in the formative stages.

23 The theory here is if we could get 1150 in a
24 package, which is basically the way we're going to handle this
25 thing within the agency, et al., and then picks it up, and we

1 can then start making some decisions within that office.

2 So I think right now the approach we should use is
3 to continue 1150, move that information when it's done over
4 here. After public comment, peer review, and establishing
5 we've got good science there, then start making the
6 decisions. But only after we've reached the point where we're
7 satisfied that we've had the scientific input. That we don't
8 have some remaining nuggets out there that could come in and
9 upset the whole regulatory program.

10 I think the important thing too is this is not done
11 only in the United States. I think the impression I've gotten
12 from attending the meetings in Paris and the meetings last
13 week in Columbus, this is an international research effort of
14 very large proportions. And it's a very helpful effort to
15 keep the world attention on this situation. We've got
16 excellent scientists in Germany and the U.K., France, Japan,
17 other nations.

18 COMMISSIONER ZECH: But that might be even more
19 reason to have somebody kind of in overall charge who could
20 focus on the international aspects as well as our own aspects.

21 MR. DIRCKS: Well, right now I think that's being
22 picked up through the Research office.

23 MR. ROSS: Yes, we're doing that.

24 MR. DIRCKS: And Dr. Silberberg down there who has
25 been very active in this -- assuring that we're on top of the

1 research.

2 COMMISSIONER ZECH: Right. I just think you should
3 be satisfied as well as we're satisfied that you have enough
4 focus and priority on this program. And that's important.

5 MR. DIRCKS: Yes. Well, we'll come back when we're
6 getting frayed around the edges.

7 COMMISSIONER BERNTHAL: I want to make a comment,
8 Lando, that what was running through my mind here -- and I'm
9 glad that you raised the issue -- is whether or not this lends
10 itself to what I guess the Harvard Business School types call
11 matrix management. And you know, it's your call, but it seems
12 to me whether you call it a czar or whatever that somehow
13 you've got this massive effort cutting across the Research
14 division, and of course, then there's the severe accident
15 policy implementation.

16 And I'm just a little worried that there's somebody
17 that's got this whole thing pulled together that can pool the
18 resources and exercise the authority. And of course, you can
19 do that, Bill. But it's really a major effort it seems to me,
20 and it needs to be presented to the Congress as a major
21 independent effort if we're going to get the resources to do
22 it. That's my concern.

23 MR. DIRCKS: Well, how we got today -- or we had the
24 source term project office set up, a project office. It did
25 function. It established the basic directions to guide the

1 agency. I think they laid out the tasks.

2 What we're doing now is implementing what that
3 office had to say to us. The two principals here, Denny and
4 Harold, and I think it's worked. We've got it narrowed down
5 to two principal officers here. And I don't think we've
6 scattered our resources out from them.

7 I don't know whether we've had any indication that
8 we've let anything fall through the cracks from your side.

9 CHAIRMAN PALLADINO: Bill, we're not asking you to
10 defend what you're doing. I think the point is -- the point
11 is being made, if you satisfy yourself that you have the best
12 organizational structure to handle it, and it is your call
13 too.

14 MR. DIRCKS: And it could change.

15 CHAIRMAN PALLADINO: Certainly.

16 MR. DIRCKS: And we could certainly do it.

17 CHAIRMAN PALLADINO: Well, I don't want to extend
18 this meeting any longer than we have to. As a matter of fact
19 you're getting into my uncertainty band here.

20 [Laughter.]

21 COMMISSIONER BERN'THAL: I just want to say that I
22 think Lando has a good idea to -- it's worth thinking about.
23 Lord knows I don't know all the management ins and outs here,
24 but it's worth thinking about.

25 CHAIRMAN PALLADINO: Okay.

1 COMMISSIONER ASSELSTINE: Let me just add one brief
2 comment if I could. You know, Bill, I think you should decide
3 what it is you think you need. It does strike me that your
4 rationale has some sense to it.

5 When you get into the implementation phase what
6 you're talking about are first deciding how to do these plant
7 specific reviews. And second, what regulatory changes to
8 make. Those are NRR type functions. And you have information
9 needs to make those kinds of judgments that are Research
10 functions. As long as you're satisfied with that coordination
11 I think that's the important part.

12 I would say I agree with Fred's -- some of Fred's
13 concern about getting on with the plant specific reviews to
14 find the outliers, the vulnerabilities for severe accident
15 purposes. And I share some of his frustration. But I guess I
16 would say, what we want to make sure is that we do the job
17 right.

18 And when I look at those Research results and think
19 about what the industry was urging us to do a year or a year
20 and-a-half ago, it seems to me that we'd have been pretty
21 foolish if we'd marched along that path only to find out now
22 that the Research results call into question those basic
23 assumptions.

24 CHAIRMAN PALLADINO: Now I should remind you that
25 this -- we had set these up as quarterly reports. So we look

1 forward to meeting --

2 MR. DIRCKS: We'll be back next quarter. And if we
3 need a new organizational element we'll come up with one.

4 CHAIRMAN PALLADINO: Yes, I think it was just being
5 pointed out as an interested observer on the part of the
6 Commissioners. So you have to satisfy yourself.

7 MR. DIRCKS: We just disbanded the office a little
8 while ago, but we can -- we'll take another look at it.

9 CHAIRMAN PALLADINO: Okay. Well, thank you very
10 much, gentlemen. We'll stand adjourned.

11 (Whereupon, at 12:22 p.m., the commission meeting
12 was adjourned.)

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1 CERTIFICATE OF OFFICIAL REPORTER

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3
4
5 This is to certify that the attached proceedings
6 before the United States Nuclear Regulatory Commission in the
7 matter of: COMMISSION MEETING

8
9 Name of Proceeding: Quarterly Source Term Briefing (Public
10 Meeting)

11 Docket No.:

12 Place: Washington, D. C.

13 Date: Monday, November 4, 1985

14
15 were held as herein appears and that this is the original
16 transcript thereof for the file of the United States Nuclear
17 Regulatory Commission.

18
19 (Signature) Pamela Briggè
20 (Typed Name of Reporter) Pamela Briggè

21
22
23 Ann Riley & Associates, Ltd.
24
25

QUARTERLY SOURCE TERM

BRIEFING

FOR THE COMMISSION

NOVEMBER 4, 1985

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SEVERE ACCIDENT IMPLEMENTATION PROGRAM

AND

SOURCE TERM RELATED REGULATORY CHANGES

COMMISSION BRIEFING

NOVEMBER 4, 1985

T. P. SPEIS/NRR
X27517

SEVERE ACCIDENT POLICY IMPLEMENTATION PROGRAM

OVERVIEW

- ° PROCESS OF IMPLEMENTATION
- ° EXPECTED OUTCOMES
- ° POTENTIAL ISSUES
- ° SOURCE TERM RELATED CHANGES
- ° PROPOSED SCHEDULE

SEVERE ACCIDENT POLICY IMPLEMENTATION PLAN

I. SUMMARY OF THE IMPLEMENTATION PROGRAM

- ° SEVERE ACCIDENT POLICY STATEMENT - ACTION ITEMS
- ° GUIDELINES AND PROCEDURAL CRITERIA FOR THE EXAMINATION OF INDIVIDUAL PLANTS
- ° INDUSTRY PARTICIPATION
- ° EXPECTED ACCOMPLISHMENTS
- ° POTENTIAL ISSUES

II. SOURCE TERM RELATED CHANGES IN RULES AND REGULATORY PRACTICES

- ° DEVELOPMENT OF NEW SOURCE TERMS AND INITIATION OF RULE CHANGES
- ° INFORMATION NEEDED TO INITIATE SOURCE TERM RELATED CHANGES
- ° POTENTIAL CHANGES IN RULES AND REGULATORY PRACTICES

III. PROPOSED SCHEDULE

SEVERE ACCIDENT POLICY STATEMENT - ACTION ITEMS

POLICY STATEMENT

NEW APPLICATIONS

- ° GUIDANCE ON THE ROLE OF PRAs
- ° PERFORMANCE CRITERIA FOR CONTAINMENT SYSTEMS

EXISTING PLANTS

- ° SYSTEMATIC APPROACH FOR THE EXAMINATION OF INDIVIDUAL PLANTS
- ° IMPLEMENT MODIFICATION THROUGH BACKFIT POLICY
- ° CHANGES IN RULES AND REGULATORY PRACTICES, AS NEEDED

GUIDELINES AND PROCEDURAL CRITERIA FOR THE EXAMINATION
OF INDIVIDUAL PLANTS

- ° SEVERE ACCIDENT SAFETY ANALYSES ARE BEING PERFORMED FOR SIX REFERENCE PLANTS. RESULTS TO BE PUBLISHED IN AUGUST, 1986 FOR COMMENT AND PEER REVIEW (NUREG-1150).
- ° UNCERTAINTIES WILL BE ASSESSED AND QUANTIFIED.
- ° THE PURPOSE OF THE REFERENCE PLANT EVALUATIONS IS TWOFOLD:
 - EVALUATE PERFORMANCE WITH RESPECT TO SEVERE ACCIDENTS
 - DEVELOP GUIDANCE AND CRITERIA FOR THE SYSTEMATIC EXAMINATION OF INDIVIDUAL PLANTS FOR PLANT SPECIFIC ACCIDENT VULNERABILITIES (SUBSTANTIAL INPUT FROM IDCOR PROGRAM).
- ° THE GUIDELINES WILL SPECIFY:
 - CONDITIONS INDIVIDUAL PLANTS MUST MEET TO "ADOPT" THE REFERENCE PLANT ANALYSIS,
 - THE EXTENT OF A PLANT DEPENDENT EXAMINATION LICENSEES NEED TO CONDUCT, AND
 - ACCEPTABLE METHODOLOGY TO SEARCH FOR PLANT SPECIFIC VULNERABILITIES.

INDUSTRY PARTICIPATION (IDCOR)

- ° IDCOR HAS ANALYZED FOUR OF THE SIX REFERENCE PLANTS AND PRESENTED THE ANALYSES TO NRC. THE IDCOR ANALYSES ARE AN INTEGRAL PART OF THE REFERENCE PLANT EVALUATIONS AND THE DEVELOPMENT OF THE GUIDELINES.
- ° BASED ON THE IDCOR PRESENTATIONS AND UNDERSTANDING GAINED FROM THE SEVERE ACCIDENT RESEARCH PROGRAM, NINETEEN TECHNICAL ISSUES WERE IDENTIFIED WHICH WERE TREATED DIFFERENTLY BY THE TWO PARTIES AND WERE JUDGED TO HAVE A SIGNIFICANT EFFECT ON THE RESULTS. THE RESOLUTION OF THESE ISSUES IS IN PROGRESS.
- ° THE IDCOR REFERENCE PLANT ANALYSES HAVE TWO SHORTCOMINGS:
 - THE UNCERTAINTIES ASSOCIATED WITH THE ANALYSES HAVE NOT YET BEEN EVALUATED.
 - SEISMIC EVENTS AND OTHER EXTERNAL EVENTS HAVE NOT BEEN CONSIDERED, DECISION IS PENDING.
- ° IDCOR IS CURRENTLY DEVELOPING METHODOLOGY FOR THE EXAMINATION OF INDIVIDUAL PLANTS. AS PART OF THE DEVELOPMENT EFFORT, THE METHODOLOGY WILL BE APPLIED TO THE FOUR IDCOR REFERENCE PLANTS AND THREE ADDITIONAL PLANTS (A CE, A B&W DESIGN, AND A BWR-MARK II). THE METHODOLOGY WILL BE SUBMITTED TO NRC FOR REVIEW. NRC APPROVAL WILL BE ISSUED AS PART OF THE GUIDELINES.

EXPECTED ACCOMPLISHMENTS

- ° PLANT SPECIFIC VULNERABILITIES WILL BE IDENTIFIED AND FIXED (BACKFIT RULE)
- ° IF GENERIC VULNERABILITIES ARE IDENTIFIED, APPROPRIATE DESIGN AND/OR OPERATIONAL CHANGES WILL BE REQUIRED (RULEMAKING)
- ° LESSONS LEARNED WILL HELP DEVELOPMENT OF IMPROVED DESIGNS WITH SAFETY BENEFITS
- ° A NEW, MORE REALISTIC REGULATORY APPROACH ON SOURCE TERMS WILL BE PURSUED (SOURCE TERM RELATED CHANGES)

POTENTIAL ISSUES

- ° LARGE DIFFERENCES COULD EXIST BETWEEN IDCOR AND NRC CALCULATIONS
- ° QUANTIFICATION OF THE UNCERTAINTIES COULD RUN INTO DIFFICULTIES
- ° COMPLETENESS OF PLANT ANALYSES ARE IN QUESTION BECAUSE OF EXTERNAL EVENTS
- ° DEVELOPMENT OF PRACTICAL SOURCE TERMS IS A NON-TRIVIAL ISSUE

OUTSTANDING TECHNICAL ISSUES

CORE MELT ISSUES

- ° CORE MELT PROGRESSION; IN-VESSEL HYDROGEN GENERATION, FISSION PRODUCT AND AEROSOL RELEASE
- ° RETENTION AND REVAPORIZATION OF FISSION PRODUCTS IN THE REACTOR COOLANT SYSTEM

CONTAINMENT ISSUES

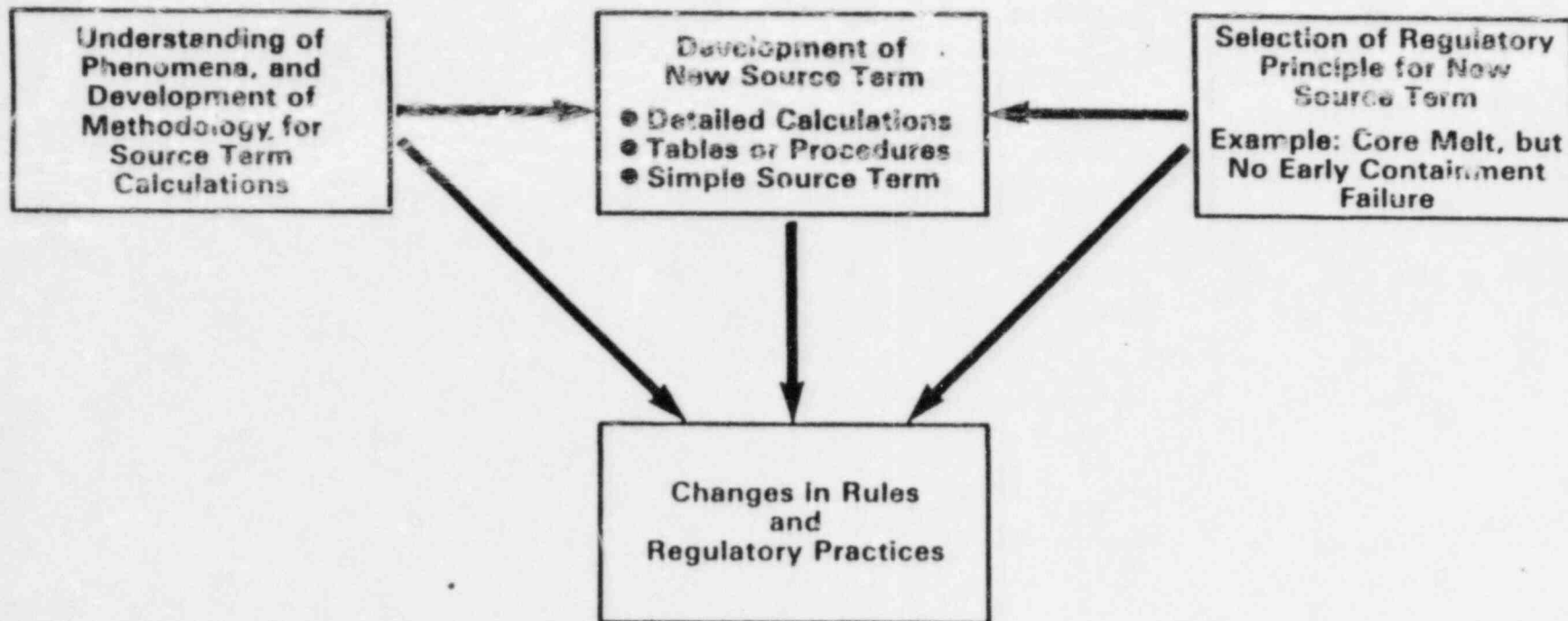
- ° EX-VESSEL FISSION PRODUCT AND AEROSOL RELEASE AND DEPOSITION
- ° SCRUBBING EFFICIENCY OF SUPPRESSION POOLS AND ICE CONDENSERS
- ° CONTAINMENT LOADS (P/T)
- ° CONTAINMENT FAILURE MODES
- ° EQUIPMENT PERFORMANCE IN SEVERE ACCIDENT ENVIRONMENT

SOURCE TERM RELATED CHANGES IN RULES
AND REGULATORY PRACTICES

DEVELOPMENT OF NEW SOURCE TERMS
AND INITIATION OF RULE CHANGES

- ° SOURCE TERM RELATED REGULATORY REQUIREMENTS AND PRACTICES WERE REVIEWED. TWELVE AREAS WERE IDENTIFIED WHERE NEW SOURCE TERM KNOWLEDGE MAY LEAD TO CHANGES.
- ° THE VARIOUS REGULATORY USES OF SOURCE TERMS COULD REQUIRE DIFFERENT FORMS OF SOURCE TERMS.
- ° NRC WILL EVALUATE AND GROUP THE TWELVE AREAS OF APPLICATIONS OF SOURCE TERMS, AND WILL DEVELOP PRACTICAL SOURCE TERMS FOR EACH GROUP. THE NEEDED FORMS OF SOURCE TERMS WILL BE DISCUSSED WITH THE NUCLEAR INDUSTRY (AIF). WE FORESEE, AT MOST, THREE FORMS OF SOURCE TERMS:
(1) DETAILED SOURCE TERM CALCULATIONS FOR INDIVIDUAL PLANTS, (2) USE OF TABLES OR PROCEDURES APPLICABLE TO PLANT TYPES, AND (3) A SIMPLE, BOUNDING SOURCE TERM APPLICABLE TO ALL PLANTS.
- ° NRC IS PRESENTLY APPLYING THE DETAILED SOURCE TERM METHODOLOGY FOR THE ANALYSES OF THE SIX REFERENCE PLANTS (NUREG-1150). THE REFERENCE PLANT ANALYSES WILL PROVIDE SOME BASIS FOR ARRIVING AT SIMPLIFIED FORMS OF SOURCE TERMS. CHANGES TO CURRENT REGULATIONS AND REGULATORY PRACTICES WILL BE INITIATED AS SOON AS AVAILABLE INFORMATION WARRANTS IT.

Information Needed to Initiate Source Term Related Changes



POTENTIAL CHANGES IN RULES AND REGULATORY PRACTICES

SHORT-TERM

(TO BE STARTED PRIOR TO ISSUANCE OF NUREG-1150)

- REMOVE SPRAY ADDITIVES (PWRs)
- CREDIT FOR FISSION PRODUCT SCRUBBING IN SUPPRESSION POOLS (BWRs)
- REVISED TREATMENT OF SEVERE ACCIDENTS IN NEAR-TERM ENVIRONMENTAL IMPACT STATEMENTS

POTENTIAL CHANGES IN RULES AND REGULATORY PRACTICES

INTERMEDIATE TERM

(BACKGROUND EFFORT PROCEEDS IN PARALLEL WITH
NUREG-1150 EFFORT; RULEMAKING BEGINS
AFTER ISSUANCE OF NUREG-1150)

- ° EMERGENCY PLANNING - ONSITE PLANNING, OFFSITE EMERGENCY PLANNING ZONES (EPZ), GRADED RESPONSE
- ° CONTAINMENT LEAK RATES - LEAK RATE TESTING, UNDETECTED BREACH OF CONTAINMENT INTEGRITY
- ° CONTROL ROOM HABITABILITY - FILTRATION AND LEAK-TIGHTNESS REQUIREMENTS
- ° ENVIRONMENTAL QUALIFICATION OF EQUIPMENT
- ° ACCIDENT INDEMNIFICATION - POTENTIAL RENEWAL OF PRICE-ANDERSON
- ° SAFETY ISSUE EVALUATION - PRIORITIZATION OF ISSUES USING NEW SOURCE TERMS

POTENTIAL CHANGES IN RULES AND REGULATORY PRACTICES

LONG-TERM

- ° OFFSITE CONTAMINATION AND RECOVERY
- ° SITING - EXPLICIT CONSIDERATION OF SEVERE ACCIDENTS IN SITING
- ° ACCIDENT MONITORING AND MANAGEMENT - ONSITE AND OFFSITE INSTRUMENTATION

Proposed Implementation Schedule

Tasks	1985	1986	1987	1988
Method Development for Analysis	-----	-----	-----	-----
Reference Plant Analyses (NUREG-1150)	-----	-----		
Method Development for Individual Plant Examination (IDCOR)	-----	-----		
Development of Guidelines and Criteria for Individual Plant Examination	-----	-----	-----	
Examination of Individual Plants (Licensees)			-----	-----
Changes in Rules and Regulatory Practices		-----	-----	-----

Legend:

- Execution of Task
- Review, Public Comments, Improvements

STATUS OF NUREG-1150

COMMISSION BRIEFING

NOVEMBER 5, 1985

B1

NUREG-1150

- o RISK PERSPECTIVES AND PROFILES ON SIX REFERENCE PLANTS
 - SURRY
 - PEACH BOTTOM
 - SEQUOYAH
 - GRAND GULF
 - ZION
 - LASALLE
- o RISK REDUCTION POTENTIAL
 - GENERIC NUREG-0900 FIXES (E.G., FILTERED VENTED CONTAINMENT. ADD-ON DECAY HEAT REMOVAL, ADDITIONAL CONTAINMENT HEAT REMOVAL, ETC.)
 - PLANT-SPECIFIC MODIFICATIONS SUGGESTED BY ACCIDENT SEQUENCE REBASELINING AND CONTAINMENT TREE INSIGHTS
- o DISPLAY AND CONSIDERATION OF IMPORTANT UNCERTAINTIES
- o INSIGHTS ON USE OF RISK INFORMATION FOR PLANT-SPECIFIC AND GENERIC REGULATORY APPLICATIONS

NEED FOR EXPANDED PROGRAM

- o POTENTIAL THAT DIFFERENT ACCIDENT SEQUENCES MAY BE RISK-IMPORTANT INCREASED THE IMPORTANCE OF UPDATED FREQUENCY INFORMATION. REBASELINING ALLOWS CONSIDERATION OF:
 - IMPROVED INSIGHTS FROM PRAs IN RECENT YEARS (E.G., COMMON-CAUSE FAILURES, PLANT-SPECIFIC DATA, HUMAN RELIABILITY)
 - PLANT AND PROCEDURE IMPROVEMENTS SINCE TMI
- o NEED FOR MORE SOURCE TERM CODE RUNS--BMI-2104 RESULTS INDICATED THAT SOURCE TERMS FOR SOME ACCIDENT SEQUENCES COULD BE LARGE, AND IT IS DIFFICULT TO EXTRAPOLATE EXISTING RUNS REALISTICALLY TO RISK-IMPORTANT SEQUENCES

FINAL SARRP SCHEDULE FOR NUREG-1150 AND NRR SUPPORT

ACTIVITY	SURRY	PEACH BOTTOM	SEQUOYAH	GRAND GULF	ZION*	LASALLE
1. ACCIDENT SEQUENCE INITIAL INPUT	C	C	C	C	C	12/19
2. SOURCE TERM BINNING	C	C	C	C	C	1/23
3. NUMBER OF SOURCE TERM CODE RUNS	~3	6	~8	3	~6	~6
4. SOURCE TERM CODE RUNS	C (EXCEPT 1)	C	11/15	11/15	12/31	3/20/86
5. RELEASE CHARACTER- ISTICS	C (EXCEPT 1)	C	11/22	11/25	1/15/86	4/14/86
6. CONSEQUENCE CALC.	C (EXCEPT 1)	11/15	12/10	12/11	1/31/86	4/28/86
7. REFINES ACCIDENT SEQUENCES	C	11/11	11/15	12/13	N/A	2/27/86
8. CONTAINMENT TREES DRAFT REPORT	11/15	12/9	12/3	1/20/86	1/31/86	5/28/86
9. BASELINE RISK CALCULATION	11/19	11/25	12/18	1/7/86	2/15/86	5/26/86
10. RISK/RISK RED. TABLES	12/9	1/20/86	1/21/86	3/14/86**	3/28/86**	6/9/86**
11. RISK/RISK RED. DRAFT DETAILED RPT.	2/26/86**	4/6/86**	4/1/86**	4/15/86	4/30/86	7/7/86
12. RISK/RISK RED. FINAL DETAILED RPT.	4/23/86	6/1/86	5/27/86	6/10/86	6/30/86	9/1/86

*TENTATIVE SCHEDULE

**INCLUDES FINAL SENSITIVITY ANALYSES AND UNCERTAINTY RANGES

PRESENT SCHEDULE
(COMPARED TO 6/27/85)

<u>PLANT</u>	<u>RISK/RISK REDUCTION TABLES AND EXPLANATORY TEXT</u>	
	<u>6/27/85</u>	<u>10/31/85</u>
SURRY	10/15/85	12/9/85
PEACH BOTTOM	11/30/85	1/20/86
SEQUOYAH	12/30/85	1/21/86
GRAND GULF	1/30/86	3/14/86*
ZION**	2/28/86	3/28/86*
LASALLE	N/A	6/10/86*
NUREG-1150	MID SUMMER OF 1986 (NO CHANGE)	

*INCLUDES FINAL UNCERTAINTY ANALYSES

**TENTATIVE SCHEDULE

SCHEDULE IS BOTH AMBITIOUS AND OPTIMISTIC.

AMBITIOUS BECAUSE OF EXTENSIVE NEW ANALYSES REQUIRED AND THE FACT THAT EVERY TASK IS ON CRITICAL PATH

OPTIMISTIC BECAUSE IT ASSUMED:

- o NO PROBLEMS WITH CODE PACKAGE LINKAGE
- o NO PROBLEMS WITH PLANT ACCESS
 - PHYSICAL ACCESS
 - INFORMATION ACCESS
- o NO ADDITIONAL SOURCE TERM RUNS NEEDED
 - REBASELINING
 - CONTAINMENT TREE PEER REVIEW
- o NO NEED TO MAKE RISK-SIGNIFICANT CHANGES TO CONTAINMENT TREES OR TO REBASELINING EFFORT BASED ON RESULTS OF PEER REVIEWS

REASONS FOR SLIPS

1. LEARNING CURVE
2. DIFFICULTIES IN INTEGRATING SOURCE TERM CODE PACKAGE (STCP)
3. ERRORS IN RUNNING STCP
4. NEED FOR ADDITIONAL STCP RUNS (SURRY)
5. NEED TO LOOK CLOSELY AT RECOVERY ACTIONS AND RISK REDUCTION MEASURES
6. ACCIDENT SEQUENCE ANALYSIS PEER REVIEW
7. CONTAINMENT EVENT TREE PEER REVIEW
8. NEED TO CONSIDER ALTERNATE ROD INJECTION (ARI) AND AUGMENTED STANDBY LIQUID CONTROL SYSTEM (SLCS) FOR PEACH BOTTOM
9. SOME DELAY IN ACQUIRING PLANT INFORMATION FOR PEACH BOTTOM
10. NEED TO ADDRESS UNCERTAINTIES IN A MORE REALISTIC MANNER

OVERALL CONCLUSIONS

RE: SCHEDULES

- o SLIPS ARE OCCURRING IN INDIVIDUAL SCHEDULES,
AS ANTICIPATED
- o MAJOR STARTUP AND LEARNING CURVE PROBLEMS WERE
IDENTIFIED EARLY AND LARGELY AVOIDED
- o THE ORIGINAL SCHEDULE FOR NUREG-1150 ANTICIPATED
SOME STARTUP PROBLEMS AND REMAINS UNCHANGED, I.E.:

DRAFT TO BE PUBLISHED FOR PUBLIC
COMMENT MID-SUMMER 1986

CONSIDERATION OF UNCERTAINTY

THERE ARE SIX BASIC AREAS THAT CONTRIBUTE TO UNCERTAINTY IN RISK PREDICTIONS:

- o BASIC EVENT DATA (COMPONENT FAILURE RATES, HUMAN ERROR PROBABILITIES)
- o PRE-CORE-MELT PHENOMENOLOGICAL CONSIDERATIONS ASSOCIATED WITH ACCIDENT SEQUENCE FREQUENCIES (SUCCESS/FAILURE CRITERIA)
- o PHENOMENOLOGICAL CONSIDERATIONS PERTAINING TO CONTAINMENT LOADS, FAILURE MODES, AND FAILURE LIKELIHOODS
- o PHENOMENOLOGICAL CONSIDERATIONS ASSOCIATED WITH ESTIMATES OF SOURCE TERMS IN THE CONTAINMENT ATMOSPHERE AS A FUNCTION OF TIME AND ACCIDENT SEQUENCES
- o METEOROLOGICAL VARIABILITY AND EFFECT OF VARIATIONS IN IMPORTANT CONSEQUENCE MODEL PARAMETERS
- o EFFECT OF EMERGENCY RESPONSE ASSUMPTIONS

GENERAL PRINCIPLES FOR ANALYSIS OF
RISK-DOMINANT UNCERTAINTIES

PURPOSE IS TO FOCUS ATTENTION ON IMPORTANT ANALYTICAL ASSUMPTIONS AND ASSESS THEIR UNCERTAINTIES IN TERMS OF REASONABLE RANGES OF MEAN ESTIMATES OF CORE MELT FREQUENCY AND RISK

- o IDENTIFY 10-15 PARAMETERS OF MOST IMPORTANCE TO CORE MELT FREQUENCY AND RISK ESTIMATES

- o DETERMINE REASONABLE, CREDIBLE RANGE IN WHICH ACTUAL VALUES OF DRIVING PARAMETERS SHOULD LIKELY BE FOUND (ABOUT 90 PERCENT DEGREE OF BELIEF)

- o CALCULATE RANGE OF MEAN VALUES BY COMBINING REASONABLE RANGES OF MOST IMPORTANT PARAMETERS USING STATISTICAL SAMPLING APPROACH

- o RANGE OF MEAN VALUES WILL NOT BE EXPRESSED IN TERMS OF FORMAL STATISTICAL BOUNDS

ISSUE CLOSURE FOR SARRP/NUREG-1150

- o INVESTIGATE RISK IMPORTANT ISSUES INHERENT IN ASSESSING ACCIDENT PROGRESSION, CONTAINMENT BEHAVIOR, AND SOURCE TERMS
- o IDENTIFY DOMINANT PARAMETERS AND PERFORM SENSITIVITY STUDIES OVER A REASONABLE UNCERTAINTY RANGE TO ASCERTAIN IMPACTS ON RISK
- o DEVELOP NRC STAFF POSITION AND RATIONALE ON PARAMETER VALUES TO BE USED IN NUREG-1150
- o TYPICAL TOPICS INCLUDE NON-VOLATILE (LANTHANIDE, ACTINIDE) RELEASE FRACTIONS DURING CORE-CONCRETE INTERACTION, DIRECT HEATING, HYDROGEN GENERATION AND OXIDATION WITH RESULTANT CONTAINMENT LOADING, REVOLATIZATION, RCS NATURAL CIRCULATION, BWR ATWS ACCIDENT ANALYSIS, BWR VENTING
- o OTHER ISSUES TO BE IDENTIFIED

PUBLIC COMMENTS ON NUREG-0956

o COMMENT PERIOD:

BEGAN AUGUST 7, 1985
EXTENDED FROM 90 TO 150 DAYS
ENDS JANUARY 7, 1985

o LETTERS RECEIVED AS OF OCTOBER 30, 1985:

EXTENSION OF COMMENT PERIOD	20
TECHNICAL	<u>8</u>
	28

o REASONS CITED FOR EXTENDING COMMENT PERIOD:

TIME NEEDED TO GET NOTICE OF REPORT AND REPORT ITSELF
MANY INTERESTED PEOPLE ON VACATION
REPORT WILL HAVE SIGNIFICANT IMPACT ON REGULATIONS
REPORT IS LENGTHY AND HIGHLY TECHNICAL

o TECHNICAL COMMENTS:

TECHNICAL COMMENTS HAVE JUST BEGUN TO ARRIVE
EVALUATION OF TECHNICAL COMMENTS TO BEGIN SOON
DISPOSITION OF COMMENTS TO BE DESCRIBED IN FINAL NUREG-0956

D

STATUS OF SOURCE TERM CODE PACKAGE

- o CODE PACKAGE NOW BEING USED IN SARRP
- o OBSOLETE MODEL OPTIONS BEING REMOVED IN PREPARATION FOR PUBLIC RELEASE
- o RELEASE OF DOCUMENTATION AND TAPES EXPECTED IN DECEMBER
- o MANUAL FOR CODE PACKAGE WILL RELY ON MANUALS FOR INDIVIDUAL CODES

RECENT RESULTS ON VOLATILE IODINE FORMATION

- o BREAKDOWN OF CsI IN RADIATION FIELD
SNL EXPERIMENT
- o I₂ AND ORGANIC IODINE FOUND IN CONTAINMENT
LOFT FP-2 TEST
- o NO CsI FOUND ON DEPOSITION COUPONS
PBF SFD 1-3 TEST
- o ORGANIC IODINE CONFIRMED EXPERIMENTALLY IN WATER WITH
IONIC IODINE, RADIATION FIELD, AND ORGANIC MOLECULES
ORNL EXPERIMENT
- o NO CsI PRODUCED IN SEPARATE-EFFECTS TEST
ORNL EXPERIMENT
- o Cs AND I WERE RELEASED SEPARATELY IN MASS-SPECTROMETER
FISSION PRODUCT RELEASE EXPERIMENTS
BCL EXPERIMENT

9/85

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Meeting Title:

Quarterly source term briefing

Meeting Date:

11/4/85

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