UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Title: BRIEFING ON STATUS OF PACIFIC NORTHWEST LABORATORIES (PNL) STUDY OF DECOMMISSIONING COSTS

Location: ROCKVILLE, MARYLAND

Date: JUNE 24, 1993

Pages: 51 PAGES

NEAL R. GROSS AND CO., INC.

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PUBLIC MEETING

Nuclear Regulatory Commission
One White Flint North
Rockville, Maryland

Thursday, June 24, 1993

The Commission met in open session, pursuant to notice, at 8:30 a.m., Ivan Selin, Chairman, presiding.

COMMISSIONERS PRESENT:

IVAN SELIN, Chairman of the Commission
JAMES R. CURTISS, Commissioner
FORREST J. REMICK, Commissioner
E. GAIL de PLANQUE, Commissioner

STAFF SEATED AT THE COMMISSION TABLE:

WILLIAM C. PARLER, General Counsel

JOHN HOYLE, Assistant Secretary

JAMES TAYLOR, Executive Director for Operations

THOMAS MURLEY, Director, NRR

CLEMENS J. HELTEMES, Deputy Director, RES

SEYMOUR WEISS, Chief, Nonpower Reactor and Decommissioning Project Directorate, NRR

DONALD COOL, Chief, Rad. Prot. & Health Effects Branch, RES

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

2 8:30 a.m.

3 CHAIRMAN SELIN: Good morning, ladies and
4 gentlemen.

5 This morning the Commission is to receive
6 a briefing from the staff on the costs associated with
7 the decommissioning of nuclear power plants.

8 Five years ago, in July of '88, which is
9 in fact five years ago, the Commission published
10 regulations concerning nuclear power plant
11 decommissioning, including standard decommissioning
12 funding requirements for both pressurized and boiling
13 water reactors. These regulations include minimum
14 required funding amounts and a formula for updating
15 these minimums periodically.

16 Over the last five years, these minimum
17 decommissioning funding amounts have been the subject
18 of repeated analysis, one might even say criticism
19 from a variety of sources for being too low and for
20 not reflecting the real costs that utilities face in
21 decommissioning large reactors. Also, several power
22 reactors have ceased operations prematurely in the
23 last few years before they could run up the full
24 amount of decommissioning funds that was expected.
25 Furthermore, in each case the site-specific cost

1 estimate has been higher than would have been produced
2 from the NRC's generic formula.
3 There are now over 100 operating reactors,
4 many of which are funding for decommissioning on the
5 basis of the minimums required in our regulations and
6 therefore it is a matter not just of neatness and
7 housekeeping, but real importance that the minimums we
8 do require be adequate for their purpose, which is to
9 assure that at least the bulk of the monies needed for
10 decommissioning will be available when needed. This
11 is not easy given the dearth of actual decommissioning
12 experience and also the fact that a number of
13 assumptions such as the fuel being take off-site
14 promptly and a couple of other such assumptions have
15 not held up very well.
16 I understand the staff will address these
17 assumptions as well as how the original estimates have
18 held up, concentrating on both the high level and the
19 extreme variability and uncertainty of low-level waste
20 disposal costs, as well as the regional variation of
21 labor costs, a factor which affected the
22 decommissioning cost estimate for Shoreham quite
23 significantly.
24 With all these points in mind, the
25 Commission is quite interested in hearing from the

1 staff on its efforts to reexamine decommissioning cost
2 and what you might have to say in terms of suggestions
3 for our regulations in this area.
4 Would any of my fellow Commissioners care
5 to make any comment?
6 Mr. Taylor, would you proceed, please?
7 MR. TAYLOR: Good morning. I'll open with
8 a few notes about the briefing which you'll receive.
9 First, the information is based on a draft
10 report prepared by Pacific Northwest Laboratories to
11 look at the subject of decommissioning costs, to give
12 another assessment and a potential update based beyond
13 the development of the decommissioning rule issued in
14 June 1988. This evaluation will cover a referenced
15 PWR, pressurized water reactor facility and boiling
16 water reactors will be a separate report.
17 With me at the table are Jack Heltemes and
18 Don Cool from the Office of Research, Tom Murley and
19 Sy Weiss from NRR. The briefing will commence with
20 Don Cool.
21 DOCTOR COOL: Thank you, Mr. Taylor.
22 Good morning, Commissioners.
23 (Slide) If I can have the second slide,
24 we'll get right into the discussion.
25 I'm going to try and cover several things

1 this morning, a little bit of background on the first
2 assessment to give us a baseline from which to look at
3 the reassessment, the results as we have them from the
4 draft report at this time, and then finally an outline
5 of where we see ourselves going from here in terms of
6 schedule.
7 (Slide) If I can have the next slide.
8 The assessments of the decommissioning
9 costs have been something which have been occurring
10 over a large number of years. It goes way back to the
11 mid-1970s. The first pair of assessments were done
12 for the staff by Pacific Northwest Laboratories, PWRs
13 coming out in 1978 and the BWRs coming out in 1980.
14 There were a whole set of assumptions built into that
15 at that time, including the fact that when those
16 assessments were originally done reprocessing was
17 still a viable option, waste disposal was very cheap
18 and no one was particularly worried about waste
19 volumes. There were a lot of things that could
20 properly be assumed at that time which, of course,
21 have changed since then.
22 The studies were done assuming a reference
23 facility and a reference PWR and a reference BWR were
24 selected. They were both up in the Pacific Northwest.
25 They were Trojan for the PWR and WPPSS for the BWR.

1 Going along with the selection of a particular
2 reference go those set of particular assumptions about
3 labor costs in that particular area, where the waste
4 would go, to Hanford in that case. It was nearby.
5 And those sorts of things which are in some respects
6 facility-specific and make it a little more difficult
7 to then extrapolate to what other facilities would
8 have. As we look at the reassessment, that's going to
9 play out very strongly in a couple of aspects that
10 we'll get into.
11 The assessments were updated in 1986 in
12 preparation to support the decommissioning rule,
13 which, Mr. Chairman, you referred to which came out in
14 1988. So, they were done in 1986 dollars to support
15 that rule. The staff initiated its reassessment with
16 a contract to PNL in late 1990 at the request of
17 Office of Nuclear Material Safety and Safeguards,
18 recognizing that a lot of things had changed at that
19 point and we wanted a complete fresh relook trying to
20 take some of those into account.
21 (Slide) If I can have the next slide.
22 As a starting point, recall the 1988 rule
23 defined decommissioning as being for unrestricted
24 release of the facility in terms of radiological
25 criteria in terminating the license. More

1 specifically, and this is in a footnote to 50.75(c),
2 decommissioning was defined to not include the costs
3 associated with spent fuel and costs for other
4 activities at the site which were for things other
5 than radiological. Any other demolition of the
6 buildings, any other activities were specifically
7 excluded by the regulation as being part of the
8 decommissioning cost. That's part of the rule. So,
9 that sets the framework for what was and was not
10 included within the reassessment.
11 CHAIRMAN SELIN: Let me just stop you. I
12 just want to be a little more precise. They're not
13 part of the decommissioning costs, but they are not
14 costs against which we require assurance.
15 DOCTOR COOL: They are not costs for which
16 we require assurance as we've defined decommissioning.
17 As the Commission has defined decommissioning in that
18 definition, it's from a radiological standpoint to
19 meet our criteria for unrestricted use. So, things
20 that you would do which aren't related to meeting the
21 radiological criteria might be things that you would
22 want to do for any number of reasons that are outside
23 our jurisdiction.
24 CHAIRMAN SELIN: The reason I'm nitpicking
25 about that is that it was never intended that these

1 estimates be full decommissioning costs. These were
2 intended to be requirements against which escrow
3 accounts have to be built to meet our radiological
4 decommissioning requirements.
5 DOCTOR COOL: That's correct.
6 CHAIRMAN SELIN: So, we're ending up a
7 little bit comparing apples and oranges.
8 DOCTOR COOL: That's correct, yes. And
9 you have the difference between the term of art which
10 we've defined as decommissioning with that narrow
11 definition. The more wide general use of the term
12 which is all of the things that you would do at the
13 facilities. So, there's a difference there in terms
14 of whether we're using decommissioning in quotes, if
15 you will, and a more general use of the term.
16 COMMISSIONER REMICK: Mr. Chairman, might
17 I add, I'm sure you know that the public does not
18 understand it well at all and that's why it's believed
19 that there's a deficiency in our regulation.
20 COMMISSIONER CURTISS: And, Don, the
21 rationale behind the decision not to treat spent fuel
22 management, I gather, was that the Department of
23 Energy had a program going forward at the time that by
24 the time these plants would decommission, the spent
25 fuel would be moved off to the repository or

1 conceivably an MRS?

2 DOCTOR COOL: That's correct. And, in

3 fact, at the time the studies were originally done in

4 '78, one of the assumptions built in was that it would

5 be there for 120 days or so and would go to a

6 reprocessing plant. At that time, the GESMO operation

7 was still in play and a lot of things in the late

8 '70s. So, there were a number of assumptions there.

9 It was assumed that fuel would be gone relatively

10 quickly, that there was in place the process with DOE

11 for waste disposal, and even with the decommissioning

12 rule in the mid-'80s, the waste confidence, it was

13 assumed that DOE would have the facilities that that

14 plan would be in place that the high-level waste would

15 be taken care of. That's correct.

16 (Slide) Slide 5.

17 The three alternatives from the original

18 report, the first being DECON, which was the prompt

19 decontamination following shutdown to the point where

20 you could release it for unrestricted use. There are

21 several facilities that have, in fact, done this or

22 are doing it. Fort St. Vrain, for example, is in the

23 process of DECONing, Shoreham. The Shipping Port

24 reactor has been DECONed. So, there are several

25 examples where folks have moved forward in that kind

1 of mode of operation.

2 Alternatively, an alternative would be the
3 SAFSTOR approach where you would do certain things to
4 place the facility in a stable situation and then you
5 would hold onto it for a period of time to allow
6 relatively short lived materials to decay away,
7 followed by going ahead and doing whatever else was
8 necessary to decontaminate for unrestricted use. A
9 good example there is Pathfinder, where they put it
10 into a SAFSTOR period for a number of years and came
11 out of that just a couple years ago and finished the
12 activities just earlier this year.

13 The third alternative that was looked at
14 in the study was an ENTOMB study where you would
15 remove the radiological contamination from around the
16 facility, but leave the containment itself either with
17 or without some of the internals such as the lower
18 shroud and things in place, seal it up and leave it
19 there for decay, no matter whatever period of time
20 that was. It could be a very long period of time.
21 There are a couple of the older small facilities, such
22 as the Bonus facility in Puerto Rico, Piqua up in Ohio
23 where, in fact, that was done. Those have been
24 ENTOMBed and are continuing to be watched under
25 various programs.

1 So, those were the three alternatives.

2 COMMISSIONER CURTISS: Don, is the Agency

3 officially neutral on which of these alternatives a

4 licensee pursues or do we have a preference between

5 and among these options?

6 DOCTOR COOL: With the 1988 rule, the

7 Commission has expressed a negative preference in a

8 sense that ENTOMB would not fit the definition of

9 decommissioning where you take it down for release for

10 unrestricted use. ENTOMB assumes that you've got some

11 sort of guardianship continuing. The rule does not

12 specify a preference between DECON and SAFSTOR. It

13 allows a period of up to 60 years, which would

14 certainly encompass a SAFSTOR sort of proposal. So,

15 either one of those are certainly viable under the

16 regulation. Per se, DECON would not be within the

17 regulatory structure, but the structure also provides

18 that a licensee could apply and could be granted on a

19 site specific basis to do that sort of approach.

20 So, we haven't expressed a positive

21 preference, a slight negative preference away from the

22 long-term controls.

23 (Slide) Slide 6.

24 The results of the original study for PWRs

25 and BWRs, these are in constant 1986 dollars as they

1 came out of the report and were updated in '86. DECON
2 of $103.5 million for PWRS, several numbers for
3 SAFSTOR, depending on how long you assumed you watched
4 it before you went back in and took care of it, and in
5 ENTOMB where the INC means "included," the internals
6 included. They were still in the area, or that the
7 internals were removed.
8 (Slide) If I can go ahead and have the
9 next slide.
10 That resulted in the requirements which
11 are in 50.75 for PWRs of $105 million. We rounded it
12 up slightly and placed that as the minimum
13 requirement. $135 for BWRS. We selected the DECON
14 option in placing those financial assurance
15 requirements on. That was the most expensive option
16 in the study at that time. Place an inflation factor
17 into the regulation which is based, once again, on the
18 1986 dollars. So, those ratios only hold assuming
19 labor costs, energy costs and burial costs in 1986, 65
20 percent, 13 percent and 22 percent. Each of those
21 were adjusted each year for what happens in each of
22 those three areas and they may not be consistent. We
23 know burial has gone up significantly and that's why
24 you have a formula for escalating them.
25 COMMISSIONER REMICK: Don, in arriving at

1 those estimates, what was used as a definition of
2 unrestricted use, Part 20?
3 DOCTOR COOL: The assumption used for the
4 unrestricted use was the guidance in place, Reg. Guide
5 1.86, the Branch Technical Positions, those criteria
6 that were in place then. I should note that the
7 reassessment uses those same criteria as the
8 Commission reaffirmed last year with its SDMP action
9 plan. Those criteria presently in place were the
10 criteria assumed.
11 COMMISSIONER REMICK: Later on when you
12 come to the current estimates, if you'd know how
13 sensitive the estimates are to what is defined as
14 the -- what one assumes for the decommissioning
15 criteria in a qualitative sense, I would appreciate
16 knowing.
17 DOCTOR COOL: I think I can go ahead and
18 answer that real quickly. I don't have a good answer
19 for you today. I already have PNL working under a
20 separate contract to give me that exact breakout. We
21 have asked them to look at a range of dose values
22 right through the range on down to a very small number
23 that would match the EPA's 10^{-6} in support of the GEIS
24 for the criteria rule because that's one of the things
25 we know we'll need and we're developing that over the

1 next couple months.

2 COMMISSIONER REMICK: That's fine. Thank

3 you.

4 DOCTOR COOL: (Slide) Slide 8.

5 Looked at a number of things, or had PNL

6 look at a number of things in the reassessment. Some

7 of the things related to technology, such as what you

8 would actually do in terms of decommissioning. The

9 original study assumes you would go in and you'd take

10 off two inches of concrete. Waste disposal was very

11 cheap. Go in and get it, a very conservative

12 approach. The reality is you don't go in and you rip

13 off two inches of concrete. You go in and you take

14 off a quarter inch or a half inch and you check to see

15 if you've done the job to try and minimize the amount

16 of waste. So, that factor has been taken into

17 account. High density packaging, cutting up pieces

18 and packaging them in a high density manner, once

19 again to reduce waste volumes, another assumption

20 that's now built into the reassessment that wasn't

21 there before. Things related to safety, both in terms

22 of regulatory requirements, the ALARA requirement, the

23 dose limit requirement.

24 The original study assumed that you had

25 the old Part 23 rem per quarter. Now we're assuming

1 it's five rem per year. You've got the revised Part
2 20. So, that makes a difference in how you would
3 utilize workers. How a utility would actually go
4 about supervising, managing, planning the activities.
5 There's an increased level of planning, increased
6 level of oversight, increased health physics coverage
7 that now takes place as a result of a variety of
8 factors, post-TMI and a variety of things in the
9 regulatory regime.
10 So, the control mechanisms, oversight,
11 supervision and planning, trying to take into account
12 the reality of how this work is actually done this
13 time, costs, both including what we've learned in the
14 last 15 years or so about decommissioning, things like
15 Shipping Port and some of the activities where there
16 have been activities that have taken place, costs
17 associated with low-level waste disposal. That's one
18 of the really volatile ones and we'll see that in a
19 couple of minutes.
20 And timing and some of the assumptions
21 about that. The original study assumed the fuel was
22 going to be gone very quickly. Now the assumption is
23 that you have the fuel sitting around for awhile. DOE
24 has a requirement that it has to have cooled off at
25 least five years. That's the same time period that we

1 have before you could put it in an MRS. It has to do
2 with heat generation. So, you're going to have the
3 fuel around for a considerably long period of time
4 than originally assumed, even longer than that likely
5 given the current DOE acceptance schedules, some of
6 those sorts of things, influences, timing associated
7 with the particular options.
8 (Slide) If I can have the next slide,
9 slide 9.
10 There are a couple of things that are not
11 factored into the reassessment by virtue of the way
12 the regulations are constructed. Restoration of the
13 site to "green field." That term of art, if you will,
14 for all of the things you would do, once again not
15 related to radiological cleanup, further demolition of
16 the building, other things that you would do there, as
17 we discussed before, and the management of spent fuel
18 because spent fuel is handled separately as an
19 operational cost, this time under 50.54(bb).
20 Now, we did ask PNL to take a very cursory
21 look, this is one of the things that we did just in
22 the last couple months, at what spent fuel management
23 costs might look like, although they are not included
24 in the numbers that are on the next slide. We can
25 come back and address those, if you like, but those

1 are not included in the numbers because they're not
2 included in the decommissioning financial assurance
3 under the regulation.
4 COMMISSIONER REMICK: Don, do we have any
5 requirements, guidance or is there any industry
6 general practice on how long to store in a pool before
7 going to dry storage?
8 DOCTOR COOL: There is a requirement that
9 it be cooled a minimum of five years before you can go
10 to a dry storage facility because of the heat
11 generation considerations.
12 (Slide) Slide 10. Sort of like, "And now
13 the envelope, please."
14 From the draft report as we have it at
15 this time, their estimates of numbers, these are once
16 again constant dollars in 1983 dollars. 1993, excuse
17 me. I just suddenly lost ten years. DECON at $124.6
18 million, SAFSTOR, a range of values depending on
19 whether you assume that the facility has had a
20 relatively clean life without any fuel breakdowns,
21 fuel failures. So, it's whether you have relatively
22 short-lived activation products, like cobalt-60, which
23 after 55 years or so you've gone through ten half
24 lives and significantly reduced the activity you have
25 to deal with. But whether you've got some of the

1 cesiums and other things that even after you've gone
2 55 years you're still going to have to deal with them.
3 And ENTOMB, which we continue to consider
4 because a licensee could apply for it as an option.
5 Here, the only thing considered in the assumption was
6 that the internals would have been removed as part of
7 the initial activities, at $162.7 million.
8 SAFSTOR and ENTOMB that period of time
9 particularly are increased now. A couple of things
10 that go into that, added costs of monitoring and
11 surveillance, the ongoing activities associated with
12 the whole variety of the way operational business is
13 conducted, surveys and those increased costs of
14 insurance. Post-TMI we've had a significant increase
15 in what insurance would be. Now, the effects of what
16 might be reduced because you no longer actually have
17 fuel in the core, you're no longer operating the
18 facility. Very difficult to estimate. So, it was a
19 very conservative assumption that the insurance was
20 still a relatively high quantity continuing over those
21 periods of time.
22 COMMISSIONER de PLANQUE: Don, what's the
23 reason for the higher dose on the ENTOMBment?
24 DOCTOR COOL: The higher dose on the
25 ENTOMBment is the result that you go in and you do all

1 of the activities outside of the containment and you
2 remove the internals. You're doing most of the work
3 right on the front end, early on, and then once you've
4 ENTOMBed it, you've got virtually no dose. You've
5 already incurred all your dose and you're just
6 watching it. It's sitting there all sealed up. So,
7 early activities.
8 In the SAFSTOR mode, you've done a lot of
9 the work out between 55 and 60 years. You take
10 advantage of the fact that a lot of the activation
11 products have decayed significantly and thereby you
12 have reduced dose. You have some reduced waste
13 disposal volume, that being dependent on whether
14 you've had fuel failures or not. So, you're still
15 dealing with the cesiums. If you've had that sort of
16 situation, you haven't really gained anything in terms
17 of volumes because you've still got to deal with that
18 other material, even though it may not be as hot as
19 it's decayed.
20 COMMISSIONER REMICK: Don -- oh, excuse
21 me. Go ahead.
22 CHAIRMAN SELIN: No, please go ahead.
23 COMMISSIONER REMICK: What's the rationale
24 that DECON went from being the most expensive in the
25 previous estimate to now being the least expensive?

1 DOCTOR COOL: There are probably a raft of
2 factors that influence that. The cost of watching it,
3 as I said, the costs of insurance. Costs of that
4 uncertainty out there in the course of time is the
5 biggest factors as we've been able to determine it at
6 this point. The staff has had this draft in its hands
7 for one week. We had seen an earlier draft in
8 December after we had talked with Commissioner Curtiss
9 about that at that time. That one was done in 1991
10 dollars. There were a number of things that we asked
11 PNL to do before we believed it would be ready to be
12 looked at for public comment, moving it to '93
13 dollars, looking at waste disposal sensitivities and
14 some of those things. But as we've been able to
15 determine it thus far, the watching it over the course
16 of time, as you can see in the ENTOMB, the assumption
17 is that it's about $1.03 million per year to continue
18 to watch it. If you multiply that by 55 or 60 years,
19 you'll see that there's the majority of the difference
20 between the activities.
21 COMMISSIONER REMICK: In counting that, I
22 would think that with decay you'd end up with less
23 volume going to the waste disposal and with a large
24 waste disposal cost -- I'm not arguing with you, it's
25 just I find it interesting that there was a switch

1 from being the most expensive to least expensive.

2 CHAIRMAN SELIN: Just following up on

3 Commissioner Remick's comments, a fair summary seems

4 to be that DECON costs are within the same ball park

5 as the original costs. You probably could account for

6 all of those that -- for instance, disposal cost for

7 low-level waste, whereas SAFSTOR and ENTOMB are --

8 I'll go back. On an apples to apples basis, not

9 looking at real costs, which include green field costs

10 and high-level waste costs, but on an apples to apples

11 basis, the original estimates of DECON have held up

12 extremely well, and the others have held up very

13 badly.

14 DOCTOR COOL: That's correct. In fact,

15 just so the record is clear, if you simply inflated

16 the old 1986 numbers to 1993 dollars, that number

17 would be $153 million. So, in fact, the estimate is

18 a little bit less for DECON than strictly counting for

19 inflation. That has to do with reductions in waste

20 volume. The assumptions you make about the use of

21 technology and not taking large quantities of

22 material, waste volume comes down by over a factor of

23 two, which tends to offset disposal costs under the

24 assumption, and we'll get there in a minute, about

25 where you dispose of it.

1 (Slide) Go to the next slide.

2 The original study and the numbers I just
3 gave you are all in constant dollars. The reality, of
4 course, is there's inflation, there's interest being
5 accrued on the money. So, in addition to the constant
6 dollars, the draft report contains present value
7 dollars in 1993. These assumes an interest rate or a
8 net rate of three percent interest minus inflation, a
9 discount rate. You can see that when you do that you
10 end up with all the numbers. You can cover them with
11 a very small dime, everything from '91 under the
12 lowest of the SAFSTOR options to $103. So, they all
13 come very close together because your SAFSTOR
14 activities and ENTOMB activities which run out for a
15 long period of time because of your three percent
16 discount rate get discounted back significantly.

17 CHAIRMAN SELIN: The previous one was just
18 adding up the --

19 DOCTOR COOL: The previous one just
20 assumed --

21 CHAIRMAN SELIN: -- value plus over the
22 lifetime of the --

23 DOCTOR COOL: Over the lifetime without
24 any --

25 CHAIRMAN SELIN: Without any discounting.

1 DOCTOR COOL: Without any discounting,
2 that's right.
3 CHAIRMAN SELIN: So, this has the benefit
4 that the huge uncertainties in out year costs are
5 offset by very large amounts of discounting by the
6 time you bring them back?
7 DOCTOR COOL: That's correct.
8 CHAIRMAN SELIN: So, even if you're way
9 off on burial costs for SAFSTOR and ENTOMB, in other
10 words when you finally get around to getting rid of
11 the stuff, you've got a very high discount rate to go
12 through.
13 DOCTOR COOL: That helps to some extent at
14 least, yes.
15 COMMISSIONER REMICK: Don, on the discount
16 rate and I'm not arguing with the three percent. I
17 think history, that's kind of been what it has been.
18 And I'm not sure about this, but I think the
19 Commission has on its desk right now regulatory
20 analysis guidelines that uses a different discount
21 rate.
22 MR. HELTEMES: I can answer that. That's
23 correct, Commissioner Remick. The OMB recommended
24 discount rate is seven percent. So, we reflected that
25 in the revised regulatory analysis guidelines --

1 CHAIRMAN SELIN: Seven percent real
2 discount rate?
3 MR. HELTEMES: Seven percent is the
4 recommended OMB guidance. The staff in the past has
5 used five percent and in the past OMB guidance was ten
6 percent. We thought the difference between the five
7 percent and the ten percent was too large. But when
8 OMB revised their guidance last year to seven percent,
9 we went ahead and adopted it.
10 COMMISSIONER REMICK: The only reason I
11 raise it, I'm one who likes consistency. Why we have
12 two things before us, one three percent and seven
13 percent.
14 MR. HELTEMES: Well, the other thing I
15 should mention is that in the regulatory analysis
16 guidelines we say for very long activities. Part of
17 that was low-level waste disposal type activities. But
18 we took that to be 100 years or so. Then you use a
19 lower discount rate than the seven percent.
20 DOCTOR COOL: And that three percent
21 matches about what you've got here, if I remember what
22 you've got on your desk in terms of the reg. analysis
23 requirements. So, it's not that far off. The other
24 thing that the reg. analysis requirements say --
25 COMMISSIONER REMICK: I'm sorry, I didn't

1 follow that, Don. Why three and seven percent are
2 close?
3 DOCTOR COOL: No, no. The seven
4 percent -- let's try one more time. Let's see if I
5 can dig myself in a hole here. Reg. analysis
6 guidelines assumed seven percent. But for a long-term
7 activity, as Mr. Heltemes said, it suggests use of a
8 smaller number, which would be on the order of three
9 percent, three, four percent. The three percent is
10 relatively consistent with that. The other thing, it
11 says that you also ought to look at what the actual
12 constant dollar would be to see what influence you're
13 having way out there in the future by discounting
14 those down. So, in that sense --
15 CHAIRMAN SELIN: These are very different
16 figures. The OMB figure is supposed to be a figure
17 that you use when figuring out whether federal
18 investment is worthwhile or not and it's not just real
19 interest, it's the cost of capital. In other words,
20 even the federal government can't borrow infinitely as
21 each dollar.
22 DOCTOR COOL: Right.
23 CHAIRMAN SELIN: And before you make long-
24 term investments that aren't going to pay off for ten
25 or 20 years, you need to charge yourself a proper

1 amount of capital, not the three percent that the
2 government charges itself for water projects, which
3 makes investments that don't pay off for 30 years look
4 attractive. This is the other way around. This says
5 that when you're looking at costs to people that are
6 being delayed for awhile, if you use too high a
7 discount rate, you're effectively saying that anything
8 that doesn't get incurred for another five or six
9 years is free.
10 In an industry like ours where you have
11 long-term capital decisions being made, it would be
12 ridiculous to use a seven percent figure. I wasn't
13 aware of the fact we had this figure ahead of us, but
14 I think we really need to take a hard look at that
15 because that says that any investment where you don't
16 really have to start paying off for five, six or seven
17 years is essentially free. In an industry where you
18 don't get any power out of a new plant for five, six
19 or seven years, that's clearly a very poor way of
20 doing things. But this is sort of cost oriented and
21 the other one is an investment oriented figure, very
22 different purposes. For investment oriented you want
23 large figures so that you don't treat capital as free,
24 and for cost you want relatively low discount rates so
25 that you don't ignore it long-term, long-term effects.

1 DOCTOR COOL: Correct.

2 (Slide) Go ahead and go to the next

3 slide, slide 12.

4 The draft report contains a revised

5 formula matching the '93 dollars. If you flip back to

6 the previous slide, you can note that there are some

7 changes. Labor is up a little bit, waste disposal

8 actually down just a little bit, labor and energy down

9 just a little bit. These relating to the relative

10 proportions that labor, energy and the waste disposal

11 contribute to this reference waste disposal cost.

12 Now, one of the things that we recognized as being

13 relatively important was the assumptions you make

14 about waste disposal, where you're going to take it

15 and thereby how much it costs.

16 (Slide) So, one of the things that we

17 asked PNL to take a look at, if I can have the next

18 slide, was the sensitivity of these estimates to the

19 waste disposal assumptions. The assumption of a

20 reference facility being Trojan up in the Northwest,

21 direct access to Hanford, which will continue in that

22 compact. Waste disposal contributed about 25 million

23 to the total, which was 17 percent as we saw a minute

24 ago.

25 If you had to make the assumption that you

1 had to go out of compact, in this case the only way we
2 could try to estimate that was to say what if they had
3 to ship all this for disposal at Barnwell, the other
4 operating facility, it makes a significant difference.
5 To be precise, a factor of almost five, so that waste
6 disposal, instead of being $25 million would be about
7 $106 million. Instead of being roughly 17 percent of
8 the total cost, almost 50 percent, roughly 47 percent
9 of the total.
10 CHAIRMAN SELIN: That's basically the
11 difference between -- obviously transportation is
12 trivial compared to the burial cost. Is that the
13 difference between decommissioning a plant in a
14 compact that has a site versus decommissioning a plant
15 in a compact that doesn't have a site where you have
16 to pay out of compact costs?
17 DOCTOR COOL: It's roughly reflective of
18 that because what you have is you have the Hanford
19 facility which does not have surcharges. So, you're
20 looking at a per cubic foot on the order of $50.00 per
21 cubic foot versus disposal at Barnwell where although
22 the basic charge is in that same vicinity, you've got
23 a $200.00 surcharge, roughly comparable perhaps to
24 what you might expect with an out of compact. From
25 what we understand, compacts may be looking at $270.00

1 to $300.00 or more dollars per cubic foot. So, that
2 gives you some indication of what the disposal cost
3 might be in that environment. And here we're starting
4 to get very speculative in terms of where those
5 numbers may end up.
6 CHAIRMAN SELIN: They're also very
7 significant.
8 DOCTOR COOL: But very, very significant.
9 COMMISSIONER CURTISS: Does the analysis
10 use a set amount that you assume for purposes of
11 disposal costs?
12 DOCTOR COOL: The cost comparison assumed
13 the disposal costs from the beginning of 1993 for
14 Hanford and Barnwell, including the surcharges, and
15 assumed the disposal of the volume which the study had
16 projected, which was roughly 7,000 cubic meters to
17 either one of those locations.
18 COMMISSIONER CURTISS: You don't project
19 out though what you think disposal costs will be?
20 DOCTOR COOL: Have not attempted to
21 project it out. The sensitivity was based on the hard
22 numbers we had for actual disposal at either Hanford
23 or Barnwell right now. To go beyond that, you're
24 going to then start speculating and you give me a set
25 of assumptions and you could rig a set of numbers.

1 DOCTOR MURLEY: May I make a point here?
2 Clearly most of the plants that are going through
3 decommissioning now or that will be in the near future
4 are going to not be able to go to Hanford. So, it's
5 more likely that the Barnwell figures are more
6 typical. Clearly, when you look at the plants that
7 are going through decommissioning now and you see the
8 large costs, Shoreham and Yankee and so forth, it's
9 due largely to this $80 million difference that you
10 see in low-level waste costs.
11 COMMISSIONER CURTISS: let me pick up on
12 that point. If you take a look at the option of
13 SAFSTOR from the standpoint of what the projected low-
14 level waste cost will be, and if you assume just as an
15 operating assumption that the costs are going to be
16 more expensive tomorrow than they are today and
17 perhaps much more expensive ten years from now than
18 they are five years from now, is there any benefit
19 from the standpoint of the volume that a licensee
20 would have to dispose of? Assuming here, for the sake
21 of discussion, that the standards stay the same, the
22 cleanup standards, to seeing the high cost of disposal
23 to simply SAFSTORing for the purpose of decay or does
24 the 60 year outer limit that we've got on that option
25 limit the time frame within which decay would be

1 required to achieve any significant reduction in the
2 volume?
3 DOCTOR COOL: It really depends on the
4 kind of contamination you've got. If you've got
5 activation products and simply cobalt-60, then going
6 out to 60 years will have an impact because you'll be
7 down ten half lives on that. That could reduce your
8 volume significantly. If you've got fission product
9 contamination, cesium and otherwise, 60 years gets you
10 a half life or two, but isn't going to have a major
11 impact on the total volume because you're going to
12 have to remove that material one way or another. So,
13 it really depends on the assumptions you make about
14 the kind of contamination you've got and that's why
15 you saw in the SAFSTOR numbers a range depending on
16 whether or not you had assumptions that you did in
17 fact have decay working for you well or whether decay
18 was buying you something in terms of dose, but not in
19 terms of volumes.
20 DOCTOR MURLEY: Could I also make a point
21 on this? As Don said, we've just gotten the draft
22 report, so we want to take a look at it as well in
23 NRR. But we now have about a half a dozen plants that
24 have prematurely shut down and we have some experience
25 on what requirements, operating cost requirements

1 would be/ For example, security requirements.
2 There's some fitness for duty requirements and those
3 sorts of things. So, we'll get, I think, a better
4 experience judgment on what SAFSTOR costs would be
5 than we had in the original report.
6 My sense is that those costs are going to
7 be higher, those costs of just maintaining the
8 facility than was originally assumed, but I don't have
9 firm numbers on that.
10 COMMISSIONER CURTISS: The important point
11 I'd emphasize here is that the situation with respect
12 to low-level waste today is a much more significant
13 influence on the decommissioning process than it was
14 back in 1988 or than was expected to be.
15 DOCTOR COOL: That's absolutely correct.
16 COMMISSIONER CURTISS: Take just a couple
17 of recent examples. We see situations where the
18 potential for denial of access is driving a utility,
19 in this case Yankee-Rowe, with respect to its steam
20 generators and pressurizer, to move forward as
21 expeditiously as possible to try to get those major
22 components to a facility before the facility closes
23 down. Similarly, it's conceivable that the cost
24 figure, and particularly that starts going up in the
25 $400.00 to $500.00 per cubic foot range, and there

1 have been some that have speculated to go that high,
2 may in turn also have an influence on decommissioning.
3 This consideration, together with the spent fuel
4 consideration, is I think the two most significant
5 developments since the rule has been promulgated and
6 the ones that make it much more problematic trying to
7 predict what the minimum values ought to be and what
8 the future is going to look like, what the options
9 are, what the relative merits of DECON versus SAFSTOR
10 are going to be.
11 DOCTOR COOL: Agree with you completely.
12 (Slide) Go ahead and have the next slide.
13 Just to wrap up what we had wanted to
14 present today, as I said a few minutes ago we've had
15 this version of the PWR draft report for a tad over a
16 week. It's currently under review in the Office of
17 Research, NMSS and NRR. When we complete that and
18 have a draft that has been reviewed, it's still
19 undergoing PNL internal review as well, they have not
20 completed their own QA process on it, our plan would
21 be to publish it for comment, recognizing that there
22 are an awful lot of things out there that are subject
23 to controversy that people have a lot of opinions on,
24 to obtain that public comment prior to going and
25 trying to finalize that report.

1 Similarly with the BWR reevaluation where
2 we tentatively expect a draft in the December time
3 frame, a review, also a public comment period, and to
4 take advantage of the public comments, the things that
5 have come in on that prior to the time of making some
6 recommendations with regard to how the funding
7 requirements should be changed, what factors are in,
8 how some of those things interplay in terms of trying
9 to reset the numbers.
10 COMMISSIONER de PLANQUE: Don, when would
11 you expect the PWR one to be ready for public comment?
12 Have any idea?
13 DOCTOR COOL: I would like to think that
14 it would be within a month or two. It will really
15 depend on how comfortable we are at this point with
16 the draft report. As I had said, we had seen a draft
17 in the December/January type time frame and we
18 requested the contractor to do a number of things.
19 That report had been in '91 dollars. We asked them to
20 update it to '93. We asked them to take a look at the
21 sensitivity of waste disposal, so we haven't had a
22 chance to look at that portion of it. So, I can only
23 speculate in terms of whether or not we'd be ready to
24 have this out later in July or in August. It will
25 really depend on what we see, how quickly PNL

1 completes their own internal review and they're
2 comfortable with their product.
3 CHAIRMAN SELIN: I have a couple of things
4 I'd like you at least to consider before you publish
5 a document. Actually, one set of things before you
6 publish it, one set of things thinking ahead.
7 Before you publish it, given the
8 centrality of both high-level and low-level waste
9 costs, you might consider putting out a couple of --
10 well, not parameters but different situations. In
11 other words, you'll get from the contractor enough
12 information to say what would happen to the estimate
13 if you assumed Barnwell costs instead of --
14 DOCTOR COOL: Correct, we will.
15 CHAIRMAN SELIN: You should look at a few
16 cases rather than just publish the numbers. It might
17 be Barnwell versus Hanford. It might be an assumption
18 that delay for ten years would give everybody access
19 to a compact site. I don't know exactly what cases
20 you'd want to look at, but given how central low-level
21 costs are, rather than just publishing an estimate you
22 might put in front of it some parameters, taking the
23 same factors but making some other assumptions about
24 low-level waste. You should at least think about
25 whether you want to have the staff add that to the

1 contractor --

2 The second point, thinking far ahead, not
3 for the publication of the estimates, but any
4 suggestions you might make, I was thinking about what
5 Doctor Murley said about the public doesn't understand
6 the difference. The reason the public doesn't
7 understand the difference is we haven't explained the
8 difference. What we have here is a classical
9 insurance situation which says that if you project
10 costs, there are a bunch of costs, including green
11 field costs and high-level waste costs. It doesn't
12 mean that one has to be insured against all these
13 costs. They're really two separate amounts. One is,
14 without trying to be too cute about it, what is it
15 going to cost the utility to decommission a plant?
16 The public doesn't care whether it's for radiological
17 reasons, DOE wasn't able to live up to its commitment
18 or this or that. That's a cost. That quantity should
19 be a quantity that's estimated.

20 There's a second cost which is we as
21 radiological regulators, how much is it appropriate
22 for us to require be covered and that could exclude
23 certain whole units, like decommissioning radiological
24 stuff, or it could be based on estimates that says,
25 there's not 100 percent chance that people are going

1 to run through their full 40 year period anyway, so we
2 could conceivably require more rapid buildup of the
3 fund, but not up to 100 percent of the cost. I mean
4 there are a lot of different ways of looking at it.
5 If you separate out what are the total decommissioning
6 costs and what is appropriate for a nuclear safety
7 regulatory agency to require in the way of escrow
8 accounts to protect the public from being stuck with
9 these at least nuisances and probably unsafe
10 situations. That's the kind of thing that I think the
11 staff ought to be thinking about, not just what is the
12 amount and therefore how much do we need at a point in
13 time, namely exactly 40 years after the amount is
14 done. Then I think we'd have much better
15 communication with the public and I think it's also
16 much fairer. So, we're not in a position of, "I'm
17 sorry, that's not our problem. That's your problem."
18 It doesn't mean we have to cover the whole amount. In
19 fact, I don't it would be appropriate to cover the
20 whole amount. But laying them out as two separate
21 pieces when you think about policy recommendations,
22 not analytical views, might be useful.
23 That's the end of your --
24 DOCTOR COOL: That's the end of my
25 presentation. We'll try to answer any other

1 questions.

2 COMMISSIONER CURTISS: I just have a

3 couple of quick questions. This was a good overview

4 and it will be interesting to see as the report gets

5 scrubbed by the contractor and then by us what

6 actually makes it way out for public comment.

7 I have two really unrelated questions.

8 With regard to spent fuel, I understand that you're

9 not including the cost of spent fuel management in

10 this reevaluation, and perhaps appropriately so given

11 what the rule itself says today.

12 But as you look at the spent fuel

13 situation, and in particular the assumptions that were

14 made when the decommissioning rule was promulgated in

15 1988 about what would happen with the spent fuel,

16 clearly we're talking here about a radiological

17 consideration as opposed to a green field issue and in

18 my view they're distinguishable for that reason.

19 Taking a plant to green field may be something that's

20 desired, but it's not essential from the standpoint of

21 a radiological concern that we ought to be focused on.

22 Spent fuel, on the other hand, is clearly

23 a matter that involves a radiological consideration

24 that the licensee will need to account for as it

25 decides to decommission its facility when it takes

1 that decision. And I guess, in looking at the
2 estimates that we've seen on Shoreham and Yankee Rowe,
3 the cost of spent fuel management is a significant
4 contributor to the estimates that those utilities are
5 coming up with for how to manage the radiological
6 component of their decommissioning.
7 I guess what I'd like to just ask and
8 invite you to comment on is, recognizing that the Rule
9 says what it says today, what is the staff's current
10 thinking given the developments that have occurred and
11 the potential that we may see plants shutdown with as
12 much as, I guess, currently 10 to 15 years before a
13 repository would be available? What is the staff's
14 current thinking with regard to whether spent fuel
15 management costs ought to be encompassed in the
16 financial considerations that we as an agency take
17 into account and perhaps require a utility to account
18 for in turn?
19 DOCTOR COOL: Well, let me start and then
20 Mr. Murley or Sy may want to add to it.
21 Spent fuel cost currently covered as an
22 operational cost under 50.54(bb) requires that a
23 utility submit their plan within five years of end of
24 license and of course we have gotten ourselves into a
25 situation where because of a premature shutdown they

1 wouldn't have to even submit that cost until a number
2 of years down the road.
3 Staff is looking right now at considering
4 some requirements which would at least require the
5 utility to submit their plans and how they would fund
6 that at the same time they submit their
7 decommissioning plan. That's an interim step to at
8 least get the timing together on those. We have
9 talked about whether or not and how you would
10 incorporate that more directly into the
11 decommissioning costs recognizing that the structure
12 that we've got of setting up financial assurance
13 targets says you've got a rough estimate of the amount
14 out there.
15 If you're going to weave spent fuel costs
16 into that, you need to likewise have a rough estimate
17 of what a typical plant would have in terms of spent
18 fuel management costs and we know that varies all over
19 the map depending on the DOE acceptance schedule which
20 each facility has. With Trojan you've got it accepted
21 at one time, but some facilities on the currently
22 published acceptance schedule go out 25 years or more.
23 So that's a high variable, but that is one of the
24 things that we've at least considered is how you might
25 approach that.

1 Sy, did you want to add anything?

2 DOCTOR MURLEY: Let me add a point and
3 maybe Sy can add something. My staff collects data
4 and information on what utilities are actually
5 collecting versus what they're required to collect by
6 our regulation and it turns out at about 49 out of 76
7 sites they're actually collecting in excess of NRC's
8 formula and that's largely because their state PUCs
9 are asking them to do that for just these reasons,
10 fuel storage and green field costs. It is a
11 significant cost. Of the three recent shutdowns where
12 they've had to build the ISFSIs, that is on-site
13 storage facilities for fuel, the cost estimates range
14 from $27 million to $56 million, so it's a fair cost.

15 And I'll add one other point, Mr.
16 Chairman. The reason I mentioned the public's views
17 on this was I about a month ago was at a public
18 meeting in Vermont where I thought the focus was going
19 to be exclusively on the plant and safety. It turns
20 out what exercised a lot of the public was
21 decommissioning costs were not being, they felt,
22 collected enough to really decommission the plant the
23 way they understood it.

24 And it sounds very lame, quite frankly, to
25 have to explain, "Well, we only collect part of it for

1 radiological safety," and they don't understand why
2 fuel storage costs are not part of radiological safety
3 costs and in a way it makes us appear to be part of
4 some kind of conspiracy to reduce the apparent cost of
5 nuclear power and I think somehow we've got to do a
6 better job, as well as the industry, in explaining
7 just what we require and why.
8 MR. WEISS: At Trojan, for example,
9 they've estimated that it will be about $220 million
10 in 1989 dollars to do a decommissioning, including
11 substantial removal of the power block on the site.
12 That's about $180 million in terms of just doing the
13 radiological portion. This is about 1989 dollars, so
14 I would guess that Trojan's just radiological
15 decommissioning would be about $216 million in today's
16 numbers. That does not account for spent fuel, which
17 might vary from, I guess, a low of about $27 to $56 to
18 $72 million. Those are the estimates.
19 COMMISSIONER CURTISS: This issue is
20 clearly evolving. We're comparing what we thought in
21 '88 to what we think now in '93 and I suspect there
22 will be further evolutions in this. The Department of
23 Energy, I gather, is taking a look at the option of
24 perhaps funding some of this storage through universal
25 casks under the Waste Fund and it's conceivable that

1 there may be funding mechanisms that emerge separate
2 and apart from the minimum values that we require in
3 the decommissioning rule.
4 The important point, it seems to me, is
5 that, for some of the reasons that Doctor Murley
6 mentions, that it's important to be able to say with
7 respect to at least the radiological risk and explain
8 why we treat the green field differently that we have
9 confidence that the funds will be available to
10 decommission the facility, including management of the
11 spent fuel if required for the licensees that we
12 regulate and that seems to me an important objective
13 here. It's, as I say, something that we've got a
14 different view on now since we first promulgated the
15 decommissioning rule and a much more sharp perspective
16 on what's happening on the waste disposal front.
17 My second question, actually, wholly
18 unrelated to that, we obviously have the same list of
19 what individual utilities are doing, because I did
20 count them and there are in fact 49 that collect more
21 than we require in the minimum values. I guess the
22 question here is more of a question that involves the
23 financial end of this. Who is it in the process who
24 makes a determination as to how much can be invested
25 in qualified funds? It's obviously not us. Is it the

1 IRS or the PUC or who makes that determination?

2 DOCTOR MURLEY: I'll ask Bob Wood from my

3 staff.

4 COMMISSIONER CURTISS: Okay.

5 MR. WOOD: Generally it's the utility in

6 concert with their PUC that makes that decision. As

7 you know, Commissioner, the IRS rules on that were

8 recently changed because of the Energy Policy Act of

9 '92 and the allowable investments were broadened and

10 the tax rate is being ratcheted down on the earnings

11 on the qualified fund. But essentially all investor-

12 owned utilities now are using the qualified fund

13 approach, at least for a significant portion of their

14 funds.

15 COMMISSIONER CURTISS: Right. The reason

16 I raise that question, if the estimates are going up

17 a little and if there are some additional costs

18 related to spent fuel storage that need to be

19 collected, if a utility is permitted to invest in

20 qualified funds, only the minimum value -- and I don't

21 know if that's what's going on with the utilities that

22 have only invested, set aside the minimum value, but,

23 if they're only permitted by their state PUCs to

24 invest the minimum estimates in the NRC Rule in

25 qualified funds and no more, obviously there's a

1 disincentive for them to go beyond that because
2 they're non-qualified funds.
3 And an adjustment to the minimum value, in
4 turn, for those PUCs that tie qualified fund
5 investments to our minimum value might in fact cause
6 those that are investing only what we require today
7 and no more to adjust those upwards and invest the
8 amounts that we're seeing many of these utilities
9 invest beyond what we require, and I don't know if
10 there's a way we can get a handle on that.
11 Actually, my thought as I read this is it
12 would be very useful I think for the Agency, and I
13 know this was discussed in 1988, it would be very
14 useful I think for the Agency now to consider
15 collecting directly from the utilities the information
16 on how much they're setting aside in their funds,
17 whether they're in qualified or non-qualified funds
18 and what the instrument type is. This list that we've
19 gotten from Prudential Securities I gather is the
20 working list that we use, and it's a pretty good list,
21 but there might be some merit in considering,
22 reconsidering the question of whether we ought to
23 collect the information directly from the utilities
24 ourselves.
25 Other than that, I thought this was a good

1 briefing and I appreciate you all putting this
2 together on the short notice that you had with the
3 report having just come in. It was an excellent
4 briefing.
5 CHAIRMAN SELIN: Commissioner Remick?
6 COMMISSIONER REMICK: Just a comment. I
7 certainly agree with several of the comments that have
8 been made about the fact that we probably lack some
9 credibility because we don't fully explain why we're
10 doing things the way we are. And I agree with the
11 comments made that there's nothing wrong and in fact
12 there's some advantage in estimating what going to
13 green field costs might be, but that does not say that
14 we necessarily have to provide assurance because there
15 is a complication. There's more than one example.
16 Because of the value of existing sites,
17 these sites have been converted to other uses,
18 production of electricity or other industrial uses, so
19 I don't think it's safe to assume that just because
20 any type of plant is decommissioning at a site where
21 you have a tremendous investment in cooling towers and
22 intake structures and discharge structures and other
23 industrial buildings that those sites will go back to
24 green fields at least immediately. Elk River is a
25 good example, which was converted to other forms, and

1 there are many examples, but I think it is reasonable
2 to estimate what those costs might be if they went
3 back to that so that we're not accused of overlooking
4 those type of things.
5 And the same thing is on the storage of
6 fuel. It's not just the question of when is Yucca
7 Mountain available. It's a question will DOE fulfill
8 what some people perceive to be their responsibility
9 to accept spent fuel for storage, possibly in an MRS
10 or elsewhere in 1998 or when. So one could make
11 estimates, but one has to factor in those possible
12 considerations also in doing it. But if we at least
13 do it, if we attempt to do it, lay the figures out, I
14 think then we won't be accused of hiding information
15 and so forth.
16 DOCTOR COOL: I should note, in agreement
17 with you, Pathfinder is another example where in fact
18 the utility chose to continue using the infrastructure
19 that it had available. Although it has now
20 decommissioned the reactor itself, it continues to use
21 the same turbine with a materials license because
22 there's a small quantity of byproduct material there
23 and they now use it as a peaking plant.
24 One of the things that we heard in our
25 series of workshops which we talked about with you a

1 couple of weeks ago was there is a considerable
2 sentiment out there about what you would do with these
3 facilities and whether or not it is the right
4 assumption to assume you're going to go back and no
5 longer use it for any purposes such as this, people
6 coming at it not only from the standpoint of using the
7 existing infrastructure but some other industrial base
8 because of the infrastructure or locations that may be
9 there having to do with a whole variety of things
10 including wanting to keep industry locations and
11 otherwise for tax base purposes for local communities,
12 a variety of things like that.
13 COMMISSIONER REMICK: Thank you.
14 CHAIRMAN SELIN: Commissioner de Planque?
15 COMMISSIONER de PLANQUE: My questions
16 have been covered, so thank you for the briefing.
17 CHAIRMAN SELIN: Okay. I'd like to thank
18 you very much also. I personally think, based on this
19 discussion, and this was an illuminating discussion,
20 clearly the centrality of the waste cost leads to a
21 somewhat different approach, more of a parametric
22 approach and less of a point estimate in what we're
23 going to do in the future.
24 I would like to hear from Mr. Weiss or
25 somebody in the not too distant future how we

1 reconcile the real estimates of the Trojan costs with
2 the parametric estimates of the Trojan costs. Since
3 you're talking about the same amount of waste and the
4 same compact, it's not a generic question.
5 But more broadly, I hope that we as a
6 Commission can find our way, more like what we do in
7 the SDMP, to arrive at an overall estimate of
8 decommissioning costs on a set of more comprehensive
9 assumptions and then back off and say, "For our
10 purposes, this is what we think should be covered,"
11 and then local public interest groups could look at
12 these figures and decide whether they want to return
13 to green fields or what-have-you. But I'd much rather
14 start with a gross estimate including most everything
15 and then take a look at the parts that are of interest
16 to us.
17 The first set are the ones that are in the
18 rule.
19 The second, as Commissioner Curtiss
20 suggested, is we can't walk away from high-level waste
21 situations regardless of who's responsible.
22 And the third set says, "These are also
23 costs and they're part of our sort of magistrate job
24 to get them out on the table, even if we don't feel
25 it's necessary or appropriate that they be used as a

1 basis for setting qualified funds aside and we'll see
2 where we go."
3 It was very, very helpful. Thank you very
4 much.
5 (Whereupon, at 9:31 a.m., the above-
6 entitled matter was adjourned.)
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CERTIFICATE OF TRANSCRIBER

This is to certify that the attached events of a meeting of the United States Nuclear Regulatory Commission entitled:

TITLE OF MEETING: BRIEFING ON STATUS OF PACIFIC NORTHWEST LABORATORIES (PNL) STUDY OF DECOMMISSIONING COSTS

PLACE OF MEETING: ROCKVILLE, MARYLAND

DATE OF MEETING: JUNE 24, 1993

were transcribed by me. I further certify that said transcription is accurate and complete, to the best of my ability, and that the transcript is a true and accurate record of the foregoing events.

Carol Lynch

Reporter's name: Peter Lynch

DECOMMISSIONING COSTS REASSESSMENT

BRIEFING FOR THE COMMISSION

JUNE 24, 1993

Dr. Donald A. Cool
Radiation Protection and Health Effects Branch
Office of Nuclear Regulatory Research

- **OUTLINE**

  - ✓ *BACKGROUND*
  - ✓ *RESULTS OF REASSESSMENT FOR PWR's*
  - ✓ *CURRENT STATUS OF REEVALUATION*

- **HISTORY**

  - ✓ *Assessments of decommissioning costs performed by Batelle Pacific Northwest Laboratories (PNL)*

    - ▸ *PWR Assessment Trojan NUREG/CR-0130 1978*
    - ▸ *BWR Assessment WNP-2 NUREG/CR-0672 1980*

  - ✓ *Reference facility represents assumptions which may not be directly applicable to other sites*

  - ✓ *Dollar value updates in 1986 to support rulemaking*

  - ✓ *Decommissioning rule financial assurance requirements published in 1988*

  - ✓ *Reassessment initiated in late 1990*

- **NRC Regulatory Requirements**

  ✓ *<u>Decommissioning</u> is the process for safely removing a nuclear facility from service and reducing residual radioactivity to a level that permits release of the facility for unrestricted use and termination of license*[1]

  ✓ *<u>Decommissioning</u> financial assurance requirements do not include treatment of costs related to spent fuel handling or site remediation for reasons other than meeting radiological criteria for unrestricted use*

[1] Paraphrased from 1988 Decommissioning Rule

- **DECOMMISSIONING ALTERNATIVES - ORIGINAL REPORTS**

  ✓ *DECON - Prompt decontamination to unrestricted release levels*

  ✓ *SAFSTOR - Custodial storage for a predetermined period of time followed by decontamination to unrestricted release levels*

  ✓ *ENTOMB - Prompt removal of hot internals and entombment followed by a period of surveillance and maintenance until unrestricted release levels are achieved*

- SUMMARY OF ESTIMATED COSTS - ORIGINAL REPORTS

OPTION	PWR - $MILS 1986	BWR - $MILS 1986
DECON	103.5	131.8
SAFSTOR	97.7 (10 YRS)	128.3 (10 YRS)
	100.5 (30 YRS)	131.4 (30 YRS)
	80.3 (100 YRS)	106.1 (100 YRS)
ENTOMB		
INTERNALS INC	60.2 (100 YRS)	104.3 (100 YRS)
INTERNALS REM	70.5 (100 YRS)	120.2 (100 YRS)

- **FINANCIAL ASSURANCE REQUIREMENTS - 10 CFR 50.75**

  - ✓ ***PWR (3400 MWT or greater)*** ***$105 MILLION***[2]
  - ✓ ***BWR (3400 MWT or greater)*** ***$135 MILLION***
  - ✓ ***Annual Inflation Factor:***

$$0.65\,L + 0.13\,E + 0.22\,B$$

Where L, E, and B are escalation Factors for Labor & materials, Electrical energy & transport, and Waste burial

[2] 1986 Dollars

- **ISSUES ADDRESSED IN REASSESSMENT**

  - ✓ *TECHNOLOGY - Use of Current technology as basis for estimates*
  - ✓ *SAFETY - Projections based on current conditions and regulatory framework*
  - ✓ *COSTS - Use actual decommissioning costs as available*
  - ✓ *TIMING - DOE requirement that Spent Fuel decay for a minimum of 5 years*

- **FACTORS NOT INCLUDED IN REASSESSMENT**

  - ✓ *Restoration of site to "green field"*
  - ✓ *Spent Fuel Management Costs*
    - ▸ *Operation and maintenance of spent fuel pool*
    - ▸ *Cost of constructing, operating, and decommissioning an independent spent fuel storage installation*

- **REASSESSMENT RESULTS FOR REFERENCE PWR**

ALTERNATIVES	EST. COST ($ MILS - 1993) CONSTANT DOLLARS	EST. DOSE (PERSON-REM)	DURATION (YEARS)
DECON	124.6	931	≈ 9 YRS
SAFSTOR[3]	174.2	321	≈ 60 YRS
	230.3	321	≈ 60 YRS
ENTOMB[4]	162.7	790	> 60 YRS

[3] Range of costs based on potential of contamination from long-lived radionuclides

[4] Additional annual cost of $ 1.03 MIL/YR after 60 YRS

- **INFLUENCE OF PRESENT VALUE CALCULATION**

ALTERNATIVES	EST. COST ($ MILS - 1993) CONSTANT DOLLARS	EST. COST ($ MILS - 1993) PV DOLLARS[5]
DECON	124.6	102.7
SAFSTOR	174.2	91.8
	230.3	101.1
ENTOMB	162.7	103.2

[5] Discount rate of 3%

- **REVISED INFLATION FACTOR FORMULA**

$$(0.75\ L + 0.07\ E + 0.18\ B) + \text{TAXES/INS.}$$

Where: L = Labor & Materials
E = Energy & Transport
B = Waste burial

- COST COMPARISON DIFFERENT DISPOSAL SITES

	TRANSPORT $ Mil	DISPOSAL $ Mil	TOTAL $ Mil
HANFORD (WA)	4.1	21.2	25.3
BARNWELL (SC)	9.6	96.6	106.2

- **CURRENT STATUS OF REEVALUATION**

✓ ***PWR Draft Reevaluation***

- ***Staff review of draft in June 1993***
- ***Publication for public comment***

✓ ***BWR Draft Reevaluation***

- ***Staff review of draft in December 1993***
- ***Publication for public comment***

✓ ***Staff recommendation on changes to funding requirements following consideration of public comments and preparation of final reports***