

NUCLEAR REGULATORY COMMISSION

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In the Matter of: PUBLIC MEETING

BRIEFING ON SECY-81-267 - 10 CFR 60  
DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTES  
IN GEOLOGIC REPOSITORIES: TECHNICAL CRITERIA

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

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PUBLIC MEETING  
BRIEFING ON SECY-81-267 - 10 CFR 60  
DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTES  
IN GEOLOGIC REPOSITORIES:  
TECHNICAL CRITERIA

- - -

Nuclear Regulatory Commission  
1717 H Street, N.W.  
Room 1130  
Washington, D.C.

Wednesday, May 20, 1981

The meeting of the Nuclear Regulatory Commission  
was convened, pursuant to notice, at 10:05 a.m.

NRC COMMISSIONERS PRESENT:

- JOSEPH M. HENDRIE, Chairman
- VICTOR GILINSKY, Commissioner
- PETER A. BRADFORD, Commissioner
- JOHN F. AHEARNE, Commissioner

## 1 NRC STAFF PRESENT:

2 SAMUEL J. CHILK, SECRETARY  
LEONARD BICKWIT, GENERAL COUNSEL  
3 SHELDON TRUBATCH  
PATRICIA A. COMELLA  
4 JAMES R. WOLF  
JOHN G. DAVIS  
5 JACK MARTIN  
MICHAEL J. BELL  
6 FRANK A. COSTANZI  
WILLIAM DIRCKS  
7 DENNIS RATHBUN  
HOWARD SHAPAR  
8 MARTIN MALSCH

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DISCLAIMER

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

2                    CHAIRMAN HENDRIE: If we could come to order,  
3 please, the Commission continues a series of meetings here  
4 discussing a proposed rule on the technical criteria for  
5 disposal of high-level wastes in geologic depositories.

6                    The last time we met there were a number of  
7 questions and some useful discussion. We are today in  
8 effect continuing that, as soon as I can find the  
9 appropriate papers.

10                   (Pause.)

11                   CHAIRMAN HENDRIE: Since my paper has flipped up  
12 into it, since we were curious last time, did Figure 6 turn  
13 out to have a reverse labeling?

14                   MR. MARTIN: Yes, it did.

15                   CHAIRMAN HENDRIE: Well, that happily restores the  
16 configuration to one in which one's expectations of nature  
17 are reasonably met.

18                   COMMISSIONER AHEARNE: At least it's  
19 understandable.

20                   CHAIRMAN HENDRIE: Now, John, you had a number of  
21 questions last time.

22                   COMMISSIONER AHEARNE: They've been pretty well  
23 answered, or I got them all asked.

24                   CHAIRMAN HENDRIE: You got them asked for the  
25 first round.

1           One of the reasons I scheduled this meeting was so  
2 that I could ask some questions, some more questions. But  
3 before I launch, Dick, do you or Peter have anything?

4           COMMISSIONER GILINSKY: No.

5           CHAIRMAN HENDRIE: Then let me go ahead.

6           COMMISSIONER AHEARNE: I will have a few after  
7 yours.

8           CHAIRMAN HENDRIE: Well, I expect as one or  
9 another of us asks questions they will generate some  
10 interest from others.

11           There is a footnote on page 20. Let's see, a  
12 high-level waste facility means --

13           COMMISSIONER AHEARNE: The earlier or the later  
14 version of it?

15           CHAIRMAN HENDRIE: Let's see. That's a good  
16 question. Are they different?

17           MR. MARTIN: I think not. We talked about this a  
18 little last time.

19           CHAIRMAN HENDRIE: The citation is not different,  
20 I think. There's a difference in that -- is that right?  
21 Well, maybe not. Anyway, let's see. I put marks on it.  
22 These are DOE facilities used for the receipt and storage  
23 from activities licensed from the Act, and then there is a  
24 clause that includes retrievable surface storage facilities  
25 and others authorized for long-term -- in case they ever go

1 that way. Okay?

2 MR. MARTIN: Yes, I think these words are listed  
3 directly out of the Act.

4 CHAIRMAN HENDRIE: So let me put a slash after the  
5 parens in the third line. We say, "High-level waste  
6 facility means a facility subject to licensing and related  
7 authority." Okay, and then the asterisk says, "These DOE  
8 facilities used primarily for receipt and storage of  
9 high-level radioactive waste resulting from activities  
10 licensed under such Act."

11 Wouldn't that pull in an AFR?

12 COMMISSIONER AHEARNE: This is one of the  
13 questions I asked last time, and they were promising, at  
14 least the legal representatives who were sitting at the  
15 table last time, not being here this time.

16 CHAIRMAN HENDRIE: They said they would mull on it.

17 COMMISSIONER AHEARNE: They said they would try  
18 and make sure it tracked through there.

19 CHAIRMAN HENDRIE: My note didn't reveal that I  
20 was satisfied with the answer.

21 COMMISSIONER AHEARNE: There was no answer.

22 CHAIRMAN HENDRIE: Aha, that's why I wasn't  
23 satisfied with the answer.

24 MR. MARTIN: I think I'll defer to legal counsel  
25 on this one.

1 MR. SHAPAR: Am I going to answer?

2 MR. WOLF: That's --

3 CHAIRMAN HENDRIE: You may answer, Howard.

4 Whether you can answer is something we will find out, which  
5 means in the near future.

6 MR. WOLF: The question was asked last time, and  
7 the answer offered at the time in dialogue was that if you  
8 tracked all the definitions you could indeed determine that  
9 unless a facility included at least the geological  
10 repository as a part of the facility, there would be no  
11 licensing jurisdiction under Part 60.

12 COMMISSIONER AHEARNE: Yes, and that was the  
13 statement of belief, and at least I left the meeting with  
14 the understanding that someone was going to actually try to  
15 track through and ensure that that's correct.

16 MR. WOLF: That is correct. I haven't done so,  
17 but I would be happy to do so separately for the record, if  
18 you would like.

19 COMMISSIONER AHEARNE: Okay. So I guess the way  
20 to say it is if one does that careful analysis of tracking,  
21 then you find out that that is what that refers. But the  
22 reader of the footnote just reading through is not likely to  
23 be able to understand.

24 MR. WOLF: Not from that footnote alone, and the  
25 question of the AFR, if co-located, is not completely



1 resolved by that issue.

2 CHAIRMAN HENDRIE: I would think not, because it  
3 seems to me that the way the proposition reads here you've  
4 got the paragraph at the top of page 20, and the footnote at  
5 the bottom, and it seems to me that they form in fact a  
6 closed definition set that you can't get out of.

7 It says HLW facility means a facility subject to  
8 -- and then the footnote says these facilities are at, and  
9 you create a problem with respect to co-located AFRs and  
10 even co-located waste tanks, as a matter of fact

11 MR. WOLF: That's right. If they are co-located,  
12 then they would be included in Part 60, except to the extent  
13 that an exemption were granted. It would provide a  
14 mechanism to determine whether or not the relationship to  
15 the geologic repository activities are such that there  
16 should be --

17 CHAIRMAN HENDRIE: Ah, you would tend to include  
18 them?

19 MR. WOLF: That's the way it's presently written.  
20 As long as there is a geologic repository that we are  
21 licensing, everything at that repository site, by the terms  
22 of the scope and everything else --

23 CHAIRMAN HENDRIE: Part 60?

24 MR. WOLF: Is included. To the extent it doesn't  
25 make any sense, then the facility -- the co-located AFR

1 would have to be exempted on a case-by-case basis. That is  
2 the way it is -- it is currently literally set up.

3 COMMISSIONER AHEARNE: Was that the intent?

4 MR. MARTIN: This is the point that we thrashed  
5 through for an hour or so over the procedural rules just  
6 this issue. My recollection is that it was left, if they  
7 were co-located, to the extent that they are intricately  
8 bound together, they are covered. If not, then they would  
9 not be covered. Then we would have to just leave it to the  
10 case that presents itself at the time, and exercise a reason  
11 if there are.

12 CHAIRMAN HENDRIE: But you've got some rules for  
13 AFRs, right?

14 MR. DIRCKS: Yes, Part 72, isn't it?

15 MR. RATHBUN: Yes, Part 72.

16 MR. MARTIN: Yes.

17 CHAIRMAN HENDRIE: Would the intent be to license  
18 under Part 72 for the AFR if there were one co-located? Or  
19 would it be licensed under Part 60? Would there be two  
20 licenses on the site, or would there be one?

21 MR. WOLF: Presumably there would be a Part 72  
22 license. The point is that before any kind of a waste could  
23 be received at a geologic repository site, Part 60 would  
24 apply. In other words, if they are thinking about using the  
25 site for a geologic repository, they wouldn't be able to

1 bring any high-level waste there for whatever purpose  
2 without at least having made a submission to NRC so that it  
3 would give us a possibility to see that the activities they  
4 are proposing to do aren't going to interfere for the use of  
5 the site for geologic repository purposes.

6           Having been satisfied that the proposed activities  
7 aren't going to louse up the site for purposes of a geologic  
8 repository, then if we propose to go ahead and have these  
9 facilities, AFR for example, licensed under Part 72, if an  
10 appropriate technical determination is made that it is truly  
11 independent and it's not going to interfere with the use of  
12 the site under Part 60, then there would be an exemption  
13 given from the requirement that you have to go through all  
14 the Part 60 procedures before you bring any material on-site.

15           CHAIRMAN HENDRIE: Good. Where in the  
16 supplementary considerations or the rule itself does it say  
17 just that?

18           MR. WOLF: In the discussion of comments on the  
19 procedural rule, the question arose as to whether or not the  
20 language, as written, would cover AFRs at the site of a  
21 geologic repository. I believe, in response to that  
22 specific question, this concept was presented, although in a  
23 very shorthand sort of a way.

24           I think that's the only place where it is  
25 addressed.

1 COMMISSIONER BRADFORD: In the procedural rule?

2 MR. WOLF: That's my recollection, that there was  
3 some correspondence on this point at that time. I would be  
4 happy to pursue this and try to recapture some of these  
5 things.

6 CHAIRMAN HENDRIE: Well, yes. This isn't  
7 particularly a sticking point with me, but I have the  
8 following observation.

9 It makes me uneasy to put out rules which appear  
10 to have certain logical, either inconsistencies in them or  
11 overlaps in licensing authority or other pedimentia of that  
12 kind, with simply the understanding in the sponsoring staff  
13 and the approving commission that oh, well, when a case  
14 arises why we will grant exemptions and fix that all up.  
15 Because, first of all, it doesn't seem to me that it can  
16 possibly be very clear to an observing, interested audience  
17 what the intent of the agency is. And on the other, suppose  
18 all of us reasonable people aren't here at some future time  
19 and some bunch of mud-headed clods who are determined to  
20 make mischief use the regulation as written, with all of the  
21 clumsies that were built into it?

22 Now I am sure that won't happen. I'm sure that at  
23 least some of us reasonable people will still be around to  
24 preserve sanity and save the day. But, after all, as  
25 regulators prudence is indicated and I would very much like

1 to see in the tracks which this proposition leaves as it  
2 goes through the forest a fairly clear indication of what we  
3 had in mind and how we would handle cases like that.

4 Now I don't know whether it's worth discussing it  
5 in the supplementary discussions or whether -- I suspect  
6 that you are going to get a comment on it when we put this  
7 out for comment. And that would give you an opportunity in  
8 the reply to that comment to expand upon the comments made  
9 in connection with the procedural rule.

10 Or, if you didn't get a comment directly, why it's  
11 no great shakes to take the closest one and expand the  
12 answer to it to cover the point.

13 MR. SHAPAR: It might be best to include a  
14 paragraph in the statement of considerations and the  
15 proposed rule to flag it and state what our theory is.

16 CHAIRMAN HENDRIE: Well, whatever. It just --

17 MR. MARTIN: If it's not covered already. We have  
18 discussed this at great length the last time.

19 MS. COMELLA: I don't believe it's in the  
20 supplementary information to the final procedures. I just  
21 don't think we put it in there.

22 CHAIRMAN HENDRIE: No, no. I just think it's just  
23 in the agency's response to comments, which is in the staff  
24 paper.

25 MR. WOLF: That's right.

1 CHAIRMAN HENDRIE: It's at least there in the  
2 files.

3 MS. COMELLA: This footnote is probably the  
4 easiest way to deal with it, to elaborate on that footnote.

5 MR. WOLF: We can work on that.

6 CHAIRMAN HENDRIE: I leave that to the ... .

7 COMMISSIONER AHEARNE: Vic, I hope you are  
8 listening carefully, because I think you are the only one of  
9 when you said "us" who are likely to be left here when this  
10 thing comes back, when they have applied for their  
11 application.

12 (Laughter.)

13 COMMISSIONER GILINSKY: I ceased listening when  
14 you said "mudhead."

15 (Laughter.)

16 CHAIRMAN HENDRIE: You concluded he was talking to  
17 someone else, so why listen?

18 COMMISSIONER AHEARNE: He then went on to say, "we  
19 reasonable."

20 COMMISSIONER BRADFORD: What Vic is doing is  
21 improving the document retrieval system to a point where he  
22 will be able to find the comments and responses on the  
23 procedural rule.

24 CHAIRMAN HENDRIE: A question which grows out of  
25 things that the safety analysis report is to include. Page

1 25, actually, but starting a page earlier, this is in 6021,  
2 the content of application. There is a requirement here for  
3 estimates of the likely maximum individual doses which could  
4 result.

5 Now I keep thumbing because it's where my notes  
6 are on the old one --

7 MR. MARTIN: It's page 25, item C.

8 CHAIRMAN HENDRIE: Yes. Also page 25, it's a new  
9 one. Yes, paragraph C there.

10 Now doses are nowhere else. Dose calculations  
11 aren't required anywhere else in the rule. And when DOE  
12 calculates the doses and puts them in the SAR and you look  
13 at them, as far as I know, nothing happens to them. You  
14 don't do anything. That is, if the calculated likely  
15 maximum individual dose is 17.5 R, you say aha, it's 17.5 R.

16 On the other hand, if you say it's 107, you aha,  
17 it's 107. If it's 3 millirem, you say aha, it's 3 millirem.

18 I think that's right. Is it?

19 MR. MARTIN: Well, I think --

20 CHAIRMAN HENDRIE: There's no regulatory criteria  
21 attached to the likely maximum individual dose?

22 MR. MARTIN: This is correct. The governing EPA  
23 standard does not deal with individual doses.

24 CHAIRMAN HENDRIE: Right.

25 MR. MARTIN: The only real reason that we ask that

1 that be in there is that in comparing, at this point, that  
2 they submit their application, undoubtedly there will be  
3 several tradeoffs that they will have looked at. It would  
4 be nice to know how the different approaches they are  
5 looking at compare with regard to an individual dose.

6 And that's just another way to look at the  
7 problem. There was a lot of discussion internally among the  
8 staff as to whether we ought to do this or not, and the  
9 final resolution was that yes, we really ought to see at  
10 some point what the maximum individual doses would like be  
11 out of this system.

12 MS. COMELLA: One of the things that this does it  
13 assist in the assessment of the overall performance of the  
14 repository. How well is the repository working? Because  
15 one of the jobs of the repository in isolating the waste is  
16 really a release -- a very slow release -- over very long  
17 periods of time, and so by calculating this one gets a  
18 picture of how well the repository is working.

19 I think this is a way of --

20 CHAIRMAN HENDRIE: Wait. When you say "is  
21 working", you mean "is projected to work"?

22 MS. COMELLA: Is projected to work, yes.

23 CHAIRMAN HENDRIE: But as far as I know, the dose  
24 number can come out -- it just doesn't matter what it comes  
25 out in terms of the regulatory basis.



1 MR. MARTIN: This is true.

2 MS. COMELLA: That is correct.

3 MR. MARTIN: This is true.

4 CHAIRMAN HENDRIE: Now, presumably, if the  
5 facility meets the three -- the limiting criteria for the  
6 subsections, a thousand-year container, a Part in 100,000  
7 leak rate, and the thousand-year travel time, water travel  
8 time, and also meets the EPA's standard of not more than so  
9 many carries of a certain isotope over the first 10,000  
10 years, then it's hard to see how DOE could calculate out of  
11 a specific repository design and set of geology, doses which  
12 were any larger than EPA calculated for its generic one. Is  
13 that right, or wrong?

14 MR. MARTIN: I think that's right. The biggest  
15 doses, if everything is working the way it should, that we  
16 could find are in the order of, oh, a few millirem less than  
17 ten.

18 Now the thing, of course, that they would be  
19 looking at here is --

20 CHAIRMAN HENDRIE: But they might be less, if they  
21 found themselves with a really great site.

22 MR. MARTIN: Absolutely.

23 CHAIRMAN HENDRIE: About absorption in the media,  
24 why they might be able to show it, say, gee we not only meet  
25 the EPA standards but we're much better than that. We

1 project --

2           Now it might be nice to have that estimated  
3 individual dose number. I guess one might even speculate  
4 that if you went ahead without it in what you require by way  
5 of information, that you were going to end up asking that it  
6 be calculated anyway, because some Board member would be  
7 bound to say, by the way, what dose does this all turn out  
8 to be for the maximally exposed person?

9           So I can see some rationale for it. But it's also  
10 ---

11           MS. COMELLA: It was placed in there basically to  
12 assist in the understanding of the projected performance of  
13 the repository. I think that's a very important part of  
14 this regulation that we have before you right now, is the  
15 fact that, granted DOE will have to do a calculation in  
16 order to assess -- in order to evaluate whether it meets the  
17 EPA standard.

18           Part of the licensing decision is going to be an  
19 assessment of that evaluation, and all of the uncertainties  
20 attendant upon the performance of the geologic repository.  
21 And I do believe that this tends to assist in an  
22 understanding of how well a particular repository can be  
23 expected to perform.

24           COMMISSIONER AHEARNE: How would we --

25           CHAIRMAN HENDRIE: I guess I -- let me -- I guess

1 I don't follow that, because in order to meet the regulatory  
2 criteria you have to show the retention limits, the three  
3 retention limits, plus the overall EPA retention limit,  
4 right? So you are going to show those things. You have to  
5 demonstrate those things so that findings can be made by a  
6 Board eventually that those criteria are met.

7 Now, having made that showing, then the only other  
8 thing you do for the doses is say -- and having those leak  
9 rates out of the facility, I assume the following about a  
10 pathway, and then I get a dose. And I don't think there is  
11 anything you are going to show in your assumptions about the  
12 pathway and the conversion from -- and then the rest of the  
13 dose calculation that particularly illuminates how you met  
14 the regulatory criteria on a 1,000-year container, the EPA  
15 standard, et cetera.

16 I just seems to me that it is a downstream part of  
17 a series calculation and it's not going to, you know, do  
18 that much for you.

19 MR. MARTIN: I think that's correct. But, as you  
20 pointed out --

21 CHAIRMAN HENDRIE: Proving things you have to  
22 prove in order to meet the regulations.

23 MR. MARTIN: That's right. But on the other hand,  
24 I can't imagine getting into the licensing proceeding where  
25 we don't know what the doses to individuals might be. It's

1 going to come up and we are going to expand the analysis to  
2 include that so we have some visibility as to what is  
3 happening.

4 COMMISSIONER AHEARNE: How would you expect to  
5 calculate this likely maximum individual dose?

6 MR. MARTIN: Well, I think this gets to a -- there  
7 are plenty of codes for doing that. We have some; DOE has  
8 some.

9 COMMISSIONER AHEARNE: I guess more specifically  
10 what I am asking, oft times in the reactor case you put in a  
11 theoretical individual at the site boundary and have him  
12 stand there for forty years.

13 MR. MARTIN: I think it would be that same kind of  
14 a calculation, given the site and the population patterns  
15 and the way you think they are going to be for a while, what  
16 is the most realistic? Where are people living? Where are  
17 they drawing their water?

18 CHAIRMAN HENDRIE: Steady now. You have just run  
19 back and forth across a barbed wire fence. If you use the  
20 words "likely maximum", okay, do you mean "likely maximum"?

21 MS. COMELLA: That's exactly what is meant.

22 CHAIRMAN HENDRIE: Or do you mean we will take a  
23 realistic look? And what is a "likely maximum" anyway?

24 MS. COMELLA: We --

25 COMMISSIONER AHEARNE: If you remember, an

1 individual's lifetime is at least the same order of  
2 magnitude of a reactor's lifetime, but it isn't for the  
3 repository.

4 CHAIRMAN HENDRIE: True, but --

5 COMMISSIONER AHEARNE: Well, I'm not sure if they  
6 are going to hypothesize Methuselah.

7 CHAIRMAN HENDRIE: Well, no, I guess this will be  
8 the root mean standard, 76-year-old human being. And you're  
9 right. I can see where one would have to look and see when  
10 in the history of the repository a 76-year receiving period  
11 would accumulate the maximum dose, right? Because clearly  
12 on day zero nothing has come out and on day 1 million, why  
13 what comes out never mind, and somewhere in-between there is  
14 a maximum. And I guess you could do all of that.

15 Suppose the likely maximum dose occurs at about  
16 the 2400th year of the repository?

17 MR. MARTIN: That's probably about when it would  
18 occur.

19 CHAIRMAN HENDRIE: That's why I selected it.

20 (Laughter.)

21 MR. MARTIN: Well, I think the way you do that  
22 calculation is to assume that somebody living there would  
23 use the water from the contaminated aquifer and what dose  
24 would he get over a fifty-year dose commitment. You know,  
25 we've done that hypothetically. It comes out a few hundred

1 millirem over his lifetime.

2           CHAIRMAN HENDRIE: I suspect that is the way it's  
3 going to have to come out.

4           MR. MARTIN: And as time goes on that gets better.

5           CHAIRMAN HENDRIE: I guess by "maximum" you are  
6 going to have to mean he lives relatively close to the  
7 boundary and that he gets his principal water intake from  
8 that aquifer. I guess the "likely" part means that he  
9 doesn't spend at least forty hours a week down in a mine  
10 shaft drilled into the repository. Okay?

11           It used to be in releases during normal operation  
12 from reactors, there was a time of great interest in that,  
13 in the regulatory process, Appendix I time, and we used to  
14 have the "fencepost cow." There was an infant which went  
15 with the fencepost cow. The cow was tethered to the site  
16 boundary, post at the site boundary, hence "fencepost cow,"  
17 and the infant was cradled beside the cow. The cow ate the  
18 grass at the fencepost, and the infant drank the milk, and  
19 that's how we calculated how much iodine was allowed to come  
20 out.

21           And I guess what you are going to have here is the  
22 fencepost resident, and I wish you well with it. At one  
23 time I formed the Society of the Fencepost Cow, and it was a  
24 select group. You may remember it, Mike. You were active  
25 in this. We had a rather good time. I wish you well with

1 your enterprises. On with it.

2           On to Subpart (e). Now we've got performance of  
3 geologic repository after permanent closure. And what I am  
4 wondering about the overall system performance and then the  
5 engineering system performance, the subgroups, we don't  
6 anywhere in here include the kinds of words that have been  
7 useful in other regulatory aspects of our work -- like there  
8 is reasonable assurance the waste packages will contain all  
9 radionuclides for the first 1,000 years.

10           I hear some complaint from the DOE side and  
11 contractors who have worked on it and looked at the draft  
12 regulations that phrases like on page 33 in the old one,  
13 performance of engineered system, sub (i), containment of  
14 wastes, "The waste packages will contain all radionuclides  
15 for 1,000 years after permanent closure." Okay?

16           And the concern is that that may be intrinsically  
17 unestablishable; that the best we can hope for in this  
18 imperfect world is that there can be a reasonable showing of  
19 laboratory data and of general metallurgical and geochemical  
20 reaction theory and analysis to tell us that for the  
21 particular package design that they propose that we have a  
22 good, sound basis for believing in fact that they will hold  
23 up for at least 1,000 years.

24           Now is that identical to proving that packages  
25 will contain all radionuclides for 1,000 years? And the

1 answer is no, it's not. Okay? And I wonder then why in  
2 these sections, since the same is sort of true for each one  
3 of them, why you have avoided such language as, you know,  
4 the engineered system shall be designed so that there is  
5 reasonable assurance that the packages will contain all  
6 radionuclides for 1,000 years and so on?

7 MR. MARTIN: Well, first of all, let me say I  
8 think it's the staff's intent to do just exactly what you  
9 described, and we have massaged these words around  
10 considerably to get some language that we think does that.  
11 Some of the wording that has been complained about  
12 we think has been fixed, and DOE agreed have been fixed, by  
13 the current version that you have where we used the words  
14 "designed" rather than "shall be capable of". There is a  
15 difference there. I think "designed" means, or has implicit  
16 in it, some of the connotation that you were discussing.  
17 And also notice that we have "assuming anticipated processes  
18 and events" to further get this into a more reasonable grove.  
19 And at some point in the past we had the words  
20 "reasonable assurance" in there, which I personally liked,  
21 but were taken out, judged being not really necessary. But  
22 I would have no objection personally to putting them back  
23 in. But I think the intent is to do just exactly what you  
24 described. We think that this does that.

25 COMMISSIONER AHEARNE: Howard?



1           MR. SHAPAR: I think it's our viewpoint you could  
2 make the argument, if you use the word "designed",  
3 "designed" has no guarantee that it will perform that way.

4           CHAIRMAN HENDRIE: If it's got to be designed to  
5 contain all radionuclides, people are going to argue with  
6 you that you have not met that standard unless you can show  
7 that materials and the way in which you have done the  
8 design, that a case can be made that nothing comes out,  
9 maybe.

10           Now you can also argue that by saying "design" you  
11 can say, no, design means the best we can here and have high  
12 assurance but not absolute assurance.

13           MR. SHAPAR: You could go through our mass of  
14 regulations and find it done both ways.

15           CHAIRMAN HENDRIE: I think that's probably right.  
16 My feeling here was, if we mean "reasonable assurance", then  
17 we ought to say it, because I think these are going to be  
18 hard enough propositions to make the case on in any event on  
19 the one hand, and on the other, I think it is just clearer  
20 to people who are more nearly the informed lay public what  
21 precisely your standard is if you say "reasonable assurance".

22           MR. MARTIN: I thought that back in the procedural  
23 rule the basis for finding a favorable finding was  
24 "reasonable assurance" that those requirements of subpart  
25 (e) are met.

1 MS. COMELLA: Yes, that was just the point I was  
2 trying to recollect. I think you are right. It's in the  
3 decision standard itself in the procedural rule.

4 MR. MARTIN: Do we need to repeat it again here?

5 CHAIRMAN HENDRIE: I don't know whether we do or  
6 not. Is it clear?

7 MR. SHAPAR: I think it is. We can put a generic  
8 thing in this one to make it understandable rather than  
9 repeating it in each section.

10 CHAIRMAN HENDRIE: That is a possible approach. I  
11 would appreciate a recommendation on that that looks both at  
12 the procedural rule and what it says and what the  
13 practicalities are. What I am afraid of is that if you  
14 leave it to the procedural rule you have the interesting  
15 configuration that you have a technical criteria regulation  
16 which we say, now here are the technical criteria, and if a  
17 repository meets these, why, then, the implicit assumption  
18 is that it is acceptable to us.

19 The technical criteria say "will contain all" and  
20 everybody says, by God, those are good criteria. But over  
21 here we've got a procedural rule that says well, actually,  
22 when we make the decision we don't want the technical  
23 criteria to be met as written. All we want is reasonable  
24 assurance that they will be met. And it seems to me that  
25 that may sort of hold up in a logical way, and through the

1 Commission's administrative procedures as a basis, but it  
2 just seems to me that it would be clear to everybody if the  
3 technical criteria themselves said now, look, here are  
4 technical criteria. We want to have reasonable assurance  
5 that the container design is such that nothing will get out  
6 for 1,000 years.

7           And then right at the immediate level where nobody  
8 can, you know, if they quote the section sub(i) here, the  
9 containment of wastes, you've just got to fill it in. You  
10 don't have to know that somewhere either in the preamble to  
11 this rule or over in the procedural rule it says well, well,  
12 now wait a minute. You know, our decision basis is just  
13 reasonable assurance that those great criteria are met.

14           So I don't know. I wish you would think some on  
15 that.

16           MR. MARTIN: Yes, we'll take a look at it.

17           CHAIRMAN HENDRIE: I don't know whether the  
18 Commissioners have a point of view on it.

19           COMMISSIONER AHEARNE: I don't see how practically  
20 one is going to ever do anything more than have some  
21 standard met, that with a degree of confidence. But you  
22 certainly aren't going to prove a 1,000-year behavior.

23           COMMISSIONER GILINSKY: But the sense of it is  
24 that you want to have high confidence that the material is  
25 going to stay there for 1,000 years.

1           CHAIRMAN HENDRIE: Yes.

2           COMMISSIONER GILINSKY: Now when you come to  
3 evaluating it, you are going to have to apply some  
4 reasonable standards, because you can't do anything but  
5 calculate and make some judgment.

6           COMMISSIONER BRADFORD: Well, I think that's  
7 right. And it may be possible to say it -- that one wants  
8 the sum total to be high assurance and that that is going to  
9 be the product of a number of reasonable assurance judgments  
10 that have to be made at the individual steps.

11           I agree with your point, Joe, that whatever the  
12 standard is it is well to say it in both rules so that if  
13 one reads one and not the other they won't feel we are not  
14 putting anything over on them.

15           CHAIRMAN HENDRIE: I just have a feeling that at  
16 some later time when some future set of Commissioners and  
17 staff officers are trying to explain to the Congress or a  
18 hearing board what was meant here, it's all going to sound  
19 rather patched together, and it would be better if it was  
20 fairly straightforward here.

21           MR. DIRCKS: I think something got lost in the  
22 shuffle here. As I recall, when we got into this last year,  
23 that "reasonable assurance" was in there, and, Jack, I  
24 remember us talking about this. So I think we started off  
25 with that intent. Somehow or other the words got lost.

1           CHAIRMAN HENDRIE: I think there was this business  
2 about saying it once in the procedural rule and then there  
3 were words like "designed" and "assuming anticipated  
4 processes and events", which helped the ability to make the  
5 case.

6           In having "assurance," -- and please stick to  
7 "reasonable assurance." The last time you used "high  
8 assurance." Do you remember what happened?

9           COMMISSIONER GILINSKY: It was, what, "physical  
10 security," or something like that?

11          CHAIRMAN HENDRIE: Yes.

12          MR. DIRCKS: We wound up with three degrees of  
13 "high assurance."

14          (Laughter.)

15          CHAIRMAN HENDRIE: We wound up patting everybody  
16 down, remember, and promptly had to retreat before a storm  
17 of protest, so be careful about "high assurance", please.

18          In this organization a "reasonable assurance" is  
19 an extraordinarily difficult standard to meet. I was going  
20 to say there are two aspects to the proveability of these  
21 things. On the one hand you want a design which can be  
22 analyzed or judged, because it isn't going to be so  
23 complicated you are going to do great structural analyses,  
24 but just be judged to be a fairly conservative design and  
25 that the supporting information on materials, properties,

1 and interactions and so on indicate that it is probably  
2 going to hold up in great shape for a long, long time. You  
3 certainly want that.

4           Another part of it is, good, I've got this design  
5 and the supporting information, and every indication is that  
6 it will really do the job. Okay? Now I have to manufacture  
7 a number of these -- some thousands, probably -- and how do  
8 I prove that my manufacturing processes and so on, that the  
9 quality assurance will be so good that there will be -- that  
10 all the containers will be absolutely as good as the design  
11 suggests?

12           Well, you know, in the real world you get a  
13 distribution of quality in the produced product and you hope  
14 that your inspection standards are tight enough to cut off  
15 the tail on the low side -- the unacceptable side -- but  
16 there is still going to be a distribution of quality in the  
17 packages and that also introduces a variability, which makes  
18 it exceedingly difficult to prove one hundred percent of  
19 anything.

20           (Whereupon, at 10:54 a.m., Commissioner Bradford  
21 left the room.)

22           CHAIRMAN HENDRIE: And that is another reason,  
23 another part, then, of the reason, why some reasonable  
24 assurance that some of the places help the standard in the  
25 sense of making it one that is practical and for good design

1 that can be improved.

2 COMMISSIONER GILINSKY: I guess what bothered me,  
3 where you were heading on this paragraph was if you stick it  
4 in here, it seems as if the goal, the design goal, is to be  
5 able to contain it with reasonable assurance, which is a  
6 little bit different than saying our evaluation will be  
7 based on reasonable assurance --

8 COMMISSIONER AHEARNE: -- assurance that the  
9 design goal is met.

10 COMMISSIONER GILINSKY: That's right. Reasonable  
11 assurance on the part of the regulatory staff. It seems to  
12 me that the design goal ought to be to contain all, or all  
13 but a relatively small --

14 CHAIRMAN HENDRIE: One could say it that way in  
15 fact, but that's not the way it is said here. If one said  
16 the design goal of the engineered system shall be, so that  
17 even if it saturates and so on, the packages will contain  
18 all radionuclides for the first 1,000 years.

19 (Whereupon, at 10:56 a.m., Commissioner Bradford  
20 returned to the room.)

21 CHAIRMAN HENDRIE: That's one way of saying it.  
22 But what this says is the engineered system shall be  
23 designed so that that is true. And I'm just not sure that  
24 the word "designed" and the anticipated events, together  
25 with "reasonable assurance" over in the procedural part of

1 the rule, gets you (a) what will I call it, the  
2 adjudicability that I think it needs, on the one hand; or  
3 (b) on the other, be as clear about what we mean, as it  
4 might be.

5           Why don't we let them think on it, because, Peter,  
6 you said you wanted to scratch on this thing some more.

7           COMMISSIONER BRADFORD: Yes, I assume we are not  
8 going to vote today.

9           CHAIRMAN HENDRIE: You would prefer not to be  
10 asked to yay or nay on a final vote this morning?

11           COMMISSIONER BRADFORD: Yes.

12           CHAIRMAN HENDRIE: So, for that reason, I did not  
13 expect to come to a vote. We will have time to scratch a  
14 little more. Why don't we see what they suggest?

15           But I think your point is correct. That is, one  
16 goes into the design effort and says: My objective is a  
17 containment that will not leak anything for 1000 years.  
18 Okay? Now we have to find a way to say also, however, as  
19 part of that standard, that when we all sit down in the  
20 hearing to see where we are with the proposition before the  
21 house, that the standard is going to be a reasonable  
22 assurance that the radionuclides will be contained. Okay,  
23 enough said.

24           Now that is a principal --

25           COMMISSIONER GILINSKY: I thought that was what



1 was meant here.

2 MS. COMELLA: It is what we mean. That's exactly  
3 what we meant.

4 MR. MARTIN: Yes, if we say --

5 CHAIRMAN HENDRIE: I think that's what they meant  
6 too, but I have talked to some folk who have been working  
7 and trying to figure out -- you know, looking at the draft  
8 and so on and trying to figure out how would we deal with  
9 that and so on. And there's a lot of headscratching. Part  
10 of it's a communication problem and some of it gets cleared  
11 up as time goes on, as you talk to people and so on. But  
12 some of the concern, I think, has a reasonable basis.

13 Okay. The next piece I would like to talk about  
14 is a little further, on page 34 on the old one, "performance  
15 of the geologic setting." In the new one it is -- this is  
16 in ii, the isolation period paragraph. We've got a  
17 proposition here that following the containment period the  
18 geologic setting, et cetera, shall be capable of isolating  
19 radioactive waste. Here again is a place, you know, that's  
20 one of your reasonable assurance places, either built in  
21 here or elsewhere.

22 But then it goes on to say, so that the transport  
23 of radionuclides to the accessible environment shall be in  
24 amounts and concentrations that perform to such generally  
25 applicable environmental standards that may have been

1 established by the Environmental Protection Agency. That's  
2 fine. We have to conform to those generally applicable EPA  
3 standards.

4 But it goes on and says, and thereby will not  
5 result in significant doses to any of the individuals.

6 COMMISSIONER AHEARNE: To any member of the public.

7 MR. MARTIN: We've changed it to members of the  
8 public.

9 CHAIRMAN HENDRIE: Have resulted in significant  
10 doses to any members of the public. Okay.

11 Why do you want that tag on there about the doses  
12 and the criteria?

13 MS. COMELLA: Well, once again we get back to the  
14 point that the purpose of the geologic repository is to  
15 isolate the wastes. And, practically speaking, that  
16 transfers into a release of all of the material over very  
17 long periods of time. So one really wants to talk about the  
18 rate, as it were -- the amount released at any particular  
19 point in time to make certain that it does not work for a  
20 time, hold it up, and then it's released to the accessible  
21 environment in a slug. I can't think of a better way to  
22 describe it.

23 So that was a way of coming at an understanding of  
24 whether or not, indeed, the repository was going to function  
25 at or as projected.

1           COMMISSIONER BRADFORD: I'm sorry. Where are you  
2 now, Joe?

3           COMMISSIONER AHEARNE: Page 34, 2, near the bottom.

4           CHAIRMAN HENDRIE: What are the doses you  
5 calculate under this paragraph? Do you calculate doses  
6 under the paragraph? Or is the comment about doses meant as  
7 a sort of parenthetical remark along the lines of you've got  
8 to meet these EPA standards and we just note in passing that  
9 if you do, why members of the public won't get significant  
10 doses.

11          MS. COMELLA: No.

12          CHAIRMAN HENDRIE: Or do you mean meet the EPA  
13 standards and also show that no member of the public  
14 receives significant doses?

15          MS. COMELLA: It implies a dose calculation. That  
16 is what is asked for there.

17          CHAIRMAN HENDRIE: What do you mean by  
18 "significant"? The EPA has, under their authority, decided  
19 that if this repository doesn't -- or they will decide, I  
20 trust. They have in draft decided that if this repository  
21 doesn't let out more than so many curies of this isotope and  
22 so many curies of that isotope in the first 1,000 years that  
23 doses to the individuals are not significant.

24          MS. COMELLA: That's correct, but part of it was a  
25 desire -- part of it is for completeness. We really don't

1 have an EPA standard yet, and what does a functioning  
2 repository mean? It means that -- what does isolation  
3 mean? It means limited release to the environment over very  
4 long periods of time.

5           And this was a way of coming at an understanding  
6 of how the repository was operating and whether it could  
7 operate.

8           CHAIRMAN HENDRIE: Well, but I don't know what you  
9 are going to do with the dose calculation that you made  
10 here. In the first place, is it the same dose calculation  
11 you made back in the "likely maximum"?

12           MS. COMELLA: Yes, it is the same.

13           MR. MARTIN: Both are the same.

14           MS. COMELLA: Dose calculation.

15           CHAIRMAN HENDRIE: But you didn't propose to do  
16 anything with that one, except to have it handy when the  
17 inevitable question arose. Okay, enough of this hanky panky  
18 about geology, what does it really mean in terms of doses to  
19 people as an information item?

20           Here it cracks a little tougher. Here there is a  
21 comment, "will not result" -- "requirement will not result  
22 in significant doses to any member of the public." In a  
23 section which is part (e), here are the requirements for  
24 technical criteria for geologic repositories. Here, having  
25 it appear over here, it suggests we are going to do

1 something with the dose.

2           Furthermore, it suggests, when we say "will not  
3 result in a significant dose", it suggests we know what a  
4 significant dose is. And not only that, but even if they  
5 meet the EPA release standards, we have in mind some  
6 different radiologic health standard. All right?

7           MR. MARTIN: True.

8           CHAIRMAN HENDRIE: Let me suggest, if they meet  
9 the EPA standards then they meet the radiological health  
10 standards established by the appropriate authority of the  
11 Federal government.

12           MR. SHAPAR: Maybe the word "thereby" is intended  
13 to convey just that.

14           COMMISSIONER GILINSKY: That's what I understood  
15 it to mean. I'm surprised.

16           CHAIRMAN HENDRIE: No, a minute ago I said does  
17 this phrase mean just fellows, you've got to meet the EPA  
18 standards and, by the way, if you do, then we all understand  
19 there is no significant dose.

20           I asked, is that the interpretation, or is the  
21 interpretation that we are going to use the dose and look at  
22 it? And the answer was the latter, not the former. So,  
23 good, strike your comment.

24           COMMISSIONER GILINSKY: Well, what does "an  
25 thereby" mean?

1           CHAIRMAN HENDRIE: It apparently means "and show  
2 that there will not result significant dose to any member of  
3 the public". What I am saying is, wait a minute. You are  
4 now on the one hand, if you really mean that you've gone  
5 across the line into EPA's area of responsibility.

6           MS. COMELLA: I did not understand your line of  
7 questioning exactly. When I said we would use the  
8 calculation I know I am not getting across what I am trying  
9 to.

10           The repository, if it is functioning properly,  
11 ought not to release a large quantity of radioactive  
12 material at any instant of time, and a way of seeing how the  
13 repository is -- how well it's projected to work, is to look  
14 at this very calculation in order to have a better  
15 understanding and have greater confidence in whether or not  
16 the repository is likely to work as projected. That is why  
17 that is there.

18           Now it is not meant to imply that we are setting a  
19 standard that is different from EPA's. It is not meant to  
20 imply that at all.

21           CHAIRMAN HENDRIE: But the proposition as to  
22 whether it is working, whether the design is such that there  
23 is reasonable expectation that it will work the way we want  
24 it to, and within limits and so on, is determined here by  
25 whether or not the analysis of the design says we will or

1 will not hold the emission rate of radionuclides out of the  
2 total repository area down to the EPA 10,000-year numbers.

3           If you do, if your review does say yep, by George,  
4 there's every expectation that it will be held down to those  
5 limits, then you've met the standard established by that  
6 other group of Feds who have been told off to do that kind  
7 of standard-setting.

8           Now as part of their standard-setting, they have  
9 calculated some doses and decided that that's the way they  
10 set their curie numbers, but they've done. That's their  
11 responsibility. They've done that. What I am saying is,  
12 it's really not our business to come along and say we are  
13 going to meet the EPA standards and, in addition, we are  
14 going to meet the dose calculation, and we've got some ideas  
15 about what our requirements are on that.

16           MR. DIRCKS: Could you say, "and thereby  
17 demonstrate that no significant doses to members of the  
18 public would occur?"

19           COMMISSIONER AHEARNE: I guess, Bill or Pat, what  
20 Joe is stressing --

21           CHAIRMAN HENDRIE: I want a "." after "agency."

22           COMMISSIONER AHEARNE: Right. See, what he is  
23 asking is: In a licensing review, either internally or  
24 externally to the agency's review, that phrase must have  
25 application to what is being required to be proved, and it's

1 not sounding like a requirement that we are --

2 MR. DIRCKS: Well, I think the point was that if  
3 you prove you meet the EPA standards, you thereby prove that  
4 no member of the public would receive a significant dose.

5 COMMISSIONER AHEARNE: Your interpretation then is  
6 that it is a parenthetical statement.

7 COMMISSIONER GILINSKY: You mean the follow-on,  
8 "and thereby."

9 COMMISSIONER AHEARNE: Yes.

10 COMMISSIONER GILINSKY: It's just an additional  
11 explanation.

12 MR. DIRCKS: You can leave it in or take it out.

13 COMMISSIONER GILINSKY: That's the way I  
14 understood it.

15 MR. DIRCKS: But if you meet one, you thereby meet  
16 the other.

17 COMMISSIONER GILINSKY: And thus you have met it.

18 MR. SHAPAR: Which means you don't need it.

19 CHAIRMAN HENDRIE: Which means you don't need it  
20 in a section that is called specifically "technical  
21 criterial." You know, this is not a section that says:  
22 Here is an explanation of how everything is going to work.  
23 It says these are the technical criteria, one, two, three,  
24 four, five. The explanations about "thereby the significant  
25 doses" won't be significant because so on and so on are



1 appropriate elsewhere.

2 COMMISSIONER AHEARNE: A statement of  
3 consideration type of statement?

4 CHAIRMAN HENDRIE: Yes, or a footnote.

5 COMMISSIONER AHEARNE: Or this rule puts in place  
6 criteria which by meeting not only our own standards but by  
7 meeting the EPA standards will then have developed a  
8 repository which will not result in significant doses to the  
9 public.

10 MR. DIRCKS: So you can put a "." there and take  
11 it out.

12 CHAIRMAN HENDRIE: Well, I would think so. I  
13 recommend the staff gather on the point before we meet  
14 again, because I sort of -- There seem to be some different  
15 points of view.

16 MS. COMELLA: That's right.

17 MR. MARTIN: I think this is about as close to the  
18 gathering as we are going to get on this point. We have  
19 "gathered" interminably.

20 COMMISSIONER BRADFORD: Let me ask that question  
21 another way.

22 CHAIRMAN HENDRIE: Maybe some people want to  
23 calculate doses and use them for something in a regulatory  
24 requirement sense, and other people think if you meet the  
25 EPA standards then the doses are just automatically not

1 significant, and that's that. I see a hand. Yes.

2 MR. COSTANZI: Mr. Chairman, the calculation --

3 COMMISSIONER AHEARNE: Would you use the mike,  
4 please?

5 MR. COSTANZI: Oh, I'm sorry. The calculation of  
6 the dose to any member of the public is a way of measuring  
7 or evaluating the potential or expected performance of the  
8 site under the particular conditions that performance  
9 objective calls to, namely that there is no longer a  
10 reliance on the engineered portion of the repository  
11 system. And it is a way of obtaining confidence that even  
12 in the period when the engineering features are no longer  
13 being relied upon, that the site will still serve a function  
14 to assure that the amount and concentrations of nuclides  
15 reaching the environment will not be significant, will not  
16 be of significant harm.

17 And that is why --

18 CHAIRMAN HENDRIE: Yes, but isn't all of that  
19 assured if you find that you can make a reasonable case that  
20 the EPA radionuclide limits over the first 10,000 years are,  
21 in fact, met?

22 MR. COSTANZI: When this was written, of course,  
23 as it is now, there was no EPA standard.

24 CHAIRMAN HENDRIE: I guess there still isn't in a  
25 formal sense.

1 MR. COSTANZI: No, it's not. And the fact that  
2 over the period beyond 10,000 years there will be a  
3 significant in-growth of dollars within the repository and  
4 there will still be significant amounts of radiation in the  
5 waste, and the draft EPA standards that we have of course  
6 don't speak to any period beyond 10,000 years.

7 CHAIRMAN HENDRIE: That's right.

8 COMMISSIONER AHEARNE: So you are saying you would  
9 interpret this as a, as far as a required calculation -- It  
10 wasn't clear to me whether you were saying that I can  
11 interpret it as two requirements -- one, that EPA talks  
12 about 10,000 years, and we would want to look at slices  
13 within that, or say yearly, or a ten-year period. And,  
14 second, that we would want to look at past 10,000 years.

15 MR. COSTANZI: I think that is correct. That's  
16 the way I would see it.

17 COMMISSIONER AHEARNE: So you do see it as an  
18 additional regulatory requirement?

19 MR. COSTANZI: Without an additional -- the EPA  
20 standard I can't say whether it's additional or not.

21 COMMISSIONER AHEARNE: But, given that the EPA  
22 standard is in draft, it would be an additional standard?

23 MR. COSTANZI: Yes.

24 MR. DIRCKS: That poses a problem.

25 COMMISSIONER AHEARNE: That's an interesting

1 question.

2 MR. DIRCKS: Then we should have raised that with  
3 the EPA, I guess.

4 CHAIRMAN HENDRIE: I'm not sure that when the EPA  
5 was empowered under the transfer authority back, when was  
6 it, '73 or something like that?

7 MR. DIRCKS: Yes.

8 CHAIRMAN HENDRIE: To establish generally  
9 applicable radiological standards, that there was conferred  
10 upon the AEC and then devolving upon us and authority to (a)  
11 conform to their standards in their area of applicability,  
12 certainly, but (b) also go them one better in those areas,  
13 if we liked.

14 MS. COMELLA: I think part of this represents a  
15 belief on the part of some members of the staff that the  
16 10,000-year period, when scrutinized in the formal  
17 standard-setting period, is not probably going to survive;  
18 and that if it does, obviously that this would be truncated  
19 at 10,000 years, or perhaps a requirement change.

20 But if, in reality, that does not stand up --

21 CHAIRMAN HENDRIE: Doesn't stand up where?

22 COMMISSIONER BRADFORD: In EPA.

23 CHAIRMAN HENDRIE: We don't have an EPA --

24 CHAIRMAN HENDRIE: In the EPA rulemaking?

25 MS. COMELLA: In the EPA rulemaking. We don't

1 have an EPA standard.

2 CHAIRMAN HENDRIE: But whatever the EPA produces  
3 from its rulemaking --

4 MS. COMELLA: Yes.

5 CHAIRMAN HENDRIE: Be it two years --

6 MS. COMELLA: Yes, that's correct.

7 CHAIRMAN HENDRIE: Or to the end of the universe,  
8 is covered by, "as may have been established by the  
9 Environmental Protection Agency." So you've got it built  
10 in. I don't see, you know --

11 COMMISSIONER BRADFORD: No, but I think what Pat  
12 is saying, is that if in fact they said "two years,"  
13 ridiculous though that might be, then the staff does not  
14 want to be bound by that.

15 CHAIRMAN HENDRIE: A party to it.

16 COMMISSIONER BRADFORD: Or a party to it. And  
17 there I guess you had another question of just whether we  
18 have the power to set a standard.

19 CHAIRMAN HENDRIE: That is exactly the question I  
20 raised.

21 MS. COMELLA: Yes, and my understanding is that we  
22 don't have that.

23 CHAIRMAN HENDRIE: Good, then why are you talking  
24 about a time period longer than the EPA has judged  
25 necessary--

1 MS. COMELLA: Because we don't have --

2 CHAIRMAN HENDRIE: -- to establish these generally  
3 applicable environmental standards? Don't tell me that we  
4 haven't got the standard. I know we haven't got the  
5 standard. We are basing this criterion on the proposition  
6 that there will be one.

7 MS. COMELLA: All right.

8 CHAIRMAN HENDRIE: And we adopt what our  
9 requirements are to whatever that EPA standard may be by  
10 saying, "as may have been established by the EPA." So you  
11 have anticipated whatever they may do.

12 COMMISSIONER BRADFORD: Is it true, as a legal  
13 matter, that if EPA cuts their standard off at any given  
14 point in time we not only do not have the power to establish  
15 a different standard within that period of time, but also  
16 cannot address a desirable standard for the period of time  
17 they haven't addressed?

18 CHAIRMAN HENDRIE: I don't know. It would seem to  
19 me that that would intrinsic in the transfer of that  
20 authority which, let's see, was by Executive Order, I think.

21 MR. DIRCKS: Yes.

22 CHAIRMAN HENDRIE: It isn't statutory.

23 MR. DIRCKS: I worked on it in '73, and I think  
24 the rule was --

25 COMMISSIONER BRADFORD: You drafted it.

1 MR. DIRCKS: -- to make the distinction. They  
2 have what's out in the environment; we have what is within.  
3 Now the lawyers can always come in and say what we had in  
4 mind when we did this.

5 MR. SHAPAR: I think it was done by the  
6 reorganization plan and I think it's more complicated than  
7 the simple question that has been raised. They have two  
8 sets of authorities. They have the authority they got from  
9 the reorganization plan, which is generally applicable, and  
10 standards applicable to the general environment. They also  
11 have the old FRC authority, the question about whether that  
12 is binding on us without the Presidential imprimatur being  
13 added to it.

14 However, you've got the concept, "as low as  
15 practicable." You've got the concept that the EPA standards  
16 are supposed to be ambient standards, about which there has  
17 been some quarrel in the past. And that our standards are,  
18 in essence, emission standards.

19 Now how that all fits into this posture I think I  
20 would have to say that any reasonable steps we took to meet  
21 the EPA standards, remembering that they are different kinds  
22 of standards -- one is supposed to be ambient and ours are  
23 supposed to be emissions standards -- So I would say we have  
24 considerable flexibility, but the general goal ought to be  
25 the EPA "generally applicable" standards, and we ought not

1 to try to rewrite those certainly.

2 CHAIRMAN HENDRIE: Sheldon, you about to explain?

3 MR. TRUBATCH: There have been situations in which  
4 EPA has not acted, and we have acted, though. One example  
5 was the Appendix I to Part 50.

6 CHAIRMAN HENDRIE: Yes, that's right.

7 MR. TRUBATCH: So at least the answer to  
8 Commissioner Bradford's question to the point that say after  
9 the 10,000 years, when EPA no longer has any standard, I  
10 don't think that precludes the NRC from then having a  
11 standard.

12 CHAIRMAN HENDRIE: But if the EPA has determined  
13 that for purposes of establishing these radiological safety  
14 requirements for geologic repositories, it is necessary and  
15 it is sufficient to have considered the first 10,000 years.  
16 Then why are we mucking around out after that?

17 MR. TRUBATCH: Well, that's a separate question --

18 COMMISSIONER GILINSKY: Did they put it in that  
19 form?

20 MR. TRUBATCH: -- from whether as a matter of  
21 law--

22 CHAIRMAN HENDRIE: I don't know that they did,  
23 Vic.

24 MR. TRUBATCH: That's a separate question from  
25 whether as a matter of law we can't go beyond EPA standard.



1           CHAIRMAN HENDRIE: Well, it would seem to me  
2 peculiar if we could, and if so, something of a little  
3 idiosyncrasy in the federal regulatory scope. I would hope  
4 that federal agencies, you know, have authorities which  
5 match along the interfaces so we are not in their pockets  
6 and they are not in ours, and on the other hand, so there  
7 are not gaps.

8           I would think if they are told to do it we would  
9 take their product and that's that, and we work on our side  
10 of the line.

11          MR. DIRCKS: There was the reason for the '73  
12 meeting, because there had been a history of one moving back  
13 and forth across the line.

14          CHAIRMAN HENDRIE: Yes, what you've got here is a  
15 proposition that goes beyond that. There is a question,  
16 first of all, about what are our appropriate authorities in  
17 the matter. Are we firmly bound by whatever EPA publishes  
18 as a final rule on the one hand? And, on the other hand,  
19 there is the policy question: If we may, should we?

20          Let me suggest to you that if the EPA could bring  
21 itself to think that the 10,000 years is an ample time to  
22 judge repositories, that as a policy matter I would be  
23 extremely reluctant to see us lunge further into the  
24 impenetrable future. The only thing we are going to do by  
25 establishing requirements out past that EPA required period

1 is to put ourselves in a regime where we aren't going to be  
2 able to say much of anything except to wave our hands and  
3 look honest and look honest and sincere.

4 COMMISSIONER BRADFORD: And talk about significant  
5 doses.

6 CHAIRMAN HENDRIE: And let me tell you about long  
7 experience on the reactor licensing side, that's not the  
8 kind of regulation you want to write for yourself nor -- and  
9 I really think that if one can conclude that if you meet the  
10 10,000 leakage requirement that you've got a system which is  
11 intrinsically as good as you are going to do and will hang  
12 together for whatever time you are interested in, why, then,  
13 I think you are not going to do better than that in a real  
14 safety sense, and I think you may make a lot of trouble for  
15 yourself by trying to project out into the distant  
16 millenia. And you're just going to have a very tough time  
17 making that case in court.

18 MR. MARTIN: That's why one of the major features  
19 of the EPA rulemaking is to get straight just that point --  
20 that beyond 10,000 years you are just kidding yourself and  
21 you really know what's happening here.

22 CHAIRMAN HENDRIE: I know, but you have language  
23 here, at least one interpretation of it from a group that  
24 worked on it, which would suggest that you in fact want to,  
25 if they quit at 10,000 for what they regard are good and

1 sufficient reasons: Never mind, we'll go forth beyond that.

2           And I suggest that I wouldn't want to go that way  
3 as a matter of policy. I also think as a matter of  
4 authority it is not right. But I recommend that you think  
5 on it.

6           Now, let's see. For the purpose of -- the rest of  
7 that paragraph is, "for the purposes of this paragraph, the  
8 evolution of the site is based on the assumption that those  
9 processes operating are those" et cetera, "those that are  
10 operating on it during the" -- Is that quaternary or  
11 quarternary? How do you pronounce it?

12           MR. MARTIN: Quarternary.

13           CHAIRMAN HENDRIE: I know there had to be a  
14 variation on it.

15           COMMISSIONER BRADFORD: How many years is that?

16           MR. MARTIN: It's about the last 2 million -- you  
17 know, nothing much has happened. That's the definition of  
18 the quarternary. Nothing much has happened geologically  
19 except the ice ages and the mountain-building is over.

20           CHAIRMAN HENDRIE: You have to learn to take a  
21 long view, Peter.

22           COMMISSIONER BRADFORD: Well, I was thinking of  
23 that in the context of your last few minutes of discussion,  
24 Joe. I wondered how much time the Phoenicians had spent  
25 wondering about what they were doing to us.

1 (Laughter.)

2 CHAIRMAN HENDRIE: Not much.

3 COMMISSIONER BRADFORD: On the other hand, they  
4 may not have been creating much by way of isotopes.

5 (Laughter.)

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1 COMMISSIONER BRADFORD: May I ask a question or  
2 two, if you are about finished?

3 CHAIRMAN HENDRIE: Pray do. I am trying to  
4 puzzle-- I know what the staff is trying to do here is to  
5 provide some guidance because you are going to have to try  
6 and guess what is going to happen, project what is going to  
7 happen over some period of time, whether it is 1000 or  
8 10,000 or 100,000 or whatever we end up with, and you are  
9 trying to provide some reasonable basis for them to make  
10 those projections about what the geological events are going  
11 to do. So let me mull on that while Peter asks his  
12 questions.

13 COMMISSIONER BRADFORD: With regard to the EPA  
14 standard, and let's leave out the other half of that  
15 controversy, are you saying here that the repository in and  
16 of itself just during the first few thousand years should be  
17 sufficient to assure that the EPA standard is met -- I'm  
18 sorry -- that the geologic setting should be sufficient to  
19 assure that even if the engineered aspects and the waste  
20 package themselves don't perform up to your expectations?  
21 Is the repository an independent barrier that  
22 assures the EPA standard even if the others fail?

23 MR. MARTIN: No.

24 CHAIRMAN HENDRIE: I don't read it that way but  
25 I'm interested.

1 MR. MARTIN: What this says is that after the  
2 engineered design life and the engineered system, that the  
3 geologic portion alone must be sufficient.

4 CHAIRMAN HENDRIE: This is the post-1000 years.

5 COMMISSIONER BRADFORD: Why wouldn't you say it  
6 the other way? Why wouldn't you want the repository to be  
7 sufficient in itself?

8 CHAIRMAN HENDRIE: Because I don't think you make  
9 the grade.

10 MR. MARTIN: I think you would like to but I don't  
11 think that could be done. Furthermore, I don't think it  
12 could ever be proven. That is why we have come at it from  
13 the other --

14 CHAIRMAN HENDRIE: I differ from that. I think it  
15 could be done but I don't think you could ever prove it.

16 COMMISSIONER BRADFORD: Even to a reasonable  
17 assurance level?

18 MR. MARTIN: Yes.

19 CHAIRMAN HENDRIE: Well, no, because in this case  
20 the reasonable assurance has -- there is a broader --

21 COMMISSIONER BRADFORD: The uncertainties are  
22 broader?

23 CHAIRMAN HENDRIE: Yes, the uncertainties are  
24 broader. One of the things they are trying to do with this  
25 waste container is to tie up high specific activity

1 materials until they are pretty well decayed out. That is  
2 what the waste form and the package container concept is  
3 for. And if you do not have a container or waste form which  
4 has a very low leach rate over the period that those high  
5 specific activity materials are there, there are just a  
6 whole of a lot of curies of cesium and strontium. And if  
7 you leach that stuff into the groundwater and then launch it  
8 and wait for adsorption or other processes and the travel  
9 time to protect you, I think you might have a tough time  
10 showing that that wasn't a risky proposition.

11           COMMISSIONER BRADFORD: So the right way to take  
12 this is in terms -- if I were just visualizing this process  
13 in terms of years, when is it that you really come to rely  
14 on the geologic setting as the primary barrier to migration?

15           MR. MARTIN: Well, if everything works the way it  
16 has been designed to work, after the first thousand years  
17 you start depending upon it, because that is when you start  
18 releasing the stuff from the repository hopefully at a  
19 limited rate, and after the far distant future you rely on  
20 it.

21           COMMISSIONER BRADFORD: So the way you have  
22 written the standard now, you don't intend it to say  
23 anything about the repository performance during the first  
24 one thousand years?

25           MR. MARTIN: No.

1 COMMISSIONER BRADFORD: "No" you don't? Or "no" I  
2 have just stated it wrongly?

3 CHAIRMAN HENDRIE: You mean the performance of the  
4 geologic setting?

5 COMMISSIONER BRADFORD: I'm sorry. I keep mixing  
6 up "geologic setting" and "repository."

7 CHAIRMAN HENDRIE: I think the inference is that  
8 it is performing superbly, but it has gotten nothing to  
9 perform on for 1000 years.

10 COMMISSIONER BRADFORD: Well, that is what I was  
11 asking, essentially.

12 MR. MARTIN: Well, that is not quite -- That is  
13 true if everything is working right. Now the EPA standard  
14 also covers -- you know, the limits apply to if everything  
15 works right and also those reasonably foreseeable events  
16 like people drilling into it, for example, which is almost a  
17 certainty if you believe the probabilistic calculations.

18 Well, there is a case where one or a number of the  
19 canisters will very likely be destroyed or chewed up, and  
20 the geology then would have to provide the protection for  
21 that. So that for the different credible accident  
22 conditions, the geological system, or the geologic setting  
23 would have to provide ample protection if you had premature  
24 failure of the engineered barriers.

25 CHAIRMAN HENDRIE: But not all of them.



1 MR. MARTIN: No.

2 CHAIRMAN HENDRIE: Because on these kinds of  
3 intrusions, why you are saying: Well --

4 MR. MARTIN: That's partially why we did it.

5 CHAIRMAN HENDRIE: -- some of these people who are  
6 on the one hand, bright enough to drill 1500 feet, but on  
7 the other hand, nothing has survived and so on, and they go  
8 down and get themselves a drill bit full of radioactive  
9 material and they get out.

10 MR. MARTIN: This is correct, and it is another  
11 reason why we sort of went for the engineered systems. It  
12 provides some sort of a discrete nature to the repository,  
13 that there are only so many things you can wreck at one try  
14 and the rest of it is not effective. So for those kinds of  
15 off-normal things, where I think will be the bulk of a  
16 debate or in any sort of a licensing procedure, the geologic  
17 setting is all important.

18 COMMISSIONER BRADFORD: But in terms of the  
19 significant performance below expectations of either the  
20 repository itself or the waste package, the geologic setting  
21 isn't required to function as a barrier in those first one  
22 thousand years. I am not saying now that it won't. I'm just  
23 saying that in terms of your not assessing its ability to do  
24 that in terms of your requirements here.

25 CHAIRMAN HENDRIE: Can you say it again, Peter? I

1 lost the front end of the sentence.

2           COMMISSIONER BRADFORD: In terms of a really  
3 significant failure of either the package or the engineered  
4 repository to perform up to expectations, the geologic  
5 setting isn't for regulatory purposes being assessed on the  
6 basis of its ability to be a barrier to that failure in the  
7 first one thousand years.

8           MR. MARTIN: I think that is right. It is  
9 recognized as some sort of a very large, albeit  
10 unquantifiable reserve, and one of the major reasons why we  
11 have selected to emphasize the engineering portion of it is  
12 because the geologic setting is inherently unknowable to a  
13 large degree. I think the Chairman expressed it right.  
14 Most everyone feels it will work, but our despair is to how  
15 you prove very much beyond. If too big a demand is put on  
16 it, you get into a very hard proof problem.

17           COMMISSIONER GILINSKY: Let's see. The one  
18 thousand year water travel problem is a backup to that  
19 failure of the container, the repository.

20           MR. MARTIN: Just exactly right, but --

21           CHAIRMAN HENDRIE: But it at least postponed  
22 things.

23           MR. MARTIN: That is the one feature that we have  
24 selected that is reasonably provable as a backup, but we  
25 have not, for example, said, well, if all of the engineering

1 fails, the setting alone must be capable, because I don't  
2 think we could prove that.

3 COMMISSIONER AHEARNE: That also goes back to the  
4 IRG approach not to have any one facet be responsible for  
5 everything.

6 COMMISSIONER BRADFORD: Well no, the IRG approach  
7 would have said don't make the setting alone responsible for  
8 everything. I don't think it in itself would have precluded  
9 saying that you have three levels, each of which you  
10 consider to be responsible independently. It may make no  
11 sense to do that for other reasons, but I don't think their  
12 approach would have ruled out saying that if step one and  
13 step two don't work out, you still have step three that you  
14 think will contain it.

15 COMMISSIONER AHEARNE: I think it would have. I  
16 think it says you don't design. That says that all geologic  
17 settings must be able to handle all or that the container  
18 must be able to handle all.

19 COMMISSIONER BRADFORD: It doesn't really matter.  
20 I had read it to say that you don't rely on any one of those  
21 things to handle it all.

22 Go ahead.

23 CHAIRMAN HENDRIE: Can I charge off in a new  
24 direction? On this general -- well, we will let you think  
25 about it, and we will hear whether or not you would like to

1 put in a "."

2 MR. MARTIN: Yes.

3 CHAIRMAN HENDRIE: Or which side wins that debate  
4 on the staff side. The Commissioners can express their  
5 views.

6 Now we get back to design and construction  
7 requirements. The stuff about radiological protection,  
8 natural phenomena looks good. We begin to get to a place as  
9 one goes on back through this part of the rule where I  
10 wonder if we have run out of regulation material and have  
11 begun to put regulatory guide material into the Code of  
12 Federal Regulations?

13 MR. MARTIN: I think we are wondering that too,  
14 and that is one of the things we call out to particularly  
15 ask some comment on in the introduction. Almost all of this  
16 stuff has been lifted out of either the existing Part 50 or  
17 Part 72, or there are a couple of things in there I have had  
18 some bad experiences with in the past that I felt ought to  
19 be in there, and in the aggregate it looks a bit ponderous,  
20 but there is very little in here that is sort of invented  
21 out of whole cloth. Most all of it is an adaptation in  
22 design and construction from sort of our corporate  
23 collection of the stuff we have found that you really ought  
24 to do. There are a few additions but not too many.

25 CHAIRMAN HENDRIE: Are there Reg Guides that go

1 with this?

2 MR. MARTIN: There will be, and maybe that is one  
3 of the things we thought it would be useful to focus the  
4 comments on, how much of this stuff are there really strong  
5 feelings one way or the other. There hasn't been too much  
6 in the past.

7 CHAIRMAN HENDRIE: Yes. Well, whether it is a  
8 unique manifestation in this part of the rule or not, you  
9 know, I'm not sure that the nuclear safety regulations of  
10 this Commission need to include the requirement for two  
11 independent indicators on hoists to indicate when waste  
12 packages are in place, grappled and ready for transfer.

13 MR. MARTIN: That is one of those bad experiences  
14 that I have told you that I have personally had with fueling  
15 unloading.

16 CHAIRMAN HENDRIE: Shaft conveyances used in  
17 radioactive waste handling.

18 MR. MARTIN: That's the second one.

19 (Laughter.)

20 MR. MARTIN: If you have ever had an experience of  
21 seeing a spent fuel cask dropped into the bottom of the dry  
22 dock, you do not soon forget that. And to my mind, having  
23 had that kind of experience, it is very important to --

24 CHAIRMAN HENDRIE: But after you have already made  
25 the regulations to read that hoists important to safety

1 shall be designed to preclude cage refall, reliable cage  
2 location system -- you know, it just seems to me there are  
3 some places in here, and this one struck my eye in  
4 particular, where one reaches down to a level of detail  
5 which is sort of regulatory guide stuff.

6 MR. MARTIN: Well, there was some discussion on  
7 those two points. We have had significant bad experience in  
8 the nuclear business that I think it merits a bit.

9 CHAIRMAN HENDRIE: Well, I'll tell you, you have  
10 to think some about those bad experiences and how much of a  
11 guidance there should be about regulations.

12 MR. MARTIN: Well, for example these two points.

13 CHAIRMAN HENDRIE: There must be some sort of  
14 hoist standards that the Bureau of Mines uses or various  
15 people use. There are hoist standards for fuel handling,  
16 cask handling stuff, for instance, in the Standard Review  
17 Plan for reactor facilities, and it seems to me that some of  
18 this is at about that level of detail where it is better  
19 handled in the staff guidance documents where the regulation  
20 says, you know, the shaft conveyance --

21 MR. MARTIN: I agree with you in principle.

22 CHAIRMAN HENDRIE: -- or conveyances shall meet  
23 appropriate safety standards. They'll say, Oh, boy, what  
24 does that mean? What that means is some staff guidance  
25 which gives you a little more flexibility to adapt to

1 developments in codes, standards, practice and so on.

2 MR. MARTIN: I agree with you.

3 CHAIRMAN HENDRIE: I just say that as a comment  
4 since you are going to get comment on it.

5 MR. MARTIN: That is what we are particularly  
6 asking about already.

7 CHAIRMAN HENDRIE: Now, I think the last area I  
8 want to pursue this morning is the 50-year-after-closure  
9 retrievability question. I guess the question is -- well,  
10 there are several questions. Fifty years seems like a long  
11 time, on the one hand, in some ways at least.

12 COMMISSIONER AHEARNE: They have got two  
13 requirements. One is for 50 years, but the other is how  
14 long it would take. You would have to be able for the  
15 operation to go in order to do the retrieval, and that is a  
16 pretty long time.

17 CHAIRMAN HENDRIE: Yes, that is probably another  
18 20 to 50 years.

19 MR. MARTIN: Right.

20 CHAIRMAN HENDRIE: And for the place for wastes  
21 which are emplaced during the operating period of the  
22 facility, then those wastes are there until the facility  
23 closes, which is, I don't know, 20, 30 years, 50 years. I  
24 don't know how long the damn thing will be open. But say 30  
25 years for round numbers, and then 50 years after that. And

1 then since you are going to allow them, I think quite  
2 reasonably, and extended period to take the stuff out if it  
3 ever had to come back out, then as John points out, there is  
4 another 30-year period out on the end of that.

5           The first stuff that goes in, you need to have  
6 some reasonable basis that you can mine it for 100 years.  
7 It seems kind of a long time. Not long on the time scale of  
8 the expected operation of the facility, I grant you, but I  
9 am wondering what sort of effects that has on facility  
10 design, among other things, as I look at the temperature  
11 profiles and that "J" thing which you sent along.

12           A question. Does the retrievability requirement  
13 in and of itself compel a very much reduced thermal loading?

14           MR. MARTIN: Well, it could.

15           CHAIRMAN HENDRIE: Which then would be perfectly  
16 reasonable on all other grounds except retrievability.

17           MR. MARTIN: Well, each of these performance  
18 objectives has tried to be somehow tied to temperature and  
19 thermal. We have discussed this point extensively with DOE  
20 and several of the industries groups, and their feeling is  
21 that no, it would not be the controlling item on repository  
22 design, particularly after we got over the hump of what do  
23 we mean by retrievability.

24           It does not mean ready retrievability or ready to  
25 go pluck it out at a moment's notice or it's an extended



1 storage facility. It can be backfilled, it can be done a  
2 number of things with it as long as one could make the case  
3 that the design is such that if things start going wrong,  
4 you can still do something about it.

5           But once you got over that hump, the concern with  
6 this is a very disruptive type of requirement has subsided  
7 considerably. What we are trying to guard against here, I  
8 guess what I had in mind is how, say, 50 years from now,  
9 whoever is in charge of this facility will probably want  
10 some time to monitor how it is working and, you know, I  
11 can't even imagine what all things they will be concerned  
12 about at the time, but they would like some time to consider  
13 whether they have enough confidence to close up and walk  
14 away.

15           What we want to make sure of is that design  
16 decisions being made today don't make it impossible for  
17 people to know they want to watch it, either for longer or  
18 shorter, further downstream. I guess in an extreme case if  
19 one designed it so that the temperature ramp was such that  
20 it reached a point where it was just too hot to go back in  
21 and re-mine or do anything with it, I think that would be a  
22 rather very unsatisfactory situation if it happened anytime  
23 soon.

24           The industrial people we have talked to feel,  
25 well, with any other kind of temperatures they have been

1 talking about that shouldn't be a problem; that adequate  
2 heating paths could be established, that things could be  
3 re-mined, and it should not be a major issue as long as you  
4 are not saying it has to be standing there open in a ready  
5 retrievable mode.

6 CHAIRMAN HENDRIE: What sort of thermal loadings  
7 are contemplated these days for reasons of package integrity  
8 and engineered system integrity rather than retrievability?

9 MR. MARTIN: Well, that sort of varies as the  
10 design work on the packages has been advancing. Two or  
11 three years ago people were talking about canisters that  
12 would reach, oh, in the order of 300 or 400 degrees. That  
13 took a sharp downturn to where a year or so ago the people I  
14 talked to at Savannah River were thinking about 100 degrees  
15 as the right number, at least for openers.

16 That seems to be creeping back up a little bit  
17 lately as they get some more confidence, but it is in the  
18 order of a canister picture of, oh, 200 to 300 degrees.

19 CHAIRMAN HENDRIE: Do you know what that turns out  
20 to be for ten-year old waste? Does that look like 60? Is  
21 that more like 60 kilowatts an acre than 150?

22 MR. MARTIN: Well, there are two different curves  
23 you have to look at. One is the canister wall temperature,  
24 which I think has the most to do with the retrieval.

25 CHAIRMAN HENDRIE: I'm not so sure if you are

1 going to have to go down and mine, if you have got the whole  
2 media coming up in temperature so that you have got to  
3 provide cooling, that's going to be kind of burdensome. I  
4 guess people just are not going to want to deal with that.

5 MR. MARTIN: That's true, but the heat capacity of  
6 most of these rocks is such that the bulk temperature of the  
7 repository rises relatively slowly compared to the peak  
8 temperatures of the canisters. They peak out at about 50  
9 years, where the bulk temperature doesn't hit its max until  
10 about 500 years.

11 CHAIRMAN HENDRIE: Yes, but it's pretty well up by  
12 about 100.

13 MR. MARTIN: It's up around 100 degrees or so.

14 CHAIRMAN HENDRIE: And it seems to me the  
15 retrievability requirement extends, at least the  
16 front-loaded canisters, extends that long.

17 MR. MARTIN: That's right. So the types of  
18 temperatures, just for other reasons that are being kicked  
19 around now, are on the order of maybe a canister wall  
20 temperature of maybe about 100. Lately I've heard some  
21 talk, maybe 150. If you were to take a ten-year old spent  
22 fuel element and encapsulate it, it's hard to get over 100  
23 degrees. If you take reprocessed waste and load it very  
24 high, then of course you can design any temperature you like.

25 Now, retrievability, of course, was an extreme

1 case that sort of envelopes a whole bunch of more likely  
2 things that you might want to do, some sort of maintenance  
3 action, perhaps you have some wrong heats of material in  
4 there that you want to fix up, or some better kind of  
5 backfill you want to put in. I really would doubt that you  
6 would ever get in a situation where you would want to  
7 retrieve it. But it is a shorthand way of covering just  
8 about everything you can think of.

9 CHAIRMAN HENDRIE: Is the nature of the  
10 retrievability that clear in the statement of consideration?

11 COMMISSIONER AHEARNE: When you say the "nature of  
12 retrievability"?

13 CHAIRMAN HENDRIE: That they have in mind. Well,  
14 you know, things like being able to backfill holes and rooms  
15 that have been filled and so on?

16 COMMISSIONER AHEARNE: Somewhere in there --

17 MR. MARTIN: We say in there that we don't require  
18 ready retrievability, but I would have no problem with it.  
19 I think we discussed it in great detail in the rationale  
20 document.

21 CHAIRMAN HENDRIE: Maybe that's where --

22 COMMISSIONER AHEARNE: There is a discussion  
23 somewhere.

24 MR. MARTIN: I wouldn't have any trouble with  
25 putting some more of that in.

1           CHAIRMAN HENDRIE: If you don't do it now, you  
2 will probably get a chance in responding to the comments.

3           MR. MARTIN: This has been the single hardest  
4 concept to get across, because some people think this is  
5 just a scheme to promote reprocessing; other people feel it  
6 is a show of no confidence in being able to design  
7 repositories. You know, everybody just looked at it from a  
8 different vantage point, but when we finally got across what  
9 we were talking about, most of the concern seems to have  
10 subsided.

11           The words that we have in here have been discussed  
12 explicitly with DOE and several of the industrial people and  
13 they seem to be satisfied with it.

14           CHAIRMAN HENDRIE: What happens in -- Does this  
15 rule out bedded salt?

16           MR. MARTIN: No.

17           COMMISSIONER AHEARNE: How about EPA?

18           MR. MARTIN: Well, the EPA had some -- You mean  
19 their comments about salt?

20           COMMISSIONER AHEARNE: Yes.

21           MR. MARTIN: Well, their comments were more from  
22 the -- they didn't have -- let's see. Were their comments  
23 specifically related to retrievability?

24           COMMISSIONER AHEARNE: Yes, I thought they had  
25 something about salt.

1 MR. MARTIN: Their comments I think were--

2 COMMISSIONER AHEARNE: Not bedded salt; salt domes.

3 MR. MARTIN: Salt domes?

4 COMMISSIONER AHEARNE: Yes; that's right.

5 MR. MARTIN: They had some statements in the  
6 draft, their equivalent of statement of considerations, that  
7 I would doubt survive to see the light of day, but there  
8 were some gratuitous comments.

9 CHAIRMAN HENDRIE: I think they commented that  
10 salt domes were in their view --

11 MR. MARTIN: Rather inferior --

12 CHAIRMAN HENDRIE: -- a resource, something that  
13 attracted the people interested in getting salt; whereas  
14 bedded salt wasn't in that category. I dimly remember  
15 something like that.

16 MR. MARTIN: Yes, well, it said --

17 CHAIRMAN HENDRIE: But I was asking because there  
18 was this proposition about canisters. Let's see, do they  
19 migrate up or down the thermal gradient?

20 MR. MARTIN: At low temperatures they really don't  
21 do either. If you are talking several hundred degrees, then  
22 there are a lot of strange brine migration phenomena and  
23 that sort of thing that tend to -- You know, there are  
24 asymptotic types of things at temperatures of 100 or 150  
25 degrees. I think that is one of the reasons motivating

1 people towards lower temperatures --

2 CHAIRMAN HENDRIE: I see.

3 MR. MARTIN: -- because there are a lot of strange  
4 things you don't have to deal with. Maybe as more  
5 confidence is developed over the years, the temperatures  
6 will go back up.

7 CHAIRMAN HENDRIE: I see. Okay, that runs me out  
8 for the moment.

9 Peter?

10 COMMISSIONER BRADFORD: No, nothing now. For one  
11 thing, we are out of time. I would propose to get you a  
12 memo by the end of the week and be ready for a discussion  
13 and vote next week, if that suits you.

14 CHAIRMAN HENDRIE: Okay. Other questions? Are  
15 you at an end, John?

16 COMMISSIONER AHEARNE: No. I guess when we come  
17 back, I know they have done a fair amount of work on looking  
18 at EPA standards and how they fold into the criteria they  
19 are proposing. I think that those who are still  
20 uncomfortable about it might ask them to go into a little  
21 bit of detail on that, because I think they have a fairly  
22 sound case they can make to show at least the logic of the  
23 criterion.

24 I would like Bill to consider when we come back,  
25 since that does seem to be a point of major concern in some

1 quarters about the criteria, perhaps he ought to consider  
2 one of the issues being asked for comment is putting it into  
3 the statement of considerations, and later into a guide  
4 versus embedding it into the rule. That might at least get  
5 it out for comment.

6 COMMISSIONER BRADFORD: What is the EPA timetable  
7 at this point? When do they hope to have their standard  
8 finalized?

9 COMMISSIONER AHEARNE: About a year ago.

10 COMMISSIONER BRADFORD: A year "ago"?

11 (Laughter.)

12 MR. MARTIN: Yes. It has been two weeks away ever  
13 since I have been --

14 COMMISSIONER BRADFORD: Do they still have to go  
15 through a publication and comment period?

16 MR. MARTIN: That's right. And it is --

17 MR. DIRCKS: I believe they have to go to OMB,  
18 now, too.

19 COMMISSIONER AHEARNE: At the moment it is still  
20 in the interagency group.

21 CHAIRMAN HENDRIE: Is it out of EPA yet?

22 MR. DIRCKS: I think they want to give the new  
23 administrator a chance to take a look at it.

24 CHAIRMAN HENDRIE: Yes, because they have this  
25 great thing where, like the Office of Radiation Program, it



1 is all thrashed out among themselves. And then it takes six  
2 months minimum or likely a year to get it out of EPA by the  
3 time it cycles through the various other offices.

4 MR. DIRCKS: The last time we saw them over there  
5 I think we met with Wolf Barber and he indicated that would  
6 be one of the things that the new administrator or deputy  
7 administrator would get involved in.

8 COMMISSIONER BRADFORD: Well, if the process ran  
9 smoothly, let me put it that way, how long would it be  
10 before they had a final standard?

11 MR. DIRCKS: I think they have a package ready to  
12 go and they do only want to have this checked, and how long  
13 he or she might take on this matter is uncertain.

14 COMMISSIONER BRADFORD: But then they would still  
15 have to go through a comment process?

16 MR. DIRCKS: Then they would have to go -- I think  
17 what they --

18 COMMISSIONER BRADFORD: What are they proposing  
19 for the length?

20 MR. MARTIN: On the order of a year. That is  
21 usually the -- about like ours, nine months to a year.

22 COMMISSIONER BRADFORD: The comment process  
23 itself? That is the whole process; that is not just the  
24 comment period.

25 MR. MARTIN: Well, I think they have a comment

1 period similar to ours --

2 COMMISSIONER BRADFORD: Ninety days.

3 MR. MARTIN: -- maybe 120 days and then some more  
4 massaging.

5 MR. DIRCKS: But I think even before they go out  
6 for comment, as an Executive Branch agency they will have to  
7 go to OMB where they have this interagency review.

8 COMMISSIONER BRADFORD: I think you have answered  
9 the concern that underlay my question. It sounds as though  
10 we are talking about a schedule that contemplates our  
11 publishing a final rule before the EPA standards are  
12 finalized.

13 MR. DIRCKS: Yes.

14 MR. MARTIN: Which, of course, we have done many  
15 times.

16 COMMISSIONER BRADFORD: Yes. No, but I was  
17 thinking of leaving open some of these questions that have  
18 come up this morning for resolution, in light of the  
19 ultimate EPA standard. That clearly cannot be done unless  
20 we are prepared to leave our own rule open for longer than I  
21 would like to.

22 CHAIRMAN HENDRIE: Well, it seems to me that we  
23 can certainly go out for comment.

24 COMMISSIONER BRADFORD: Oh yes, yes.

25 CHAIRMAN HENDRIE: And then people have to

1 struggle with whether we want to go final before EPA? Or  
2 semi-final, saying: Folks, this --

3 COMMISSIONER BRADFORD: Fill in the numbers.

4 CHAIRMAN HENDRIE: -- isn't final, but here is  
5 what it will be as soon as the EPA does something. I don't  
6 know. Something like that. Okay, look. Let us meet again  
7 on this subject next week just to keep it going and so it  
8 doesn't fall apart.

9 COMMISSIONER AHEARNE: How about perhaps finishing  
10 it?

11 CHAIRMAN HENDRIE: Well, very possibly maybe  
12 finish it. What I would like to hear from you on next time  
13 is some discussion on the points that I have raised and that  
14 other Commissioners have raised here this morning, but I am  
15 obviously interested in the ones that I punched at.

16 COMMISSIONER BRADFORD: So am I.

17 CHAIRMAN HENDRIE: And presumably by the next go  
18 'round you will be in shape to --

19 COMMISSIONER BRADFORD: Yes.

20 CHAIRMAN HENDRIE: -- be ready to vote, so the  
21 prospects are we might be able to vote next week. I will  
22 have to look at the schedule and see when that best comes.

23 COMMISSIONER BRADFORD: Later is better than  
24 earlier. It is a calendar problem.

25 CHAIRMAN HENDRIE: Well, the chances are it is

1 Thursday afternoon, isn't it, Sam?

2 MR. CHILK: Yes.

3 MR. DIRCKS: It is Wednesday that Jack has to be  
4 out in Santa Fe to talk to the people about uranium mill  
5 tailings.

6 MR. CHILK: Friday may be a possibility?

7 CHAIRMAN HENDRIE: When are you going to be around?

8 MR. DIRCKS: Will you be here Friday?

9 CHAIRMAN HENDRIE: Or Wednesday?

10 MR. MARTIN: Tuesday would be good.

11 COMMISSIONER BRADFORD: Tuesday is not so good for  
12 me, at least if I wind up circulating anything substantial  
13 on Friday night.

14 MR. MARTIN: I am not sure I can get back from  
15 Santa Fe by Friday.

16 CHAIRMAN HENDRIE: You need a meeting before  
17 Wednesday? When are you going?

18 MR. MARTIN: Well, I haven't set the reservations  
19 yet, but it is a Thursday meeting at Santa Fe. I think you  
20 can leave Thursday morning and still get there. Coming back  
21 is harder. There is a plane that leaves at 7:00 and gets  
22 there at 10:00.

23 COMMISSIONER AHEARNE: Gets to Santa Fe or  
24 Albuquerque?

25 MR. MARTIN: Albuquerque, so that's another hour.

1 So that could be done.

2 CHAIRMAN HENDRIE: All right. I just have to look  
3 at it first and the Commissioners' schedule. I could bounce  
4 things around on Tuesday, but that is not good for you.

5 COMMISSIONER BRADFORD: Well, we can bounce some  
6 things around some more but I'm not sure we can vote on  
7 Tuesday. I will try, but I am not sure.

8 CHAIRMAN HENDRIE: That's right. It also moves up  
9 your time.

10 COMMISSIONER BRADFORD: Yes.

11 CHAIRMAN HENDRIE: If we have to slip to the  
12 yellow, why, let's see. Sam will look at the schedule.

13 COMMISSIONER GILINSKY: What happens Wednesday?

14 CHAIRMAN HENDRIE: Well, if he's got to be there  
15 Thursday, I would hate to -- You know, we could run it, but  
16 there is an emergency drill warning Wednesday morning that  
17 other things being equal, I ought to be out there for.  
18 Wednesday afternoon we were going to talk about the operator  
19 qual rule, but we could slide that. But if he is going to  
20 be in Santa Fe Thursday, why, it is sort of cruel and  
21 inhuman treatment to keep him here through Wednesday  
22 afternoon.

23 MR. MARTIN: If we could get a vote on this, I  
24 would be willing to be abused.

25 (Laughter.)

1 CHAIRMAN HENDRIE: I wouldn't allow you to put  
2 yourself in that position lest it create a feeling of  
3 obligation over on this side.

4 COMMISSIONER BRADFORD: Well, if Jack is willing  
5 to be abused I think it might be worth trying Wednesday.

6 CHAIRMAN HENDRIE: Let's see what we can --

7 MR. CHILK: I will work something out.

8 CHAIRMAN HENDRIE: But normally you would have  
9 been traveling Wednesday afternoon?

10 MR. MARTIN: Yes.

11 CHAIRMAN HENDRIE: I just don't know that you can  
12 get there without going Wednesday afternoon.

13 COMMISSIONER BRADFORD: Although flying west you  
14 may be able to leave fairly late on Wednesday afternoon and  
15 still --

16 MR. MARTIN: I think you can.

17 COMMISSIONER BRADFORD: -- get there at a  
18 reasonable hour.

19 MR. MARTIN: Yes.

20 CHAIRMAN HENDRIE: Okay, thank you very much.

21 (Whereupon, at 12:06 p.m. the meeting was  
22 adjourned.)

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NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the  
COMMISSION MEETING

in the matter of: Public Meeting - Briefing on SECY-81-267 - 10 CFR 60  
Disposal of High-Level radioactive Wastes in Geological  
Repositories - Technical Criteria  
Date of Proceeding: May 20, 1981

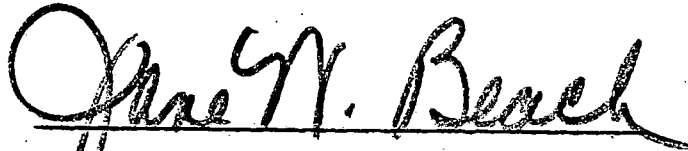
Docket Number:

Place of Proceeding: Washington, D. C.

were held as herein appears, and that this is the original transcript  
thereof for the file of the Commission.

Jane W. Beach

Official Reporter (Typed)

A handwritten signature in dark ink, reading "Jane W. Beach". The signature is written in a cursive style with a large, looped initial "J".

Official Reporter (Signature)