

# UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

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BRIEFING ON PROPOSED 1989 WASTE CONFIDENCE DECISION

- - - -

PUBLIC MEETING

Nuclear Regulatory Commission  
One White Flint North  
Rockville, Maryland

Wednesday, July 26, 1989

The Commission met in open session, pursuant to notice, at 2:00 p.m., Kenneth M. Carr, Chairman, presiding.

COMMISSIONERS PRESENT:

KENNETH M. CARR, Chairman of the Commission  
THOMAS M. ROBERTS, Commissioner  
KENNETH C. ROGERS, Commissioner  
JAMES R. CURTISS, Commissioner

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STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

SAMUEL J. CHILK, Secretary

WILLIAM C. PARLER, General Counsel

ROBERT M. BERNERO, Director, Office of Material Safety  
and Safeguards

STUART TREBY, Assistant General Counsel for Rulemaking  
and Fuel Cycle

FRANK GILLESPIE, Director, Program Management, Policy  
Development

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

2:00 p.m.

CHAIRMAN CARR: Good afternoon, ladies and gentlemen.

In October, 1979, the Commission initiated a generic rulemaking to assess the degree of assurance that radioactive waste can be safely disposed of to determine when such disposal of off-site storage will be available and to determine whether radioactive waste can be safely stored on site past the expiration of existing facility licenses until off-site storage or disposal is available.

In issuing the findings in the Waste Confidence Decision in August of 1984, the Commission noted that the decision was a prediction and committed to review its conclusions on waste confidence whenever significant or pertinent events occur or at least every five years until a repository for high-level radioactive waste and spent fuel is available.

In August of 1988, the Commission requested that the staff initiate such a five year review and provide its findings to the Commission. The purpose of today's meeting is to hear from the NRC staff regarding its review and proposed revision of the Commission's Waste Confidence Decision. Copies of the

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1 presentation slides should be available at the  
2 entrance of the meeting room.

3 Do any of my fellow Commissioners have any  
4 opening comments?

5 If not, Mr. Bernero, you may proceed.

6 MR. BERNERO: I'll defer to the Chairman.

7 MR. TREBY: My name is Stuart Treby. I'm in  
8 the Office of the General Counsel. When this Waste  
9 Confidence Review Group was established in August of  
10 1988, the head of the group was determined to be from  
11 the Office of General Counsel. When it was  
12 established, Martin Malsch was the initial Chairman of  
13 it. But when he assumed his duties as Acting  
14 Inspector General, I assumed the position of Chairman  
15 of the Waste Confidence Review Group.

16 The Waste Confidence Review Group also had  
17 as part of its membership senior management members of  
18 the Office of NMSS, which is Mr. Bernero; the Office  
19 of NRR, which is Frank Gillespie, who is to my far  
20 left; and from the Office of Research, Derwood Ross.  
21 Unfortunately, Mr. Ross is on travel today and he's  
22 not able to be with us.

23 The Waste Confidence Review Group received  
24 great assistance from other members of each of these  
25 offices, including: Karen Cyr, from the Office of

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1 General Counsel; Robert MacDougall, John Roberts,  
2 Julia Corrado, from the Office of NMSS; Gerald Wermiel  
3 and Helen Pastis, from the Office of NRR; and Bob  
4 Kornasciewicz, from the Office of Research. The  
5 purpose of enumerating all these people is to indicate  
6 that this is a collegial effort from the various  
7 offices and the report that you're going to receive  
8 today is one from the Waste Confidence Review Group  
9 and is not from those individual offices.

10 CHAIRMAN CARR: I understand.

11 MR. TREBY: The presentation is going to be  
12 made by Mr. Bernero, and I'll let him do so at this  
13 time.

14 MR. BERNERO: Thank you, Stuart.

15 It's fair to ask why are we here. The  
16 Commission, in its Waste Confidence Proceeding, and  
17 this is part of it, is engaged in a generic  
18 environmental finding.

19 (Slide) If we go to slide one, I've got  
20 some notes here. The whole thing started with reactor  
21 licensing litigation. The purpose of establishing  
22 waste confidence was to enable continued licencing.  
23 The original proceeding actually took five years. It  
24 ran approximately from 1979, late 1979, into 1984, and  
25 culminated in the Commission decision of 1984 which

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1 included a pledge, as you noted, Mr. Chairman, to  
2 revisit the subject should major events occur or at  
3 least every five years.

4 Well, we're now in the 1989 review, the five  
5 year review, and there have been some events and we'll  
6 speak of them in the presentation, events that could  
7 and should lead to some subtle changes in the  
8 findings.

9 (Slide) May I have slide 2, please?

10 It started with a November, 1976, petition  
11 from the Natural Resources Defense Council that raised  
12 two matters of petition. They're enumerated on this  
13 chart here on slide 2.

14 The first petition matter was to seek  
15 rulemaking on whether radioactive wastes from nuclear  
16 reactors could ever be safely disposed of -- and  
17 consequently you'll hear this "waste confidence"  
18 phrase used frequently -- whether there is confidence  
19 that one could ever dispose of the waste.

20 And item two, the petition asked that the  
21 NRC not grant operating licenses or amendments thereto  
22 until that finding of safety could be made. That was  
23 the petition.

24 Now I note here on this slide -- and you  
25 should keep in mind, because it affects the dates that

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1 appear in the finding -- it so happened that in 1976,  
2 two utility companies requested license amendments to  
3 expand their spent fuel storage capacity, absent any  
4 destiny for the spent fuel. Those two reactors that  
5 were involved are Prairie Island and Vermont Yankee.  
6 And their dates, the dates associated with those  
7 licenses, became very significant.

8 (Slide) May I have slide 3, please?

9 The matter, the petition, the NRC's action  
10 on it, and so on, this matter was litigated until more  
11 than two years later, shortly after the Three Mile  
12 Island accident, the U.S. Circuit Court Appeals did  
13 not vacate the license amendments that were granted to  
14 those cases, Vermont Yankee and Prairie Island. But  
15 the Court of Appeals did remand to the NRC the issue  
16 that's stated right here on slide 3, and the key  
17 aspects of it are that the Commission should determine  
18 whether there is reasonable assurance of an off-site  
19 storage solution by the years 2007-2009.

20 Now that pair of dates coincide with the  
21 then expiration dates of those two licenses. They  
22 have since been amended in the practice of going from  
23 40 years after construction permit to 40 years after  
24 operating license. But keep in mind that's where  
25 those two numbers, those two dates, 2007 to 2009--

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1 and it lends an air of false precision to the thing,  
2 as if somehow or other there was some very special  
3 date, plus or minus one year. And it's not that at  
4 all. It's purely circumstantial.

5 The other thing, toward the end of that  
6 remand statement, is reasonable assurance that fuel  
7 can be safely stored at reactor sites beyond those  
8 dates, because of the obvious time it would take to  
9 ship fuel to a repository. So that's the substance of  
10 the remand to the Commission.

11 (Slide) May I have slide 4, please?

12 The Commission stated its purpose for the  
13 1979 Waste Confidence Proceeding, the one that  
14 culminated in '84, and it had three elements to it.

15 The first is on the third line of that  
16 quote. It is whether waste can be safely disposed of.

17 The second element is when such disposal or  
18 off-site storage would be available.

19 And the third element is farther down in the  
20 quotation. It's whether waste can be safely stored  
21 on-site past the expiration date.

22 So three elements of the Waste Confidence  
23 Decision are: whether off-site disposal is feasible,  
24 when it might be available, and what do you do until  
25 it is available. That proceeding went on for five

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1 years, until 1984.

2 (Slide) May I have slide 5?

3 If you look at slide 5, you see the first  
4 elements of what those findings were, and these of  
5 course are just shorthand words for the full length of  
6 the findings which we'll touch on later.

7 The first one, whether, is covered.  
8 Disposal in a repository is feasible. That's the  
9 Commission answering the question of whether it's  
10 feasible.

11 The second element addressed when. And the  
12 Commission concluded, carrying those dates forward, at  
13 least one repository will be available by 2007-2009;  
14 and sufficient repository capacity will be available  
15 within 30 years to dispose of all spent fuel and high-  
16 level waste generated. At that time, the Commission  
17 envisioned what most of us envisioned, a multiple site  
18 exploration and development of at least two high-level  
19 waste repositories.

20 The number three finding there, the spent  
21 fuel and high-level waste will be safely managed.

22 (Slide) And if you go to slide 6 you'll see  
23 the rest of it. Items 4 and 5 on slide 6, it's  
24 basically the Commission's conclusion that things can  
25 be safely managed on-site for 30 years beyond the

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1 expiration of a reactor's operating license, as item 4  
2 says on page 6.

3 So the Commission's conclusions, then,  
4 covered: a favorable conclusion, yes, high-level waste  
5 repository is feasible; two, it will be available by  
6 these artificial dates that derive from two licensing  
7 cases; and 30 years beyond the expiration of an  
8 operating license one can safely assume the materials,  
9 the spent fuel, will be handled properly.

10 (Slide) May I have slide 7, please?

11 As a corollary to that, the Commission had  
12 two rulemakings. I just note them here. The key  
13 thing is the one rulemaking calls on spent fuel  
14 management plans to be clearly identified five years  
15 prior to operating license expiration. Recall for the  
16 moment that the handling of the spent fuel is treated  
17 outside of the handling of decommissioning.  
18 Decommissioning speaks only to the plant and the  
19 contamination thereof. The spent fuel is considered  
20 discretely and separately. So this 10 CFR 50.54 deals  
21 with that.

22 And 10 CFR 51.23 provides the generic  
23 environmental impact finding that disposes of this  
24 issue in a generic fashion so that you don't have to  
25 raise this confidence finding in individual licensing

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1 cases or amendments.

2 (Slide) May I have page 8, please?

3 Slide 8 lists the principal issues that were  
4 considered. Two of them are worthy of special  
5 reconsideration in 1989, where you're dealing with the  
6 aftermath of the 1987 revision of the Nuclear Waste  
7 Policy Act.

8 Now finding or issue number 1 and number 6  
9 speak right to the question of slipping schedules, in  
10 the first place, and then the narrowing of the focus  
11 to a single site. The Nuclear Waste Policy Act  
12 Amendment of 1987, of course, closed off all  
13 investigations of other sites and the second  
14 repository and focused all DOE's resources on the  
15 Yucca Mountain site. So that raises a question of  
16 timing, availability. And this was all in a context  
17 of schedules for the repository that were already  
18 slipping.

19 Now I'd like to go through the findings  
20 review and point out the proposed changes to the  
21 findings and why we're proposing those changes.

22 (Slide) So if I have slide 9, please?

23 The original finding number 1 and the  
24 recommended finding number 1, which are the same, they  
25 say that safe disposal is technically feasible. Now

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1 if you look at the Waste Confidence Paper that we  
2 furnished to you, we went through rather exhaustively  
3 the issues on page 10.

4 (Slide) If you look at slide 10, in the  
5 proposed paper, if anything we feared that we had too  
6 much in there. Because, we did try to look and even  
7 edited downward a careful reevaluation of the  
8 technical issues on waste package, on waste form, the  
9 role of reprocessing. I might add here that presently  
10 the repository would have both reprocessed waste from  
11 the Defense program and onward processed waste, namely  
12 spent fuel, from the civilian reactor program. We  
13 looked at the backfill technology for a repository,  
14 sealants for shaft seals and tunnel shields.

15 And basically, having looked at all of that  
16 information with the fundamental question, what do we  
17 know today that we didn't know in 1984, and is there  
18 anything there that would shake the confidence of the  
19 finding? On that basis, as we say here on this slide,  
20 the NRC staff has no basis for decreased confidence in  
21 the technical feasibility of geologic disposal.  
22 There's a lot of technology there. This is not to say  
23 that designs are final or even site selection is final  
24 by any means, but it says that the technology is  
25 there. There's no basis for decreased confidence,

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1       therefore we say finding number 1 should stay the  
2       same.

3               (Slide)   If we go to page 11, the original  
4       finding number 2 has a couple of things that are a  
5       little bit troubling.

6               For one, those two dates, 2007-2009 that  
7       derive from the Prairie Island and Vermont Yankee case  
8               are there and they don't exceed the present  
9       schedule by a significant amount.   The present  
10      schedule nominally is a repository available in 2003,  
11      but many people suggest it will probably slip in the  
12      next mission plan amendment, which is expected soon.  
13      But the key issue for the Commission to look at is not  
14      whether those precise years mean anything, but what is  
15      the significance of them.   Do we need that precision?  
16      Does confidence rest on those years?   So that's one  
17      major problem with it.

18              And then the further words, right after  
19      those dates, "that sufficient repository capacity will  
20      be available within 30 years beyond expiration of any  
21      reactor operating license ...".   As you probably  
22      recall, the Nuclear Waste Policy Act Amendment of 1987  
23      said stick with one site.   Go with Yucca Mountain.  
24      Look at it first and shift only to another site if  
25      needed.   Don't come to us for the second repository

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1 for a good long time. And further, there is a 70,000  
2 metric ton limit on Yucca Mountain. The first  
3 repository still has that limit from the original Act.

4 Well, the result is, if you look -- and even  
5 if you postulate accepting Yucca Mountain, you can't  
6 put all off the spent fuel from the current generation  
7 of reactors in 70,000 tons, the projected spent fuel  
8 generations. So the wording of this finding is  
9 obsolescent, if not obsolete.

10 (Slide) So if we go to slide 12, we touch  
11 briefly on the two licensing cases that were part of  
12 the basis -- they were the basis for the dates.

13 (Slide) And the 30 year time frame,  
14 shifting now to page 13, is really a description of  
15 what the Commission saw before it five or more years  
16 ago. There was a conservative estimated time for  
17 disposal of all spent fuel -- again, remember as I  
18 said earlier, expecting more than one repository. And  
19 there was a general evaluation of the long-term  
20 storage in terms of the reliability of engineered  
21 structures.

22 When the Commission first put out 10 CFR  
23 10.72, the regulation for licensing spent fuel  
24 storage, I think I can say accurately -- I was  
25 personally involved in it -- we all thought of wet

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1 storage, of spent fuel, wet pools just like the ones  
2 at reactors only more like GE Morris, a separate wet  
3 pool sitting on the same site or at some nearby site.

4 And the considerations, if you go back into  
5 the records of the earlier review, there was this  
6 general understanding of multiple repositories and  
7 some interim storage, probably wet. And then the  
8 institutional considerations were ones of how long can  
9 you expect that after a site is dormant, after the  
10 last reactor shuts down, that you've got the  
11 management presence, the health physics, the financial  
12 assurance and all of that, to be confident of active  
13 control of spent fuel, and a rather conservative  
14 judgement was drawn and that's where the 30 years  
15 comes from. It was a very conservative cast of that.

16 (Slide) Now, if we go to page 14, the Waste  
17 Confidence Review Group recommends that the Commission  
18 consider a substantive change in the finding for  
19 finding number 2. There is not that precision of a  
20 certain date plus or minus one year. What we think is  
21 that the proper time horizon here is not in individual  
22 years, but in decades. We're dealing with blocks of  
23 time that are notably larger than one year. In fact,  
24 the Commission, in its review every five years is even  
25 being rather tight considering how events evolve in

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1 this arena.

2 So, we shouldn't have a finding that hinges  
3 on a certain date plus or minus one year. What we  
4 recommend instead is that the Commission finds  
5 reasonable assurance that at least one, and we are  
6 observing DOE developing only one right now, one mined  
7 repository will be available within the first quarter  
8 of the 21st century. That's the next century, only 11  
9 years from now, and that sufficient repository  
10 capacity will be available within 30 years beyond the  
11 licensed life. Now, we made a subtle change in that  
12 phraseology too, license life instead of expiration of  
13 an operating license, for the simple reason that there  
14 is widespread interest in and possibility of plant  
15 life extension.

16 We have already extended licenses to shift  
17 from 40 years after construction permit to 40 years  
18 after operating license issuance, which is usually a  
19 relatively minor change, but there is active technical  
20 consideration of ten or 20 or perhaps even 30 years of  
21 plant life extension by license renewal. So, we  
22 consciously changed the phraseology to reflect the  
23 total license life.

24 Now, the reasons for changing finding 2 are  
25 enumerated in the next seven slides in this packet. I

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1 will use slide 15 just to highlight them. If you  
2 wish, I can go into individual ones.

3 (Slide) If we turn to page 15, each letter  
4 has a slide dedicated to it, so that the things are  
5 there if you wish to go into detail. But basically,  
6 if you look at A, B and C, you've got a fundamental  
7 issue. The Nuclear Waste Policy Act Amendment put all  
8 the effort on one site, Yucca Mountain, so that you  
9 could say a fairly significant schedule impact can  
10 ensue if something goes wrong with Yucca Mountain, if  
11 you find it unacceptable.

12 So, what we did, the Waste Confidence Review  
13 Group made what I consider a very pessimistic  
14 assumption. Please don't interpret that as a  
15 prediction or a projection. We said, "Let us  
16 postulate the maximum sort of delay one might envision  
17 that we would linger on Yucca Mountain, arguing,  
18 haggling, evaluating, characterizing until the end of  
19 this century, until the year 2000, 11 years from now,  
20 and then finally DOE would give up and say, 'No, we  
21 need another site,' and they would go back to the  
22 Congress then, 11 years from now."

23 Now, in their '87 Mission Plan Amendment,  
24 they made a projection of the time it takes to go to  
25 the Congress, screen sites, narrow it down,

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1 characterize a site, prepare an application, go  
2 through all of that and get to operation of a  
3 repository. Now, they did that in the context of a  
4 second repository and they projected 25 years. So, we  
5 said, "Let's assume that we agonize over Yucca  
6 Mountain for another ten or 11 years and then it takes  
7 another 25 years to get a replacement site operating."  
8 From that, we got the words at the end of the quarter,  
9 the next quarter of the next century.

10 The increased confidence -- this is Item E  
11 on that chart. The increased confidence in long-term  
12 storage is really worth noting because in the time  
13 since the previous waste confidence finding, a very  
14 successful program has borne fruit. Among other  
15 things, the Congress commissioned the Department of  
16 Energy to look at dry storage and alternatives for dry  
17 storage of spent fuel and the Department of Energy  
18 supported such a program. Industry people  
19 participated in fair degree.

20 Right now, we've got -- and I'll show you a  
21 few pictures a little bit later -- we've got what I  
22 would consider a very promising, highly reliable  
23 technology, with many options available for the  
24 storage of spent fuel and for that storage to be done  
25 for many, many years. The conditions are such that

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1 you don't have any significant thermal gradients or  
2 instabilities. They're very, very passive systems,  
3 nothing sensitive, nothing delicate to them.

4 So, this raised with that highly reliable  
5 spent fuel storage the possibility to look at 40 years  
6 of originally licensed life for a reactor and perhaps  
7 even up to 30 years of renewed life. We don't know  
8 what the license renewal movement might show up,  
9 whether ten, 20 or 30. But perhaps as much as 70  
10 years of operating, of licensed life for a reactor and  
11 then another 30 years after that expiration of  
12 licensed life. So, one has in the finding the  
13 technology to support at least that much dry storage  
14 with confidence.

15 (Slide) So, if I go next to page 22, unless  
16 you would want to linger on one of those subjects, we  
17 have three final findings that are all associated with  
18 the until aspect, what do you do in the meanwhile.

19 If you look at finding number 3, the  
20 Commission is finding that high-level radioactive  
21 waste and spent fuel will be managed in a safe manner.  
22 We have no reason to change this finding. As we've  
23 discussed in the paper, we know a fair amount more  
24 about it now. We've got more experience with these  
25 alternatives and there are even more options than we

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1 envisioned before for handling this. So, there is no  
2 reason to change finding 3 and the group recommends  
3 that we retain it.

4 (Slide) If we go to finding 4, there was a  
5 minor problem with it. I have it on page 23. If you  
6 look at the original finding 4, it's got a slightly  
7 cumbersome wording. It says, "For at least 30 years  
8 beyond the expiration of that reactor's operating  
9 license." It's a little bit troubling because we  
10 thought that could be interpreted to be the initial  
11 operating license. So, if you go to page 24, we  
12 reworded the finding to clarify it and perhaps we made  
13 it a little too long. But if you go to it, you'll see  
14 that we changed it to say at least 30 years beyond the  
15 licensed life for operation of that reactor and that  
16 makes it consistent with what I pointed out in finding  
17 number 2. So, it embraces license renewal.

18 Then, in what is perhaps the superfluous  
19 sentence, the last sentence, to make it very explicit  
20 we put in, "If a reactor's operating license were  
21 renewed for 30 years, this would extend the whole  
22 period to as much as 100 years." We don't really  
23 expect that at all. Some of this fuel has been around  
24 for perhaps 20 years now. But if you envision a  
25 repository becoming available at the latest at the end

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1 of the first quarter of the next century, the oldest  
2 fuel around at that time would be of the order of 50  
3 years old.

4 This finding -- the principal change in it  
5 is the licensed life for operation of the reactor,  
6 just to embrace renewal. The final sentence could be  
7 deemed superfluous if you feel that way.

8 (Slide) If you go to slide number 25 then,  
9 the original and recommended 1989 finding number 5 is  
10 essentially reasonable assurance of safe, on-site  
11 storage or off-site storage.

12 Now, right now, the MRS, which was  
13 originally envisioned as the more likely off-site  
14 storage, is not likely to be feasible unless there's  
15 some change in legislation. The Nuclear Waste Policy  
16 Act Amendment of '87 put a lot of conditions on the  
17 MRS that tied it to the repository so tightly that it,  
18 in essence, becomes the head end of the repository.  
19 That's being considered by the MRS Commission right  
20 now. They should make their report in November, I  
21 believe it is, of this year. There may not be an MRS  
22 in capital letters, but the trends in dry storage at  
23 the sites that we have now are, in some respect,  
24 replacing or supplanting the need for an MRS. I  
25 sometimes use the expression "MRS in lower case

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1 letters."

2 (Slide) If you go to the first photograph,  
3 please, Karen.

4 Some of these pictures you may have seen  
5 before. We have licensed and are licensing now dry  
6 storage. The first photograph that we have is of the  
7 Surry reactor. This is a low-level helicopter view of  
8 the storage pad. Now, those casks in the foreground,  
9 those cylinders that are sort of white, you can see  
10 the people farther in the background and one of them  
11 in the transporter, this is basically just a concrete  
12 pad parking lot with a standardized cask. It's loaded  
13 with the older spent fuel in relatively large numbers  
14 of fuel assemblies.

15 This is a PWR, the Surry plant in Virginia.  
16 You just line them up. They're passive, they're not  
17 operating at high temperature. There's no active  
18 cooling system. They require no special surveillance.  
19 They're so big you can't readily go in there and steal  
20 them or damage them very well. You see the size of  
21 the transporter that's used to haul them. There are  
22 virtually no threats that are significant to them.  
23 They have a security fence and some sort of  
24 surveillance on them for long-term maintenance.

25 (Slide) May I have the next photograph,

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1 please?

2 A variation on the theme is rather than have  
3 individual casks, go to a concrete bunker or module  
4 and have canisters of spent fuel put into it, sort of  
5 like a mausoleum, and then put a shielded closure plug  
6 over it. Here, this one is at the H.B. Robinson plant  
7 in South Carolina. That cylindrical object on the  
8 yellow truck with the crane reaching over it is  
9 actually a shipping cask that's used just to move on-  
10 site. There is a stainless steel can, a cartridge or  
11 a module called the New Home 7. It has seven PWR fuel  
12 assemblies in it and there's a hydraulic ram that's  
13 pulling it into that cylindrical hole in the bunker.  
14 As soon as you have the cylindrical hole filled, that  
15 is it's in the mausoleum, you close the shielded door  
16 and you once again have no big thermal gradients, a  
17 passive cooling system, too big to hurt or steal. So,  
18 you have on-site, very passive, very long-term, easily  
19 monitored fuel storage. This trend is increasing.

20 (Slide) May I have the third photograph,  
21 please, Karen?

22 Right now, the ~~Scout~~ Nuclear Station in  
23 South Carolina is building an enlarged version of what  
24 you just saw in the previous photograph. This is a  
25 bunker system also and all you see now is the

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1 reinforcing bar with the three PWRs in the background  
2 behind it. It's right on the site there. It's a  
3 chosen flat area and it has a larger module that goes  
4 in. It holds 24 PWR assemblies in each can.

5 There are so many variations. The staff is  
6 reviewing topical reports in large number and all  
7 these options add up to a very widely available,  
8 highly reliable set of options for managing spent fuel  
9 for decades. So, findings 3, 4 and 5 with the minor  
10 change I noted are worthy of support by the  
11 Commission.

12 COMMISSIONER CURTISS: This finding can be  
13 made, it sounds like, independent of the availability  
14 of an MRS. It doesn't depend upon an MRS.

15 MR. BERNERO: Yes, indeed. Yes.

16 COMMISSIONER CURTISS: Okay.

17 MR. BERNERO: You don't really need an MRS.  
18 It uncouples, it goes on an even broader basis of  
19 confidence for the Commission with respect to safe, on  
20 site or off-site storage. These modules are on-site,  
21 as you have seen, but there's no mandate that they be  
22 on-site. They could be at virtually any site.

23 COMMISSIONER CURTISS: Okay.

24 MR. BERNERO: So, if I can summarize the  
25 whole thing, the Waste Confidence Review Group

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1 recommends to the Commission that we modify two of the  
2 conclusions as indicated to reflect the schedule and  
3 the broader time horizon and the minor subtlety about  
4 spent fuel storage and that the Commission reaffirm  
5 its waste confidence finding and to do so the  
6 Commission would publish the material that we  
7 furnished you for comment and then after due  
8 consideration of comments make the final finding later  
9 this year.

10 I'd be happy to answer any questions you  
11 have.

12 CHAIRMAN CARR: Commissioner Roberts?

13 COMMISSIONER ROBERTS: I want to frame this  
14 intelligently and so it's answerable. Suppose there  
15 is a repository in the first quarter of the next  
16 century limited to the 70,000 tons, forgetting or  
17 discounting any fuel pool storage or any of these last  
18 things you're speaking of. How does the 70,000 tons  
19 available compare with what would be needed, not  
20 allowing fuel pool storage, dry storage? Now, maybe  
21 that's too convoluted a --

22 MR. BERNERO: No, no, it's not too  
23 complicated. I think what we can do is --

24 Karen, if you go to those backup graphs,  
25 figure 2, version 2.

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1 I have some slides and just on the outside  
2 chance, our colleagues in NRR took pains to make these  
3 up and I have four sets of them here, if I could hand  
4 them to you, if you could, please, Mr. Chairman.

5 (Slide) This is an approximate projection.  
6 Remember, we're projecting operating reactors and how  
7 much spent fuel and who's going to change the fuel  
8 enrichment and burn up. Wherever possible, we tried  
9 to use the Department of Energy data. If you look at  
10 the squares on this chart of figure 2, version 2, that  
11 heavy curve going up, that is the projection of spent  
12 fuel generation by reactors in thousands of tons. You  
13 see that 70,000 tons is about the year 2015 or 2020 is  
14 when you reach that total.

15 Now, the little crosses are on-site  
16 inventory assuming that you start around the year 2005  
17 or 3, whatever that is. Actually, what you see is  
18 that the rate of generation is not so great that you  
19 desperately need the second repository right away. If  
20 you proceed in an orderly fashion with the first  
21 repository and it has a 70,000 metric ton capacity,  
22 and you follow the admonition of the Congress that as  
23 you proceed with the first one around the year 2000,  
24 you go to them and say, "I'm ready for the second  
25 one." DOE would then dust off their site screening

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1 files and start on the second repository.

2 You can see from the curves that you don't  
3 get into desperate straits. You've got this  
4 flexibility of dry storage, which is equivalent to an  
5 MRS --

6 COMMISSIONER ROBERTS: I understand.

7 MR. BERNERO: -- that takes away the  
8 pressing need. You don't have to do two repositories  
9 in parallel.

10 COMMISSIONER ROBERTS: You answered my  
11 question. Second brief question. Why do we have to  
12 review this every five years?

13 MR. BERNERO: Well, that's what the previous  
14 Commission said.

15 COMMISSIONER ROBERTS: Can we change that?

16 MR. BERNERO: I would think so. We have  
17 strongly recommended to you that the planning horizon  
18 should be in decades. So, I certainly think that the  
19 Waste Conference Review Group would join you in saying  
20 that the reconsideration might be in major events or  
21 in decades or something like that.

22 MR. PARLER: I think the choice in the first  
23 instance was a policy decision and not a legal  
24 requirement or the legal decision which kicked this  
25 thing off in the first instance in 1979.

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1 COMMISSIONER ROBERTS: Thank you. That's  
2 all I have.

3 CHAIRMAN CARR: Commissioner Rogers?

4 COMMISSIONER ROGERS: The ACRS had some  
5 concern, didn't they, regarding the ability of the  
6 staff to confirm that the repository complies with the  
7 probablistic standards developed by the EPA? Where  
8 does that concern stand?

9 MR. BERNERO: Ah-ha. A favorite subject  
10 with me. We touched on this, by the way, if you  
11 wanted to make reference to it, in slide number 17.

12 The possibility that Yucca Mountain would  
13 prove unsuitable, in a left-handed way we are also  
14 accounting for the possibility that a precedent  
15 setting standard, such as the EPA high-level waste  
16 standard, might go further than saying yes or no on  
17 Yucca Mountain as a site, but prove to be an  
18 intractable or unusable standard for any site because  
19 of its sheer demand. I interpret the comment of the  
20 ACNW as being in that vein. Not so much that it  
21 proves Yucca Mountain as unacceptable, but that it  
22 might not be a usable standard.

23 We have a very, very substantial discussion  
24 of this going on with staff, with the ACNW. The EPA  
25 is trying to move this year to repromulgate 40 CFR

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1 191, which is the reference standard. Basically,  
2 there are two views on the subject that we're trying  
3 to deal with and reconcile. One view says that no  
4 matter how much you wish it, such a demanding  
5 standard, pondering the imponderable, trying to look  
6 out 10,000 years and make quantitative findings at  
7 very, very low levels of likelihood is just simply  
8 impossible, that you should throw up your hands and  
9 walk away from it.

10 On the other hand, there are those who feel  
11 that the words of the standard and of our regulation  
12 which call for the consideration of 10,000 years and  
13 events of these low probabilities but warn that this  
14 is not proof in the ordinary sense of the word, that  
15 those words are sufficient to give you an intelligent  
16 basis to evaluate the far future in such an  
17 unprecedented way and make a reasonable litigatable  
18 finding.

19 That's the contest. The jury is still out.  
20 We have a lot of active debate going on. I hope very  
21 soon to be able to come before the Commission and lay  
22 out this decision, the elements of this decision and  
23 this particular controversy.

24 COMMISSIONER ROGERS: When would you expect  
25 to bring that to us?

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1 MR. BERNERO: This year definitely. I'm  
2 hoping to do it before the summer is out.

3 COMMISSIONER ROGERS: I think it's very  
4 important.

5 MR. BERNERO: Oh, it's extremely important.  
6 I think it's the heart of the decision process on  
7 high-level waste, what is society expecting and what  
8 are we promising when we say there is reasonable  
9 confidence that adequate isolation in deep geology  
10 will be available.

11 CHAIRMAN CARR: But that doubt and hesitancy  
12 you don't think affects our confidence decision at  
13 this point in time?

14 MR. BERNERO: No, we don't. We think that  
15 that is how you establish that it is acceptable, the  
16 mechanics, the logic. Often people cite in reactor  
17 regulation -- in fact, I heard part of your meeting  
18 this morning. You have a safety goal that flits into  
19 the licensing review and then flits out of the  
20 licensing review.

21 CHAIRMAN CARR: That's the right word.

22 MR. BERNERO: Do you really make the finding  
23 based on the number or do you use the numbers as a  
24 numerical discipline, for instance in high-level waste  
25 Yucca Mountain when we briefed you on the 11th. I

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1 showed you the picture of the volcanoes. Are we  
2 judging the volcanoes by numbers or are we using a  
3 numerical discipline to get the scientist to sit down  
4 and talk about the age of cinder cones and the size of  
5 magma fields and the geological parameters? It's the  
6 methodology of decision making that's here.

7 COMMISSIONER CURTISS: I guess I thought in  
8 view of the uncertainty on that question, given the  
9 work that the staff is doing with the statement, the  
10 discussion of the issue in the Federal Register notice  
11 was a little bit strong, that it came down on the side  
12 of saying that the Commission is confident at this  
13 point that the EPA standard -- on page 12, the  
14 Commission does not share the concern that the EPA  
15 standard can't be applied. "Despite initial  
16 reservations about its ability to implement the  
17 standards, NRC is not of the opinion that such  
18 standards can be implemented."

19 Until we see what the EPA standard is and  
20 whether they change 10,000 to 100,000, until we get  
21 your paper, maybe it would be appropriate to stay  
22 neutral on that.

23 MR. BERNERO: If you would permit me--  
24 touche. We had four Commission papers, all of which  
25 touched on this subject. Well, they weren't all

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1 Commission papers. There were two Commission papers,  
2 this one, the one I just refereed to about the  
3 decision making, another rulemaking paper and the  
4 letter to the ACNW. We had the same phraseology, the  
5 phraseology before you in all of them and that  
6 reflects one of the salient views on the subject.

7 The jury is still out, the debate is still  
8 on. That set of words in this paper got before you in  
9 insufficient time. I should point out to you, we do  
10 need to change that.

11 COMMISSIONER CURTISS: Okay.

12 MR. BERNERO: We do need to change that  
13 passage because it's too sanguine. It slides over.  
14 You know, it's too conclusive.

15 COMMISSIONER CURTISS: The sentence that I  
16 thought captured it, if I understood what you were  
17 saying, is on page 13. Actually, I think the overview  
18 on page 17 captures the right emphasis. But in the  
19 second full paragraph where it says -- well, you can  
20 explain to me what you're saying here. "The  
21 Commission further concludes that there is  
22 insufficient basis at this time to determine that the  
23 EPA standards will be promulgated in a forum for which  
24 it would be impossible to evaluate compliance." Can  
25 you tell me what you're trying to get? I think you're

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1       trying to get at the same thing there, but it had so  
2       many negatives in it, I wasn't quite sure.

3               MR. BERNERO:   Well, yes.   We're trying to  
4       deal with a standard that hasn't been presented yet.  
5       The concern is the degree of flexibility that exists  
6       for the NRC to amplify in its own rulemaking.  
7       Remember in our long-range strategy we have a  
8       rulemaking we presented to you on how do you implement  
9       their standard?   What are the licensing review  
10      findings and calculations and conclusions that are  
11      needed?

12              In the present version of the EPA standard,  
13      the one remanded by the court, there are a number of  
14      places where it falls back to a great uncertainties,  
15      not proof by the ordinary sense of the word, phrases  
16      and passages that give flexibility.   The standard  
17      itself has certain numerical values in it that are  
18      quite stringent.

19              In the final version, whatever numerical  
20      values exist and whatever implementation clues exist  
21      in the words, if not carefully reviewed could give you  
22      an unimplementable standard.   If someone said,  
23      "Calculate with a high level of assurance that the  
24      probability of exceedance is X, where X is an  
25      extremely strict limit," you just can't do it because

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1 you're dealing with probabilities that are really down  
2 in very low levels.

3 But if you're trying to distinguish a  
4 societal decision that says, "I want to look as far as  
5 I can look, which is 10,000 years to the next ice age,  
6 and I want to look at repositories the way I find them  
7 and understand them and the way they might be upset by  
8 foreseeable earthquakes or volcanoes or whatever in  
9 that time period, and I want to make a knowledgeable,  
10 disciplined finding that that's a good site," what  
11 does it take in an EPA standard numerically and in  
12 implementation clues to enable that? That's the idea  
13 we were trying to get across. It's a tough issue.

14 COMMISSIONER CURTISS: That's all.

15 CHAIRMAN CARR: Commissioner Curtiss, any--

16 COMMISSIONER CURTISS: No, that covered my  
17 topics. I just wanted to comment that I think the  
18 staff and the working group did a good job, an  
19 excellent job on the paper. It was well done and  
20 persuasively presented it pretty cohesive. I think  
21 you all did a good job and the other people who aren't  
22 here ought to be commended for it.

23 CHAIRMAN CARR: I agree with that. I think  
24 it was a thorough and comprehensive analysis of the  
25 Waste Confidence Decision and I think you've done a

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1 good job of going back and bringing it up to date.

2 I think it's important that this will be the  
3 basis for future Commission decisions. I think we  
4 should emphasize that the Commission is required to  
5 make these findings as the result of a court decision  
6 and that the findings shouldn't be interpreted as the  
7 Commission's preferred method of fuel disposal.

8 I think I speak for all of us when I say our  
9 preferred method is the permanent repository in  
10 accordance with the Nuclear Waste Policy Amendments  
11 Act as revised and we certainly don't want 115 storage  
12 sites in the country for permanency.

13 I am encouraged, however, that the  
14 operational experience and research has come up with  
15 the dry storage and the extended storage of fuel  
16 doesn't lead to significant degradation of the spent  
17 fuel integrity. I believe you presented a pretty  
18 strong case for, given adequate time and resources, a  
19 technically acceptable disposal site can be found.

20 I believe the next action on the matter is a  
21 notation vote by us and I would encourage us to finish  
22 that as soon as possible, considering the information  
23 that they presented us.

24 It was a good briefing.

25 Any other comments? No questions?

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1 We stand adjourned.

2 (Whereupon at 2:52 p.m., the above-entitled  
3 matter was adjourned.)

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PLACE OF MEETING: ROCKVILLE, MARYLAND

DATE OF MEETING: JULY 26, 1989

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COMMISSION BRIEFING

ON

PROPOSED 1989  
WASTE CONFIDENCE DECISION

JULY 26, 1989



### WASTE CONFIDENCE PROCEEDING

- O A GENERIC ENVIRONMENTAL FINDING
- O RESULTED FROM REACTOR LICENSING LITIGATION
- O ORIGINAL PROCEEDING 1979-1984
  - 1984 DECISION
  - PLEDGE TO REVIEW EVERY 5 YRS
- O 1989 REVIEW

### NOVEMBER 1976 NRDC PETITION

1. FOR RULEMAKING ON WHETHER RADIOACTIVE WASTES FROM NUCLEAR REACTORS CAN BE SAFELY DISPOSED OF; AND
  2. THAT NRC NOT GRANT OPERATING LICENSES OR AMENDMENTS UNTIL ABOVE FINDING OF SAFETY CAN BE MADE.
- O TWO NUCLEAR UTILITY COMPANIES REQUEST LICENSE AMENDMENTS TO EXPAND SPENT FUEL STORAGE CAPACITY (NOVEMBER 1976)

O U.S. CIRCUIT COURT OF APPEALS DID NOT  
VACATE LICENSE AMENDMENTS, BUT DID  
REMAND TO NRC THE FOLLOWING ISSUE IN  
MAY 1979:

"WHETHER THERE IS REASONABLE ASSURANCE  
THAT AN OFF-SITE STORAGE SOLUTION WILL  
BE AVAILABLE BY THE YEARS 2007-2009,  
THE EXPIRATION OF THE PLANTS' OPERATING  
LICENSES, AND IF NOT, WHETHER THERE IS  
REASONABLE ASSURANCE THAT FUEL CAN BE  
SAFELY STORED AT REACTOR SITES BEYOND  
THOSE DATES."

PURPOSE OF 1979 WASTE CONFIDENCE  
PROCEEDING:

"SOLELY TO ASSESS GENERICALLY THE DEGREE  
OF ASSURANCE NOW AVAILABLE THAT RADIO-  
ACTIVE WASTE CAN BE SAFELY DISPOSED OF,  
TO DETERMINE WHEN SUCH DISPOSAL OR OFF-  
SITE STORAGE WILL BE AVAILABLE, AND TO  
DETERMINE WHETHER RADIOACTIVE WASTES CAN  
BE SAFELY STORED ON-SITE PAST THE  
EXPIRATION OF EXISTING LICENSES UNTIL  
OFF-SITE DISPOSAL OR STORAGE IS  
AVAILABLE."

### 1984 WASTE CONFIDENCE FINDINGS

1. DISPOSAL IN A REPOSITORY IS FEASIBLE
2. AT LEAST ONE REPOSITORY WILL BE AVAILABLE BY 2007-2009; SUFFICIENT REPOSITORY CAPACITY WILL BE AVAILABLE WITHIN 30 YRS TO DISPOSE OF ALL SPENT FUEL AND HLW GENERATED
3. SPENT FUEL AND HLW WILL BE SAFELY MANAGED

#### 1984 WASTE CONFIDENCE FINDINGS (CONT'D)

4. SPENT FUEL CAN BE SAFELY STORED FOR  
AT LEAST 30 YEARS BEYOND EXPIRATION  
OF A REACTOR'S O.L.
5. SUFFICIENT ON-SITE OR OFF-SITE STORAGE  
CAPACITY WILL BE MADE AVAILABLE, IF  
NEEDED.

### WASTE CONFIDENCE RULEMAKINGS

- o 10 CFR 50.54 PROVIDES THAT LICENSEES  
SUBMIT PLANS FOR SPENT FUEL MANAGEMENT  
AT-REACTOR NO LATER THAN 5 YRS PRIOR  
TO OPERATING LICENSE (OL) EXPIRATION
- o 10 CFR 51.23 PROVIDES THAT NO  
DISCUSSION OF ANY ENVIRONMENTAL  
IMPACT OF SPENT FUEL STORAGE  
FOLLOWING OL EXPIRATION IS  
REQUIRED IN CONNECTION WITH A  
LICENSE OR LICENSE AMENDMENT FOR  
A REACTOR OR AN ISFSI

REVIEW OF ISSUES CONSIDERED IN  
1984 DECISION

1. FINDING TECHNICALLY ACCEPTABLE SITES  
IN A TIMELY FASHION
2. TIMELY DEVELOPMENT OF WASTE PACKAGES  
AND ENGINEERED BARRIERS
3. INSTITUTIONAL UNCERTAINTIES IN  
REPOSITORY PROGRAM
4. CONTINUITY OF WASTE PROGRAM MANAGEMENT
5. CONTINUED PROGRAM FUNDING
6. DOE SCHEDULE FOR REPOSITORY DEVELOPMENT



ORIGINAL AND RECOMMENDED 1989  
FINDING 1

"THE COMMISSION FINDS REASONABLE  
ASSURANCE THAT SAFE DISPOSAL OF HIGH-  
LEVEL RADIOACTIVE WASTE AND SPENT FUEL  
IN A MINED GEOLOGIC REPOSITORY IS  
TECHNICALLY FEASIBLE."

BASIS FOR REAFFIRMING ORIGINAL FINDING 1

- O WASTE PACKAGE
- O WASTE FORM/REPROCESSING
- O BACKFILL
- O SEALANTS
- O CONCLUSION

- ON BASIS OF RESEARCH TO DEVELOP  
WASTE FORM, WASTE PACKAGE, BACKFILL,  
AND SEALS, NRC STAFF HAS NO BASIS  
FOR DECREASED CONFIDENCE IN  
TECHNICAL FEASIBILITY OF GEOLOGIC  
DISPOSAL.

## ORIGINAL FINDING 2

"THE COMMISSION FINDS REASONABLE ASSURANCE THAT ONE OR MORE MINED GEOLOGIC REPOSITORIES FOR COMMERCIAL HIGH-LEVEL RADIOACTIVE WASTE AND SPENT FUEL WILL BE AVAILABLE BY THE YEARS 2007-09, AND THAT SUFFICIENT REPOSITORY CAPACITY WILL BE AVAILABLE WITHIN 30 YRS BEYOND EXPIRATION OF ANY REACTOR OPERATING LICENSE TO DISPOSE OF EXISTING COMMERCIAL HIGH-LEVEL RADIOACTIVE WASTE AND SPENT FUEL ORIGINATING IN SUCH REACTOR AND GENERATED UP TO THAT TIME."

## BASIS FOR ORIGINAL COMMISSION FINDING 2

1. 2007-09 TIMEFRAME FOR REPOSITORY  
OPERATION BASED ON COURT REMAND OF  
ISSUE FROM REACTOR LICENSING CASES --  
NOT A REQUIREMENT FOR SAFETY OR  
ENVIRONMENT
2. 30-YEAR TIMEFRAME FOR AVAILABILITY OF  
SUFFICIENT CAPACITY BASED ON:

BASIS FOR ORIGINAL COMMISSION FINDING 2  
(CONT'D)

- A. CONSERVATIVE ESTIMATED TIME FOR  
DISPOSAL OF ALL SPENT FUEL AFTER  
2007-09
- B. EVALUATION OF TECHNICAL  
CONSIDERATIONS FOR LONG-TERM  
STORAGE (E.G., RELIABILITY OF  
ENGINEERED STRUCTURES)
- C. EVALUATION OF INSTITUTIONAL  
CONSIDERATIONS FOR LONG-TERM  
STORAGE (RELIABILITY OF  
FINANCING AND MANAGEMENT)

## RECOMMENDED 1989 FINDING 2

THE COMMISSION FINDS REASONABLE ASSURANCE THAT AT LEAST ONE MINED GEOLOGIC REPOSITORY WILL BE AVAILABLE WITHIN THE FIRST QUARTER OF THE 21ST CENTURY, AND THAT SUFFICIENT REPOSITORY CAPACITY WILL BE AVAILABLE WITHIN 30 YRS BEYOND THE LICENSED LIFE FOR OPERATION OF ANY REACTOR TO DISPOSE OF THE COMMERCIAL HIGH-LEVEL RADIOACTIVE WASTE ORIGINATING IN SUCH REACTOR AND GENERATED UP TO THAT TIME.

BASIS FOR RECOMMENDED 1989 FINDING 2

- A. DELAYS IN DOE PROGRAM PRIOR TO NWPAA
- B. NEED TO ACCOUNT FOR POSSIBILITY THAT YUCCA MOUNTAIN SITE WILL PROVE UNSUITABLE
- C. SUSPENSION OF SITE-SPECIFIC ACTIVITIES FOR SECOND REPOSITORY
- D. DOE ESTIMATE OF TIME REQUIRED FOR SECOND REPOSITORY
- E. INCREASED CONFIDENCE IN LONG-TERM STORAGE
- F. REVIEW OF ISSUES CONSIDERED IN 1984 DECISION

A. DELAYS IN DOE PROGRAM PRIOR TO NWPAA

1. 5-YEAR SLIPPAGE IN DATE FOR REPOSITORY AVAILABILITY (FROM 1998 TO 2003) (DOE DRAFT 1987 MISSION PLAN AMENDMENT, JANUARY 1987)
2. SLIPPAGE IN NEAR-TERM MILESTONES FOR EXPLORATORY SHAFT EXCAVATION AND START OF IN-SITU TESTING (DOE DRAFT AND FINAL 1987 MISSION PLAN AMENDMENTS)



B. NEED TO ACCOUNT FOR POSSIBILITY THAT  
YUCCA MTN SITE WILL PROVE UNSUITABLE

- O IF YUCCA MTN SITE IS FOUND UNSUITABLE,  
DOE MUST SUSPEND CHARACTERIZATION AND  
REPORT TO CONGRESS

- 1987 NWPAA AUTHORIZED DOE TO  
CHARACTERIZE ONLY YUCCA MOUNTAIN, NV

- SITE CHARACTERIZATION SUSPENDED AT  
HANFORD, WA; DEAF SMITH, TX, SITES

- O NEED TO ACCOUNT FOR POSSIBILITY THAT  
EPA STANDARDS FOR HLW DISPOSAL WILL  
NOT BE TIMELY OR USABLE FOR EVALUA-  
TION OF ANY SITE IN THE NEAR TERM

C. SUSPENSION OF SITE-SPECIFIC ACTIVITIES  
FOR SECOND REPOSITORY

1. NWPAA REQUIRED SUSPENSION OF SECOND  
REPOSITORY, BUT DID NOT REMOVE 70,000  
MTHM LIMIT ON FIRST
2. DOE REQUIRED TO REPORT TO CONGRESS  
WITH RECOMMENDATIONS ON SECOND  
REPOSITORY NO SOONER THAN 2007, NO  
LATER THAN 2010

D. DOE ESTIMATE OF TIME REQUIRED  
FOR SECOND REPOSITORY

1. 25-YEARS FOR SECOND REPOSITORY  
OPERATION, STARTING WITH SITE  
SCREENING (DOE DRAFT 1987 MISSION  
PLAN AMENDMENT)
2. BASIS FOR FINDING ON TIMING
  - A. DOE FINDS YUCCA MTN UNSUITABLE  
IN THE YEAR 2000
  - B. DOE REQUIRES 25-YRS TO PROGRESS  
FROM SITE SCREENING TO REPOSITORY  
OPERATION

E. INCREASED CONFIDENCE IN LONG-TERM  
STORAGE

NEED: WITH POSSIBLE REACTOR LICENSE  
RENEWALS UP TO 30 YRS, CONSERVATIVE  
SCENARIO FOR EARLIEST SPENT FUEL  
GENERATED AT ANY REACTOR COULD BE A  
REQUIREMENT FOR STORAGE UP TO 100 YRS.  
(40-YR INITIAL OPERATING LICENSE, PLUS  
30-YR RENEWAL, PLUS 30-YRS WAITING FOR  
AVAILABILITY OF SUFFICIENT REPOSITORY  
CAPACITY FOR DISPOSAL OF ALL SPENT FUEL)

E. INCREASED CONFIDENCE IN LONG-TERM  
STORAGE (CONT'D)

1. TECHNICAL CONSIDERATIONS

- O NO FAILURE MODES OF SIGNIFICANT  
CONCERN FOR STORAGE POOLS OR  
DRY CASKS
- O IF REPOSITORY AVAILABLE BY 2025,  
100-YR STORAGE WILL NOT BE  
REQUIRED FOR ANY REACTORS

2. INSTITUTIONAL CONSIDERATIONS

ORIGINAL AND RECOMMENDED 1989 FINDING 3

"THE COMMISSION FINDS REASONABLE ASSURANCE THAT HIGH-LEVEL RADIOACTIVE WASTE AND SPENT FUEL WILL BE MANAGED IN A SAFE MANNER UNTIL SUFFICIENT REPOSITORY CAPACITY IS AVAILABLE TO ASSURE THE SAFE DISPOSAL OF ALL HIGH-LEVEL RADIOACTIVE WASTE AND SPENT FUEL."

#### ORIGINAL FINDING 4

"THE COMMISSION FINDS REASONABLE ASSURANCE THAT, IF NECESSARY, SPENT FUEL GENERATED IN ANY REACTOR CAN BE STORED SAFELY AND WITHOUT SIGNIFICANT ENVIRONMENTAL IMPACTS FOR AT LEAST 30 YEARS BEYOND THE EXPIRATION OF THAT REACTOR'S OPERATING LICENSE AT THAT REACTOR'S SPENT FUEL STORAGE BASIN, OR AT EITHER ON-SITE OR OFF-SITE INDEPENDENT SPENT FUEL STORAGE INSTALLATIONS."

#### RECOMMENDED 1989 FINDING 4

THE COMMISSION FINDS REASONABLE ASSURANCE THAT, IF NECESSARY, SPENT FUEL GENERATED IN ANY REACTOR CAN BE STORED SAFELY AND WITHOUT SIGNIFICANT ENVIRONMENTAL IMPACT FOR AT LEAST 30 YRS BEYOND THE LICENSED LIFE FOR OPERATION OF THAT REACTOR AT ITS SPENT FUEL STORAGE BASIN, OR AT EITHER ON-SITE OR OFF-SITE INDEPENDENT SPENT FUEL STORAGE INSTALLATIONS. IF A REACTOR'S OPERATING LICENSE WERE RENEWED FOR 30 YRS, THIS WOULD EXTEND THE EXPECTED DURATION OF SAFE AND ENVIRONMENTALLY ACCEPTABLE STORAGE TO AT LEAST 100 YEARS.



ORIGINAL AND RECOMMENDED 1989 FINDING 5

"THE COMMISSION FINDS REASONABLE  
ASSURANCE THAT SAFE ON-SITE SPENT FUEL  
STORAGE OR OFF-SITE SPENT FUEL STORAGE  
WILL BE MADE AVAILABLE IF SUCH STORAGE  
CAPACITY IS NEEDED."