

ORIGINAL

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

Title: BRIEFING ON STATUS OF EFFORTS TO DEVELOP A BELOW
REGULATORY CONCERN POLICY

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BRIEFING ON STATUS OF EFFORTS TO DEVELOP
A BELOW REGULATORY CONCERN POLICY

PUBLIC MEETING

Nuclear Regulatory Commission
One White Flint North
Rockville, Maryland

Friday, September 16, 1988

The Commission met in open session, pursuant to notice, at 10:00 a.m., the Honorable LANDO W. ZECH, Chairman of the Commission, presiding.

COMMISSIONERS PRESENT:

- LANDO W. ZECH, Chairman of the Commission
- THOMAS M. ROBERTS, Member of the Commission
- KENNETH M. CARR, Member of the Commission
- KENNETH C. ROGERS, Member of the Commission

1 STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:
2
3 A. BATES
4 W. PARLER
5 V. STELLO, JR.
6 B. MORRIS
7 W. LAHS
8 H. THOMPSON
9 F. CONGEL
10 R. ALEXANDER
11 L. TAYLOR
12 T. TIPTON
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P R O C E E D I N G S

(10:00 a.m.)

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3 CHAIRMAN ZECH: Good morning, ladies and
4 gentlemen. The purpose of this mornings briefing is for the
5 Commission to learn of the NRC staff's progress in
6 formulating a policy in the area of below regulatory concern
7 for practices whose public health effects and safety impacts
8 should be below a threshold level of regulatory concern.

9 I understand that the staff proposes that the
10 Commission approve for discussion its draft policy statement
11 at an NRC-sponsored international workshop on exemptions from
12 regulatory control for practices where public health and
13 safety impacts are below regulatory concern. This workshop
14 is currently scheduled for October 17th through the 19th.

15 I would ask today that the NRC staff include for
16 discussion during the workshop any topics that are raised by
17 the Commissioners during this mornings meeting. I believe
18 that the Commission should reach its final decision -- I
19 emphasize final decision -- on the staff's proposal following
20 the conclusion of the staff's evaluation of public comments
21 and the results of the international workshop. In other
22 words, after the public comments and then after the
23 international workshop.

24 After hearing the staff's briefing this morning,
25 I suggest that the Commission consider the possibility of

1 agreeing to support the staff's using their draft policy
2 statement or any modifications that we might suggest as a
3 basis for discussion at their forthcoming international
4 workshop.

5 I also suggest that the Commission consider
6 requesting public comments on the proposed policy including
7 issues raised by the Commission here this morning.

8 The Commission this morning will also hear from
9 Doctor Lauriston Taylor, Chairman of the Health Physics
10 Society work group on below regulatory concern, presenting
11 the views of the Health Physics Society on this subject.
12 Additionally, the Commission will hear from Mr. Thomas Tipton
13 who will present a brief summary and status on industry
14 efforts on radiation risk which are below regulatory concern.
15 I understand there are copies of the view graphs available
16 at the entrance to the meeting room.

17 Do any of my fellow Commissioners have any opening
18 comments that they would like to make before we begin?

19 (No response.)

20 CHAIRMAN ZECH: If not, Mr. Stello, you may proceed.

21 MR. STELLO: Thank you, Mr. Chairman. The subject
22 we want to discuss this morning is certainly not an easy one.
23 It is indeed very, very complex for which there are a variety
24 of views of how to proceed. That variety of views exists
25 within the staff as well as -- if you have read much of the

1 literature -- the debate is considerable within the technical
2 community.

3 I think there is an element of this approach we are
4 following that deserves a little bit of comment up front in
5 terms of getting a broad picture. That has to do with
6 setting two particular elements to describe an area where
7 we would suggest is an appropriate policy for below regulatory
8 concern. One is to try to establish admittedly a fairly
9 small number in terms of units of millirem -- the ten
10 millirem that is in the paper -- as well as a collective dose.
11 The collective dose is one for which there is in fact
12 considerable controversy and I am sure you will hear more
13 about that this morning -- at least I have heard a great deal
14 about it from some of the scientists who argue that that
15 isn't the way we ought to go -- but one for which there is a
16 considerable precedent within the Agency as a tool that we
17 have used that dates back to the ALARA concept starting back
18 I guess with the very extensive hearings in 1971 I think, and
19 it has been embodied within a great deal of the regulatory
20 approach that we have used over those years.

21 I think because the precedent is there that we are
22 obligated to still consider it but I think it has two
23 reasons. One is that is where you go when you look at how
24 you do the calculations based on extrapolation of the data
25 collected of the radiation effects from the bombs. You

1 extrapolate to low exposures and then you integrate under a
2 curve to get the cumulative effects.

3 But there is another aspect of that and that is
4 we have established a \$1,000 a person rem. And, if you look
5 at the bounds of what we have put in the table, it suggests
6 that for a 100-person rem exposure at \$1,000 a person rem
7 about \$100,000 in almost any kind of analysis that we would
8 undertake and the resources that we would devote. It also
9 suggests that that is another policy call as to whether it
10 is well worth the time and the effort and the energy of
11 spending additional analyses to get further in there because
12 analyses, by itself, cost money and take resources. It also
13 is the precedent.

14 So, I think there is some history and rationale
15 behind the approach that we take that is going to be one for
16 which considerable thought needs to go into the process but
17 what we really want to do is to start the process, to start
18 the comment, to start the debate, and then come to the
19 Commission after that debate has had a chance to go on, and
20 we can collect that kind of information and then come back
21 to the Commission and say we now think we have got a policy
22 that has the benefit of the input from every word that it
23 ought to have and then can come to the Commission with far
24 more confidence that we have a reasonable approach.

25 So, we are not here today to tell the Commission

1 that we think we have the final answer for the Commission.
2 To the contrary, we don't, but we think we have a reasonable
3 approach if the Commission agrees it is a reasonable approach
4 to start this debate, to start this discussion and engage
5 the scientific community to the best of our ability to do so
6 to comment on this kind of policy.

7 With that background, let me ask Bill Morris to go
8 through the presentation for us this morning. And, we will
9 be mindful of the comments the Commission raises this
10 morning to be sure that as we continue to get into this
11 issue that we have considered all of the issues that will be
12 raised here this morning.

13 Thank you, Mr. Chairman.

14 CHAIRMAN ZECH: Thank you very much. Proceed.

15 MR. MORRIS: Thank you. On the first page of the
16 handout, it provided an outline of the presentation plan for
17 today. It covered the purpose of this presentation, the
18 background, went into the objective of the policy statement
19 and some of the basic considerations that have been in the
20 staff's mind as they developed the policy, covered the key
21 elements of the policy statement and briefly mentioned our
22 plans for an international workshop.

23 (Slide.)

24 MR. MORRIS: In addition, if time permits, I will
25 provide a brief discussion of the major issue raised in the

1 ACNW letter that was issued yesterday.

2 On page two --

3 (Slide.)

4 MR. MORRIS: -- I note that the purpose of the
5 presentation is to discuss this proposed Commission policy
6 statement which would be the basis for decisions on
7 exemptions from regulatory control for those practices with
8 such small health and safety impacts that they may be
9 considered below regulatory concern. As I said, we will go
10 into the workshop very briefly later on.

11 The next page --

12 (Slide.)

13 MR. MORRIS: -- I note that the Commission sent
14 out a staff requirements memorandum on March 30th of 1988
15 which directed the staff to submit for Commission
16 consideration a policy statement and options which establish
17 a generic number for exposures that are below regulatory
18 concern.

19 In SECY-88-257 a draft proposed policy statement
20 was provided by the staff. Included among the enclosures
21 are discussions which provide perspective on policy options
22 other than those proposed by the staff but which the
23 Commission may wish to consider in its deliberations. In
24 addition, we included a discussion of the uncertainties in
25 the risk dose data base that was of interest to the

1 Commission.

2 As Mr. Stello said, once we get the Commission's
3 guidance regarding your views on this subject of a proposed
4 policy statement, issues you are interested in, we will
5 proceed to discuss this at an international workshop and
6 prepare to issue the policy for public comment.

7 On page four of the handout --

8 (Slide.)

9 MR. MORRIS: -- we note that the objective of the
10 policy statement is to establish a basis for development of
11 regulations and for making licensing decisions. These would
12 define conditions for exemption of certain practices from
13 regulatory control. Specific rulemaking applications that
14 are currently planned or envisioned include disposal of low
15 level reactor waste streams, radiological criteria for de-
16 commissioning of lands and structures, radiological criteria
17 for release of materials and equipment.

18 It is also expected there may be other applications
19 if new consumer product exemptions are proposed. These could
20 also be granted based on the elements of the policy. Once
21 the new regulations are in place, individual licensees would
22 only have to demonstrate compliance with the conditions of
23 the exemption. That is something, for instance, say a
24 volume concentration level of various isotopes would be the
25 condition on which some material could be released in our

1 reactor waste stream.

2 Having done that, they would be taking advantage
3 and we would be taking advantage of the policy and the ease
4 with which we would be able to then go forward and release
5 this material.

6 On page five --

7 (Slide.)

8 MR. MORRIS: -- I wanted to go over some of those
9 basic considerations that the staff has been attentive to as
10 it has developed this policy. There are three fundamental
11 principles of radiation protection that we have based the
12 policy on. The principle of justification of practice is
13 essentially the concept that there should be no deliberate
14 exposure to radiation or release of radioactive materials
15 from licensed or exempt activities which does not provide
16 some benefit to society.

17 The reason the staff recommends that this principle
18 of justification be incorporated into the policy statement is
19 to clarify the Commission's intention to make such judgments
20 in implementing these exemption decisions.

21 We have also used the concept of radiation dose
22 limits which, by the way, are included as the basic
23 radiation protection standards in 10 CFR Part 20. In the
24 proposed revision of Part 20, which is moving through the
25 concurrence process within the staff now, the maximum allowed

1 annual dose to a member of the public is 100 millirem. In
2 granting exemptions under the proposed policy, our basic
3 objective is that by no means should an individual receive
4 a cumulative dose greater than this value when all the
5 licensed or exempt practices -- that is multiple exposures --
6 are taken into account.

7 In fact, the goal that the staff would have in mind
8 would be that such doses would be well below 100 millirem.
9 Let me clarify that for each licensee the licensee is expected
10 to monitor and take measures to provide that assurance but
11 when you exempt the practice and there is some reduction of
12 control or essentially a loss of control of the material,
13 then there is no monitoring. It is only up to the judgment
14 of the Commission in developing a policy like this that you
15 would be assuring that those doses or multiple practices
16 remain below 100 millirem.

17 As Mr. Stello pointed out, a longstanding element
18 of radiation protection is the concept that in addition to
19 the basic radiation protection standard, such as the 100
20 millirem limit on annual dose, the concept of ALARA is
21 applied. That means that you want enhanced protection beyond
22 the limit. In applying ALARA, it has been traditional that
23 we do cost benefit tradeoff analyses to determine when doses
24 have been achieved which are as low as reasonably achievable
25 which is ALARA. And, the reasonable part pertains to those

1 analyses and judgments that one makes to determine how far
2 one should go in reducing doses.

3 In addition to the concept of cost benefit
4 tradeoffs in order to attain an ALARA level, the concept
5 also exists and one that has been developed further in this
6 policy that you can decide that doses and risks are ALARA
7 just because they are sufficiently small that they don't
8 warrant further attention.

9 To go on to page six --

10 (Slide.)

11 MR. MORRIS: -- another basic consideration that we
12 had to take into account as we developed this policy was the
13 relationship between radiation dose and risk. The risk
14 estimates in the policy are based on the linear non-threshold
15 relationship between dose and risk. In enclosure five of
16 SECY-88-257, the staff provided a discussion of the
17 uncertainties associated with the linear non-threshold model.
18 This discussion that we provided is primarily based on the
19 BEER-3 report. It highlights the unavailability of
20 epidemiological data in the low dose range and uncertainties
21 in the data base from the atomic bomb explosions in Japan.

22 Specifically with regard to the latter, I should
23 point out that there is a re-evaluation of the dosimetry
24 from the bomb data that is expected to result in an increase
25 in the numerical coefficient associated with the linear

1 relation between risk and dose. BEER-5, which is expected
2 to be released early next year, will include this revision.
3 Preliminary estimates based on our staff's understanding of
4 what the new data is telling people is that that increase
5 would not be of an order of magnitude increase but perhaps
6 of an order factor of two.

7 CHAIRMAN ZECH: Before you go in on that slide, I
8 know there has been discussion for many years on this linear
9 relationship issue. In the extrapolation, as I understand it
10 that you are discussing here and in your paper, it would imply
11 some effect at low doses. I guess my question would be what
12 is a technical basis for associating the likelihood of an
13 individual getting cancer at these low radiation doses? Has
14 there been any change in the thinking in the scientific
15 community in this regard?

16 MR. MORRIS: I am not aware of changes. I have
17 discussed the issue of what technical principle is at play
18 here. The way I understand it is that the basic effect that
19 may cause the cancer to occur is the impact of radiation on a
20 DNA molecule. If the dose rates are very low, there is the
21 possibility that repair can take place in the molecule but
22 the repair process is not thought to be 100 percent in the
23 sense that all molecules will not be expected to be repaired.
24 In other words, there is a re-combination of the bonds that
25 were broken by the radiation and that process is not complete.

1 So, from that basis, it has been theorized that
2 even at very low doses you might not be able to exclude the
3 possibility that cancer could occur. I think, you know, this
4 is a very technical subject and there are others who could
5 describe it to you far better than I but that is my
6 understanding of the basis today for thinking that the linear
7 non-threshold hypothesis is --

8 MR. STELLO: Well, let me add I think a couple of
9 points to it because I have been asking that very question
10 of scientists and I think the impression I got from them is
11 that they don't believe that these low doses are in fact
12 harmful. But the data that you have to get, the scientific
13 data, was one of the reasons I think in the BEER-3 report
14 they concluded that they did not have the evidence to show
15 it was harmful or not harmful because of the amount of
16 information.

17 But some of the studies provide some insight to
18 that. I remember reading of one -- I believe it was in China
19 -- where they had about 150,000 people in a controlled
20 population, 70,000 at one dose level, the natural background,
21 and about some number on the order of 70,000 at another.
22 There were, as I recall, about one and a half or two times
23 greater background in one population versus the other and
24 they saw no health effects. You see some of the same things
25 in the United States when you go out in the west at the higher

1 elevations where the background doses are 100 millirem or
2 greater and you look at the health effects. In fact, I think
3 in those cases the incidence of cancer is even lower but then
4 there are arguments that there could be other factors which
5 would in fact have contributed to this.

6 The point is when you try to go to the actual data
7 to be able to glean from data to conclude that these low
8 levels, prove they are not harmful, you have the problem of
9 statistical data. But based on what we have seen from
10 science and what I understand the scientists have been telling
11 me, there is a growing consensus that they are not. But it
12 is subject to so much debate that we have just decided in
13 fact to avoid it. There seems to be consensus that, to the
14 extent you want to use the word conservative, it is
15 conservative then just to use the extrapolation of the linear
16 hypothesis that we have been using.

17 That does not mean, in my view, that that is
18 conservative necessarily from a society point of view because
19 you are definitely adding a burden, a cost, that if society
20 did it some other way, you could spend that money for some
21 other purpose. This is one of the big, major issues of
22 debate; are these low doses really harmful? Here is where
23 we hope we will be able to get some of the scientists around
24 the world to speak to this point.

25 CHAIRMAN ZECH: All right. Well, maybe the

1 following speakers this morning can also talk to this a little
2 bit. I am sure you will be discussing it at the
3 international workshop too.

4 MR. STELLO: Yes.

5 CHAIRMAN ZECH: But it has, as we all know, been a
6 subject of long debate and there are two schools of thought
7 on the subject. But if there is any new thinking or any new
8 concensus or anything like that, I think it would be important
9 to the Commission to become aware of that.

10 MR. STELLO: Yes.

11 CHAIRMAN ZECH: Because we do know and we do have
12 scientific data for the higher levels, as we know, and we
13 have reasonably good analysis of the higher levels of doses
14 but we do not, as far as I know, have at the very low levels
15 and that is why we talk about extrapolation and scientific
16 analysis and so forth.

17 So, if there is any more definitive conclusion in
18 that area, I think the Commission would be very interested in
19 learning about that in your forthcoming discussions with the
20 international community and other experts.

21 Now, let's proceed.

22 MR. MORRIS: Going on to page seven of the
23 handout --

24 (Slide.)

25 MR. MORRIS: -- I just wanted to come back to this

1 issue that the Commission raised in its staff requirements
2 memorandum. That is the Commission directed the staff to
3 discuss in the policy statement an approach for implementing
4 the proposed below regulatory concern dose levels where
5 multiple sources or licensed activities might be involved.
6 This has been one of the major issues that we grappled with
7 as I mentioned before. There is a range of views on this
8 issue within the staff. I just wanted to highlight it again.
9 I will be coming back to it later when we talk about these
10 dose limits and explain how we have gained confidence that
11 we can deal with this issue.

12 On page eight of the handout --

13 (Slide.)

14 MR. MORRIS: -- I mention one of the two ways that
15 the staff envisions that an exemption decision can be made.
16 That is the decision would be made on the basis of costs
17 benefit analysis where the costs and technical feasibility of
18 measures which could be taken to reduce doses are weighed
19 against the risk reduction that would be achieved. That's
20 where the use of this \$1,000 per person rem dose aversion
21 factor comes into play in the Commission's decision making as
22 used in the application of the backlook (phonetic) rule and
23 other decisions like that. The ALARA principle traditionally
24 has been based on this kind of thinking.

25 We also have provided another way to get at ALARA

1 and that is indicated on the next page.

2 (Slide.)

3 MR. MORRIS: The second basis for decisions on
4 exemptions is that when the risk from the practice or source
5 is sufficiently small that there would be no need to require
6 risk to be reduced further, then an exemption should be
7 granted. In other words, without cost benefit analyses of
8 feasible dose reduction measures. In other words, it would
9 be a declaration that you had reached a point of sufficiently
10 low risk that it is below regulatory concern.

11 The staff identified two risk parameters which can
12 be used to define the conditions for which this below
13 regulatory concern condition can be met and for which cost
14 benefit analysis can be waived. These are the annual
15 individual dose and the annual collective dose.

16 (Slide.)

17 MR. MORRIS: So, if you look on page ten of the
18 handout, we identify that we propose in the policy statement
19 that these values, these criteria, are ten millirem for an
20 individual and 100-person rem for the societal risk level.
21 We believe that to many these levels would be considered
22 ALARA and below regulatory concern.

23 So, if a practice is judged to be justified -- that
24 is it has a societal benefit -- and can be demonstrated to
25 meet these criteria, then the granting of an exemption under

1 the policy would be highly likely. However, it is emphasized
2 in the policy statement that failure to meet these criteria
3 would not result in the exemption being rejected. In such a
4 case, ALARA could be demonstrated through cost benefit
5 analysis.

6 If we back up and look at slide number one that is
7 in the handout --

8 (Slide.)

9 MR. MORRIS: That is on the screen there now. It
10 is about four slides from the back of the package that we
11 handed you. I have indicated the risk methods of some of the
12 doses that could be envisioned. In particular, the ten
13 millirem level for an individual dose is indicated here as
14 representing an increase -- this is an incremental dose --
15 received from a practice exempted under this policy. That
16 would involve an increase in risk of two times ten to the
17 minus six per year of dying of cancer. This is one-tenth of
18 a percent of the cancer risk from all of the causes.

19 I think you will recognize that this is the same
20 as the quantitative risk objective for reactor operation
21 adopted in the NRC's safety goal policy.

22 Using this same table maybe you can see, if you look
23 in this table -- I didn't put it down here but it is in the
24 Commission paper that the risk conversion factor is two times
25 ten to the minus four. You can use that number and remember

1 that the other criterion we are using, the 100-person rem
2 collective dose which is the summation of all the individual
3 doses incurred because of the practice, that really amounts
4 to a very small annual risk to all individuals summed together
5 per year of the practice that would be exempted under this
6 policy automatically without cost benefit analysis.

7 Another way to look at this 100-person rem number
8 would be that if the practice persisted for 50 years, that
9 that would amount to one additional cancer fatality in 50
10 years of the practice. That just gives me a perspective on
11 what kind of risk that we are talking about. But, remember,
12 that is merely a criterion such that it tells you when you
13 must or must not do further cost benefit analysis.

14 Let's go back to page ten of the handout.

15 (Slide.)

16 MR. MORRIS: I just want to mention that these
17 criteria pertain to a single practice. They do not pertain
18 to a collection of practices. It is the notion that you may
19 have individuals exposed to more than one exempted or licensed
20 practice that raises the question of whether or not you might
21 be approaching that 100-millirem limit.

22 CHAIRMAN ZECH: Before you go on, I was trying to
23 do some arithmetic on what you are telling us when you say
24 one in 50 years at the 100-person rem annual dose. If I
25 calculated correctly, assuming that there are 250,000 deaths

1 per year due to cancer in the United States -- and I think
2 that is a low number, that it could be higher than that.

3 MR. MORRIS: I think it is 500,000.

4 CHAIRMAN ZECH: Okay. Well, just say it's
5 250,000. That's what I used. But say it's 500,000 or
6 250,000, somewhere in that ballpark, one in 50 years then
7 comes out to be between 12,000,000, 12.5 million, and
8 25,000,000, depending on whether you use 250,000 or 500,000,
9 between 12.5 and 25,000,000 deaths then due to cancer that
10 we would expect in a total of 50 years.

11 MR. MORRIS: Yes, that's what it calculates.

12 CHAIRMAN ZECH: So, what you are saying is that we
13 would have one additional or one in addition --

14 MR. MORRIS: That's what this number amounts to.

15 CHAIRMAN ZECH: -- to the 12.5 to 25,000,000 that
16 might be expected; is that right?

17 MR. MORRIS: Well, that's --

18 CHAIRMAN ZECH: So, it is a pretty small number.
19 That's what I was trying to figure. Would you agree with
20 that? That is what you are saying.

21 MR. MORRIS: Yes.

22 MR. STELLO: That's why it's so difficult to get the
23 data to show what happens for these very small numbers
24 because these numbers are well within the variation you have
25 in background doses.

1 CHAIRMAN ZECH: But what I was trying to figure
2 out, frankly, you know, is something that the general public
3 can understand is important I think, and when you tell me
4 ten millirem, I have got an understanding what that means
5 but lots of people really don't. Ten millirem, it's just a
6 number. It's an absolute number. But what does it relate to?
7 So, I was trying to say, well, why do this collective thing?
8 The collective dose, at least in my judgment, would tell me
9 that over a 50-year period when we would expect 12 to
10 25,000,000 deaths due to cancer in the United States, that
11 this below regulatory concern would mean perhaps one more
12 than that number.

13 So, it's a very small number; is that correct?

14 MR. MORRIS: Yes.

15 MR. STELLO: Yes.

16 CHAIRMAN ZECH: Were my mathematics correct?

17 MR. MORRIS: That's close, yes.

18 CHAIRMAN ZECH: All right.

19 COMMISSIONER CARR: I saw a quote from the Cancer
20 Society this morning. Their estimate was 494,000 people this
21 year will die of cancer in the United States. If you look to
22 put that in a one-year perspective, if we went to say the
23 10,000-person rem, on top of that 494,000, you would see two
24 more people in this year.

25 CHAIRMAN ZECH: That's if you used what, the

1 10,000 --

2 COMMISSIONER CARR: Well, just put it in the one
3 year. The 10,000 number says two in one year.

4 CHAIRMAN ZECH: Right.

5 COMMISSIONER CARR: So, you would try to find those
6 two guys in those 494,000 others.

7 CHAIRMAN ZECH: Well, that's what they are saying.
8 They are not using 10,000. They are using 100.

9 MR. MORRIS: Yes.

10 COMMISSIONER CARR: Well, but I was just trying to
11 make the point to do it in an annual year.

12 CHAIRMAN ZECH: An annual year, fine.

13 COMMISSIONER CARR: You would see two more people.

14 CHAIRMAN ZECH: Sure, I see. Okay, fine, I
15 understand. Anyway, it's a small number and that's what you
16 are saying too.

17 COMMISSIONER CARR: Yes, it's the same thing you
18 are saying.

19 CHAIRMAN ZECH: I think I'm trying to say the same
20 thing. I just used it for 50 years and you used it for one
21 year.

22 COMMISSIONER CARR: Yes.

23 CHAIRMAN ZECH: The point is, to me, the value of
24 it is not so much the number itself but the point I think you
25 are trying to make is it's a very, very small number.

1 COMMISSIONER CARR: Yes.

2 CHAIRMAN ZECH: That's what we are interested in,
3 making sure that it is a very small number; is that correct?

4 MR. STELLO: It is indeed. Perhaps in terms of
5 getting a perspective, it might be easier for the public to
6 understand the recent article that talked about radon
7 exposures, naturally occurring radioactivity in homes. The
8 radiation levels that they are talking about are in fact one
9 to two orders of magnitude beyond what we are talking about
10 here.

11 Do you remember -- someone help me -- I think it
12 was a couple of years ago when the average background
13 exposure for individuals was in fact raised about 150 to 200
14 millirem.

15 MR. LAHS: From 100 up to 300.

16 MR. STELLO: So, it's a 200 millirem increase
17 average in naturally occurring background radiation. There
18 are levels in the country where the radon levels have been
19 measured and I think they have exceeded 1,000 millirem in
20 background levels in the home. So, you can get a fairly
21 reasonable feel for the relative insignificance of this
22 number compared to something that there has been a great deal
23 of interest recently in terms of radon levels.

24 CHAIRMAN ZECH: Now, these numbers we are talking
25 about this morning do not include radon.

1 MR. STELLO: They do not include radon. Radon is
2 not a radioactive substance for which this agency is
3 responsible for regulation.

4 CHAIRMAN ZECH: But what you are saying I guess in
5 essence is that the deaths from radon as far as we know now
6 would be considerably higher than the deaths that we are
7 talking about from radiation products.

8 MR. STELLO: If someone would help me, I think as
9 I recall the number in the newspaper was --

10 MR. LAHS: 20,000.

11 MR. STELLO: -- 20,000.

12 CHAIRMAN ZECH: 20,000 per year --

13 MR. STELLO: Yes, per year.

14 CHAIRMAN ZECH: -- annual deaths in the United States.

15 MR. STELLO: Yes.

16 CHAIRMAN ZECH: And, what you are talking about --

17 MR. STELLO: Using the same techniques we used
18 which, I might add, there are many who questioned whether
19 those numbers are or are not correct too.

20 CHAIRMAN ZECH: All right. Let's proceed.

21 MR. MORRIS: One point to remember there is that
22 that is the increment per practice, the definition that might
23 be involved in granting multiple exemptions under this. So,
24 I just wanted to remind you of that.

25 CHAIRMAN ZECH: All right.

1 MR. MORRIS: And, maybe at this time, I think since
2 we are at this point, it would be a good idea to look at
3 backup slide two for a minute. Again, that's in the backup
4 part of the handout.

5 (Slide.)

6 MR. MORRIS: I just might make a point now that in
7 the ACNW letter that we received yesterday, there were
8 several points that they made. We think we can accommodate
9 most of those. They talked about the use of international
10 units, the definition of effective dose equivalent,
11 clarification of this concept of justification and
12 clarification of the linear non-threshold hypothesis that we
13 are using. But the major point the letter makes and one that
14 we are not yet ready to accept -- I wanted to call it to your
15 attention for that reason -- is that they believe the ten
16 millirem and 100-person rem criteria should be treated as
17 limits for each exempted practice and, in fact, that
18 exemptions should not be granted, as I understand their
19 letter, should not be granted under the policy if either one
20 of these criteria has been exceeded.

21 And, if you just look at this figure, we have drawn
22 the region of risk below ten millirem and below 100-person
23 rem as the region where we believe it is simply appropriate
24 to not do cost benefit analysis but that does not preclude
25 in our minds that the Commission would not grant exemptions

1 for other cases outside that region of BRC risks. You could
2 make the decision on other bases. It is an issue that you
3 will see, you know, if you peruse that letter and I just
4 wanted to call it to your attention now.

5 Let's see if there is any other point that would be
6 made by this. We have indicated on here the regulatory dose
7 limit. So, in this figure, you could envision that you might
8 be looking at more than one exemption granted, and it is the
9 issue of how far up towards 100-person rem that you might get
10 from multiple exemptions that we will turn to in just one more
11 minute now.

12 Let's go back to page 11 of the handout.

13 (Slide.)

14 MR. MORRIS: The staff has recommended that the
15 proposed policy state clearly that certain practices would
16 be excluded as candidates for exemptions. These would
17 involve practices in which radioactivity has been introduced
18 into toys or where radioactivity would be applied to or
19 ingested or inhaled by human beings. These practices have
20 not been considered to be justified in the past.

21 However, there was heretofore not a clear statement
22 from the Commission on these issues. We believe at this time
23 that the Commission should make a clear statement of its
24 policy regarding this.

25 Again, on page 12 of the handout --

1 (Slide.)

2 MR. MORRIS: -- this is another way of saying what
3 we mean by justification. We believe that the release of
4 radioactivity where there are clear economical alternatives
5 or where there are no unique benefits from the use of
6 radioactivity should not be considered to be exempt under
7 this policy.

8 Let's go on to page 13 now.

9 (Slide.)

10 MR. MORRIS: I want to summarize some of the
11 provisions that are in the policy that limit the potential
12 that there might be individuals who could be exposed to
13 multiple sources of radiation exempted under the policy or
14 licensed by the NRC which could approach 100-person rem.

15 COMMISSIONER ROGERS: Excuse me a minute.

16 MR. MORRIS: Yes.

17 COMMISSIONER ROGERS: I want to just ask a question
18 on this to see what your thinking is on these items on page
19 12.

20 (Slide.)

21 COMMISSIONER ROGERS: You are talking about
22 excluding from the exemption category items which there are
23 clear economical alternatives or no unique benefits but does
24 that mean in your thinking that you would exclude them from
25 any consideration? In other words, that even though they

1 would be excluded from exemption, could they be permitted in
2 some way? Now, not falling under the exempted category but
3 still be --

4 MR. MORRIS: Under some --

5 COMMISSIONER ROGERS: -- permitted in some way.

6 Have you thought about that?

7 MR. MORRIS: I have not thought about that. I am
8 not aware of cases where we have done such a thing.

9 MR. LAHS: I don't know of any.

10 MR. MORRIS: The members of the group that worked
11 on this do not recollect any case where we have allowed that
12 to happen. We principally were looking at an exemption
13 policy. So, I really have not got a firm answer as to what
14 we would --

15 COMMISSIONER ROGERS: Well, these things sometimes
16 do turn up.

17 CHAIRMAN ZECH: Well, why don't you look into that.

18 MR. MORRIS: Yes.

19 CHAIRMAN ZECH: See if you see the appearance of
20 anything that didn't follow through there.

21 MR. MORRIS: Okay.

22 MR. STELLO: I think that maybe -- I don't
23 understand the question well enough -- but there are clearly
24 cases where there have been applications to use radioactive
25 material where we have rejected the application, period,

1 without this policy in place. We have just said in our
2 judgment that is not a correct use of the application and we
3 rejected it. Now, any licensee is entitled pursuant to our
4 regulations to follow the process of appeal and go through
5 the agency to have his, if you will, day in court.

6 But we would not only pursuant to this policy but
7 continue to follow the past practice if we felt there was
8 something that just ought not to be an area where radioactive
9 material ought to be used and that was our judgement. We
10 would continue to make the judgment that that application
11 ought not be allowed and permitted.

12 COMMISSIONER ROGERS: Well, I don't think we should
13 prolong this discussion on this particular point but my
14 concern ultimately will come back to this question of
15 justification and not that the justification is not an
16 important consideration but who is going to make that
17 decision. It could overlap into this area. So, I would
18 like to return to that at some point when it is appropriate.
19 I don't want to derail the presentation to attack that but I
20 think at some point I want to hear more about how one
21 envisions this question of justification being decided.

22 MR. STELLO: Okay. Well, let me comment then I
23 think that would be an interesting subject the next time we
24 have an application we are going to reject, that we will come
25 to the Commission and explain what we do, for example, and

1 why.

2 COMMISSIONER ROGERS: Well, it's something that we
3 had to grapple with when we considered the gemstone issue.

4 MR. MORRIS: The gemstone issue, that is correct.

5 COMMISSIONER ROGERS: I am not sure that we really
6 settled all questions with respect to how this would be
7 decided.

8 MR. STELLO: No.

9 COMMISSIONER ROGERS: So, I think it is a very
10 important issue for us to approach but I think we can set it
11 aside for the moment. But I would want it on the list of
12 things which are under active consideration for explanation
13 to the Commission as to how that justification question is
14 going to be decided.

15 MR. STELLO: Okay. And, I am suggesting that the
16 next time we have an application we are rejecting, we will
17 bring it to the Commission and explain that particular case
18 and then have a more generic discussion of how we do that
19 because I think it is outside this policy.

20 COMMISSIONER ROGERS: Well, just as a general
21 comment, I always like to make decisions in the absence of a
22 particular case that has to be decided.

23 MR. STELLO: Okay.

24 COMMISSIONER CARR: Is the justification issue
25 going to be discussed at the workshop coming up?

1 MR. MORRIS: Yes.

2 MR. LAHS: Yes.

3 CHAIRMAN ZECH: All right. Let's proceed.

4 MR. MORRIS: Going on to page 13 of the handout
5 now --

6 (Slide.)

7 MR. MORRIS: -- and talking about now those
8 provisions that we believe limit the potential to impact
9 people through multiple exposure. First, there are the ten
10 millirem and 100-person rem dose criteria we proposed. With
11 regard to the ten millirem individual dose, it should be
12 emphasized that this is the maximum dose reasonably expected
13 to be received by an individual due to the given practice.
14 So, only under unusual circumstances would the majority of
15 the people exposed to that practice be up near the ten
16 millirem limit.

17 However, if one were to hypothesize such a
18 situation, the 100-person rem population dose criterion
19 limits the number of individuals who could be exposed at the
20 ten millirem level or near to it to no more than 10,000
21 people. So, what we are doing is we are saying that if you
22 are looking at potential for people in the population at
23 large to be exposed to multiple sources, these two criteria
24 reduce that potential somewhat.

25 Also, the policy makes clear -- we have just

1 discussed this issue of justification -- that only
2 justified practices will be allowed. This principle would
3 assure that we are not facing a situation where unnecessary
4 exposures are being encountered. Therefore, that is going to
5 also give assurance that you won't have many people that
6 would possibly be near the 100-millirem level.

7 Going on to page 14 and continuing this thought --

8 (Slide.)

9 MR. MORRIS: -- there is a key point in the policy
10 that as the policy is being implemented there would be an
11 assessment of this potential for cumulative doses to various
12 key members of the exposed population, that there would be a
13 potential that they would get unacceptably high doses, those
14 approaching 100-millirem. Each time we make an exemption
15 decision, we will look at that population, choosing the key
16 members who would be limiting in that regard that they might
17 be receiving doses from other practices. And, if we find
18 that we believe there is a potential that that could happen,
19 then we are going to require that further analysis be
20 necessary before an exemption could be granted.

21 Going on now to page 15 of the handout --

22 (Slide.)

23 MR. MORRIS: -- we would point out also that in
24 the policy statement, in the very first paragraph I believe,
25 we talk about the concept of practice and the concept of

1 fractionation of practice. The policy says that
2 fractionation of practice will not be allowed. That is where
3 there are similar activities, similar kinds of releases that
4 could occur. They wouldn't be treated in an integrated way
5 so that you won't have a proliferation of practices that
6 should be actually integrated together in our thinking
7 process. And, by that, we believe that we will have
8 artificial situations that will break these practices up and
9 allow ten millirem and 100-person rem for each exempted
10 practice when that wouldn't be reasonable to do.

11 Finally, we believe that as experience is gained
12 in this issue as policy is implemented, we will learn more
13 about what this potential is like. If there were a number of
14 new applications for consumer products to be exempted, for
15 instance, that would make us take a close look at whether
16 this policy was giving the kind of protection that we thought
17 was necessary. So, we will just use common sense and good
18 judgment as we go forth to implement the policy. If
19 something is determined to warrant a re-look, then we would
20 take that initiative and do that.

21 Now, one other point that we wanted to make was in
22 the course of performing collective dose calculations which
23 would be done say for cost benefit analysis, the staff has
24 identified several methods that we would find reasonable in
25 order to truncate these doses.

1 (Slide.)

2 MR. MORRIS: We included truncations in space --
3 that is at some large distance from the source so that the
4 doses clearly are going to be small and negligible -- and
5 truncations in time so that after radioactive products have
6 decayed to a very low level, then the doses would be
7 negligible. We have also open in the policy the issue of
8 cutting off these collective dose calculations at low
9 individual doses which we believe might be considered
10 negligible by most people such as one-tenth of a millirem.

11 All of these provisions would simplify and reduce
12 the burden on those who are trying to do these sometimes
13 sophisticated cost benefit analyses. We don't think they
14 should necessarily be so sophisticated when they are making
15 these simple judgments. So, this is moving in that direction
16 to send a clear signal that you do not have to go to infinite
17 lengths to determine what the collective dose is.

18 Finally, we open the possibility too of weighting
19 collective dose with different factors depending on what
20 range of individual dose the collective dose was received in.
21 So far the Commission in Appendix I has indicated that \$1,000
22 per person rem is an acceptable weighting factor to convert
23 dose to cost so that you can compare those with the cost of
24 reducing the dose. Now, this opens up the possibility that
25 other ways to do that could be entertained. In fact, in this

1 body of ways to treat collective dose that I have just been
2 discussing, the staff would recommend that a variety of
3 these concepts -- you know, that you could combine these
4 concepts to do what makes sense when you are calculating
5 collective dose.

6 I think just to end this up, I just wanted to
7 mention that we do have the plan to go to the international
8 workshop to discuss the diversity of international regulatory
9 views with other regulators.

10 (Slide.)

11 MR. MORRIS: There are commitments from regulators
12 from ten countries who would be joining us.

13 (Slide.)

14 MR. MORRIS: We would have the International
15 Commission on Radiation Protection, the Nuclear Energy Agency,
16 and the --

17 MR. LAHS: Community of European --

18 MR. MORRIS: -- Community of European --

19 MR. LAHS: What did we say before? We just looked
20 that up.

21 CHAIRMAN ZECH: Excuse me. Just one of you talk at
22 a time so the reporter can keep track of what --

23 MR. MORRIS: I'm sorry. We will also have EPA,
24 DOE, National Council on Radiation Protection, and the
25 Advisory Committee on Nuclear Waste attending. The workshop

1 will be held, as I mentioned, in October, and it will be held
2 in Washington.

3 (Slide.)

4 MR. MORRIS: So, what we would be awaiting is the
5 Commission's guidance on what we would focus on in that
6 workshop.

7 MR. STELLO: Mr. Chairman, we are about finished.
8 In the paper we had suggested that perhaps the policy
9 statement subsequently would be changed and then issued for
10 public comment. I have been thinking more and more about it
11 and I cannot see any reason for delaying it. I think I am
12 satisfied it is in a form now where we could in fact issue
13 it for public comment.

14 CHAIRMAN ZECH: Do you mean before the international
15 meeting? Is that what you are saying?

16 MR. STELLO: Yes.

17 CHAIRMAN ZECH: All right.

18 MR. STELLO: So that we would have a generous
19 opportunity for public comment. I don't see any reason to
20 hold up doing that. The only risk is that we might want to
21 have public comment twice but that wouldn't concern me either.
22 I think it is important to try to generate to the extent we
23 can further comment and debate in this area. So, I would
24 urge to move out whatever the Commission feels that we
25 addressed all of the questions that need to be addressed and

1 if we have to ask specific questions in a comment period, why
2 we could easily just add those to it and move on rather
3 crisply with getting the comments.

4 CHAIRMAN ZECH: Well, let me make sure I understand.
5 I thought the purpose of this meeting was to get the
6 Commission authority to go to the international conference
7 with at least the proposed strawman policy.

8 MR. STELLO: Yes.

9 CHAIRMAN ZECH: And, then after the conference, you
10 would come back to us with your views and then we would go
11 out officially. Now you are saying that we would go out
12 ahead of time for public comment; is that right?

13 MR. STELLO: And, then come back to the Commission
14 after that public comment but then putting it out one more
15 time.

16 CHAIRMAN ZECH: There would be a public comment
17 period twice.

18 MR. STELLO: Yes. I think in this case it might be
19 worth it.

20 CHAIRMAN ZECH: All right. Then are you making a
21 different proposal than we had before the meeting?

22 MR. STELLO: I am suggesting that the Commission
23 might want to consider that because of the interest in this
24 issue, that instead of trying to publish it once, do it twice.
25 Put it out right now and have the benefit of that comment

1 process perhaps twice. I don't see any problem with that in
2 going in that direction. The Commission may want to consider
3 that.

4 CHAIRMAN ZECH: Does the General Counsel have any
5 comment?

6 MR. PARLER: There is no legal requirement, Mr.
7 Chairman, for policy statements to be put out for public
8 comment in any event, although that is in my judgment a good
9 practice to follow. The agency has followed it on a number
10 of occasions. I am at a loss myself from my perspective to
11 see how putting the thing out for public comment prior to the
12 international workshop would be overall beneficial. It might
13 give the participants in the international workshop the idea
14 that some minds have been made up prior to the exchange of
15 information and the exchange of views.

16 Also, it is my understanding that the workshop
17 perhaps may be limited to the participants from the various
18 organizations and countries. To put the policy statement out
19 for comment in advance of the workshop under those conditions
20 might unnecessarily complicate the thing. Those are my
21 thoughts but there are no legal problems.

22 CHAIRMAN ZECH: Right. Thank you very much. Do
23 you have any other comment on that, Mr. Stello?

24 MR. STELLO: No, sir.

25 CHAIRMAN ZECH: All right. I know we have two other

1 speakers but perhaps before we ask them to come forward, I
2 will ask my fellow Commissioners if they have any comments or
3 questions that they would like to address to the staff.

4 Commissioner Roberts.

5 COMMISSIONER ROBERTS: No.

6 CHAIRMAN ZECH: Commissioner Carr.

7 COMMISSIONER CARR: No.

8 CHAIRMAN ZECH: Commissioner Rogers.

9 COMMISSIONER ROGERS: Well, just on this
10 justification. I don't expect an answer now but I think that
11 is something that I really would like the staff to dig into.

12 MR. STELLO: We will arrange to brief the
13 Commission separately on that issue.

14 COMMISSIONER ROGERS: All right. Thank you.

15 CHAIRMAN ZECH: All right. Thank you very much.
16 I guess the next speaker is either Doctor Taylor or Mr. Lahs.
17 What order do we have them? Mr. Lahs.

18 MR. LAHS: No, I'm here with the staff.

19 CHAIRMAN ZECH: All right. Doctor Taylor and Mr.
20 Tipton; is that correct?

21 MR. STELLO: Yes.

22 CHAIRMAN ZECH: All right.

23 (Pause.)

24 MR. ALEXANDER: I would like to introduce the
25 doctor, please.

1 CHAIRMAN ZECH: All right, fine. Please do.

2 MR. ALEXANDER: Good morning. I am R. E.

3 Alexander, President of the Health Physics Society. This
4 society has 6,400 members and is believed to encompass and
5 represent consensus scientific opinion in the field of
6 radiation protection and health effects. We believe that
7 consensus scientific opinion should have a more prominent
8 role in public health policy development and today we are
9 making our initial attempt in that direction.

10 The society is grateful to the Commission for
11 providing this opportunity. We have prepared a list of
12 criteria that we believe should be met by the BRC level
13 selected and this list is available for your consideration.
14 With regard to the collective dose question, the NCRP has
15 stated, "There are no direct data that confirm that a few
16 random ionizations in tissue cause fatal cancers.
17 Irrespective of such scientific opinion, there has for many
18 years been concern over extremely small radiation doses if
19 they are received by extremely large numbers of people.

20 Considering current radiobiological and
21 epidemiological information, it is our position that
22 public health policy derived from such concerns is not
23 scientifically sound. Risk estimates made in this manner
24 must be described as speculative or inadmissible. Even if
25 such risks actually exist, they are imperceptible and too

1 small to be of regulatory concern.

2 For these reasons, it is the position of the society
3 that the Commission's generic BRC level should not be
4 accompanied by a collective dose restriction. Such a
5 restriction could defeat the Commission's purpose with
6 respect to effluent control, low level radioactive waste
7 management, de-commissioning, and other practices involving
8 the exposure of large numbers of people.

9 Whether an agent carcinogenic at high exposures is
10 also dangerous at low levels may be unknown. If the risks
11 could be substantial, regulation or even prohibition may be
12 necessary. If the hypothesized risk is known to be small,
13 costly regulations can be imprudent. Such is the case with
14 radiation doses as low as ten millirems per year. If doses
15 this low create a substantive public risk, we would have
16 evidence from high natural radiation areas where people
17 received doses on the order of 1,000 millirems per year. No
18 adverse effects have been found among these people.

19 However, if the Commission should find it necessary
20 to establish a collective dose criterion, we recommend
21 acceptance of the NCRP advice to exclude from the dose
22 calculation those people who receive less than one millirem
23 per year.

24 The society spokesman today will be Doctor Lauriston
25 S. Taylor who was our President in 1958. Doctor Taylor was a

1 co-founder of the ICRP and founder of the NCRP. He was the
2 first Chairman of the NCRP, a position in which he served
3 with distinction from 1929 until 1977. He has also served on
4 the ICRP and is now an emeritus member of both the ICRP and
5 NCRP. He has essentially devoted a long and distinguished
6 career to the development of radiation protection
7 recommendations for public policy makers such as this
8 Commission.

9 It is my honor and pleasure to introduce Doctor
10 Taylor at this time.

11 CHAIRMAN ZECH: Thank you very much. Doctor Taylor,
12 you are very welcome. Please proceed.

13 DOCTOR TAYLOR: Thank you. Speaking for the Health
14 Physics Society, I was asked to express two appreciations to
15 the Commission. The first of these was for the opportunity
16 of appearing before you to present evidence of our society's
17 concern and interest in what you are doing and in support for
18 what you are doing.

19 The second expression of appreciation would be for
20 the Commission's support of one of its staff to become
21 President of the worlds largest radiation protection
22 organization, the Health Physics Society. We realize that
23 this makes a considerable drain from time to time on the
24 parent organization of these individuals but also we believe
25 that it not only helps the society and the country in general

1 but we think it also helps the parent body.

2 Since the meeting of the Nuclear Regulatory
3 Commission today is attended by the public, I want to make it
4 very clear what the term "health physics" means. It is a
5 word not well understood by the general public. At the outset
6 of the weapons program under the Manhattan District Operations
7 in 1943, it was recognized that radiation safety and the
8 protection of people would require one of the major efforts
9 in their program. At the same time, they were afraid that if
10 the word radiation were to appear in any way in connection
11 with that program, it might give away the secret of what they
12 were working on which of course was the first atomic bomb.
13 To preserve the secrecy, they called the radiation protection
14 activities "health physics". It was a decoy name meaning
15 nothing that might be associated with radiation.

16 Unfortunately that same name has hung on and the
17 public most of the time does not know what the word "health
18 physics" means. What it means is radiation protection and
19 health physicists are radiation protectionists. That's what
20 it's all about.

21 Now, in the radiation protection community, we have
22 been increasingly concerned about the complexity of our
23 radiation control measures, the drain from our professional
24 manpower and the heavy financial burdens that are restraining
25 important applications of ionizing radiation in science,

1 medicine and industry.

2 For example, we are facing a continuing shortage of
3 trained radiation protectionists in this country. The costs
4 of protection are no longer commensurate with the degree of
5 protection that is being provided with these high costs in
6 the low level region. The cost per unit improvement in
7 radiation protection increases enormously when we get down
8 into the very low dose range, especially the range which is
9 only a small fraction of the natural background at which we
10 are exposed all the time.

11 I'm sure the NRC can develop some specific
12 information on this question and I have heard it discussed
13 already this morning their plans to do so and they sound
14 sound. As an example, we have heard something of the order
15 of 90 percent of the costs of the overall effort that is
16 expended on radiation protection is expended in the very low
17 dose range where the effects of radiation cannot be found
18 specifically by any means that we know of today. Why? Why
19 all this?

20 Well, the statistical methods that we have today
21 and probably will always have are simply inadequate to deal
22 with the small size samples that we have to work with. Also,
23 direct observation may come some time in the future but there
24 is nothing in sight. There are some but extremely limited
25 data in the range of five to ten-rem acute exposure and five-

1 rem per year exposures extending over many years. We use
2 what data there are available but we are still left with huge
3 gaps in our knowledge with little likelihood in sight for
4 solving some of these openings or closing some of these
5 openings.

6 Now, the lack of information and data in the low
7 dose range -- I call anything below ten rems a low dose --
8 but anything lower than that has forced our main scientific
9 body such as the --

10 CHAIRMAN ZECH: Anything below ten rems.

11 DOCTOR TAYLOR: Ten rems.

12 CHAIRMAN ZECH: Anything below ten rems you call a
13 low dose.

14 DOCTOR TAYLOR: I call a low dose.

15 CHAIRMAN ZECH: Ten rems, what, per hour or per
16 year?

17 DOCTOR TAYLOR: Well, ten rems in a single shot, in
18 an acute exposure.

19 CHAIRMAN ZECH: Over what period of time?

20 DOCTOR TAYLOR: Ten rems in one minute or one day
21 or a week.

22 CHAIRMAN ZECH: A total of ten rems you are talking
23 about.

24 DOCTOR TAYLOR: A total of ten rems.

25 CHAIRMAN ZECH: Not in an hour or a year but just

1 a total absolute number, ten rems.

2 DOCTOR TAYLOR: Well, a total in a short time. If
3 it is delivered in a long time, it can be a lot more than
4 that.

5 CHAIRMAN ZECH: Well, that's my point.

6 DOCTOR TAYLOR: Oh, yes. Well, this is a ten-rem
7 single acute dose.

8 CHAIRMAN ZECH: All right.

9 DOCTOR TAYLOR: The reason that I name that figure,
10 which I won't support too heavily, is because we simply don't
11 have any decent data to work with below that level. Everything
12 from there on down involves a certain degree of speculation
13 and assumptions.

14 CHAIRMAN ZECH: I understand. Thank you.

15 DOCTOR TAYLOR: That's the reason for it.

16 CHAIRMAN ZECH: You may proceed.

17 DOCTOR TAYLOR: This situation I was starting to
18 say has forced the main scientific bodies such as the NCRP
19 and ICRP to extrapolate the occurrence of effects from the
20 high dose region where we do know a lot about radiation
21 effects in terms of dose to the low dose region where we have
22 no information. This is an extrapolation and a number of
23 assumptions. Simultaneously, we have to use compounded
24 assumptions, one assumption after another. Invariably, when
25 assumptions are made and you are thinking about a problem that

1 covers maybe a range, it is almost always the case that the
2 people who are making these assumptions veer in the direction
3 of conservatism and this is the way it should be but it also
4 makes for a very severe and perhaps over-protection
5 requirements.

6 Big expenditures are made to ensure low doses in
7 the region where we can't find anything except in theory or
8 by involving assumptions. This big effort is known to the
9 public and it creates the impression that if it is designed
10 to meet some strange situation, it must be very dangerous.
11 Otherwise, all of this effort wouldn't be devoted to it.
12 They can't understand it. They don't know that the scientists
13 don't understand it. So, they think it is something about
14 which they should be alarmed.

15 Any action taken by the government in any trivial
16 matter or a matter of relatively low importance excites undue
17 perceptions on the part of the media and of the general public.
18 That's one of the problems we have to face in this particular
19 question.

20 Now, from the health physics side, we don't want to
21 pretend that we are trying to tell the Nuclear Regulatory
22 Commission very much or maybe anything that it doesn't already
23 know. I listened to the presentation this morning. I agree
24 with just about every word that was said. Obviously you are
25 understanding these things.

1 We are aware of your preoccupation with the BRC
2 concept and that you are grappling with the problem. What we
3 do want you to know is that the Health Physics Society of
4 radiation protectionists shares your concern and shares your
5 concern and shares your positive and promising efforts to
6 control it.

7 I will mention a few further points as I go along
8 but these will be primarily for emphasis and to indicate that
9 our two organizations are thinking alike, yourselves and
10 ourselves. I will assume that you have had the opportunity
11 to read at least the first couple of pages of our letter of
12 September 8th. I hope that's a better assumption than we can
13 make about many of our technical matters.

14 We will not offer you any specific proposals for
15 a level of radiation exposure that should be below regulatory
16 concern. We do, however, offer you our help and cooperation
17 in solving this problem if you were to request it. The final
18 answer on the BRC problem can come only from you. By you, I
19 mean this organization. But because it is not primarily a
20 scientific or technical problem, however much it may be based
21 on scientific and technical data. Your kind of organization
22 is the only kind that is properly constituted to deal with
23 the question. The question is politic and can be solved only
24 by actions that are, and I quote, "prudent and sagacious in
25 devising and pursuing measures adopted to promote public

1 welfare", the kindness of Mr. Webster.

2 Personally, I find it compelling when considering
3 such a problem as below regulatory concern to examine the
4 common sense of the situation, together with the technology.
5 We know that radiation, among hundreds of other agents, cause
6 cancer. We know that one-third of us sitting in this room
7 today will have cancer at some point in our lives and that
8 half of those will die from cancer. But we have no direct
9 statistical evidence of cancer having been induced by
10 radiation exposures below maybe five rem in a single
11 exposure -- I mentioned ten rems before but five rem is a
12 more common figure -- or one rem per year spread over many
13 years continually.

14 Now, it has been conservatively proposed that the
15 upper limit of exposure of individuals in the public not
16 exceed one-tenth rem or 100-millirem in a year. To ensure
17 that this level of exposure is not exceeded, the protection
18 bodies are suggested a goal of one millirem per year as an
19 average dose to the whole population. This is a dose which
20 they describe as being of negligible risk or at a negligible
21 risk level. One millirem a year. Now, why are we doing this
22 to ourselves? We cannot find any effect, so we theorize them.
23 We cannot measure the exposure, so we calculate them. But
24 each and every step in each process, there is a large number
25 of assumptions and choices of range and, as already noted,

1 they are almost always drawn in the direction of
2 conservatism.

3 In the general goals, the Regulatory Commission has
4 an overall safety goal of 25-millirem for its general
5 coverage. I won't go into detail as to how that is
6 distributed. To achieve this at the present time, the NRC
7 must regulate every radiation matter coming within their
8 jurisdiction all the way down to zero exposure but, fortunately,
9 the law does not require the NRC to regulate the exposures
10 from natural background radiation which as a matter of fact
11 outweigh the ones that man is making.

12 In establishing a radiation control system, there
13 are two factors. One is the matter of individual doses and
14 the second is the matter of collective doses for the whole
15 population. That is the average dose to individuals multiplied
16 by the number of individuals. This can be applied where you can
17 measure doses and you can measure the number of people that
18 are exposed. These objectives can be accomplished with a
19 modest effort in the upper dose region but in the low dose
20 region it becomes increasingly difficult, increasingly costly
21 and decreasingly important in the regions that are less than
22 the 25-millirem level that you regarded as your overall goal.

23 Now, a perceived stumbling block in instituting a
24 BRC plan has been the incorporation of the collective dose
25 requirement. However, the NCRP recommends that the requirement

1 for a collective dose evaluation be explicitly eliminated
2 from any need or consideration in the region that is
3 described below regulatory concern. They happen to have
4 suggested what might be used as a BRC as one millirem a year
5 as I mentioned.

6 Thus, if the Regulatory Commission were to choose
7 a number higher than one millirem per year as their level,
8 that could be below regulatory concern and the same
9 exclusion of the requirement for collective dose consideration
10 would apply.

11 I might state parenthetically when I said that the
12 NCRP made this recommendation about a BRC, actually their
13 terminology was negligible individual risk level but that is
14 the same as BRL. I'm getting mixed up in my acronyms.

15 CHAIRMAN ZECH: BRC.

16 DOCTOR TAYLOR: BRC. The NCRP's suggestion would
17 apply to the whole population for all sources of radiation,
18 whereas the BRC would apply to those sources of radiation
19 subject to regulation by the Commission. To be sure of that
20 last statement, which I think is very critical, I checked
21 them both with the members of the NCRP and ICRP, a member of
22 the ICRP and Chairman of the Committee I of the NCRP, and
23 they have verified those statements that I just made as being
24 in accordance with their understanding.

25 The ICRP does not like the whole restriction

1 question about collective annual effective dose equivalent
2 and so far has not mentioned it at all. It is a question
3 that has been under some discussion by them but apparently
4 it is not coming to any visible conclusion at the moment.

5 Thus, I do not see any restriction on the NRC in
6 choosing a BRC level that will cause conflict with either of
7 the above radiation protection bodies. Thank you, sir.

8 CHAIRMAN ZECH: Thank you very much, Doctor Taylor.
9 Why don't we hear from Mr. Tipton next and then we will
10 entertain questions from my colleagues.

11 MR. TIPTON: Good morning.

12 CHAIRMAN ZECH: Mr. Tipton, you may proceed.

13 MR. TIPTON: Good morning. I am Tom Tipton,
14 Director of the Operations, Management and Support Services
15 Division of the Nuclear Management and Resources Council,
16 NUMARC. Byron Lee and Joe Colvin are on travel and send
17 their regrets that they could not be here today. I would
18 like to thank the Commission for the opportunity to appear
19 before you at this meeting to present a statement on behalf
20 of MUMARC with input from representatives of Edison Electric
21 Institute, the Electric Power Research Institute, Utility
22 Nuclear Waste Management Group and the U. S. Council for
23 Energy Awareness.

24 With me today are the following industry
25 representatives and they are to your right: Mary Birch,

1 Technical Systems Manager, Radwaste Engineering, from Duke
2 Power Company, and Chair of EPRI's BRC Owners Group Technical
3 Advisory Committee; Lynne Fairobent, NUMARC Project Manager;
4 Pat Robinson, Director of EPRI's Below Regulatory Concern
5 Owners Group; Steve Kraft, Director of UNWVG; and Dixon Hoyle,
6 Project Manager, Nuclear Fuel Cycle of the USCEA. These
7 individuals are directly responsible for the projects I will
8 be discussing here this morning.

9 The nuclear industry has supported and continues to
10 support the NRC's efforts to designate levels of radiation
11 that are below regulatory concern. Since the generic BRC
12 issue involves several industry organizations and addresses
13 a generic issue, NUMARC is responsible for coordinating these
14 industry activities. To accomplish that, we established a
15 BRC Ad Hoc Advisory Committee, which has representation from
16 all industry groups addressing different aspects of the issue.
17 A draft industry program plan is being prepared and will be
18 distributed in the near future. It describes the range and
19 scope of industry activities relating to the BRC issue and the
20 key milestone dates. We plan to make it available to your
21 staff so that you will be fully aware of the industry's
22 programs.

23 However, we think it is important to briefly
24 highlight today some of the industry activities already
25 completed and those in progress that address this issue and

1 then mention some important points for your future
2 consideration. Again, we appreciate you allowing us this
3 opportunity.

4 There have been several detailed industry studies
5 addressing the issue of BRC dating back to the late 1970's.
6 Some examples are identified in Attachment A to my
7 presentation. I want to emphasize that these are not all of
8 the studies but only a representative sample of what the
9 industry has done.

10 In July of 1984, EEI and UNWGMG filed a petition
11 for rulemaking with the NRC regarding the disposal of
12 radioactively contaminated waste oil from nuclear power
13 plants with levels of radiation that should be classified as
14 being below regulatory concern. We are pleased that NRC has
15 published for comment in the August 29, 1988 Federal Register
16 a proposed amendment to its regulations to permit the on-site
17 incineration of slightly contaminated waste oils generated
18 at nuclear power plants. The nuclear industry will be
19 submitting comments on the proposed rulemaking.

20 The industry has also been involved in related
21 activities. Extensive comments on the proposed revisions to
22 10 CFR Part 20 were provided in October of 1986 by the former
23 Atomic Industrial Forum and EEI. Detailed comments on the
24 NRC's BRC recommendations were included. The industry also
25 commented extensively on the NRC's advance notice of proposed

1 rulemaking on radioactive waste below regulatory concern
2 published in the December 2nd, 1986 Federal Register. These
3 comments included a strong endorsement of the Commission's
4 proposal to develop BRC regulations.

5 NRC published in the August 29th, 1986 Federal
6 Register a policy statement and staff implementation plan
7 regarding expeditious handling of petitions for rulemaking
8 to exempt specific radioactive waste streams from disposal in
9 a licensed low level waste disposal facility. This policy
10 statement provided the long sought opportunity for the
11 nuclear industry to pursue the exemption of wastes with very
12 low activity levels from NRC regulations.

13 In response to the August 1986 policy statement,
14 EPRI and UNWVG initiated a joint program in early 1987 to
15 develop a petition for rulemaking to exempt very low level
16 waste produced at nuclear power plants. EPRI is providing
17 the research and the technical data to support the petition,
18 and UNWVG is providing program support, including legal
19 support and drafting the petition. The EPRI research effort
20 is nearly complete. It alone represents an expenditure of
21 approximately 2.2 million dollars. The present target is to
22 submit the petition by the end of this calendar year.

23 The petition will propose that the regulations
24 allow the disposal of slightly contaminated wastes in on-site
25 landfills, off-site sanitary landfills, and on-site and off-

1 site incinerators. It will fully comply with the detailed
2 criteria set forth in the Commission's August 1986 policy
3 statement and the staff's implementation plan, and will
4 therefore qualify for expedited processing.

5 Now, I would like to briefly summarize some
6 important points for your consideration during future
7 discussions on the issue.

8 First, it is important that any NRC action
9 identifying a level of radiation risk or dose below which
10 government regulation would be limited or unwarranted be
11 consistent with, and not negate in any way, the August 1986
12 policy statement. We need to preserve the options it provides
13 as well as the investment the industry has made in preparing
14 the petition.

15 Second, we feel that a process should be established
16 to determine appropriate BRC levels and I want to emphasize
17 from the industry's point of view, we feel that the BRC
18 program is a process, including the performance of a cost/
19 benefit analysis for higher BRC exempted dose levels. Less
20 rigorous analyses would be required for lower dose values.
21 We generally support an approach similar to that presented
22 by the staff at the September 13th, 1988 meeting of the
23 Advisory Committee on Nuclear Waste. I want to interject
24 with a very preliminary review of the ACNW's letter of
25 September the 15th. We don't support it because it appears

1 to eliminate the process that we think BRC represents and
2 it just creates limits. Prior industry comments on the issue
3 support individual doses in the range of ten to 20-millirem
4 per year as the generic BRC.

5 Third, since protection of the individual assures
6 adequate protection of the overall population, the
7 establishment of an annual collective dose person-rem
8 standard for BRC is not appropriate.

9 Finally, it is our understanding that the staff
10 currently intends to make BRC standards a matter of
11 compatibility for agreement state regulatory programs. In
12 order to realize the full benefits from the Commission's BRC
13 initiatives, it is crucial that BRC standards be adopted by
14 agreement states identical with federal requirements, in a
15 manner similar to the Commission's other radiation protection
16 standards.

17 In conclusion, the industry strongly supports
18 initiatives to address the BRC issue, as reflected in the
19 work that has been initiated over the past decade. Further,
20 the industry believes that the development of BRC is important
21 to the conduct of good radiation protection programs while at
22 the same time making it possible to minimize the expenditure
23 of resources on matters that pose trivial levels of risk.

24 We support the need to address the generic BRC
25 issue in a timely manner and encourage the continued exchange

1 of information as it becomes available.

2 Establishing regulatory cut-off values would
3 assure that our limited resources are being used most
4 effectively in protecting public health.

5 In addition, we also support Vic Stello's
6 recommendation that the draft policy statement be issued for
7 public comment as soon as possible. Thank you very much.

8 CHAIRMAN ZECH: Thank you very much. Any questions
9 from my fellow Commissioners? Commissioner Roberts.

10 COMMISSIONER ROBERTS: No.

11 CHAIRMAN ZECH: Commissioner Carr.

12 COMMISSIONER CARR: No.

13 CHAIRMAN ZECH: Commissioner Rogers.

14 COMMISSIONER ROGERS: Well, I think just really
15 the collective dose question which is the one that is most
16 troublesome, and I wonder if either of you two gentlemen who
17 are positioned to the inclusion of a specific collective dose
18 in the policy statement could say anything about how the
19 concerns that are obviously in back of introducing this into
20 the policy statement could be addressed without setting a
21 collective dose limit in the policy statement?

22 What is your opinion as to the validity in a sense
23 of these concerns and how they could be addressed without
24 putting them in as a specific limit? You suggested that you
25 are in opposition to that but there clearly is an issue out

1 there that is troublesome, and how would you suggest that we
2 address that issue?

3 DOCTOR TAYLOR: Well, as I understand the problem
4 there, if you were to set a particular number as a BRC level,
5 you would have to do that after a determination had been
6 made that individuals were not going to be exposed above
7 whatever level it may be that you have set. At the same
8 time -- well, if you do that, you can stop. You do not need
9 to be concerned any further with the collective dose that
10 applies to the people below that level.

11 Now, am I saying something that seems to be in
12 conflict there? I think it's that simple.

13 COMMISSIONER ROGERS: Well, it's clear that
14 everybody doesn't agree that that's the case because our
15 advisory committee on waste seems to feel that there should
16 be a collective dose limit and has some ideas about the size
17 of it and so on. So, there must be an issue here that
18 reasonable people see in a different way, and I wonder if
19 there is some way of approaching that issue which is a little
20 different from we need it or we don't need it and we just
21 thrash it out on that basis.

22 Can that issue be illuminated a little bit and
23 dealt with in another way?

24 DOCTOR TAYLOR: I don't know how you treat an issue
25 like that. That is made up of a collection of opinions. This

1 committee you mentioned, I am not familiar with the name.

2 MR. ALEXANDER: Dave Mohler's.

3 DOCTOR TAYLOR: Huh.

4 MR. ALEXANDER: Dave Mohler's committee.

5 DOCTOR TAYLOR: All right, Dave Mohler's committee.

6 CHAIRMAN ZECH: Advisory Committee on Waste.

7 DOCTOR TAYLOR: Okay, right. Well, I know Dave
8 Mohler very well and I also know very well his attitude on
9 this question and Dave, quite honestly, probably believes
10 that a large number of people exposed below one millirem can
11 add up to some kind of an undesirable cumulative dose. I
12 don't think so and the NCRP doesn't think so. They say so
13 specifically in their report, if I understand what is
14 attributed to the advisory committee. I am not familiar
15 with -- I know of that report but I am not familiar with the
16 details of it.

17 MR. TIPTON: Excuse me. In our discussions and as
18 I said in my statement, we feel at these low levels if you
19 set the limit at the individual you are protecting the
20 population. Now, in the briefing of the staff, saying that
21 you can use the collective dose to assure that no more than
22 100,000 people get this ten-millirem, in preparing the
23 petition that we are preparing, we found that the maximum
24 exposed individual for this ten-millirem was actually the
25 truck driver in getting the material from the plant to the

1 landfill itself. And, looking at the overall issue of who
2 would be exposed, clearly you have to look at the most
3 exposed individual and we feel that that is the driver
4 himself.

5 We don't see how you use the 100-person rem at
6 these lower levels in terms of the protection of the public.

7 DOCTOR TAYLOR: If you were to --

8 COMMISSIONER ROGERS: Well, is it --

9 DOCTOR TAYLOR: Excuse me. Go ahead.

10 COMMISSIONER ROGERS: I was just going to say is it
11 really just another way of stating the linear hypothesis
12 really?

13 DOCTOR TAYLOR: No.

14 COMMISSIONER ROGERS: Well, because it is taking a
15 small number and multiplying it by a big number and getting
16 something that is measurable and that small number is really
17 one that comes out of the linear hypothesis.

18 MR. TIPTON: The other problem you have sometimes
19 with levels like this, if you were to multiply the potential
20 exposed individuals, et cetera, and you say that you have a
21 100,000-person rem of exposure, we are talking ten to 20-
22 millirem, and you divide that by a factor of 10,000-person
23 rem per cancer, you could say that you have a statistical
24 cancer, statistical fatality due to these types of exposures
25 when in fact, as the staff has presented, you are looking at

1 the safety goal numbers in terms of the incremental additional
2 risk to the public from these types of levels. So, one of
3 the problems you have is public perception of this running
4 the code and running out the numbers and then dividing by a
5 factor, and statistically you have a fatality when in fact
6 you sit here and say how is that possible? That's part of
7 the problem.

8 DOCTOR TAYLOR: That question of public perception
9 is one of the key issues here. When you think about it in a
10 simple way, if you were to set a level of ten-millirems a
11 year as below regulatory concern, you are saying that nobody
12 who is exposed to those lower levels is going to stand an
13 appreciable likelihood of being harmed. That's what you are
14 saying. Now, I don't care whether that happens to one person
15 or ten persons or 10,000 persons, it still isn't going to
16 produce an appreciable harm unless you get down to the point
17 of speculating how many appreciables make one harm. It gets
18 you into almost ridiculous numbers in my opinion.

19 MR. ALEXANDER: Commissioner, in answer to your
20 question about alternatives, the position of our society, as
21 I mentioned when I introduced Doctor Taylor, is that if you
22 do find it necessary to establish a collective dose criteria,
23 that we recommend that you accept the NCRP advice to exclude
24 from the dose calculation anyone who receives less than one
25 millirem per year. That seems to be a viable alternative.

1 DOCTOR TAYLOR: But one thing, Bob; if the NRC were
2 to set a level of ten instead of one, which the NCRP uses,
3 this exclusion of the requirement for the cumulative dose
4 would still apply.

5 MR. ALEXANDER: Yes.

6 COMMISSIONER ROGERS: All right. Thank you very
7 much on that.

8 CHAIRMAN ZECH: Well, it seems to me that as far as
9 the collective dose is concerned, if there is no other reason,
10 it may have some value in order to help us to put in as plain
11 language as we possibly can what is the potential harm to the
12 public. It is very difficult when we talk millirem and
13 micro-curies and all kinds of other -- echo-curies and
14 different measurements of radiation. The general public, I
15 have come to appreciate, has a very difficult time understanding
16 what these numbers are and what is the potential harm. And,
17 if we can say it has one in 10,000,000 or one in 50,000,000
18 or something like that in as simple of terms that people can
19 understand, I think it is, frankly, an obligation that we
20 all have to try to come up with something that says very
21 truthfully, very honestly, the best scientific knowledge we
22 have and put it in as plain language as we can and perhaps
23 even if the collective dosage isn't all that valuable from a
24 certain standpoint, it seems to me that it could be valuable
25 if it will help us to explain to the general public exactly

1 what we are talking about.

2 COMMISSIONER ROBERTS: I tend to think it would
3 obfuscate the whole matter more.

4 CHAIRMAN ZECH: Well, that's possible. We should
5 think about it. It seems to me that it would have merit to
6 try to come up with some way to explain what numbers we are
7 talking about and what harm, if any, in these low numbers
8 there would be. I'm sure there are different views on this
9 as Commissioner Roberts just pointed out. But to me it is a
10 challenge and it's an obligation and responsibility we have
11 to try to be as truthful and honest as we can and say what we
12 mean, rather than talk about it in these very scientific
13 terms. This is something that I think is very important.

14 DOCTOR TAYLOR: Well, I think --

15 CHAIRMAN ZECH: Doctor Taylor.

16 DOCTOR TAYLOR: Yes. Well, I think in your process
17 of arriving at a suitable number for BRC, you certainly
18 indeed do have to go through just what you are talking about
19 just to show publicly what it is you have done. But once you
20 have done that to demonstrate the number that you have set,
21 when you reach the point of exercising your BRC concept, you
22 don't have to keep track of anything that happens in the
23 region below that level.

24 Now, as I understood, you are suggesting that you
25 might have to continue to do that.

1 CHAIRMAN ZECH: No, I don't mean to do that at all.
2 I am thinking about two things. One is, first of all, what
3 is the right number, conservative number, that we as a
4 regulatory body using all the expertise and advice we can
5 gather, what is the proper number that we should place on
6 it for below regulatory concern? That is a very real
7 responsibility we have --

8 DOCTOR TAYLOR: That's right.

9 CHAIRMAN ZECH: -- we are trying to exercise. But
10 in addition to that and aside from that really, after we have
11 made that judgment or while we are making that judgment, what
12 is the best way we can explain and say in layman's language
13 what we have done and be very honest and truthful about it
14 and have a clear conscience? That's what we have done and
15 here is why we have done it and here is what we have done.
16 It's very difficult to explain these health physics terms
17 and I think it's important we try to do so.

18 DOCTOR TAYLOR: I think it is crucially important
19 that you provide an explanation that the public can
20 understand. I have been trying to do this in my own small
21 way for 15 or 20 years since this situation has been getting
22 somewhat out of control in my opinion. But the whole question
23 will hinge upon public conception of what the Commission is
24 doing. You have to put every fact out but, in addition, you
25 have to explain those facts so that people will understand

1 them in a language that they can understand.

2 CHAIRMAN ZECH: That's exactly what I'm trying to
3 do too. I think we need your help to do that. That's the
4 only reason I am saying that perhaps this collective dosage
5 has some merit.

6 COMMISSIONER CARR: Mr. Chairman, I spent two days
7 trying to understand collective dose and I consider myself
8 an average member of the public and I cannot yet see any
9 rational explanation for a collective dose as to what it adds
10 to the problem. I have tried it all. I have discussed it
11 with the proponents and the opponents and I cannot come up --
12 it just doesn't make sense to me to use it for anything.

13 CHAIRMAN ZECH: The only thing that makes sense to
14 me is if you say below regulatory concern is ten millirem or
15 whatever it is, what does that mean? What does that mean?
16 And, to me, by itself it may not mean much but if you can say
17 it means that in a 50-year period you can expect to have 12
18 to 25,000,000 deaths and what this below regulatory concern
19 means is that you would have one more.

20 COMMISSIONER CARR: Well, that's not the number that
21 we are talking about.

22 CHAIRMAN ZECH: Well, whatever, what I'm saying
23 is -- the numbers aren't important -- but what I'm saying is
24 that some way of saying in as plain language as we can what
25 we are doing. To me, that is perhaps the greatest value of

1 using a collective dose, or call it some other name but I am
2 just trying to say that I think my personal feeling is the
3 general public is pretty smart and they deserve to know the
4 answer and I want to put it in as plain language as I can.
5 I think if we do that, they will understand it and we will
6 have done a service. I have great confidence in the public
7 when they know the facts. I do believe that this collective
8 dose -- call it what you want -- is a method at least to try
9 to explain what we are doing, and I think it is important we
10 try to do that.

11 MR. LAHS: Our society can help in that regard.

12 CHAIRMAN ZECH: What's that?

13 MR. LAHS: Our society can help in that regard.
14 I'm sure it can.

15 CHAIRMAN ZECH: We need help. We are asking for
16 help. At least I am anyway.

17 MR. LAHS: We can develop that to get it before the
18 public.

19 CHAIRMAN ZECH: Commissioner Carr.

20 COMMISSIONER CARR: Let me add one more thing. In
21 trying to explain it to me, they tried to convince me that if
22 you had a lot of these sources that could expose people up to
23 ten MR, then you ought to worry about all of these sources
24 and where they come from, and finally you are going to have
25 to worry about a collective dose of the population. I said

1 why don't we in lieu of that worry about the individual
2 source that is causing the radiation and measure it and
3 control it at that level, instead of trying to control it
4 across a public that you can't really define? And, I would
5 like them to discuss that in the workshop, whether instead
6 of the collective dose we can look at the particular product
7 that is causing the dose and see if there is not some limit
8 we can set on that and say you can't put this out in the
9 general public.

10 CHAIRMAN ZECH: Well, I think I would agree, that
11 is a fundamental concern that certainly should be discussed
12 and that we should be aware of.

13 COMMISSIONER CARR: I tried to find out what the
14 100-person rem per year, what would be the limiting product
15 that would cause you to get to that. When would this come
16 into effect and what would it mean to the people if we set
17 it or what is the difference between setting it at 100-person
18 rem and 10,000-person rem except in the numbers here? I was
19 unable to come up with a satisfactory answer that I could
20 understand.

21 CHAIRMAN ZECH: Well, that's what we are trying to
22 find out. We are asking is there one and is there a way that
23 the number we could put out is sensible, is honest, is
24 meaningful? That's what we are trying to find out. We are
25 asking for help from the experts. That's what we are here for.

1 DOCTOR TAYLOR: I am sure it can be done and the
2 biggest part of the problem, however, is going to be again
3 to find a way of presenting that to meet the public idea of
4 what is being talked about. You mentioned complex terms
5 using just collective dose as a simplification of the real
6 term. Just for your amusement, I will read you the sentence
7 now on that. It is further recommended that assessments of
8 increments of collective annual effective dose equivalents
9 -- that's the right word to use. That's been reduced to
10 collective dose.

11 Now, there is a problem that we have of reducing
12 that fine scientific idea down to something that the public
13 can understand.

14 MR. TIPTON: And, I think also the public
15 understands comparisons of risks. I think when you had your
16 briefing with the staff before, they indicated that a round
17 trip flight to the west coast was around five-millirem
18 exposure. The public understands this risk relative to other
19 risks. So, you may even look at it from that standpoint. It
20 is easy to understand. I think they would have difficulty
21 with person-rem. I mean what is a person-rem and what is the
22 affected population we are talking about? Is it within ten
23 miles of the landfill? Why just ten miles? Why isn't it 100
24 miles, et cetera? And, you play that off and, you know, it's
25 according to who you are talking to. But when you talk

1 relative to other risks that they understand, it's easier
2 for them to understand what we are saying at these levels of
3 radiation.

4 CHAIRMAN ZECH: Well, let me emphasize just one
5 final point. There are two issues again. One is our
6 responsibilities for the public health and safety. We don't
7 want to harm the public. That's very real and that is what
8 we have got to decide. That's our responsibility. We are
9 using the scientific community to help us make that
10 determination.

11 The second thing is how do we explain it and make
12 it understandable to the public. There are two different
13 issues very separate in my judgment. The one is our
14 responsibilities for public health and safety are very real.
15 That is our responsibilities. They expect us to do and that
16 is what we are trying to do. But in addition to doing that,
17 when we have done that, it seems to me we ought to be able
18 to try to say in layman's language exactly what we have done.

19 MR. TIPTON: And, we support those.

20 CHAIRMAN ZECH: Well, are there any other questions
21 or comments?

22 COMMISSIONER CARR: I have got one.

23 CHAIRMAN ZECH: Yes.

24 COMMISSIONER CARR: As I say, the whole thing boils
25 down, and I hope we can work it out in that workshop, but the

1 justification of the practice, this so-called net benefit,
2 I don't know who is going to decide what is net in the
3 benefit or how net is going to be determined. On the issue
4 of collective dose then, I think, before we leave, we ought
5 to clear up this comment in the paper that says that NEPA,
6 the National Environmental Policy Act, requires that the
7 collective dose be figured.

8 Can the counsel provide any information on that?

9 MR. PARLER: Well, in addition to the radiological
10 health and safety responsibilities, this agency is subject to
11 the National Environmental Policy Act. The National
12 Environmental Policy Act certainly does not, in my judgment,
13 require that a particular collective dose be set. But in
14 either deciding whether an environmental assessment is
15 required or doing an environmental assessment, certainly the
16 societal impact would have to be considered.

17 Therefore, it would seem to me that in order to do
18 that, a range of alternatives could be considered or a ban
19 without setting any particular dose level. But after you go
20 through the analysis, you should be left with some certainty
21 as to what the societal impact would be. So, you have to do
22 something but you don't have to set a precise number.

23 CHAIRMAN ZECH: All right. Any other questions or
24 comments?

25 (No response.)

1 CHAIRMAN ZECH: All right. Well, let me then on
2 behalf of the Commission thank you Doctor Taylor very much
3 and Mr. Tipton and the staff for this presentation this
4 morning. It is a very important issue. It has been around
5 for a long time. We have a responsibility to attempt to
6 resolve it. I think the international conference certainly
7 should be very helpful.

8 I would ask my fellow Commissioners, I believe we
9 have before us SECY-88-257 that asks for -- the staff was
10 asking for our authorization to go to this international
11 conference and present these policy views. Mr. Stello has
12 also suggested perhaps that we go to the public first and
13 then go again after the meeting.

14 I would prefer, frankly, to go to the international
15 conference I think and then see what they have to say and
16 then go out with public comments later but since Mr. Stello
17 has made the proposal that we go either one way or the other,
18 I would ask you add that to SECY-88-257 and perhaps act on
19 that as soon as we can so that the staff will have our
20 guidance before they go to the international conference.

21 If there are no other questions or comments from
22 my fellow Commissioners --

23 (No response.)

24 CHAIRMAN ZECH: -- thank you very much. We stand
25 adjourned.

(Whereupon, at 11:50 a.m., the Commission meeting
was adjourned.)

CERTIFICATE OF TRANSCRIBER

This is to certify that the attached events
of a meeting of the U.S. Nuclear Regulatory Commission
entitled: BRIEFING ON STATUS OF EFFORTS TO DEVELOP
A BELOW REGULATORY CONCERN POLICY

TITLE OF MEETING: Public Meeting

PLACE OF MEETING: Washington, D.C.

DATE OF MEETING: September 16, 1988

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.



JOHN TROWBRIDGE, CVR

Ann Riley & Associates, Ltd.

PROPOSED POLICY STATEMENT
ON EXEMPTION OF PRACTICES WHICH
ARE BELOW REGULATORY CONCERN

STAFF PRESENTATION TO COMMISSION

SEPTEMBER 16, 1988

OUTLINE OF PRESENTATION

- PURPOSE OF PRESENTATION
- BACKGROUND
- OBJECTIVE OF POLICY STATEMENT
- CONSIDERATIONS UPON WHICH POLICY STATEMENT IS BASED
- KEY ELEMENTS OF POLICY STATEMENT
- PLANS FOR INTERNATIONAL WORKSHOP

° PURPOSE OF PRESENTATION:

- TO DISCUSS THE PROPOSED COMMISSION POLICY ON EXEMPTION FROM REGULATORY CONTROL FOR PRACTICES WHOSE HEALTH AND SAFETY IMPACTS ARE BELOW REGULATORY CONCERN
- TO DISCUSS PLANS FOR THE INTERNATIONAL WORKSHOP

BACKGROUND

STAFF REQUIREMENTS MEMORANDUM OF 3/30/88
DIRECTS STAFF TO "SUBMIT FOR COMMISSION
CONSIDERATION OPTIONS FOR A POLICY
STATEMENT WHICH ESTABLISHES A GENERIC
NUMBER FOR EXPOSURES THAT ARE BELOW
REGULATORY CONCERN."

OBJECTIVE OF POLICY STATEMENT

TO ESTABLISH BASIS FOR DEVELOPMENT OF
REGULATIONS OR LICENSING DECISIONS
DEFINING CONDITIONS FOR EXEMPTION FROM
REGULATORY CONTROL.

CONSIDERATIONS UPON WHICH-POLICY IS BASED

- ° FUNDAMENTAL PRINCIPLES OF RADIATION PROTECTION
 - JUSTIFICATION OF PRACTICE
 - DOSE LIMITS TO DEFINE MAXIMUM ALLOWED RADIATION LEVELS
 - ENHANCED PROTECTION BASED ON ALARA PRINCIPLES

CONSIDERATIONS UPON WHICH-POLICY IS BASED

- ° LINEAR NON-THRESHOLD RELATIONSHIP
BETWEEN LOW RADIATION DOSE AND
STOCHASTIC CANCER RISK

CONSIDERATIONS UPON WHICH-POLICY IS BASED

- RECOGNITION THAT INDIVIDUALS MAY BE EXPOSED TO RADIATION FROM MORE THAN ONE LICENSED OR EXEMPTED SOURCE

ELEMENTS OF POLICY STATEMENT

- ° GENERAL CONDITIONS FOR EXEMPTION
 - COSTS OF ADDITIONAL REGULATORY CONTROLS TO REDUCE INDIVIDUAL OR COLLECTIVE DOSE ARE NOT BALANCED BY THE REDUCTION IN RISK.

ELEMENTS OF POLICY STATEMENT

- ALTERNATELY, APPLICATION OF REGULATORY CONTROLS DOES NOT RESULT IN A SIGNIFICANT REDUCTION IN RISK.

KEY ELEMENTS OF POLICY

- PROPOSES 10 MREM AND 100 PERSON-REM AS THE INDIVIDUAL AND COLLECTIVE ANNUAL DOSE LEVELS BELOW WHICH RISKS ARE SUFFICIENTLY SMALL THAT ALARA CAN BE CONSIDERED TO HAVE BEEN ACHIEVED WITHOUT PERFORMING COST BENEFIT ANALYSES.

KEY ELEMENTS OF POLICY

- EXCLUDES FROM CONSIDERATION FOR EXEMPTION PRACTICES WHICH INVOLVE
 - INTRODUCTION OF RADIOACTIVITY INTO TOYS OR PRODUCTS INTENDED FOR INGESTION, INHALATION, OR DIRECT APPLICATION TO THE SKIN.

KEY ELEMENTS OF POLICY

- ° ALSO EXCLUDES
 - RELEASE OF RADIOACTIVITY WHERE THERE ARE CLEAR ECONOMICAL ALTERNATIVES OR THERE ARE NO UNIQUE BENEFITS FROM THE USE OF RADIOACTIVITY.

KEY ELEMENTS OF POLICY

- ° PROVISIONS TO LIMIT POTENTIAL IMPACT OF MULTIPLE EXPOSURES
 - SELECTION OF DOSE CRITERIA FOR WAIVER OF COST BENEFIT ANALYSES
 - EXEMPTIONS INVOLVING UNJUSTIFIED RELEASE OF RADIOACTIVITY WOULD BE EXCLUDED

KEY ELEMENTS OF POLICY

- FOR EACH EXEMPTION DECISION ANALYZE COMPONENTS OF EXPOSED POPULATION TO IDENTIFY THOSE WHO MIGHT RECEIVE DOSES NEAR 100 MREM WHEN OTHER PRACTICES ARE TAKEN INTO ACCOUNT.

KEY ELEMENTS OF POLICY

- REEVALUATE POLICY AND ITS IMPLEMENTATION AS EXPERIENCE IS GAINED
- DELIBERATE FRACTIONATION OF PRACTICE NOT ALLOWED

KEY ELEMENTS OF POLICY

- ° ALLOWS APPLICATION OF TRUNCATION OR WEIGHTING FACTORS WHEN CALCULATING COLLECTIVE DOSE
 - TRUNCATIONS IN SPACE OR TIME.
 - CUT OFF AT LOW DOSE (E.G., 0.1 MREM).

KEY ELEMENTS OF POLICY

- WEIGHTING FACTORS FOR COLLECTIVE DOSE IN VARIOUS RANGES OF INDIVIDUAL DOSE (E.G., \$1000 PER PERSON REM ABOVE 1 MREM AND \$100 BELOW).

INTERNATIONAL WORKSHOP

PURPOSE:

- TO DISCUSS DIVERSITY OF INTERNATIONAL REGULATORY VIEWS

INTERNATIONAL WORKSHOP

CURRENT COMMITMENTS:

- REGULATORS FROM 10 COUNTRIES

- INTERNATIONAL ORGANIZATIONS (ICRP, NEA, CEC)

- EPA, DOE, NCRP, ACNW

INTERNATIONAL WORKSHOP

- WORKSHOP SCHEDULED FOR OCTOBER 17-19
IN WASHINGTON, D.C.
- STAFF NEEDS GUIDANCE FROM COMMISSION
REGARDING
 - DISCUSSION OF PROPOSED POLICY AT
WORKSHOP
 - ISSUANCE OF POLICY FOR PUBLIC
COMMENT

BACKUP SLIDES

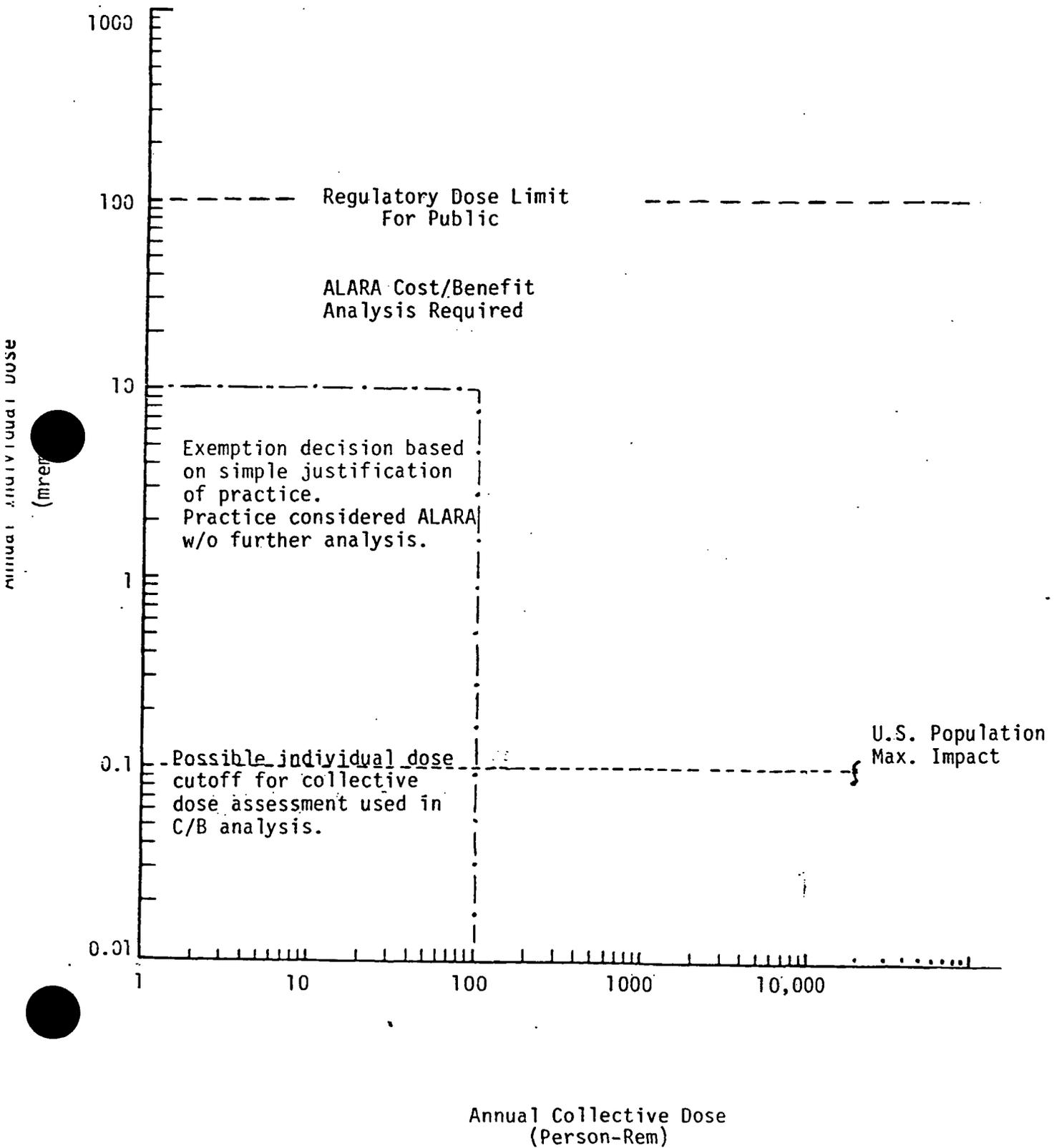
STAFF PRESENTATION
ON PROPOSED BRC POLICY
STATEMENT

SEPTEMBER 16, 1988

INDIVIDUAL RISK AS A FUNCTION OF DOSE

<u>INCREMENTAL ANNUAL DOSE</u>		<u>INCREMENTAL ANNUAL RISK</u>	<u>LIFETIME RISK FROM CONTINUING ANNUAL DOSE</u>
100	MREM	2×10^{-5}	1×10^{-3}
10	MREM	2×10^{-6}	1×10^{-4}
1	MREM	2×10^{-7}	1×10^{-5}
0.1	MREM	2×10^{-8}	1×10^{-6}

PROPOSED EXEMPTION POLICY SCHEMATIC



UNCERTAINTIES IN DOSE-RISK RELATIONSHIP

- ° UNCERTAINTIES IN DOSES RECEIVED BY
POPULATION INCLUDED IN EPIDEMIOLOGIC
STUDIES
- ° EPIDEMIOLOGIC DATA ONLY AVAILABLE AT
HIGHER DOSES

UNCERTAINTIES IN DOSE-RISK RELATIONSHIP

- ° VARIOUS HYPOTHESIS FOR EXTRAPOLATION
TO LOW DOSES

- ° VARIOUS HYPOTHESES FOR PROJECTING
FATALITY RATES INTO FUTURE

Commission Briefing on Generic BRC

Friday, September 16, 1988

Good morning. I am Tom Tipton, Director of the Operations, Management and Support Services Division of the Nuclear Management and Resources Council (NUMARC). Byron Lee and Joe Colvin are on travel and send their regrets for not being able to be here today. I'd like to thank the Commission for the opportunity to appear before you at this meeting to present a statement on behalf of NUMARC with input from representatives of Edison Electric Institute (EEI), Electric Power Research Institute (EPRI), Utility Nuclear Waste Management Group (UNWGM) and U.S. Council for Energy Awareness (USCEA).

With me today are the following industry representatives; Mary Birch, Technical System Manager, Radwaste Engineering, Duke Power Company, and Chair of EPRI's BRC Owners Group Technical Advisory Committee; Lynne Fairbent, NUMARC Project Manager; Pat Robinson, Director of EPRI's Below Regulatory Concern (BRC) Owner's Group; Steve Kraft, Director of UNWGM; and Dixon Hoyle, Project Manager, Nuclear Fuel Cycle, USCEA.

The nuclear industry has supported and continues to support NRC's efforts to designate levels of radiation that are Below Regulatory Concern. Since the generic BRC issue involves several industry organizations and addresses a generic issue, NUMARC is responsible for coordinating these industry activities. To accomplish that, we established a BRC Ad Hoc Advisory Committee, which has representation from all industry groups addressing different aspects of the issue. A draft industry program plan is being

prepared and will be distributed in the near future. It describes the range and scope of industry activities relating to the BRC issue and the key milestone dates. We plan to make it available to your staff so that you will be fully aware of industry's programs.

However, we think it is important to briefly highlight today some of the industry activities already completed and those in progress that address this issue and then mention some important points for your future consideration. Again, we appreciate you allowing us this opportunity.

There have been several detailed industry studies addressing the issue of BRC dating back to the late 1970s. Some examples are identified in Attachment A to my presentation.

In July 1984, EEI and UNWGM filed a petition for rulemaking with the NRC regarding the disposal of radioactively contaminated waste oil from nuclear power plants with levels of radiation that should be classified as being below regulatory concern. We are pleased that NRC published for comment in the August 29, 1988 Federal Register a proposed amendment to its regulations to permit the on-site incineration of slightly contaminated waste oils generated at nuclear power plants. The nuclear industry will be submitting comments on the proposed rulemaking.

The industry has also been involved in related activities. Extensive comments on the proposed revisions to 10 CFR Part 20 were provided in October 1986 by the former Atomic Industrial Forum and EEI: Detailed comments on

NRC's BRC recommendations were included. The industry also commented extensively on NRC's Advance Notice of Proposed Rulemaking on Radioactive Waste Below Regulatory Concern published in the December 2, 1986 Federal Register. These comments included a strong endorsement of the Commission's proposal to develop BRC regulations.

NRC published in the August 29, 1986 Federal Register a policy statement and staff implementation plan regarding, "expeditious handling of petitions for rulemaking to exempt specific radioactive waste streams from disposal in a licensed low-level waste disposal facility." This policy statement provided the long-sought opportunity for the nuclear industry to pursue the exemption of wastes with very low activity levels from NRC regulations.

In response to the August 1986 Policy Statement, EPRI and UNWGM initiated a joint program in early 1987 to develop a petition for rulemaking to exempt very low-level waste produced at nuclear power plants. EPRI is providing the research and technical data to support the petition, and UNWGM is providing program support, including legal support and drafting a petition. The EPRI research effort is nearly complete. It alone represents an expenditure of approximately 2.2 million dollars. The present target is to submit the petition by the end of this calendar year.

The petition will propose that the regulations allow the disposal of slightly contaminated wastes in on-site landfills, off-site sanitary landfills, and on-site and off-site incinerators. It will fully comply with the detailed criteria set forth in the Commission's August 1986 Policy Statement and the

staff's implementation plan, and will therefore qualify for expedited processing.

Now, I would like to briefly summarize some important points for your consideration during future discussions on the issue.

First, it is important that any NRC action identifying a level of radiation risk or dose below which government regulation would be limited or unwarranted be consistent with, and not negate in any way, the August 1986 policy statement. We need to preserve the options it provides as well as the investment the industry has made in preparing the petition.

Second, we feel that a process should be established to determine appropriate BRC levels, including the performance of a cost/benefit analysis for higher BRC exempted dose levels. Less rigorous analyses would be required for lower dose values. We generally support an approach similar to that presented by the staff at the September 13, 1988 meeting of the Advisory Committee on Nuclear Waste. Prior industry comments on the issue support individual doses in the range of 10-20 mrem per year as the generic BRC.

Third, since protection of the individual assures adequate protection of the overall population, the establishment of an annual collective dose (person-rem) standard for BRC is not appropriate.

Finally, it is our understanding that the staff currently intends to make BRC standards a "matter of compatibility" for Agreement State Regulatory

Programs. In order to realize the full benefits from the Commission's BRC initiatives, it is crucial that BRC standards be adopted by Agreement States identical with federal requirements, in a manner similar to the Commission's other radiation protection standards.

In conclusion, the industry strongly supports initiatives to address the BRC issue, as reflected in the work that has been initiated over the past decade. Further, the industry believes that the development of BRC is important to the conduct of good radiation protection programs while at the same time making it possible to minimize the expenditure of resources on matters that pose trivial levels of risk.

We support the need to address the generic BRC issue in a timely manner and encourage the continued exchange of information as it becomes available.

Establishing regulatory cut-off values would assure that our limited resources are being used most effectively in protecting public health.

Thank You.

Attachment A

EXAMPLES OF INDUSTRY STUDIES COMPLETED

ATOMIC INDUSTRIAL FORUM

- AIF/NESP-016 (1978): "De Minimus (sic) Concentrations of Radionuclides in Solid Wastes"
- AIF/NESP-035 (1986): "Evaluation of the Potential for De-regulated Disposal of very Low-Level Wastes from Nuclear Power Plants"
- AIF/NESP-037 (1986): "A Guide for Obtaining Regulatory Approval to Dispose of Very Low-Level Wastes by Alternative Means"

EDISON ELECTRIC INSTITUTE

- GP-33040 (1981): "The Feasibility of Establishing a 'De-Minimis' Level of Radiation Dose and a Regulatory Cut-off Policy for Nuclear Regulation"
- GP-R-72005 (1982): "Summary of Potential Benefits of Proposed Regulatory Cut-Off Policy Based on De-Minimis Radiation Dose Criteria - Results of a Survey of Nuclear Utility Personnel"

ELECTRIC POWER RESEARCH INSTITUTE

- EPRI NP-3299 (1983): "Segregation of Uncontaminated Dry Active Waste"
- EPRI NP-3370 (1984): "Identification of Radwaste Sources and Reduction Techniques"
- EPRI NP-5099 (1988): "Update Characterization of Radwaste Sources, Vol. 1 and Vol. 2"
- EPRI NP-5670 (1988): "Below Regulatory Concern Owners Group: Evaluation of Candidate Waste Streams"
- EPRI NP-5671 (1988): "Below Regulatory Concern Owners Group: Radionuclide Prioritization Study"
- EPRI NP-5672 (1988): "Below Regulatory Concern Owners Group: Selection of Plants for Sampling Program"



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON NUCLEAR WASTE
WASHINGTON, D.C. 20555

September 15, 1988

The Honorable Lando W. Zech, Jr.
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: PROPOSED POLICY STATEMENT ON BELOW REGULATORY CONCERN

During the fourth meeting of the Advisory Committee on Nuclear Waste, September 13-14, 1988, we held additional discussions with the NRC staff relative to the development of a Proposed Commission Policy Statement on Exemptions from Regulatory Control for Practices Whose Public Health and Safety Impacts are Below Regulatory Concern (BRC). This topic was previously discussed with the NRC staff during a meeting of the ACRS Subcommittee on Waste Management on May 4, 1988. The ACNW also discussed this topic with the NRC staff during our second meeting, July 21-22, 1988, and reported to you on this subject on August 9, 1988. We also had the benefit of the document referenced.

As a result of these discussions, we offer the following comments:

1. The proposed exemption system is based on the risks associated with the exposures involved, and the system, if modified as suggested here, will be compatible with most relevant regulations and policies of the NRC and other federal agencies, as well as those of international organizations.
2. We urge the adoption of dose rates up to 10 mrem (0.1 mSv) per year to individuals and annual collective doses up to 100 person-rem (1 person-Sv) as acceptable limits arising from a single exempted practice. Please note that this is a different use of the dose limits than is proposed in the draft Policy Statement. Provisions should be made to ensure that individuals within any population group are not exposed to any combination of exempted practices that results in dose rates greater than one to two times the dose rate limit. Experience indicates that such occurrences should be rare.
3. The current draft of the proposed Policy Statement is in need of extensive revision, partly to comply with the recommendations made under item 2, above. Additional items that need to be addressed include:

September 15, 1988

- a. The draft of the proposed Policy Statement should clearly specify 10 mrem (0.1 mSv) per year and 100 person-rem (1 person-Sv) per year as the limits for individual and collective dose rates, respectively. The ancillary use of a 100 person-rem (1 person-Sv) per year limit as a guide to the necessity for ALARA analysis should be removed (see item b, below).
 - b. There is a need for a much clearer statement relative to the role and application of the principle of "justification" in assessing practices being considered for exemption.
 - c. Instead of discussing dose rates at which collective dose calculations should be truncated, it would be better to do a complete calculation, and include within the data a tabulation of the number of people within each of several dose rate ranges.
 - d. The section pertaining to the linear nonthreshold hypothesis needs to be clarified. One approach would be simply to include a brief statement that risk (cancer) estimates should be based on the assumption that the linear nonthreshold hypothesis applies and that this approach will result in conservatism in the resulting estimates.
 - e. Since its use represents a change in NRC policy, the concept of the Effective Dose Equivalent should be defined within the Policy Statement. In a similar manner, since SI units are in common usage throughout the world, all dose rates and collective doses should be expressed in these units as well as in the conventional units.
4. As the proposed Policy Statement correctly points out, the Agreement States will play an important role in the implementation of the proposed exemptions. For this reason, it is important that the Statement be formally submitted to the Conference of State Radiation Control Program Directors for review and comment.

The resulting document, when properly revised, will represent a pioneering effort in nuclear safety regulation, will help conserve those of our resources that are available for the control of environmental and public health problems, and should receive strong support from the professional radiation protection community. We believe that the proposed Policy Statement, if revised as suggested above, will serve

The Honorable Lando W. Zech, Jr. - 3 -

September 15, 1988

well as a starting point for the position to be stated at the upcoming international meeting on this subject.

Sincerely,



Dade W. Moeller
Chairman

Reference:

Memorandum dated September 8, 1988 from Bill M. Morris, Office of Nuclear Regulatory Research, NRC, to R. F. Fraley, Executive Director, ACNW, transmitting Proposed Commission Policy Statement (undated)



HEALTH PHYSICS SOCIETY

September 8, 1988

Commissioners Lando W. Zech, Jr.
Thomas M. Roberts
Kenneth M. Carr
Kenneth C. Rogers

U.S. Nuclear Regulatory Commission
Washington, DC 20555

It has come to the attention of the Health Physics Society that, because of concern over the unwise use of available trained manpower and resources associated with the regulation of radiation exposures at very low doses, the Nuclear Regulatory Commission is considering the adoption of a policy to define a meaningful generic level of exposure below which it would have no regulatory concern. Although the unnecessary regulation of very low-level radiation creates employment opportunities for our members, we would like to inform you that this Society shares your concern and is prepared to provide consensus scientific assistance and support for your position. In particular, it is the position of the Society that the efforts mentioned above are in many cases not commensurate with the risks, if any, that are averted.

The Health Physics Society, founded in 1956, has a membership of more than 6,400 health physicists and other scientists who specialize in the protection of people from ionizing radiation, including physicists, chemists, radiobiologists, epidemiologists, physicians, engineers and mathematicians drawn from industry, academia, research and medical institutions, national laboratories and governmental agencies. The Society is believed to fully encompass and represent consensus technical opinion in the field of radiation protection and health effects.

Today a considerable fraction of the regulatory effort is concerned with radiation exposures that are much smaller than those received from variations in natural radiation due to altitude changes and other causes. We currently suffer from what appears to be an irrational public fear of low levels of radiation exposure; this has been fostered, in part, by associated governmental pressures to further reduce them below risk levels found and accepted in nearly all other factors of life. This, in turn, has resulted in the incurrence of inordinate pressures on all phases of the radiation industry, the cost of which is ultimately passed on to the public. We believe a real, and much greater saving of life could be accomplished by the alternative expenditure of our resources on safety operations where the risks are clearly demonstrated, as compared with the low-level radiation risks which are so miniscule that they may never be unambiguously established.

September 8, 1988

Page 2

It has never seemed logical to try to regulate radiation exposures that are miniscule relative to those we receive from nature. We believe that the Commission's objectives can be accomplished within the framework of the existing standards of radiation protection as recommended by the International Commission on Radiological Protection (ICRP), and the National Council on Radiation Protection and Measurements (NCRP). These bodies have recommended dose limits for the public that are far below the level where specific health effects have been observed for humans. It is not known whether any health effects in the general range of those recommended dose limits do or do not occur. If they do occur, they occur so infrequently that present scientific methods are incapable of detecting them using the best laboratory and epidemiological methods.

The system of dose limitation recommended by standards bodies does more than provide dose limits which are not to be exceeded without regard to cost-benefit considerations. In addition all radiation users are admonished that doses should be "kept as low as reasonably achievable (ALARA), social and economic considerations being taken into account", and that unnecessary exposures should be avoided. This is not a standard in the sense of a dose limit but is an essential advisory to be applied on a case-by-case basis. The dose limit, when coupled with the ALARA concept, provides an average individual (or collective) dose that is associated with an acceptable risk. A BRC level, would, in effect, truncate governmental involvement in the implementation of the ALARA concept, placing further implementation on an entirely voluntary basis. Thus we believe that the BRC level should, at least in theory, be near the threshold of a public risk of sufficient magnitude to warrant governmental intervention in the lives of its citizens. The current NRC safety goal for operation of a nuclear-power plant is theoretically associated with doses of some 10 to 20 millirems in a year for an entire lifetime, which would seem an appropriate range in which to start considering a BRC level.

Pertinent technical issues are addressed in more detail in the enclosed attachments No. I and II.

Respectfully submitted by the Health Physics Society,



Lauriston S. Taylor
Past President
Health Physics Society

ATTACHMENT NO. I

1. **Conservatism of current radiation protection standards.** The recommendations of the ICRP and the NCRP are put forward with extreme caution and in expectation that the responsible bodies (e.g. NRC) will apply the necessary politic adjustment of practical limits to meet the technological and social needs of the nation. Because of the absence of observed health effects in the low dose region (below the order of 5 rem in a year), both the ICRP and NCRP make the conservative assumption that the frequency of occurrence of health effects, per unit of dose at the low dose levels in the range of the dose limits, is the same as at high doses where health effects have been quantitatively observed and extensively studied in both humans and animals. This process allows the theoretical establishment of upper limits on the number of effects--if any--that might occur in the low-dose range. There has been remarkable agreement among the ICRP, NCRP, NAS, and UNSCEAR on all of the quantitative methods by which the effects should be estimated. At the same time there has been agreement that, if used for projecting real effects that will occur following low-level exposures of the public, the assumption of proportionality is inappropriate and misleading, and should not be so used.

2. **Balancing costs and dose reduction.** The taking of social and economic considerations into account is the nemesis of the radiation regulator and is the least understood by the public. Standards bodies have emphasized that in the commitment of resources to reduce doses below the dose limits, there should be an appropriate balance between resources committed to reduction of dose and the real benefits derived in the subsequent reduction of health effects. It is recognized that a point is reached where the effort (cost) required to further reduce dose exceeds the benefit from the small incremental reduction of health effects that is theoretically achieved. In such cases the further expenditure of resources to reduce dose is not justified. While several regulatory limits have been determined using this approach, it appears that a generic BRC level would more appropriately be based on other considerations such as an increase in the theoretical risk as was used in the development of the Commission's safety goals.

3. **The public perception of safety.** Failure to clearly explain the ALARA concept has, in some instances, resulted in public perceptions of health effects from very low-level radiation which are irrational and without factual basis. This, in turn, has led to the needless expenditure of substantial resources by individual members of the public, and by public agencies, because of an unreasonable concern with exposure to low-level radiation. This is all done in the name of reducing health effects which, if they exist at all, are so small as to be meaningless in comparison with the general health effects suffered by the public and as caused by ordinary substances to which people are exposed in everyday living. This type of unwarranted concern with possible health effects from low-level radiation exposure can also lead to a failure to take advantage of the use of radiation-related technologies, even though in many cases a radiation technology may be the method of first choice.

4. **The Public Perception of Risk.** Perhaps the most difficult phase of the BRC problem is that of dealing with the public's perception of radiation risks and its concept of safety of any kind. The average person in the general public does not realize that there is no such thing as absolute safety. They see that if a given condition is not safe, it must be unsafe--that there is a sharp dividing line between the two. Webster defines safe as, "free from or not liable to danger of any kind; free from or having escaped hurt, injury or damage...." Obviously, absolute safety is not obtainable for most human activities. Therefore the question is not "What is a safe level of exposure?", but "How safe is safe enough?". We know that safety is a relative term, but most of the public and the news media do not understand that. A major national effort is probably needed to educate the public as to what safety means and what they are to expect of it.

5. **Contaminated material.** Our discussions at this juncture relate only to health effects in the population. A separate, but related, problem concerns levels of contamination of material that may be returned to industrial use. Under many circumstances such material may not pose any health problem but can introduce difficulties if, by chance, it should be incorporated into devices or instruments where extremely small amounts of radioactivity could interfere with their proper operation. Thus, contamination levels far below any conceivable risk to humans may still be a costly nuisance to the very few manufacturers of radiation instruments or certain shielding materials. Strict regulation of the many thousands of facilities at levels lower than those designed primarily for human risks would be costly out of all proportion to the value of such contamination-free materials. When there is need, let it be a part of the manufacturing costs to find and test the required materials.

6. **Science and technology in radiation protection.** There is another role of the Commission that must be undertaken, and recognized not only by the general public but the scientific community generally, and especially those in radiation science as distinguished from radiation protection practitioners (e.g., health physicists). With his normal background and training, the scientist speaks on the basis of facts or theories (or assumptions or models). For example in discussing possible low-level radiation health effects, he accepts the existence of meaningful data in the range above, say, 10 rem. Below 10 rem, his data are of questionable value, if existing at all, but it appears as though the higher range data might (more or less) logically extend straight down to zero dose. When pressed, he speculates that if we could find some data in that unexplored low-dose range, it would almost certainly not be far out of proportion with the high-dose data. However, he can't say for certain that there are no effects in the low region since it has not been possible to obtain any data there at all. The best he can do is to point out that in such case there is a possibility that for any dose, no matter how small, there must also be the possibility of some health effect. As far as the public is concerned, the associated low probabilities go unrecognized and Pandora's box has been opened. They believe that any radiation exposure whatever will lead to cancer.

7. **The role of the Nuclear Regulatory Commission.** What is the point of all this? The point is that our scientifically derived radiation protection standards, by themselves, are inadequate for some radiation exposure situations, specifically for defining acceptable conditions of "safety" in the low-dose range. The only solution for this is a politic decision by a properly authoritative governmental organization, such as the Nuclear Regulatory Commission. (By politic, Webster means, "prudent and sagacious in devising and pursuing measures to promote the public welfare.") The obvious step is that the NRC must establish, and make clear, its role in the radiation protection standards arena, that 1) it is making the necessary politic utilization and adjustment of the scientifically derived radiation protection data, as far as they go, 2) it is accepting the responsibility for clarifying the concept of nuclear safety, or relative safety, and 3) it is setting a level of radiation that is below regulatory concern.

ATTACHMENT II

In its more than 30 years of direct experience with the public and radiation protection, many points have come to the attention of the Health Physics Society that we believe should at least be thought about in considering the adoption of a BRC concept. Many of them are based on questions that are asked of our members, individually, or statements--and misstatements--that appear in the various news media. We are reasonably certain that you are already aware of most, if not all, of the items to follow but offer them, largely in outline, by way of emphasis. Some additional items are in amplification of statements in the preceding pages.

A. Examples. There is about a 70 mrem/year difference in the dose from external radiation one receives from natural sources, depending on whether one lives on the coastal plane or in the hilly areas in the West. (NCRP Report 93.) The higher exposure to radiation of people who live in the hills and mountains does not seem to make them less desirable to those who want to live there.

Average natural-background radiation levels vary by 100 millirem in a year. Studies have shown a generally lower cancer incidence rate at the higher background locations, thus indicating that a BRC below 100 mrem could be scientifically defensible.

The upper limits of risk that result from levels of exposure comparable to the variations in the natural background are well below the risks from commercial activities that are generally accepted as good neighbors in the communities in which they exist.

Normal living habits such as working on the 10th floor as compared with the 1st floor of a building, or living in Bethesda as compared with downtown Washington, add a few millirems per year to one's dose. So also does commercial flying, medical procedures and so on--none of which are normally considered in individual radiation exposure concerns.

Something is considered acceptably safe when extensive study and experiment demonstrate that one's individual chances of injury or accident are exceedingly small. It should be noted that nothing is absolutely safe, but that all activities and natural events have varying degrees of risk.

B. Data Limitations. In establishing personnel protection standards it is considered by some as scientifically and morally defensive to use the "linear-nonthreshold" approach into the low dose regions as a practical expedient, because it overestimates the dose effect. However, it was never intended that risk evaluation be made using this approach.

To postulate a large number of deaths from very low exposures (less than a single dose of 10 rems, or an annual dose of 1 rem in a year) to a very large population is fundamentally indefensible; it communicates a misconception in the minds of the laypublic and legislators/administrators.

One possible reason for the lack of low-dose-effect data for humans is that such effects may not exist. Another reason is the fact that very large exposed populations (millions of subjects) are required for statistically defensible studies that must extend over 25 to 50 years. Equally large unexposed, but otherwise control populations, are also required.

Estimated Population Size to Provide Statistically
Meaningful Effects Values

DOSE	POPULATION SIZE
10 rad	50 thousand
1 rad	5 million
100 mrad	500 million
10 mrad	50 billion

C. Judgment in the absence of facts. Because the general public is not equipped by education and experience to evaluate complex technical matters, the government or some type of public body with suitable expertise must, 1) develop guidelines, excluding conditions outside the area of knowledge, 2) base any guides on facts as far as they exist, 3) clearly define conditions where they do not exist and, 4) apply professional judgment in lieu of facts when necessary, but make the action clear. In the application of judgment, the reasons and need for any action that is not amenable to quantitative evaluation must be explained.

D. Possible objections. It is quite possible that some individuals or groups will bring charges of vested interests on the part of the Health Physics Society because of this submission. Such a claim is the opposite of common sense since the personal interests of health physicists would appear to be better served by more severe rather than apparently less stringent radiation protection regulations.

It can be foreseen that objections may be raised to the implementation of the BRC concept because of the frequently stated misconception that we "know nothing about the effects of low levels of exposure." Objections may also be raised on grounds that "there is no such thing as a safe dose of radiation." Both points are discussed in Attachment I.