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Meeting Title: Brief on Proposed Changes to Part 100

Meeting Date: 3/1/94 Open X Closed _____

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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BRIEFING ON PROPOSED CHANGES
TO PART 100

- - - -

PUBLIC MEETING

Nuclear Regulatory Commission
One White Flint North
Rockville, Maryland

Tuesday, March 1, 1994

The Commission met in open session,
pursuant to notice, at 10:00 a.m., Ivan Selin,
Chairman, presiding.

COMMISSIONERS PRESENT:

IVAN SELIN, Chairman of the Commission
KENNETH C. ROGERS, Commissioner
FORREST J. REMICK, Commissioner
E. GAIL de PLANQUE, Commissioner

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STAFF SEATED AT THE COMMISSION TABLE:

JOHN HOYLE, Assistant Secretary

WILLIAM C. PARLER, General Counsel

JAMES TAYLOR, Executive Director for Operations

WILLIAM RUSSELL, Director, Office of Nuclear Reactor
Regulation

THEMIS SPEIS, Deputy Director, Office of Research

LEONARD SOFFER, Section Leader, DSIR, RES

FRANK CONGEL, Division of Rad. Protection and
Emergency Preparedness

ANDREW MURPHY, Chief, Structural and Seismic
Engineering Branch, RES

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P-R-O-C-E-E-D-I-N-G-S

10:00 a.m.

CHAIRMAN SELIN: Good morning, ladies and gentlemen.

We're pleased to welcome representatives from the staff to brief us on a number of new options for revising the Part 100 reactor siting criteria. This has been one of the more difficult issues facing the Commission at least in the several years that I've sat on the Commission. I personally am quite impressed with the approach taken in this current document, but it does leave the number of questions that are open and I'm sure the Commissioners will be very interested in hearing the approaches and investigating the options a little bit further.

We were first briefed in 1992 on Part 100 prior to issuing the rule for public comment and have been updated on this. The current proposal represents a rather significant rethinking of some of the directions in this proposal generally quite consistently with the guidance the Commission has given to the staff up until now. But as I said, given the novelty of some of the ideas and just the fact that it presents options rather than a plan, we'd be very interested in filling in some of the detail for

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1 the general lines that are laid out in the SECY.

2 Copies of the viewgraphs are available.

3 Commissioners?

4 Mr. Taylor?

5 MR. TAYLOR: Good morning. With me at the
6 table, starting at my right, Andy Murphy, Len Soffer,
7 Themis Speis from the Office of Research, Bill Russell
8 and Frank Congel from the Office of Nuclear Reactor
9 Regulation.

10 Mr. Chairman, the staff will discuss a
11 number of options which were presented to the
12 Commission in a paper dated January 26th of this year
13 and we'll also recommend a specific option, namely
14 that a modified rule be pursued by the staff. We
15 believe we can -- if the Commission agrees, we can
16 proceed to prepare such a modified rule in a
17 reasonably fast way.

18 I'll now ask Doctor Speis to continue.

19 DOCTOR SPEIS: Thank you, Mr. Taylor.

20 Mr. Chairman, Commissioners.

21 (Slide) Viewgraph number 1, please.

22 This viewgraph shows the outline of the
23 presentation. I will provide some background on the
24 siting rule and set the stage for what we'll be
25 proposing today. We'll have a brief summary of the

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1 public comments on the proposed rule. Enclosure 2 and
2 3 to this SECY paper, of course, goes into great
3 detail and, in addition, includes our analysis. And
4 also we discussed the comments extensively at the last
5 meeting which was in August 1993. I will then
6 summarize the reasons why we think we should still go
7 forward and revise the siting rule. Then, of course,
8 we'll spend most of the time today on the options
9 considered, both the non-seismic ones and the seismic
10 ones. Then, of course, we will produce with our
11 recommendations.

12 (Slide) The next viewgraph provides some
13 of the background for the stage.

14 The present rule dealing with reactor site
15 criteria again was issued in 1964 and basically it has
16 remained unchanged since that time. The key part of
17 the rule involves the postulation of the release of a
18 large amount of fission products in the containment
19 and then this fission product which is defined in the
20 so-called TID-14844, together with the leakage of the
21 containment, is utilized to evaluate the doses at the
22 exclusion boundary and the low population zone
23 boundaries. Then these are compared with the Part 100
24 dose guidelines, the 25 rem whole body and the 300 rem
25 to the thyroid.

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1 Part 100 couples plant design and site
2 very closely. In fact, the Part 100 itself has no
3 numeric criteria for the sizes of the EAB and the LPZ.
4 It allows unlimited plant design and siting tradeoffs
5 that are, in fact, discouraged by standardization.
6 This coupling, we have said this before many times,
7 has been used by the staff in the past to derive
8 "acceptable" site parameters by manipulating the
9 effectiveness of the engineering safety features.
10 That was one of the motivations that we were
11 recommending that we pursue the new rule which its
12 essence is decoupling the siting from the design.

13 The only numerical guidance in Part 100
14 involves the proximity of the nearest population
15 center in relation to the LPZ. This is the one and
16 one-third times the outer radius of the LPZ.

17 The staff in 1975 defined numerical
18 guidelines in Reg. Guide 4.7 based on the experience
19 of the previous ten years or so and this is what has
20 been used since that time.

21 COMMISSIONER REMICK: Would you summarize
22 what those are?

23 DOCTOR SPEIS: Yes. They are the .4, the
24 size of the EAB and the 300 -- excuse me, 500 persons
25 per square mile up to 40 miles.

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1 COMMISSIONER REMICK: Yes.

2 DOCTOR SPEIS: Okay. The issue of siting
3 has been almost continuously in the forefront of the
4 Commission's and the staff's agenda since the early
5 days of licensing. The Commission directed the staff
6 back in 1979 to look into this issue again and a
7 siting policy task force was set up. I understand
8 that Bill Parler was one of the members of that task
9 force, as well as Len Soffer, as well as Frank Congel.
10 One of the major recommendations was that the siting
11 criteria should be developed "to strengthen siting as
12 a factor in defense in depth."

13 Also, the Kemeny Commission report which
14 investigated the TMI accident, one of its
15 recommendations was "NRC should be required to locate
16 new power plants in areas remote from concentration of
17 population."

18 Also, Congress got into the act and in
19 1980 authorized and directed the NRC to develop and
20 promulgate establishing demographic requirements for
21 siting nuclear power plants.

22 (Slide) Continuing with the background on
23 the next viewgraph, subsequently the NRC issued an
24 advanced notice of proposed rulemaking on reactor
25 siting in 1980, but was withdrawn in 1981 to await

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1 development of safety goal and improved understanding
2 of severe accident source terms.

3 Now we're coming to the proposed rule,
4 which again involves both the non-seismic as well as
5 the seismic issues. As I said already, this rule was
6 the culmination of a number of studies and discussions
7 with the Commission over a period of two years. The
8 key to the proposed rule was the decoupling of siting
9 from plant design and which basically involves the
10 replacement of existing siting dose calculation
11 requirements with explicit requirements for site
12 characteristics. Those explicit requirements are the
13 size of the exclusion area and the population density,
14 which basically are the values that were and are in
15 the reg. guide, the 4.7. So, the attempt was to
16 codify those values in the rule itself.

17 Also, the proposed rule talks about the
18 physical characteristics that could pose significant
19 impediment to development of emergency plants and
20 they're to be identified and likewise an evaluation of
21 man-related hazards is required.

22 (Slide) Page 4.

23 Our evaluation of the proposed rule, we
24 have received of course extensive comments. They are
25 extensively discussed in this paper as well as in the

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1 previous Commission paper. The major non-seismic
2 comment was that source terms and dose calculations
3 should be retained for siting. Industry and
4 international groups felt that the rule was overly
5 conservative, too prescriptive and rigid and not
6 amenable to different reactor designs and incompatible
7 with concerns of the international community.

8 The public interest groups felt that
9 siting criteria should be made more restrictive. For
10 example, they wanted us to go to 50 miles instead of
11 30 miles and backfit numbers like .4 to existing
12 plants, or the ones that cannot meet, shut them down.

13 Seismic comments centered on the relative
14 role of probabilistic versus deterministic
15 assessments. We have reconsidered the proposed rule
16 and we recommend that the non-seismic part of the
17 proposed rule not be adopted, but again a siting
18 rulemaking should go forward.

19 (Slide) The next viewgraph summarizes
20 very briefly the reasons that we recommend to the
21 Commission that we proceed with rulemaking. To
22 incorporate experience, resource and technology
23 advancements, particularly in the geosciences since
24 the present regulation and advances such as more
25 understanding and knowledge about ground motion,

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1 historic records of earthquake. We have developed a
2 PRA framework which can be utilized to assess
3 uncertainties which did not exist before.

4 The second item is to allow consideration
5 of severe accident insights in the design of the next
6 generation plants separately from site acceptability
7 issues. Here we're talking about appropriate design
8 of mitigation systems utilizing the real science, what
9 is the characteristics of the source term,
10 characteristics of severe accidents instead of the
11 arbitrarily chosen TID source term?

12 Of course, last but not least, to
13 strengthen siting of future reactors as part of NRC's
14 defense-in-depth as recommended by independent groups.

15 COMMISSIONER REMICK: Question. The
16 second bullet, to allow consideration of severe
17 accident insights in the design of the next generation
18 plants separately from site acceptability issues, but
19 hasn't that been done for the evolutionary designs?

20 DOCTOR SPEIS: It is being done.

21 COMMISSIONER REMICK: So, I don't
22 understand why that's a reason for proceeding with a
23 siting rulemaking? It seems to me that's already been
24 accomplished in 93-087.

25 MR. RUSSELL: You're correct in that we

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1 have through the choice of site parameters found ways
2 of addressing these issues basically using atmospheric
3 dilution and controlling that as a parameter for the
4 particulars of the design. But there are other
5 issues, not so much for light water reactor designs
6 but for other designs. For example, CANDU-3. The
7 source term would likely be different in some respects
8 from what you see for a light water reactor. The dose
9 that you're using to measure, whether it's 25 rem
10 whole body or 300 rem to the thyroid may not make much
11 sense if we're talking about total equivalent dose
12 where you're looking at the total effect.

13 So, these issues, I think, would argue
14 that it is time to update to reflect what we are doing
15 in practice in the regulations.

16 COMMISSIONER REMICK: But you haven't
17 changed my view that accommodating severe accident
18 issues for the new plants has already been
19 accommodated by prior staff recommendations and
20 Commission action.

21 MR. RUSSELL: In that context, you're
22 correct. We are typically using this as a surrogate
23 for those which are within design basis where you're
24 doing those types of dose calculations. Once you get
25 into severe accident space you're no longer talking

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1 about a dose at the exclusion area boundary. So, the
2 features and what we're looking at, where we're going
3 into features for addressing severe accidents are not
4 the type of design basis events for which we do
5 deterministic calculations and use a figure of merit,
6 in this case a dose to judge acceptability or not.
7 So, it's within the context of design basis for
8 different designs other than light water reactor where
9 I see that there's some merit in updating, at least
10 eliminating the footnote and recognizing that
11 different source terms are going to exist for
12 different types of reactors, different fuel designs
13 potentially. And also to address the issue as to what
14 really is the figure of merit that you want to use.
15 Is it dose to the thyroid? Iodine may not be the
16 isotope of interest for a different design reactor.
17 Or do you want to go to a total effective dose
18 equivalent and be consistent with Part 20 and then
19 have a consistent level of risk toward risk-based
20 regulations?

21 So, I think these are important features
22 to consider. It's really more to the first point plus
23 risk-based regulation approach than to reflect what
24 we've done. The severe accident issues, you're
25 correct, we are addressing those in the evolutionary

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1 designs without this --

2 COMMISSIONER REMICK: I'm not necessarily
3 differing with what you say. It just seems like the
4 second bullet --

5 DOCTOR SPEIS: Commissioner Remick, we're
6 doing it on a plant-specific basis, as Bill said. But
7 we would like to update. There are so many small
8 things and I think the world should know ahead of time
9 what's there so they can proceed instead of going
10 through a year of negotiations.

11 COMMISSIONER REMICK: I don't differ with
12 you on it.

13 DOCTOR SPEIS: But the statement, yes,
14 this will --

15 COMMISSIONER REMICK: Another question on
16 the third bullet. It says to strengthen siting of
17 future reactors. What is meant by that?

18 MR. SOFFER: Basically we were trying to
19 say that we would put out basic siting criteria, a
20 list of basic siting principles or siting criteria
21 that we've proposed in the Commission paper and that
22 I'll be talking about shortly that we believe would
23 promulgate and would show the basic safety
24 requirements for all reactor sites.

25 COMMISSIONER REMICK: It's the word

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1 "strengthen" that I was questioning. How are we
2 strengthening? What has been past practice and more
3 recent --

4 MR. SOFFER: It's not really a differing
5 from practice, but it is, I believe, for the first
6 time a listing in a regulation.

7 COMMISSIONER REMICK: Right. Okay.

8 DOCTOR SPEIS: We will talk more about it.
9 In fact, Len should go forward with his presentation.
10 If there are no more questions, Len will proceed with
11 the heart of the presentation.

12 MR. SOFFER: Thank you, Doctor Spies.

13 (Slide) Could we have viewgraph number 6,
14 please?

15 I'd like to talk about the non-seismic
16 options that we examined. I'm just going to list them
17 briefly in this viewgraph and then discuss them in
18 more detail in some of the following ones.

19 We considered looking at withdrawing the
20 proposed rule and retaining the present rule. We
21 looked at issuing the proposed rule as a final rule.
22 We considered looking at specifying a reduced minimum
23 value of the exclusion area boundary in the rule but
24 specifying population density in a regulatory guide.
25 We considered stating basic site criteria in Part 100

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1 with numerical values to be in the regulatory guides
2 and relocating the dose calculations to Part 50. And
3 finally, we considered retaining the form of the
4 present rule, but using it with updated source terms.

5 (Slide) Could I go to the next viewgraph,
6 please?

7 Option 1 would be retaining the present
8 rule. Basically this would involve withdrawing the
9 proposed rule and retaining the present Part 100 as it
10 is. That is, using the TID-14844 source term, using
11 Reg. Guide 4.7. That is, it is basically the no-
12 change option.

13 The pros associated with this option are
14 quite obvious. It's a familiar one and it provides
15 flexibility to accommodate a number of different
16 designs. The arguments against this option, we
17 believe, are pretty significant. Number one, it
18 references an outmoded source term and one that is not
19 being used any longer in actual plant design. As
20 we've stated, it's not really a siting regulation. It
21 permits an almost unlimited degree of plant design and
22 siting tradeoffs that are really discouraged by
23 standardization policy and it does not include some
24 recent recommendations such as security considerations
25 and it doesn't address recommendations that groups

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1 suc. as the Kemeny Commission made in regard to
2 reactor siting.

3 COMMISSIONER REMICK: By security
4 considerations you mean whether the site can be made
5 adequately secure?

6 MR. SOFFER: Yes, can a security plan be
7 developed and implemented for the site.

8 MR. RUSSELL: Principally looking at the
9 minimum radius you would need for standoff or the
10 rulemaking activities that are currently underway
11 looking at vehicle threats with explosives.

12 MR. SOFFER: (Slide) Could we have the
13 next viewgraph, please?

14 The second option that we looked at would
15 be issuing the proposed rule in final form. This
16 would specify a minimum exclusion area boundary of .4
17 miles, population density of 500 people per square
18 mile in the rule and source terms and doses would be
19 relocated to Part 50. The major advantage that we see
20 of doing this is that there would be possibly a
21 reduction of some administrative hearing litigation
22 issues once the rule was issued. Against this is the
23 argument that this is a highly prescriptive and a
24 rigid rule. It has no flexibility to accommodate
25 different reactor designs and strong objections have

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1 been raised against this proposed rule by a very broad
2 spectrum, including not only the industry but also the
3 public and the international community as well.

4 (Slide) If we could have the next
5 viewgraph.

6 A third option that we looked at was
7 having a reduced but a fixed exclusion area boundary
8 in the rule and specifying population density in the
9 reg. guide. The advantage of this is that it provides
10 a better basis for an exclusion area size based upon
11 updated source terms. For example, where active
12 engineered safety features are provided, revised
13 source term insights as well as revised estimates of
14 fission product cleanup system performance suggests
15 that a reduced exclusion area boundary size on the
16 order of about a quarter of a mile perhaps --

17 COMMISSIONER de PLANQUE: Is that number
18 consistent with the security requirements that you
19 were just addressing?

20 MR. RUSSELL: It is larger than.
21 Typically for the security requirements we're looking
22 at something on the order of 100 meters.

23 COMMISSIONER de PLANQUE: Okay.

24 MR. SOFFER: So, yes, we believe that with
25 good active engineered safety features, good spray

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1 systems, good filter systems for example, we believe
2 that revised insights could suggest that a quarter of
3 a mile would satisfy the dose requirements of Part
4 100. We believe that this could provide some reduced
5 litigation and some reduced international concerns,
6 but it would eliminate flexibility for different
7 reactor designs as long as you mention a number in a
8 rule and a fixed exclusion area distance in a rule
9 would not completely eliminate some of the concerns of
10 the international users and the international
11 community.

12 The fourth option that we looked at was
13 one of stating site criteria in Part 100 and putting
14 dose criteria in Part 50. We would state basic site
15 criteria in Part 100 and relocate the dose criteria in
16 Part 50 to reflect the fact that the dose calculations
17 have, in fact, influenced plant design more than they
18 have siting. What they have typically influenced is
19 things like minor changes in containment leak rate, in
20 spray system performance, in filter system performance
21 rather than large changes in actual size of an
22 exclusion area boundary.

23 The advantages of this would be that it
24 would retain dose calculations and source term
25 calculations and this was strongly supported by almost

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1 all of the commentators. But it would emphasize that
2 these were being used for plant design purposes.
3 Consequently it has the flexibility to accommodate
4 different designs. There would, of course -- as Mr.
5 Russell points out, there might have to be different
6 source terms developed for different kinds of designs.
7 A CANDU reactor might not necessarily have the same
8 source terms as a light water reactor. By stating
9 basic site criteria in the rule, we believe it would
10 strengthen the role of siting. It would not actually
11 reflect a change in practice, but it would be for the
12 first time, we believe, a clear enunciation of what
13 these basic site criteria were.

14 COMMISSIONER ROGERS: Just before you
15 leave that, Mr. Soffer, is there any possibility of
16 tradeoffs between design parameters and site
17 parameters in this option? Is that completely
18 eliminated or not? I couldn't quite tell.

19 MR. RUSSELL: The variable with the
20 approach that we're taking with standardized design
21 reviews and design certification of specifying a
22 dilution factor as a site parameter which must be met
23 basically makes the exclusion area boundary the
24 variable. So, if you have a site with adverse weather
25 conditions, you will need to have a larger exclusion

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1 area boundary for that site. If you have a site which
2 has very good dispersion characteristics, you would
3 have a shorter exclusion area boundary for that site.
4 But the design features are all fixed. The safety
5 analysis has been completed. The parameters of the
6 physical design are controlled, the design of spray
7 systems, et cetera.

8 CHAIRMAN SELIN: That's different examples
9 of a particular design.

10 MR. RUSSELL: That's for a particular
11 design.

12 CHAIRMAN SELIN: But you could have from
13 say the passive reactor to the evolutionary reactor.

14 MR. RUSSELL: That is correct.

15 CHAIRMAN SELIN: You could end up with
16 different site characteristics.

17 MR. RUSSELL: We have -- the parameters
18 are essentially the same. That is the atmospheric
19 dispersion is the same for both the Combustion
20 Engineering and the ABWR. We would expect that we
21 would have that parameter for the passive designs as
22 well. There is a difference in the numerical value
23 which is a function of the design and some of the
24 flexibility that was chosen. For example, increasing
25 leak rate for valves, main steam isolation valves, et

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1 cetera, to provide operational flexibility.

2 So, there have been a number of tradeoffs
3 between operational flexibility and others that go
4 into the design feature of the facility. All those
5 tradeoffs are done and considered in the design
6 certification review and it's done through the
7 surrogate of using atmospheric dispersion. So, that
8 becomes then the interface with siting. So, for any
9 particular design on a site, when you choose that site
10 and marry it up, you may have different exclusion area
11 boundaries that are necessary in order to show that
12 the atmospheric dispersion for that particular site at
13 that location is within the certified design for the
14 design you've chosen.

15 COMMISSIONER REMICK: I had some questions
16 in this same area. One, I'm not sure how what you
17 propose accounts for the very strong and I think
18 nearly unanimous comments that one should not
19 decouple. As I understand, you are proposing
20 decoupling. But it's not clear to me when you say
21 relocates dose criteria in Part 50, what specifically
22 are we talking about? I assume you say dose. It's
23 the 25/300, but in what way? As it is now, if we're
24 relocating it's tied to exclusion area boundary and
25 LPZ. Would we be taking those type of relationships

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1 and putting them in Part 50, which then I would see
2 that it would be a tie in with siting? I'm not quite
3 sure what you mean by you're going to move the dose.

4 And one other comment. When you move the
5 dose, the question comes to mind are we going to look
6 at those from an updated perspective of ICRP or are we
7 talking about total effective dose equivalent, are we
8 talking about whole body dose and thyroid dose in the
9 past and so forth? Lots of questions come to mind
10 when I read those words, but I don't know which you
11 propose.

12 MR. SOFFER: Yes. To answer your second
13 question first, our thoughts were that when the doses
14 were transferred to Part 50 we would be talking total
15 effective dose equivalent. This is because, of
16 course, there are differences between the ratios of 25
17 rem whole body and 300 rem thyroid. We've looked at
18 that. In addition, when one looks at an updated
19 source term, one realizes, of course, that there are
20 other nuclides and other body organs that may be
21 involved. Consequently, in order to accommodate the
22 insights of a revised source term, you also want to
23 accommodate to a more updated and more consistent
24 notion from doses.

25 So, yes, we were going to look at total

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1 effective dose equivalent. We were contemplating
2 simply transferring those numbers to Part 50 to say,
3 for example, that an individual at the exclusion area
4 boundary should not receive more than 25 rem total
5 effective dose equivalent two hours or so after the
6 onset of the release or something of that sort.

7 COMMISSIONER REMICK: But that would not
8 be used to set the exclusion area boundary.

9 MR. RUSSELL: No. The answer to the first
10 part of your question -- that was the second piece.
11 The first part we would still propose to do a
12 calculation. It would be based upon using an
13 atmospheric dilution to get the dose to a person at a
14 location, but we would not specify the distance. We
15 would, in fact, specify the dilution that has to be
16 achieved in the same manner that we have done for the
17 evolutionary design reviews and what we're doing now.
18 So, it's similar to what I described. So, there is
19 still, for design basis events, a surrogate
20 calculation that looks at the effectiveness of the
21 design features with an assumed dilution to a location
22 and then compares it to the total effective dose
23 equivalent so that becomes the figure of merit that's
24 used then in making judgments about the design and how
25 to do tradeoffs within the design.

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1 COMMISSIONER REMICK: Okay. Now, in
2 setting that total effective dose equivalent, are you
3 looking at it from any standpoint from risk
4 perspective? Any guidance that that safety goals
5 might provide? And a related question. Are we
6 talking -- you're apparently talking about the fence
7 post person. Have you considered the critical group?
8 In other words, are we updating ourselves with current
9 type of approaches?

10 DOCTOR SPEIS: Commissioner Remick, you
11 have raised this question many times.

12 CHAIRMAN SELIN: You're finally prepared
13 to answer.

14 COMMISSIONER REMICK: I thank you for
15 remembering.

16 DOCTOR SPEIS: As recently as at the last
17 PRA briefing. Your question is to get a risk
18 perspective between 25 and the 300. There are two
19 questions that you have raised in the past. One of
20 them is the comparison between the two numbers as far
21 as the risk, and then the safety goal.

22 COMMISSIONER REMICK: Yes. The total
23 effective dose equivalent takes care of the
24 relationship between thyroid and whole body.

25 DOCTOR SPEIS: We looked at that carefully

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1 and we used the latest BEIR V numbers and we found out
2 that the 25 rem whole body leads to a higher fatality
3 risk than the 300 rem to the thyroid, for fatality.

4 COMMISSIONER REMICK: Yes.

5 DOCTOR SPEIS: By a factor of 10. When we
6 compare the two as far as the incidence, then the
7 difference is only a factor of two higher for the 25
8 rem to the whole body.

9 (Slide) And we have that backup
10 viewgraph. The first one shows the numbers that we
11 have utilized for this purpose.

12 MR. SOFFER: I might add that the basic
13 reason why there's a factor of ten difference in
14 fatality and only a factor of two difference in
15 incidence is that thyroid cancer is quite highly
16 treatable, so that the fatality rate is rather low.

17 DOCTOR SPEIS: So then, therefore, this
18 leads us that if we talk about doses in the future we
19 have to use effective dose equivalent where you weigh
20 the organs.

21 COMMISSIONER REMICK: I don't want to go
22 into detail now on this backup slide, but one
23 question. I see a 10^{-3} . What is that?

24 DOCTOR SPEIS: That's the deaths per rem
25 and this is a number which is -- there are two numbers

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1 there. One of them involves the two hour period. If
2 the dose is absorbed over a two hour period, then the
3 number is 10^{-3} . If you're talking about a day or
4 more, then it's 5×10^{-4} deaths per year.

5 COMMISSIONER REMICK: But once again, what
6 is the 10^{-3} ? I'm not sure I understand.

7 DOCTOR SPEIS: It's deaths per rem. It's
8 the coefficient.

9 MR. SOFFER: That's the risk of latent
10 cancer facility per rem if the dose is received at a
11 rather high rate. That comes from BEIR V.

12 COMMISSIONER REMICK: So you're not using
13 5×10^{-4} , you're using 10^{-3} ?

14 MR. SOFFER: Right. We've been told by
15 our people that the risk coefficient of 5×10^{-4} is
16 appropriate if the dose is being received over a
17 period of about a day or more.

18 DOCTOR SPEIS: Day or more.

19 MR. SOFFER: But if you're talking about
20 a two hour period, in this case it probably is closer
21 to a 10^{-3} .

22 MR. RUSSELL: But this gets back to the
23 earlier comment I made that the emphasis on going
24 toward a risk-based approach and looking at different
25 designs, going to total dose equivalent and then

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1 choosing which would be developed in a proposed
2 rulemaking package for Commission consideration, which
3 is the appropriate. Whether it's 25 rem whole body or
4 total dose equivalent or it's 300 or whether it's
5 prevention of cancer or its fatalities, those could be
6 addressed at that time and it would be then codified
7 by choosing the surrogate that is used, in fact, for
8 these design tradeoffs.

9 COMMISSIONER REMICK: You have not
10 included in here the probability of the occurrence of
11 the release. That's one thing you have not included.

12 MR. SOFFER: That's right, we have not.

13 COMMISSIONER REMICK: So, it's a
14 conditional risk.

15 MR. SOFFER: That's right.

16 COMMISSIONER REMICK: So, if you're going
17 to make comparison with safety goals and so forth, you
18 have to factor in what, a 10^{-6} ? I think you state in
19 your report that's a probability of bypass
20 containment.

21 MR. RUSSELL: We believe that for the new
22 designs, the CE and ABWR where we have completed our
23 review efforts, they're on the order of 10^{-6} for core
24 damage. You still have then, beyond that, the
25 containment performance and the conditional

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1 containment failure probability for bypass or large
2 release for the BWR is on the order of 10 percent.
3 And I believe for CE it was also on the order of 10 or
4 11 percent. I'd have to check the second number.

5 COMMISSIONER REMICK: Yes. I think in
6 your paper: -- I'm not disagreeing with you, Bill. In
7 your paper I think you say something like 10^{-6} to
8 assume bypass.

9 DOCTOR SPEIS: Or early containment
10 failure.

11 COMMISSIONER REMICK: Or early containment
12 failure, yes. But I agree. If you have 10^{-6} core
13 damage frequency, it's going to be smaller than that.
14 Okay. So that isn't really a risk, it's a conditional
15 risk. I don't want to get into your -- I'll have to
16 study that.

17 CHAIRMAN SELIN: But I do. I'd like to
18 follow up on two of Commissioner Remick's points.

19 As I read your document and now as I look
20 at your second backup chart, what I think you're
21 saying is if we follow the BEIR V rules, any
22 reasonable reactor performance will far exceed the
23 safety goal. The 25 millirem as an exposure in a
24 conditional case multiplied by the probabilities that
25 these events would occur would lead to much lower

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1 cancer rates, fatality rates, et cetera, than a safety
2 goal would imply. So, the safety goal is not a
3 defining factor on -- well, eventually on the
4 exclusion area zone.

5 MR. RUSSELL: As we're using it for design
6 basis events in a stylized calculation, you still have
7 the severe accident issues which go beyond that.

8 CHAIRMAN SELIN: But it's not that you've
9 ignored the safety goals, but to be consistent with
10 BEIR V, which is also one of our principles, one
11 automatically not only meets but exceeds the safety
12 goals in the design basis situation.

13 More plainly, I'd like to come back to
14 this coupling question. I think you've understated
15 what you've done in the way of accommodating to the
16 comments. We're talking about siting with regard to
17 really standardized reactors. Therefore, the siting
18 criteria are tied to the designs of the standardized
19 reactors. You will not permit, and I think it's
20 consistent with our theory of standardization, that
21 somebody put in some non-standard features into an
22 otherwise standard reactor to compensate for a
23 defective site. But if we get to another reactor
24 design that has superior safety characteristics or a
25 lower source term, then you would end up with

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1 translating this into sizes of exclusion area zones or
2 other features. You would end up with smaller
3 exclusion area zones.

4 DOCTOR SPEIS: Yes. Yes.

5 MR. RUSSELL: That's correct.

6 CHAIRMAN SELIN: So, the criteria are
7 coupled not to the individual site specific reactor,
8 but to the class of reactors.

9 DOCTOR SPEIS: Classes, yes.

10 CHAIRMAN SELIN: In other words, to the
11 standard design. So, it's not correct to say that
12 we've thrown out coupling, but rather we've done it on
13 a standard site versus standard design and not allowed
14 otherwise unsatisfactory sites to be compensated for
15 by a non-standard execution of a standard design. But
16 what site would be acceptable for reactor design 1
17 might be -- or unacceptable for reactor design 1 might
18 be acceptable for reactor design 5 if the reactor
19 design 5 had superior risk or containment features or
20 what have you. Is that correct?

21 DOCTOR SPEIS: Right. Thank you for
22 clarifying our presentation.

23 CHAIRMAN SELIN: Well, I'm serious.

24 DOCTOR SPEIS: No, no.

25 CHAIRMAN SELIN: If somebody came in with

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1 a double steel containment and did different
2 calculations, the acceptable site would be different
3 from the ones that are --

4 DOCTOR SPEIS: That's correct.

5 COMMISSIONER ROGERS: Well, I think this
6 has been a very helpful discussion because this is a
7 point that wasn't clear to me. I think somehow the
8 language that's come out of this discussion ought to
9 appear someplace to clarify this.

10 DOCTOR SPEIS: It has to be clarified in
11 the rule itself, of course.

12 COMMISSIONER ROGERS: Somehow, because I
13 think that that's an issue that's an important issue
14 and it just wasn't very clear in what we had in front
15 of us.

16 CHAIRMAN SELIN: I'd also like to point
17 out I told you to do this last time and you did it.
18 So, you at least ought to get credit for that in the
19 sense that decoupling is relevant for class of
20 reactors, but what we don't permit is individual
21 compensatory measures for other non-standard science.

22 DOCTOR SPEIS: And going back to your last
23 point, Mr. Chairman, where you talk about the numbers
24 in relation to the safety goal, in fact the QHO, the
25 quantitative health objectives for latent cancer which

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1 is a safety goal of 2×10^{-6} , they can be met for these
2 numbers even if we assume that we have core melt
3 probability of around 2×10^{-2} . So, we're way within
4 and, of course, you know that number is 10^{-4} .

5 COMMISSIONER REMICK: I notice that you
6 indicate that your calculations indicate that an EAB
7 of .25 would meet safety goals. I notice that in the
8 NUMARC response, if that's the response using MELCOR -
9 - excuse me. They indicated .25. You indicate a
10 tenth of a mile. Have you looked at that difference?
11 They indicate with MELCOR, they calculate it.

12 MR. SOFFER: We have not specifically
13 compared with MELCOR, no.

14 COMMISSIONER REMICK: Okay. Before
15 leaving this, just one comment and I don't claim to
16 remember BEIR V that much right now, but I do remember
17 my impression that 5×10^{-4} in my mind is quite
18 conservative. There's a factor in there, and I forget
19 the name of it now, that ranges between two and 20 and
20 5×10^{-4} was arrived at by using a factor of about two
21 rather than one could argue or some people argue a
22 factor of 20. And therefore it's very conservative
23 from the standpoint of this question of dose spread
24 over a long period of time versus a short period of
25 time.

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1 I hope what you've done in using 10^{-3} is
2 the risk coefficient in BEIR V, not taking somebody's
3 value and saying, "Well, if the dose is accumulated
4 over a short period of time, it's a factor of X over
5 what it is over a long period," and applied that times
6 5×10^{-4} , because I think 5×10^{-4} is already conservative
7 from that standpoint. I just throw that out as a
8 thought and don't hold me to the fact that I know what
9 I'm talking about. But it's a memory going back to
10 about 1990 looking at BEIR V.

11 MR. SOFFER: We'll go back and check that.

12 COMMISSIONER REMICK: Okay.

13 DOCTOR SPEIS: These numbers, we checked
14 them with our in-house expert, Doctor Yanif, but we
15 will revisit them again.

16 COMMISSIONER REMICK: Right. And I
17 understand not to take a ratio of 5×10^{-4} , but look
18 what is the risk coefficient for something
19 administered over two hours or a short period of time.

20 MR. SOFFER: (Slide) Could we go on to
21 viewgraph 11, please?

22 This viewgraph is a listing of what we
23 would propose as basic reactor site criteria. We
24 think that they are -- this is a succinct but a fairly
25 complete listing of the basic site criteria for siting

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1 power reactors. We would have a requirement that the
2 site atmospheric dispersion factors of dilution
3 characteristics should be evaluated and must be
4 evaluated and plant interface criteria established
5 such that doses for normal operation would be met as
6 well as radiological consequences of postulated
7 accidents to a hypothetical individual at the
8 exclusion are boundary would be acceptable.

9 Then we would have requirements that the
10 physical characteristics of the site would have to be
11 evaluated and plant interface criteria established
12 such that these would pose no undue risk to the plant.
13 As an example, this would be seismology
14 characteristics or flooding characteristics of the
15 site that in turn would be translated into criteria
16 that the plant would have to meet.

17 Similarly there would be a requirement
18 that any man related activities in the site vicinity,
19 nearby transportation routes, industrial hazards, et
20 cetera, would have to be evaluated and plant interface
21 criteria established such that these would pose no
22 undue risk. As an example, if it turned out that
23 there was large quantities of chlorine, for example,
24 that were stored or transported near the site, then an
25 example of an interface criteria would be that

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1 automatic chlorine detectors would have to be
2 installed in the control room, which is a common sort
3 of feature in many of our plants.

4 COMMISSIONER REMICK: Now, those things
5 have been reviewed in the past. Are they in what,
6 standard review plan or reg. guide not specified in
7 the rule? How is that --

8 MR. SOFFER: There is a standard review
9 plan at the present time that addresses that and it's
10 a probabilistic criteria that's an evaluation. It's
11 Standard Review Plan Section, I believe, 2.2.3 that
12 has that requirement. But we believe that it should
13 be reflected in criteria as well.

14 Finally, we would have site
15 characteristics must be such that adequate security
16 plans could be developed and adequate emergency plans
17 can be developed. Finally we would have a statement
18 that reactor sites must be located away from densely
19 populated centers, but this would not have any
20 numerical criteria in the rule itself.

21 COMMISSIONER REMICK: Len, has any thought
22 been given to the word "must" in that? An initial
23 reaction I had, and certainly I don't think anybody
24 wants one of these plants in a dense populated site.
25 It's very difficult for me to imagine that somebody

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1 would propose it. I can't imagine the NRC ever
2 agreeing to it and I can't imagine an applicant going
3 to a licensing hearing in opposition to the staff on
4 this issue. So, the thought went through my mind is
5 the word "must," has that been considered whether
6 that's needed versus something that -- well, "should"
7 comes to mind. I just ask the question has thought
8 been given to that word "must?"

9 MR. SOFFER: I don't think that we've
10 fully explored that, in all honesty.

11 COMMISSIONER REMICK: And what would the
12 international community feel about that? I realize we
13 write our regulations for our own use, but sometimes
14 a word can make a big difference.

15 CHAIRMAN SELIN: The thing that's changed
16 since last time is we haven't defined what you mean by
17 densely populated sites. So, it would be a question
18 of relative density, that given that the United States
19 has a certain average density, we would expect these
20 to be in relatively sparse areas. But in a country
21 where the average density were higher, this was done
22 so that -- say among available sites, pick those that
23 are less densely populated, but not say that it's
24 unsafe to have a greater density than some particular
25 number. I think that was the logic behind --

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1 MR. SOFFER: Yes. The intent was that it
2 could reflect the obvious differences that do exist
3 among different countries and different types of
4 regions of countries, in fact.

5 COMMISSIONER REMICK: But it's the word
6 "must." For example, something that the Chairman said
7 reminds me. When we do the Part 51 NEPA review where
8 the question of is there a superior site and so forth,
9 and even in that one would consider if there was a
10 site that was more sparsely populated and it was an
11 acceptable site under NEPA considerations in Part 51,
12 we would not find acceptable. So, it's very difficult
13 for me in the United States to imagine anybody
14 proposing it, but I can't preclude it. I certainly
15 don't feel that the Agency would ever agree and I
16 can't imagine anybody pursuing it and differing with
17 the Agency. So, just a question.

18 CHAIRMAN SELIN: I have a proposal that
19 might meet Commissioner Remick's concepts and be more
20 consistent with Part 51 and I would like you to think
21 about that. We have the concept of ALARA in
22 radiation. Without trying to be flip, something about
23 a site that's as good as reasonably achievable is a
24 concept that I personally would like to see in the
25 rule, which is more like the Part 51. It doesn't say,

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1 "Thou shalt not use a site with these
2 characteristics," but says, "Among sites that are
3 reasonably achievable, you should put a high weight on
4 certain of these characteristics." It's not must or
5 should, but that when you're looking at population
6 density, the rule ought to specify -- this is
7 something that should be very seriously taken into
8 account. Among acceptable sites, a high weight should
9 be put on those that have lower rather than higher
10 density.

11 I mean you've laid out a number of
12 criteria and I personally would like to see some
13 language and some guidance more like the Part 51, more
14 consistent with that, that says how do you use these
15 criteria? And the answer is, you try to meet as many
16 of them as possible among sites and with some guidance
17 as to what's more important to us than others without
18 flat out saying that the population density must be
19 below a certain amount or the interaction with
20 highways must be a certain point.

21 The ALARA concept -- it's not so easy
22 because you don't have a single quantity to measure
23 the way you do an ALARA, but the concept of choosing
24 among sites, otherwise acceptable sites, with a real
25 eye to these parameters as opposed to an absolute I

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1 think is an important one. I think we recognize it
2 already in Part 51 and I personally would like to see
3 that reflected in the rule and then you don't get into
4 a question of is it must or should. We would be
5 saying, all else being equal, try to find a site with
6 lower density. That's very important to us.

7 COMMISSIONER REMICK: And that's generally
8 consistent with what I had in mind. I think Part 51
9 leads us in that direction.

10 COMMISSIONER ROGERS: Just one other
11 point. It may be a trivial one, but somehow the
12 notion that this is really initial siting that we're
13 talking about--

14 MR. SOFFER: Yes, it is.

15 COMMISSIONER ROGERS: -- ought to be very
16 clear, because with license renewal as a possibility
17 after 40 years a great deal can change and we have
18 seen many times that sites that were picked for a
19 particular purpose because nobody lived there became
20 more attractive for residential communities around
21 airports and things of this sort and then all of a
22 sudden those considerations were no longer applicable.
23 I think that some way ought to be provided here to
24 make sure that we're talking about an initial siting.

25 I don't know what the relevance is to

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1 license renewal, but, if we're talking about the
2 siting of a brand new plant that 40 years later comes
3 up for license renewal, there could be a change in the
4 situation and if this "must" is taken very seriously
5 for all time that might pose a problem. So I would
6 just ask that some thought be given to the long term
7 applicability of this requirement.

8 MR. SOFFER: That's a very good point,
9 Commissioner.

10 (Slide) If we could go on to viewgraph
11 number 12, finally the last option that we considered
12 among the non-seismic portions of the rule is
13 retaining the present form of the rule but using
14 updated source terms rather than going along with TID-
15 14844, which everybody recognizes at this point is
16 outmoded, that is to simply use new source terms but
17 retain the present form of the rule.

18 There are a number of pros associated with
19 this. It utilizes updated source terms. It is
20 flexible. It also has the familiarity, except for the
21 fact of using a new source term.

22 There is a major disadvantage to this
23 option and that is that it basically does not address
24 the problems associated with the present form of the
25 rule, that is that the present form of the rule allows

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1 such unlimited trade-offs between plant design and
2 siting in terms of small changes here and there that
3 it is not really a siting regulation.

4 CHAIRMAN SELIN: It's highly prescriptive
5 and it's not adapted to the world of standardized
6 reactor designs.

7 MR. SOFFER: It's not really adapted to
8 the world of standardized designs, that's right. It
9 can be made -- it can be force fit, but it's not
10 really well adapted to it, I would say.

11 (Slide) And consequently, turning now to
12 number 13, as far as our non-seismic recommendations
13 are concerned, the staff is recommending that we do
14 not adopt the proposed rule issued for comment in
15 October of 1992.

16 Instead, we are recommending that Part 100
17 be revised to incorporate basic site criteria
18 including the requirement that reactors be sited away
19 from densely populated centers -- however there would
20 be no numerical criteria that would appear in the rule
21 itself, rather these would be stated in regulatory
22 guides -- and that source term and dose calculations,
23 including updated source terms, would be used to
24 provide improved designs for plant design.

25 The staff considers option 4 to be a

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1 performance based standard that permits severe
2 accident insights to be applied in Part 50 towards
3 plant design while more clearly stating reactor site
4 criteria and principles in Part 100, and for that
5 reason this is our recommended option.

6 With that, I will turn it over to my
7 colleague, Andy Murphy, who will talk about the
8 seismic aspects.

9 COMMISSIONER REMICK: Len, before we do
10 that, just a couple questions.

11 MR. SOFFER: Yes?

12 COMMISSIONER REMICK: Once again, a
13 question of just understanding. As I understand it,
14 by putting the dose in Part 50, which I generally
15 think is a good idea, the designer has a design and a
16 source term. Through some mechanism he develops a
17 source term and then aside from a probabilistic
18 approach he assumes there is a release, and with that
19 then there is some kind of a standard atmospheric
20 dispersion model that the designer uses to make sure
21 that the dose at the exclusion area boundary meets the
22 dose limit. So, by doing that in the design there
23 then is a proposed EAB, exclusion area boundary. Is
24 that right?

25 MR. SOFFER: No.

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1 MR. RUSSELL: No. There is a proposed
2 atmospheric dispersion with that design, and what
3 typically occurs is that they then look at what is
4 known about current sites and whether what they're
5 proposing would be accommodated by most sites or not
6 to get a feel for how realistic is the atmospheric
7 dispersion.

8 There's one other point I'd like to make.
9 This is not just dose at the exclusion area boundary
10 that could be controlling for a particular design.
11 Control room habitability and dose to the control room
12 and the dispersion to the control room could also be
13 controlling.

14 COMMISSIONER REMICK: No, but I'm talking
15 about the relationship to the exclusion area boundary
16 now. I'm trying to understand. The hypothesized
17 release based on a source term has a standard model,
18 atmospheric model, and therefore he sees what type
19 exclusion area boundaries might be required with that.
20 If that looks like it's not reasonable, he can modify
21 the plant to cut down the source term release.

22 MR. RUSSELL: In fact, there is guidance
23 within the EPRI requirements document that the
24 industry has adopted with some recommendations as it
25 relates to the owner controlled areas and those

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1 generally are larger, but they are guidelines.

2 We felt it was not necessary to specify an
3 actual radius but to control based upon the dispersion
4 factor and leave that up to the industry as to whether
5 they felt that was so conservative that a number of
6 sites would be excluded or they want to make the
7 dispersion factors larger and thereby have to actually
8 control containment leakage more tightly, valve
9 closure times, et cetera. So, this really was a
10 vehicle for looking at what the releases are to the
11 atmosphere and then choosing a location as a
12 surrogate.

13 COMMISSIONER REMICK: Okay. I'll assume
14 that's an answer yes.

15 Now let me go to the siting. I'm not
16 quite sure you're going to not have numbers in the
17 Part 100 siting. You're going to have numbers in the
18 reg guides, but I don't know what those numbers are
19 now. We've taken dose out. We're going to have
20 population density guidance. Are we going to have
21 exclusion area boundary guidance?

22 DOCTOR SPEIS: Yes.

23 COMMISSIONER REMICK: And what is that?
24 I don't think that was specified. I felt the staff
25 was perhaps thinking about .25, but it wasn't clear.

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1 DOCTOR SPEIS: We could come up with walk-
2 away numbers, for example. Maybe we could start with
3 the ones in the present Reg Guide 4.7 or possibly
4 start with a .05.

5 COMMISSIONER REMICK: You haven't decided.

6 DOCTOR SPEIS: We haven't finalized a
7 number.

8 COMMISSIONER REMICK: Okay.

9 DOCTOR SPEIS: But we are talking about
10 putting numbers in the reg guides, including possibly
11 walk-away numbers.

12 COMMISSIONER REMICK: How about 30 miles?

13 DOCTOR SPEIS: If you meet this number,
14 then you don't have to do --

15 CHAIRMAN SELIN: Well, it's a surrogate.
16 It basically says it's a --

17 DOCTOR SPEIS: Yes, that's right. Yes.

18 CHAIRMAN SELIN: So, if you meet this
19 test, you don't have to go any further.

20 DOCTOR SPEIS: Yes.

21 CHAIRMAN SELIN: If you don't, then you
22 have to actually do --

23 DOCTOR SPEIS: Yes.

24 COMMISSIONER REMICK: How about the 30
25 miles? Have you thought about what's the relationship

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1 between the safety goals where you have one mile and
2 ten miles? What I'm looking for is some kind of
3 philosophical consistency where it makes sense for the
4 Agency to do it.

5 MR. SOFFER: We haven't really thought
6 of -- you know, we had done some preliminary analyses
7 to try to estimate whether the 30 miles and the 500
8 people per square mile was a reasonable number and
9 based on some very preliminary analyses it looked like
10 it was a slightly conservative number, but we really
11 haven't explored it in any greater detail.

12 COMMISSIONER REMICK: Okay. Well, I just
13 remind you that, as you indicated earlier, that the
14 Commission at one time held off the siting until you
15 had a safety goal and a better understanding of severe
16 accident, so I just hope that as we redo these things
17 that we try to consistently incorporate some kind of
18 a consistent approach in what we're doing. I don't
19 know what the answer is, but I just hope that that
20 thought process is going on.

21 CHAIRMAN SELIN: I'd like to add something
22 to what Commissioner Remick said about this population
23 density point. I'm leery about putting in numbers for
24 population densities in outside areas because of two
25 things. One is they far exceed the safety goal. You

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1 know, you do the safety goal calculations and clearly
2 you would tolerate sites that would violate those
3 numbers that still meet the safety goal.

4 The second is we're saying look at sites
5 that have low density compared to other sites that are
6 reasonably achievable. So, in a specific licensing,
7 if somebody wanted to put something in a close Chicago
8 suburb, we would push them towards some other area.

9 And the third point is those numbers will
10 just make problems for us 15 years later when somebody
11 comes in and says, if we require 500 people per square
12 mile and now there are 2,000 people who all moved
13 there because the schools are wonderful and the tax
14 breaks are there, then it's very hard for us to
15 justify continuing to operate the plant. We know the
16 plant is quite safe because of the safety goals. So,
17 it seems to me putting numbers for the outside zones
18 into the reg. guide are not needed for safety and will
19 just cause us serious, serious problems later on in
20 the life of the plant.

21 It's one thing to say these are initial
22 figures, but you're not changing the exclusion area
23 zone. A lot of this material will basically not
24 change during the time period, presumably the
25 atmospheric, et cetera. But to take something so

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1 variable and then to be so specific about it is just
2 to set a trap for ourselves and I just don't see any
3 real benefit to do that.

4 MR. SOFFER: I agree.

5 COMMISSIONER REMICK: Now we're ready to
6 go into the simple stuff, the seismic area, right?

7 MR. MURPHY: (Slide) May I have the next
8 viewgraph, 14?

9 What I propose to do this morning is to
10 provide a brief review of the rule as it's published,
11 go over the comments that we have received, touch on
12 the options that we have suggested and then touch on
13 what we are actually recommending.

14 The first viewgraph, 14, indicates that
15 the rule as published in October of '92 proposed a
16 dual approach making use of both probabilistic and
17 deterministic and of giving equal weights to those two
18 approaches. Another item that is characteristic of
19 that rule as out for public comment was that we
20 permitted the use of both or either the EPRI or the
21 Livermore probabilistic seismic hazard approach. To
22 do this we made use of a relative criteria based upon
23 the Commission policy statement.

24 (Slide) The next viewgraph, number 15,
25 please.

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1 By way of general thoughts on this, the
2 equal weighting was pointed out to us in the public
3 comments as being reasonably difficult to achieve if
4 not impossible. There was considerable discussion of
5 this and it was well noted and pointed out to the
6 staff.

7 Another important aspect that can
8 implement the comments was that the site specific
9 investigations are a very important part of the
10 process and they should not be abandoned or set aside.

11 COMMISSIONER REMICK: Would you elaborate
12 on that because I wasn't aware that you would be
13 setting them aside under either deterministic or
14 probabilistic?

15 MR. MURPHY: No, we were not. It's just
16 that we wanted to make certain that it's understood
17 that the site specific was an important part of the
18 process and that we wanted to retain it and the public
19 wanted it retained.

20 Under the domestic comments, there was
21 quite a divergent series of comments on how to use the
22 probabilistic or the deterministic analysis, which was
23 the better way to go and if we were going to mix the
24 two of them, how we were going to mix them. Where we
25 did come to some consensus is that we got comments

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1 from the NUMARC/EPRI folks and they recommended an
2 integrated probabilistic/deterministic approach, again
3 as noted here with a specific emphasis on the
4 probabilistic part of it.

5 We also received an important comment
6 package from the U.S. Geological Survey and, again,
7 here they recommended that the probabilistic results
8 be checked by a simplified deterministic analysis.
9 They did not require that we treat these equally and
10 they suggested in discussions that these could be --
11 a simplified check could be put into the standard
12 review plan. They also recommended that we have a
13 program to update and review the probabilistic methods
14 and their databases on about a ten year basis.

15 COMMISSIONER REMICK: Does that seem
16 reasonable, the ten year basis? How big an effort is
17 that to update?

18 MR. MURPHY: I think it would be a major
19 effort, but something that we could handle within the
20 program as we envision it at this stage.

21 COMMISSIONER REMICK: This would be NRC
22 effort?

23 MR. MURPHY: This would be an NRC effort.

24 COMMISSIONER REMICK: With USGS, I
25 presume.

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1 MR. MURPHY: With USGS or other agencies
2 such as DOE that may want to cooperate in such a
3 program.

4 COMMISSIONER de PLANQUE: I find the word
5 "checked" an interesting word. In a prior briefing we
6 talked about what would the degree of agreement have
7 to be between the two methods and I believe a number
8 like ten percent was floating around at the time.
9 Were any comments made specifically on what was meant
10 by checking and to what degree?

11 MR. MURPHY: No, there were no specific
12 comments as to what was meant by checking.
13 Particularly there was no ratio or proportions
14 suggested. At this stage, the staff has not written
15 that part of the document and we have not made the
16 decision to come to agreement on how to handle that
17 check.

18 COMMISSIONER de PLANQUE: That was going
19 to be my next question, how do you anticipate actually
20 doing that and is the ten percent that you discussed
21 earlier realistic?

22 MR. MURPHY: At this stage --

23 COMMISSIONER de PLANQUE: You don't know
24 yet.

25 MR. MURPHY: -- the answer is we don't

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1 know yet.

2 COMMISSIONER de PLANQUE: Okay.

3 MR. MURPHY: We do recognize that it's
4 something we do have to carefully examine.

5 (Slide) 16.

6 Here I note the comments from the
7 international community. The first bullet refers to
8 a series of comments that we received from foreign
9 commentators that I would classify as policy related.
10 Here these folks were concerned about the maturity of
11 the probabilistic analysis and the ability to apply
12 that to a particular country. They also noted that
13 the staff, NRC staff, as noted in the public comment
14 package, had not come to a full consensus on how to
15 address the probabilistic versus deterministic
16 question. I'll address that in the next viewgraph.

17 CHAIRMAN SELIN: I wanted to ask a
18 question.

19 MR. MURPHY: Sure.

20 CHAIRMAN SELIN: Japan and Taiwan are both
21 very densely populated countries. Is there some
22 reason to believe that probabilistic analysis would be
23 harder to apply in a highly dense population than in
24 a different -- I mean in other words, is this just
25 sort of a disinterested academic observation or would

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1 it cut their programs differently for the way it cuts
2 our programs?

3 MR. MURPHY: As I understand the process,
4 it would not depend on the population density of the
5 country. We have done our calculations and the
6 development of the probabilistic methods independent
7 of the density, the density of the population.

8 COMMISSIONER de PLANQUE: In other words,
9 you're saying this grouping of countries is just
10 coincidental?

11 MR. MURPHY: I believe so. I don't know
12 of a connection between them in that way.

13 The second group of countries provided
14 what I call mixed comments. Here these were more
15 technical in nature, telling us the things that they
16 specifically liked about the way we were doing things,
17 about the definitions they were using and making
18 suggestions on how they could be improved.

19 (Slide) Viewgraph 17 contains a statement
20 on the staff recommendations as far as the content of
21 the siting portion of the rule is concerned.
22 Specifically, the staff is recommending a
23 probabilistic approach with some other parameters to
24 be established on a deterministic basis. This
25 approach would be described in a series of regulatory

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1 guides, standard review plan sections and was
2 developed following a series of discussions with the
3 folks at the U.S. Geological Survey.

4 COMMISSIONER de PLANQUE: All right. Hold
5 on.

6 MR. MURPHY: Okay.

7 COMMISSIONER de PLANQUE: Will this
8 involve this notion of having to check the
9 probabilistic against the deterministic or are they
10 isolated now?

11 MR. MURPHY: In this particular first
12 sentence they're isolated. The first sentence simply
13 refers to developing the probabilistic material and
14 getting it to the point where a deterministic check
15 would be made by the staff.

16 COMMISSIONER de PLANQUE: Okay.

17 COMMISSIONER REMICK: Andy, once again I
18 have a question of understanding the words. We're
19 talking about a hybrid approach, a dual approach in
20 deterministic and probabilistic. Deterministic, I
21 assume, we look at a history of earthquakes, we look
22 at faults and whether those faults are -- and I forget
23 the adjective.

24 MR. MURPHY: Capable.

25 COMMISSIONER REMICK: Capable, thank you.

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1 Capable faults and so forth. We look at attenuation
2 and we come up basically with a proposed magnitude and
3 a ground acceleration for a particular site. The
4 probabilistic, using I guess the EPRI or -- it's
5 Lawrence Livermore, isn't it? Yes, methods, one looks
6 at the probability of earthquakes of different sizes
7 occurring and comes up with a hazard curve.

8 MR. MURPHY: That's correct.

9 COMMISSIONER REMICK: And from that then
10 on some kind of a probability you select a ground
11 acceleration. Is that right?

12 MR. MURPHY: That's essentially correct,
13 yes.

14 COMMISSIONER REMICK: Okay. All right.
15 And from that, once you have a ground acceleration you
16 can derive a response vector, I guess, for that site.

17 Now, I go back to 93-087 on the design
18 side. What I'm getting at here, I want to make sure
19 that all these things couple. What the staff
20 recommended and the Commission approved, I believe, as
21 I understood it in 93-087 is the designers would not
22 have to do a seismic PRA. They would take the PRA
23 that's required, identify systems, structures and
24 components that are important and which were designed
25 from the design basis SSE, the .3 tenths g in the case

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1 of the evolutionary plants, I guess, and then look
2 at -- say, suppose we had a large earthquake, a one
3 and two-thirds times the -- say equivalent to .5, and
4 then look at those systems and components, structures
5 that are important and see what margin they have,
6 whether they would survive a .5 g. Am I correct?

7 MR. MURPHY: That's correct.

8 COMMISSIONER REMICK: Okay. I'm
9 interested that these things fit together.

10 MR. RUSSELL: Let me describe how they fit
11 together. I anticipated this question a little bit.
12 We have basically looked for margin in the design of
13 the facility beyond the design basis.

14 COMMISSIONER REMICK: Right. These are
15 severe accidents.

16 MR. RUSSELL: The Commission's position
17 was that we should look for at least .5 g beyond
18 design. In fact, the two designs we reviewed thus far
19 have margins that are on the order of .6 or slightly
20 better than .6 g. When you look at that design on the
21 current sites for which we've done the seismic hazard
22 analysis, that is the controversy that exists between
23 the EPRI, Livermore analysis and now that that
24 difference has gotten to be much smaller, if you take
25 that and you put a .6 g acceleration with a spectra on

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1 the more highly seismically active sites potentially,
2 Seabrook, Sequoyah, we find that the probability of
3 exceedence of that margin is 10^{-5} and the difference
4 between where -- and that's for Hycliff. That's a
5 single point that may be controlling. When you
6 convert that into what would be core damage, you're
7 probably on the order of 10^{-6} . That is, there's
8 probably in reality some substantial margin between
9 your first Hycliff and where you would really expect
10 to see core damage from a seismically induced event.

11 For Callaway, which is down near the New
12 Madrid, it's on the order of 10^{-6} and so it would even
13 be smaller.

14 So, what we're seeing is that the seismic
15 contribution to CDF for current sites is on the order
16 of magnitude of the internal events. They are not
17 substantially different. That's what we achieved when
18 we basically said do this with some margin because we
19 can address that in design as to how that's done and
20 it's very difficult to do because the uncertainty in
21 how you characterize the sites, how you handle expert
22 opinion, et cetera, some of the uncertainty in return
23 periods. Although that has been reduced over the last
24 two years with additional work and we hope to finalize
25 that report and publish it for all the sites in final

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1 form yet this summer.

2 COMMISSIONER REMICK: Okay. Now, the
3 coupling of these two is you take the information from
4 the specific site. You've got a ground acceleration
5 and you've developed a response spectra for that site
6 and you compare it with what the designer did at the
7 design certification stage, what he assumed.

8 MR. RUSSELL: Correct.

9 COMMISSIONER REMICK: And the response
10 spectra he assumed and see if one is within the other.

11 MR. RUSSELL: That's correct. The second
12 reason for including margin is that we don't want to
13 exclude that design being put on a site even though
14 there may be some areas of the spectral acceleration
15 which is exceeded. For example, if there's high
16 frequency content that's exceeded, they would have to
17 do additional work to justify why that's acceptable.

18 COMMISSIONER REMICK: Sure.

19 MR. RUSSELL: So, what we've done is we've
20 characterized it as a walk away, that if the design
21 spectra totally encompasses the site specific spectra,
22 you're done and there's no further review. If there
23 are exceedences in some areas, that would require
24 additional review to show why that is still
25 acceptable, and that was one of the purposes for

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1 including the margin.

2 COMMISSIONER REMICK: At one point in an
3 earlier meeting, and Andy probably remembers which
4 previous meeting it was, but I was concerned that on
5 one side we're telling people you don't have to do a
6 seismic PRA and on the siting we were talking about a
7 probabilistic approach and there's inconsistency if we
8 aren't going to require a seismic PRA. But I think
9 that has been answered.

10 MR. RUSSELL: Okay. The major advantage
11 I see to a seismically developed hazard is that you
12 are looking at many earthquakes, at distances rather
13 than necessarily the one which is nearest the site
14 which is capable. I see this balance between the two.
15 That is the need for a rather in-depth site
16 investigation to assure that you don't have any near
17 field effects which you have overlooked when you
18 develop a probabilistic base which is based upon
19 historical record and what you've characterized by way
20 of tectonics, et cetera.

21 So, the two, I think, are coupled in the
22 approach and I think it's very consistent with what
23 we're proposing.

24 COMMISSIONER REMICK: Thank you.

25 MR. MURPHY: Okay. Then we'll touch on

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1 the last bullet on 17. That's simply to state out
2 front that the options that we have suggested under
3 the seismic area concern the format of the rule rather
4 than the technical content

5 (Slide) Specifically, going to 18, the
6 staff examined two possible formats. The first
7 considered maintaining a separate Appendix B and that
8 is to keep it in effect as it was published, or to
9 eliminate the Appendix B and to incorporate the basic
10 requirements into the regulation itself, the Part 100.
11 Both of these options or formats would make use of
12 streamlined regulation language. Here, again, we'd go
13 back in there and try to remove the extraneous
14 material that we really don't need either in the
15 regulation or in the appendix.

16 At this stage, the staff recommendation is
17 to go with the second option and that is to eliminate
18 Appendix B, to maintain the requirement language in
19 the Part 100 itself, and then to proceed with comment
20 resolution and preparation of the final rulemaking
21 package.

22 COMMISSIONER REMICK: I assume technically
23 there's no difference, it's just a preference.

24 MR. MURPHY: That's correct.

25 With that, I'll turn it back over to

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1 Doctor Speis, if there are no other questions.

2 DOCTOR SPEIS: (Slide) Well, finally then
3 is summarizing what has been said. We recommend that
4 we do not adopt the non-seismic provisions of the
5 proposed rule which was issued in October '92. We
6 recommend that we go forward and revise the Part 100
7 to incorporate the basic siting criteria that we
8 talked about, so-called Option 4, including
9 requirement that reactors be sited away from densely
10 populated centers. However, some type of numerical
11 criteria would be in regulatory guides. We would
12 recommend that the source term be updated and the dose
13 calculations be in Part 50 to reflect the influence
14 that they have on the plant design. And, as Andy
15 said, withdraw proposed Appendix B to Part 100,
16 streamline content of the seismic portion of Part 100
17 and proceed with comment resolution and preparation of
18 the final rule.

19 With that, we have completed our
20 presentation, Mr. Chairman and Commissioners.

21 CHAIRMAN SELIN: Commissioner Rogers?

22 COMMISSIONER ROGERS: All of my questions
23 that I came into the meeting with have been answered
24 very satisfactorily, I think, and I really want to
25 commend the staff for first really being willing to go

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1 back and re^{think} that whole issue of the proposed
2 rule. Once you've put something out with a lot of
3 thought in it, it's, I'm sure, not so easy to decide
4 that the whole thing has to be scrapped. But in this
5 case that seemed to be pretty much the wisest course
6 of action and I really want to say that I felt that
7 this was a very helpful and very detailed presentation
8 and I commend the staff for it.

9 CHAIRMAN SELIN: Commissioner Remick?

10 COMMISSIONER REMICK: One question I meant
11 to ask and did not, but it can be handled in a
12 briefing paper from the staff. I remember back in
13 your proposed rule, I believe you were going to target
14 exceedence probabilities based on current plants. I
15 didn't understand the basis for that. I would
16 appreciate sometime just an explanation, it need not
17 be done now, why -- the technical basis for doing
18 that. I can understand what it means and so forth,
19 but I won't take the time here. But I would
20 appreciate a follow-up on that.

21 MR. MURPHY: We'd be pleased to do that.

22 COMMISSIONER REMICK: Okay. I agree with
23 what Commissioner Rogers has just stated. I think the
24 staff should be congratulated for going back and
25 taking seriously the comments and so forth. I

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1 apologize to my colleagues for asking such detailed
2 questions, but it was just to make sure that I
3 understood what the words meant. So, it's been very
4 helpful to me also without the paper. This SECY is
5 much better because you do give the history of this
6 siting rule and so forth.

7 In that, one thing I would like to
8 emphasize. The Commission, I know, gave very serious
9 consideration at the time it decided to not proceed
10 with the siting rule until it knew a little bit better
11 where it was headed in the severe accident and where
12 it was heading on safety goals. It was not an easy
13 decision for the Commission because they had a
14 congressional mandate to proceed, although that
15 expired I guess after one year.

16 But the thing that I would urge is as we
17 do these things that you suggested, that we very
18 carefully consider it from the standpoint of today's
19 risk perspectives, the fact that we have a safety
20 goal, that we have come a long way in severe accidents
21 and so forth and strive to make things consistent and
22 hopefully have an explanation when we pick out a
23 number and strive for consistency in what we do. I
24 think you have a unique opportunity here. I'm not
25 saying you might not develop some problems in doing

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1 that, but I think we should face up to those.

2 But in summary, I'm very pleased with the
3 area -- or what you've done with this paper. I think
4 it's come a long way from the proposed rule. I think
5 I understand it. I sometimes say I wish I understand
6 everything I know about it. But certainly the
7 briefing has been very helpful and the paper was very
8 helpful and I might need some additional follow-up
9 briefings as time goes on to get a better
10 understanding.

11 Thank you very much.

12 CHAIRMAN SELIN: Actually, I'd like to
13 thank Commissioner Remick for -- we all have the same
14 concerns. He was better able to articulate the
15 questions that would illuminate those. So, thank you.

16 Commissioner de Planque?

17 COMMISSIONER de PLANQUE: Well, I too
18 would also like to commend you on the SECY. I think
19 it was very well done and the options are very well
20 thought out and explained.

21 I'd also like to reinforce the notion of
22 thinking ahead about what you're going to put in the
23 reg. guides and have the similar concerns that have
24 been already expressed about putting population
25 densities in there, especially as they refer to times

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1 in the future. This is something that's extremely
2 hard to predict today, especially in light of possible
3 time periods of more than 40 years for a plant.

4 I'd like to ask you what's your intention?
5 What are you going to do next?

6 MR. TAYLOR: We would -- having gotten
7 direction from the Commission based upon this paper,
8 we'll try to go back and put the rule package
9 together. We estimate that if we got action in the
10 next two weeks that we could probably have a package
11 ready for the Commission approval by about the end of
12 May.

13 COMMISSIONER de PLANQUE: Is your thinking
14 for another round of public comments or not?

15 MR. TAYLOR: We have had discussions with
16 the Office of General Counsel on that subject and I'll
17 defer to him on that.

18 CHAIRMAN SELIN: Well, let me just tell
19 you. I think you ought to go out for further comment,
20 not because of legal grounds but because of policy
21 grounds. Number one, the real time pressure has let
22 up considerably given the lack of activity and
23 whatever that advanced siting program is called for.
24 Number two, this is quite different from the last
25 thing that went out and I think it's good policy when

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1 such major changes are brought together that public
2 comment is called for.

3 MR. TAYLOR: There's no pressing need to -
4 -

5 CHAIRMAN SELIN: Whether the General
6 Counsel believes it's required or not, I think it's
7 just good solid policy at this point, my own view.

8 COMMISSIONER de PLANQUE: I would agree
9 with that.

10 That's all I have. Thank you.

11 CHAIRMAN SELIN: Okay. I'd like to add my
12 commendations. I'm quite enthusiastic about this
13 paper and the approach. I really have three comments.
14 Number one is there's some sense that one looks at
15 these different criteria and tries to pick among the
16 available sites those that most nearly meet most of
17 the criteria, this sort of as good as reasonably
18 achievable I think should be --

19 And second is I'd like to, in addition to
20 attach myself to Commissioner Remick and Commissioner
21 Rogers' comments, specifically expand a little bit on
22 something Commissioner de Planque said. I think it
23 would be very helpful if you sketched out the kind of
24 things that would be in the reg. guide, or at least
25 discuss how much of the reg. guide should be pre --

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1 COMMISSIONER de PLANQUE: Determined.

2 CHAIRMAN SELIN: Yes, tipped off. I was
3 trying to think of a nice word for tipped off, before
4 we're asked to move on the rule. It's like giving us
5 a contract with everything but the numbers filled in
6 and asking us to sign. So, some rough idea about what
7 you'd see in exclusion area zones in most cases, how
8 you would handle the population densities, a few of
9 these other points I really do think should be
10 sketched out. Knowing that those will have less
11 permanence than the rule, that will change as, as
12 Commissioner Remick points out, as risk pieces come
13 up.

14 And then the third is I feel quite
15 strongly that the package as put together, at least
16 the non-seismic part of the package, should be --
17 probably the whole package, but certainly the non-
18 seismic part should be issued for a reasonably prompt
19 but not accelerated comment once it's put together.
20 I think it's really an absolutely first rate job. You
21 achieved a reputation for brilliance with your past
22 document and now for honesty in recanting it.

23 Thank you very much.

24 (Whereupon, at 11:26 a.m., the above-
25 entitled matter was concluded.)

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TITLE OF MEETING: BRIEFING ON PROPOSED CHANGES TO PART 100

PLACE OF MEETING: ROCKVILLE, MARYLAND

DATE OF MEETING: MARCH 1, 1994

were transcribed by me. I further certify that said transcription
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Carol Lynch

Reporter's name: PETER LYNCH

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COMMISSION BRIEFING
ON
OPTIONS FOR REVISING 10 CFR PART 100
REACTOR SITE CRITERIA

THEMIS P. SPEIS
LEONARD SOFFER
ANDREW J. MURPHY
OFFICE OF NUCLEAR REGULATORY RESEARCH
U.S. NUCLEAR REGULATORY COMMISSION

MARCH 1, 1994

OUTLINE OF PRESENTATION

- o BACKGROUND
- o STAFF EVALUATION OF PROPOSED RULE
- o REASONS FOR PROCEEDING WITH SITING RULEMAKING
- o OPTIONS CONSIDERED
 - NON-SEISMIC
 - SEISMIC
- o RECOMMENDATIONS

BACKGROUND

PRESENT RULE (1962)

- o FISSION PRODUCT RELEASE (TID-14844) POSTULATED INTO CONTAINMENT. DOSES EVALUATED AT EXCLUSION AREA BOUNDARY (EAB) AND LOW POPULATION ZONE (LPZ) OUTER RADIUS.
- o PART 100 COUPLES PLANT DESIGN AND SITE CLOSELY AND HAS NO NUMERIC CRITERIA FOR SIZES OF EAB AND LPZ.
- o REG. GUIDE 4.7 (1975) PROVIDES GUIDANCE ON EAB SIZE AND POPULATION DENSITY WITHIN 30 MILES FROM THE REACTOR.

RECOMMENDATIONS ON REACTOR SITING

- o SITING POLICY TASK FORCE (1979)
- o KEMENY COMMISSION REPORT (1979)
- o 1980 NRC AUTHORIZATION ACT

**BACKGROUND
(CONTINUED)**

ADVANCE NOTICE OF PROPOSED RULEMAKING (ANPR) (1980)

- o ANPR ON REACTOR SITING ISSUED IN 1980.
- o ANPR WITHDRAWN IN 1981 TO AWAIT DEVELOPMENT OF SAFETY GOAL AND IMPROVED UNDERSTANDING OF SEVERE ACCIDENT SOURCE TERMS.

PROPOSED RULE (OCT. 1992)

- o SOURCE TERMS AND DOSE CRITERIA TO BE DELETED FOR SITE EVALUATION.
- o PROPOSED MINIMUM EXCLUSION AREA SIZE OF 0.4 MILES AND MAX. POPULATION DENSITY CRITERIA OF 500 PERSONS PER SQUARE MILE OUT TO 30 MILES.
- o PHYSICAL CHARACTERISTICS THAT COULD POSE SIGNIFICANT IMPEDIMENT TO DEVELOPMENT OF EMERGENCY PLANS TO BE IDENTIFIED.
- o EVALUATION OF MAN-RELATED HAZARDS REQUIRED.

STAFF EVALUATION OF PROPOSED RULE

- o EXTENSIVE COMMENTS RECEIVED ON PROPOSED RULE.
- o MAJOR NON-SEISMIC COMMENT WAS THAT SOURCE TERMS AND DOSE CALCULATIONS SHOULD BE RETAINED FOR SITING.
 - INDUSTRY AND INTERNATIONAL GROUPS FELT THAT THE RULE WAS OVERLY CONSERVATIVE, TOO PRESCRIPTIVE AND RIGID, NOT AMENABLE TO DIFFERENT REACTOR DESIGNS, INCOMPATIBLE WITH CONCERNS OF INTERNATIONAL COMMUNITY.
 - PUBLIC INTEREST GROUPS FELT THAT SITING CRITERIA SHOULD BE MADE MORE RESTRICTIVE.
- o SEISMIC COMMENTS CENTERED ON RELATIVE ROLE OF PROBABILISTIC VS. DETERMINISTIC ASSESSMENTS.
- o STAFF HAS RECONSIDERED PROPOSED RULE. RECOMMENDS THAT NON-SEISMIC PART OF PROPOSED RULE NOT BE ADOPTED, BUT THAT A SITING RULEMAKING SHOULD GO FORWARD.

REASONS FOR PROCEEDING WITH SITING RULEMAKING

- o TO INCORPORATE EXPERIENCE, RESEARCH AND TECHNOLOGY ADVANCEMENTS, PARTICULARLY IN THE GEOSCIENCES, SINCE THE PRESENT REGULATION.

- o TO ALLOW CONSIDERATION OF SEVERE ACCIDENT INSIGHTS IN THE DESIGN OF NEXT-GENERATION PLANTS SEPARATELY FROM SITE ACCEPTABILITY ISSUES.

- o TO STRENGTHEN SITING OF FUTURE REACTORS AS PART OF NRCs DEFENSE-IN-DEPTH, AS RECOMMENDED BY INDEPENDENT GROUPS.

NON-SEISMIC OPTIONS

1. WITHDRAW PROPOSED RULE. RETAIN PRESENT RULE.
2. ISSUE PROPOSED RULE AS IS.
3. SPECIFY REDUCED MINIMUM EAB IN RULE; SPECIFY POPULATION DENSITY IN A REGULATORY GUIDE.
4. STATE BASIC SITE CRITERIA IN PART 100, WITH NUMERICAL VALUES TO BE IN REGULATORY GUIDES. RELOCATE DOSE CALCULATIONS TO PART 50.
5. RETAIN PRESENT RULE BUT USE WITH UPDATED SOURCE TERMS.

RETAIN PRESENT RULE
(OPTION 1)

SUMMARY: WITHDRAW PROPOSED RULE. RETAIN PRESENT PART 100 AS IS.

PROS:

FAMILIAR, PROVIDES FLEXIBILITY TO ACCOMMODATE DIFFERENT DESIGNS.

CONS:

REFERENCES OUTMODED SOURCE TERM, IS NOT ACTUALLY A SITING REGULATION SINCE IT PERMITS A HIGH DEGREE OF PLANT DESIGN AND SITE TRADEOFFS, CONTRARY TO STANDARDIZATION POLICY, DOES NOT INCLUDE SECURITY CONSIDERATIONS, DOES NOT ADDRESS RECOMMENDATIONS OF GROUPS SUCH AS THE KEMENY COMMISSION.

ISSUE PROPOSED RULE AS FINAL
(OPTION 2)

SUMMARY: ISSUE PROPOSED RULE (OCT. 1992) IN FINAL FORM

PROS:

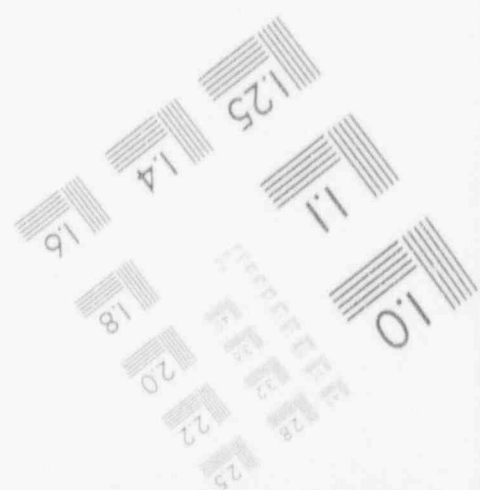
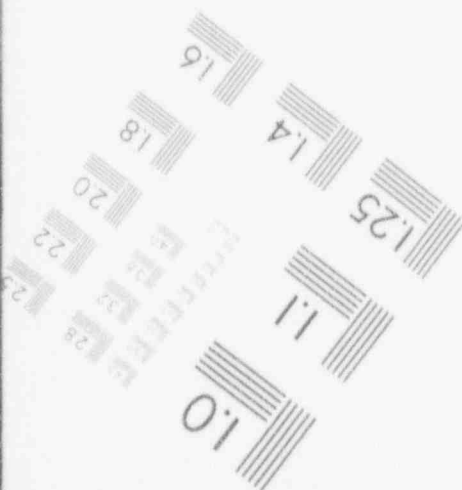
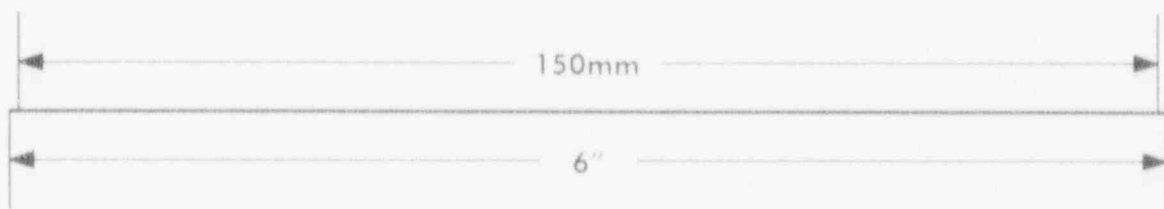
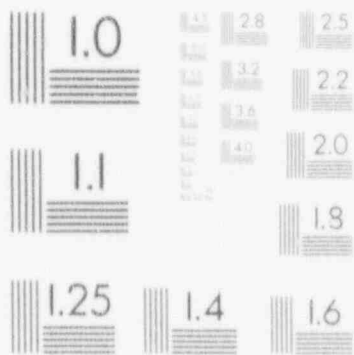
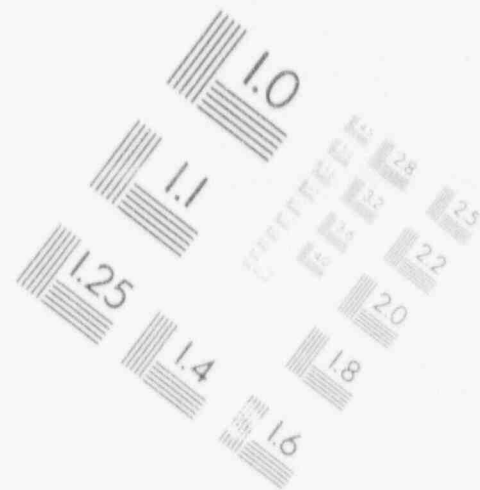
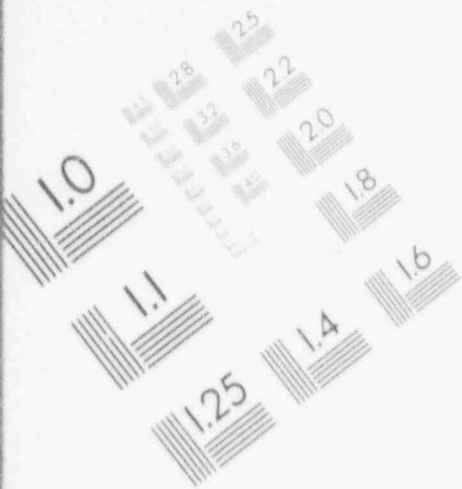
REDUCTION OF SOME ADMINISTRATIVE HEARING LITIGATION ISSUES

CONS:

HIGHLY PRESCRIPTIVE AND RIGID RULE. STRONG OBJECTIONS ACROSS A BROAD SPECTRUM, INCLUDING INDUSTRY, PUBLIC AND INTERNATIONAL COMMUNITY.

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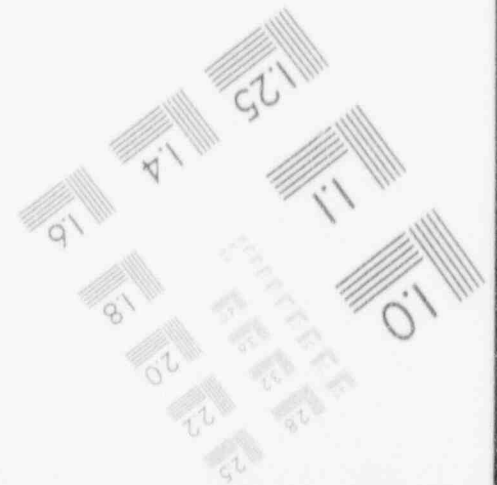
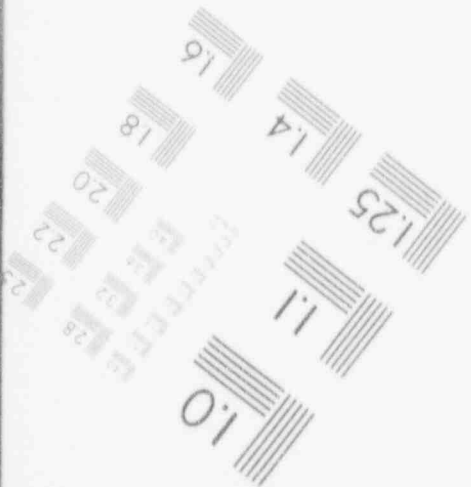
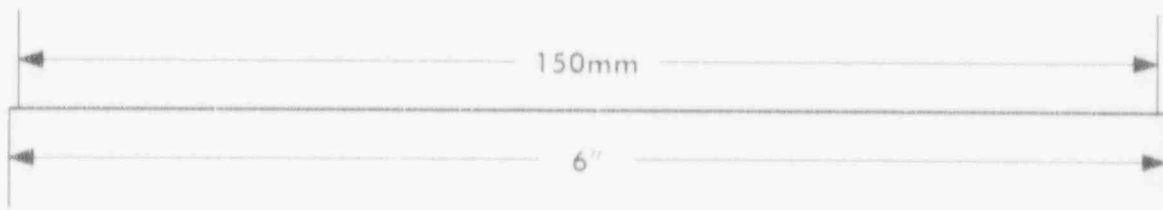
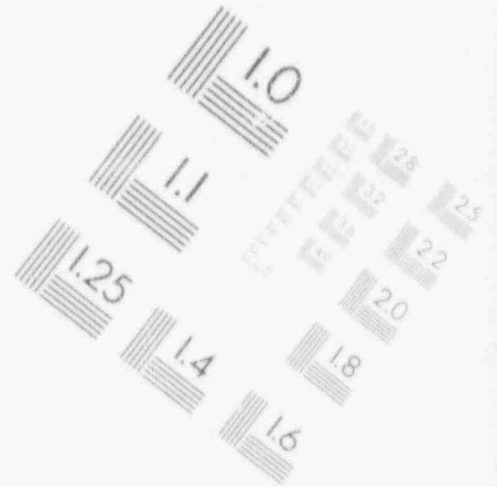
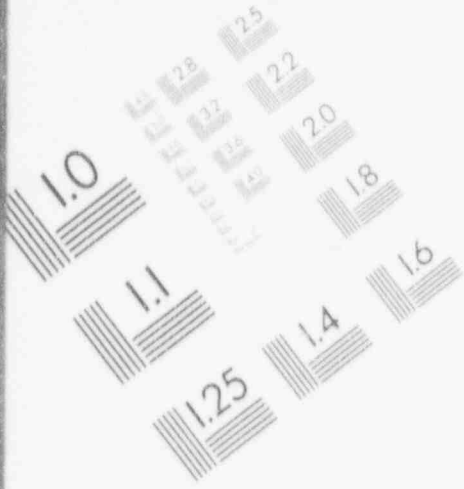
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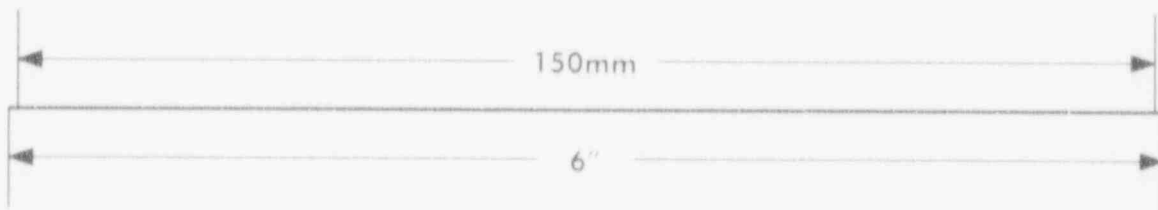
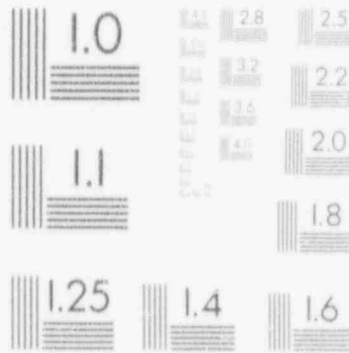
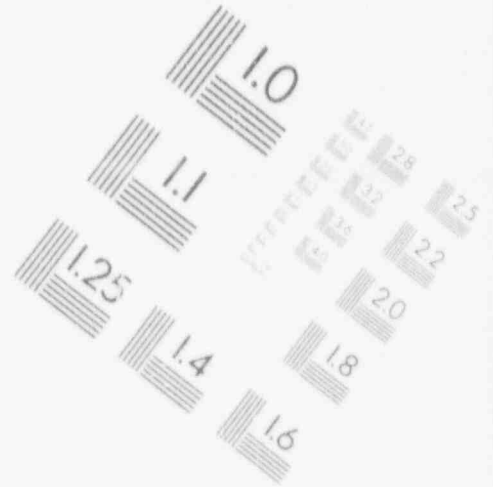
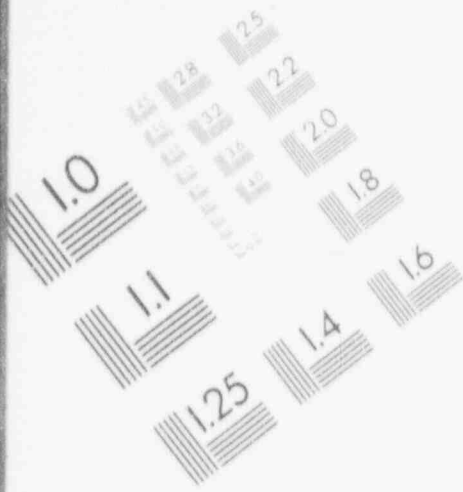
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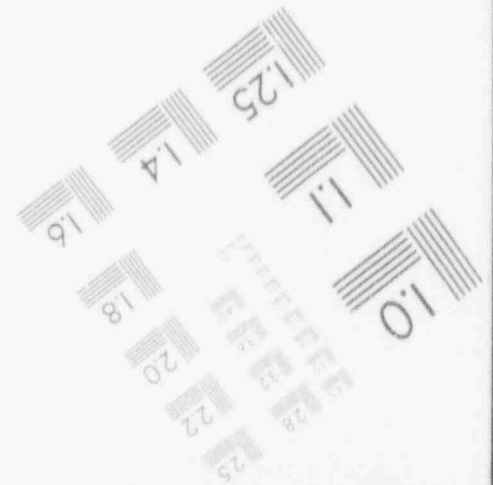
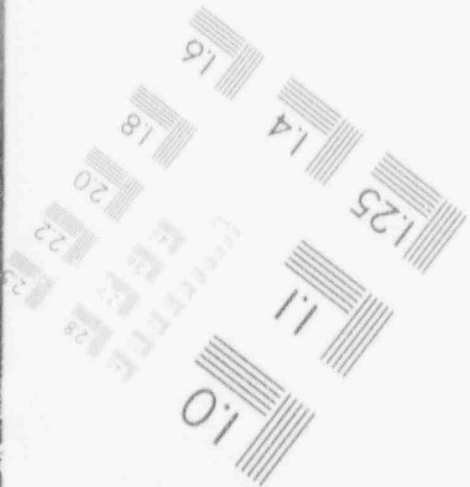
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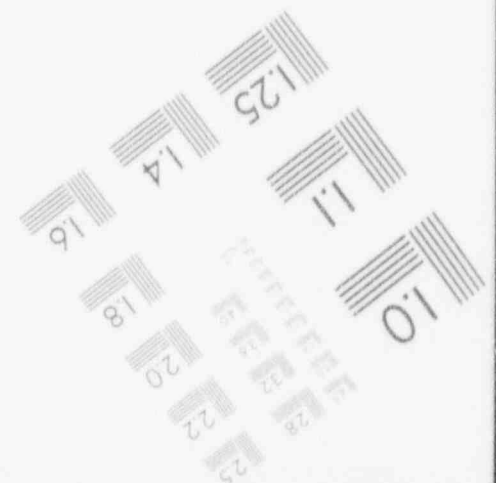
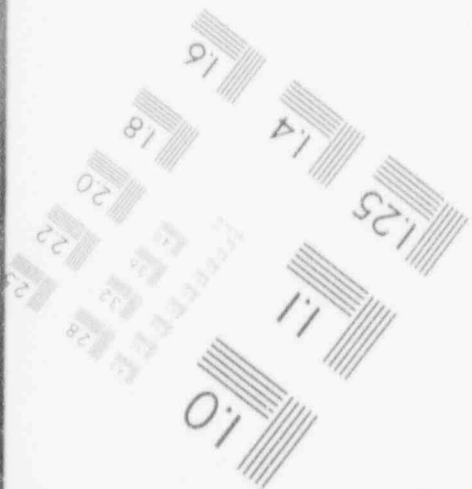
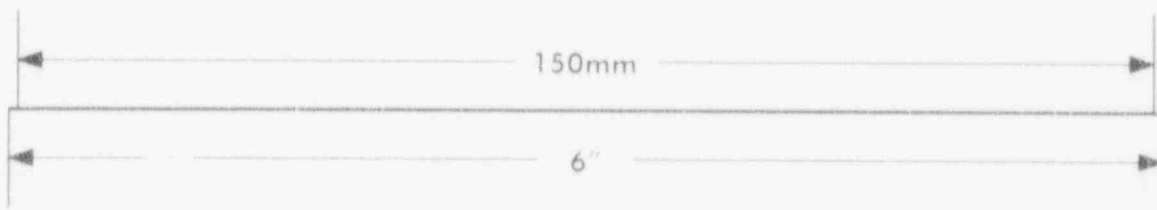
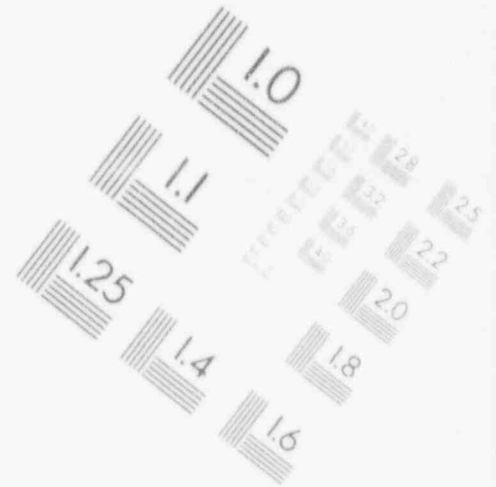
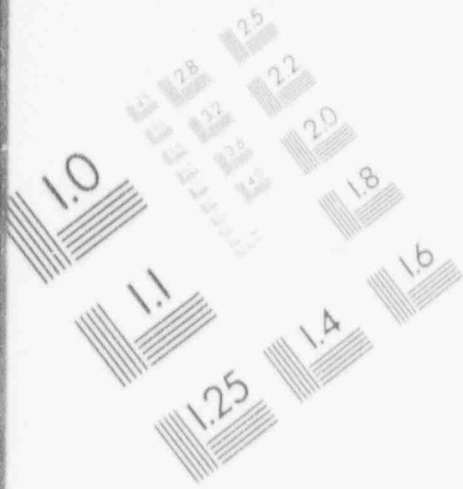


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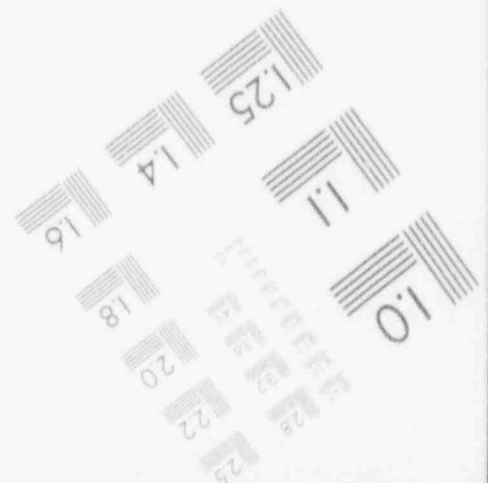
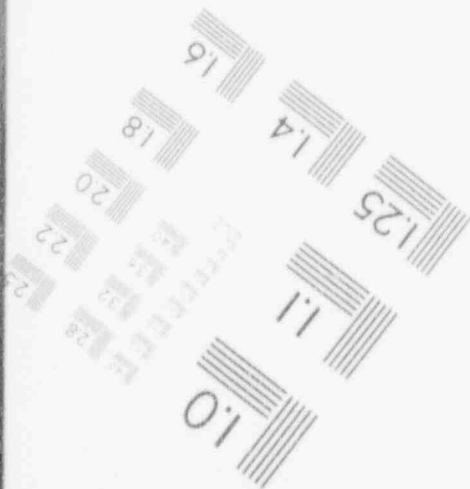
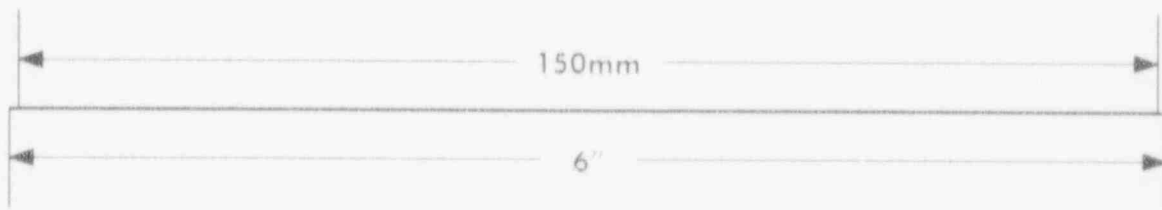
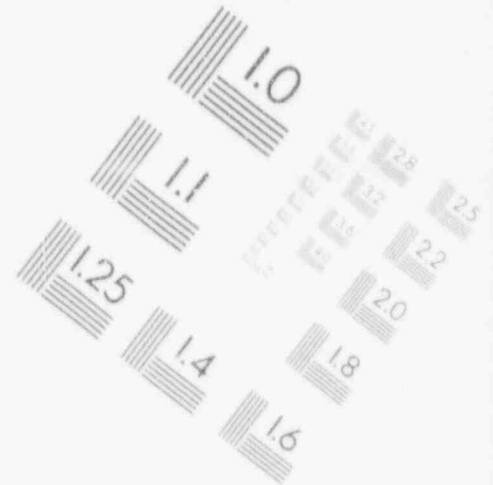
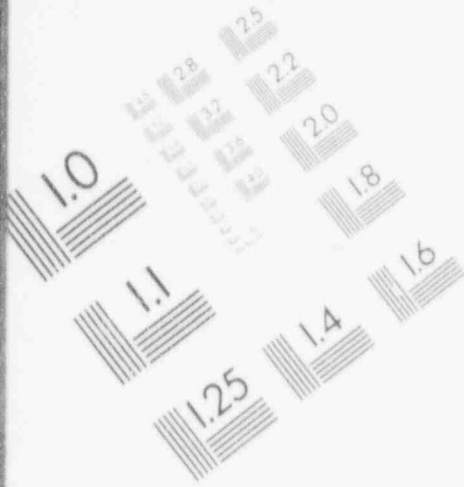
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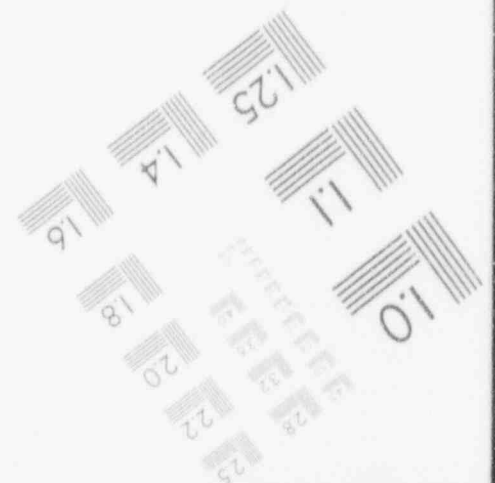
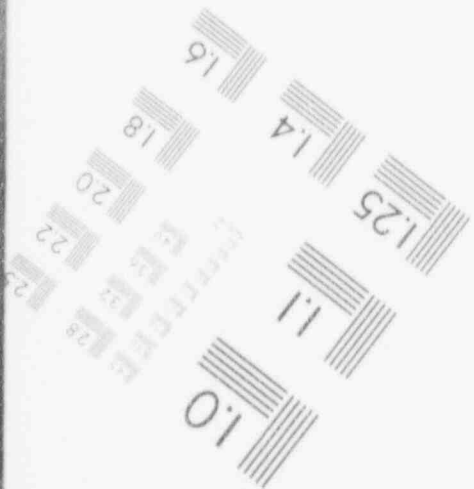
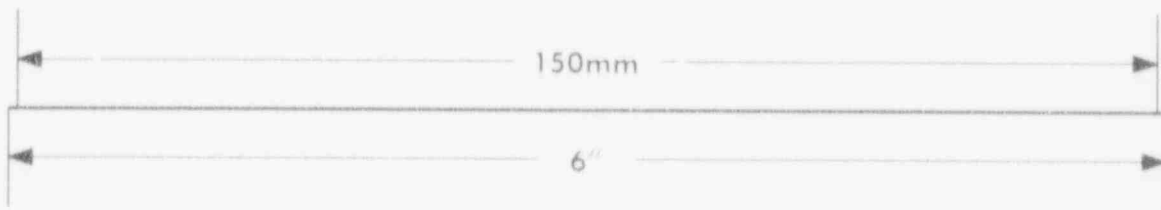
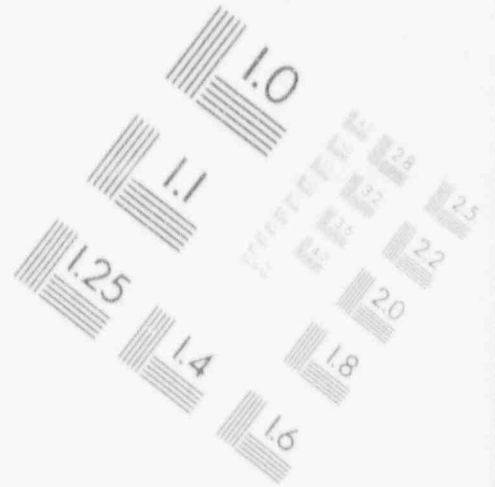
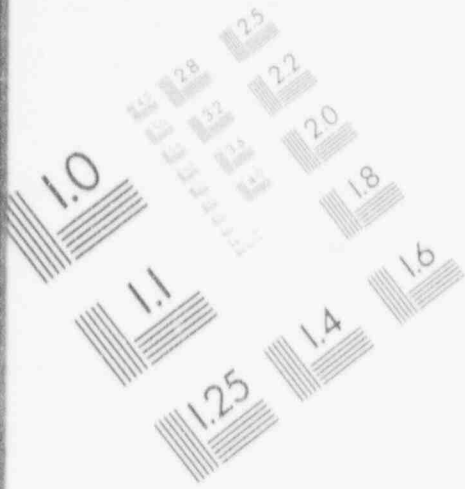
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FIXED EAB IN RULE. POPULATION DENSITY IN GUIDE
(OPTION 3)

SUMMARY: SPECIFY A FIXED EAB IN THE RULE. POPULATION DENSITY VALUES TO BE IN A REGULATORY GUIDE.

PROS:

PROVIDES BETTER BASIS FOR EXCLUSION AREA SIZE BASED ON UPDATED SOURCE TERM. REDUCED LITIGATION AND INTERNATIONAL CONCERNS.

CONS:

ELIMINATES FLEXIBILITY FOR DIFFERENT REACTOR DESIGNS. FIXED EAB WOULD NOT ELIMINATE INTERNATIONAL CONCERNS.

STATE SITE CRITERIA IN PART 100. DOSE CRITERIA TO PART 50
(OPTION 4)

SUMMARY: STATE BASIC SITE CRITERIA IN PART 100. RELOCATE DOSE CRITERIA TO PART 50 FOR PLANT DESIGN PURPOSES, USING UPDATED SOURCE TERM.

PROS:

RETAINS DOSE CALCULATIONS, BUT USES THESE FOR PLANT DESIGN. HAS FLEXIBILITY TO ACCOMMODATE DIFFERENT DESIGNS. WOULD UTILIZE UPDATED SOURCE TERMS. WOULD STRENGTHEN THE ROLE OF SITING.

CONS:

WOULD CONTINUE LIKELIHOOD OF ADMINISTRATIVE HEARING LITIGATION.

PROPOSED BASIC REACTOR SITE CRITERIA

- o SITE ATMOSPHERIC DISPERSION CHARACTERISTICS MUST BE EVALUATED AND PLANT INTERFACE CRITERIA ESTABLISHED SUCH THAT:
 - RADIOLOGICAL DOSES FOR NORMAL OPERATION WILL BE MET, AND
 - RADIOLOGICAL CONSEQUENCES OF POSTULATED ACCIDENTS TO A HYPOTHETICAL INDIVIDUAL AT THE EAB WILL BE ACCEPTABLE.
- o PHYSICAL CHARACTERISTICS OF THE SITE MUST BE EVALUATED AND PLANT INTERFACE CRITERIA ESTABLISHED SUCH THAT THESE POSE NO UNDUE RISK TO THE PLANT.
- o MAN-RELATED ACTIVITIES IN THE SITE VICINITY MUST BE EVALUATED AND PLANT INTERFACE CRITERIA ESTABLISHED SUCH THAT THESE POSE NO UNDUE RISK TO THE PLANT.
- o SITE CHARACTERISTICS MUST BE SUCH THAT
 - ADEQUATE SECURITY PLANS AND MEASURES CAN BE DEVELOPED, AND
 - ADEQUATE EMERGENCY PLANS CAN BE DEVELOPED.
- o REACTOR SITES MUST BE LOCATED AWAY FROM DENSELY POPULATED CENTERS.

RETAIN PRESENT RULE, WITH UPDATED SOURCE TERM
(OPTION 5)

SUMMARY: RETAIN PRESENT RULE AND DOSE CALCULATIONS FOR SITING,
BUT USE UPDATED SOURCE TERM RATHER THAN TID-14844.

PROS:

FLEXIBILITY TO ACCOMMODATE DIFFERENT DESIGNS. UTILIZES UPDATED
SOURCE TERM.

CONS:

RETAINS PRESENT LEVEL OF PLANT DESIGN AND SITE TRADEOFFS; THEREFORE
NOT A SITING REGULATION.

NON-SEISMIC RECOMMENDATION

- o DO NOT ADOPT PROPOSED RULE ISSUED FOR COMMENT IN OCTOBER 1992.

- o REVISE PART 100 TO INCORPORATE BASIC SITING CRITERIA, INCLUDING THE REQUIREMENT THAT REACTORS BE SITED "AWAY FROM" DENSELY POPULATED CENTERS, BUT WITHOUT NUMERICAL CRITERIA IN THE RULE ITSELF. NUMERICAL VALUES WOULD BE STATED IN REGULATORY GUIDES. RELOCATE SOURCE TERM AND DOSE CALCULATIONS, INCLUDING UPDATED SOURCE TERM INSIGHTS, TO PART 50 TO BE USED FOR PLANT DESIGN PURPOSES. (OPTION 4).

SEISMIC ASPECTS
(BACKGROUND)

RULE AS PUBLISHED FOR PUBLIC COMMENT

A "DUAL" APPROACH GIVING EQUAL WEIGHTS TO BOTH PROBABILISTIC AND DETERMINISTIC ASSESSMENTS.

SEISMIC COMMENTS

- GENERAL - EQUAL WEIGHTING WOULD BE DIFFICULT, IF NOT IMPOSSIBLE.
- SITE-SPECIFIC INVESTIGATIONS ARE VERY IMPORTANT.

DOMESTIC-

- DIVERGENT COMMENTS ON ROLE OF PROBABILISTIC AND DETERMINISTIC ASSESSMENTS
- NUMARC/EPRI RECOMMENDED AN INTEGRATED PROBABILISTIC & DETERMINISTIC APPROACH WITH EMPHASIS ON PROBABILISTIC
- U.S. GEOLOGICAL SURVEY RECOMMENDED THAT THE PROBABILISTIC RESULTS BE CHECKED AGAINST A SIMPLIFIED DETERMINISTIC ANALYSIS

SEISMIC COMMENTS
(CONTINUED)

INTERNATIONAL

- JAPANESE, FRENCH, TAIWANESE AND CANADIAN UTILITIES QUESTIONED MATURITY OF PROBABILISTIC ANALYSIS
- OTHERS (CANADA, ISRAEL, ITALY, KOREA, AND SCOTLAND) PROVIDED MIXED COMMENTS ON PROBABILISTIC ANALYSIS AND DETERMINISTIC DEFINITIONS

SEISMIC RECOMMENDATION

STAFF RECOMMENDS A PROBABILISTIC APPROACH WITH SOME PARAMETERS ESTABLISHED DETERMINISTICALLY. THIS APPROACH IS TO BE DESCRIBED IN REGULATORY GUIDES AND STANDARD REVIEW PLAN SECTIONS; WAS DEVELOPED FOLLOWING DISCUSSIONS WITH U.S. GEOLOGICAL SURVEY.

SEISMIC OPTIONS CONTAINED IN SECY-94-017 CONCERN THE FORMAT OF THE RULE RATHER THAN THE TECHNICAL CONTENT.

RULE FORMATS EXAMINED

- o STAFF EXAMINED TWO POSSIBLE FORMATS FOR THE RULE ITSELF--
 - MAINTAIN SEPARATE APPENDIX B*.
 - ELIMINATE APPENDIX B* INCORPORATE BASIC REQUIREMENTS INTO PART 100.

- o STAFF RECOMMENDS ELIMINATING APPENDIX B AND PROCEEDING WITH COMMENT RESOLUTION AND PREPARATION OF FINAL RULE AND RELATED GUIDES.

* STREAMLINE REQUIREMENT LANGUAGE IN PART 100 OR APPENDIX B

STAFF RECOMMENDATIONS

- o DO NOT ADOPT NON-SEISMIC PROVISIONS OF PROPOSED RULE ISSUED FOR COMMENT IN OCTOBER 1992.

- o REVISE PART 100 TO INCORPORATE BASIC SITING CRITERIA, (OPTION 4) INCLUDING REQUIREMENT THAT REACTORS BE SITED "AWAY FROM" DENSELY POPULATED CENTERS. HOWEVER, NUMERICAL CRITERIA WOULD BE IN REGULATORY GUIDES. RELOCATE UPDATED SOURCE TERM AND DOSE CALCULATIONS TO PART 50 FOR PLANT DESIGN.

- o WITHDRAW PROPOSED APPENDIX B TO PART 100; STREAMLINE CONTENT OF SEISMIC PORTION OF PART 100 (INCORPORATE GUIDANCE INTO REGULATORY GUIDES), AND PROCEED WITH COMMENT RESOLUTION AND PREPARATION OF FINAL RULE.