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ANN RILEY & ASSOCIATES, LTD.
1250 I St., N.W., Suite 300
Washington, D.C. 20005
(202) 842-0034

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

MEETING
YANKEE ROWE DECOMMISSIONING PLAN

McCusker's Market Building
3 State Street
Shelburne Falls, Massachusetts

Wednesday August 17, 1994

The above-entitled meeting commenced, pursuant to
notice, at 10:00 a.m.

P R O C E E D I N G S

[10:00 a.m.]

MR. FAIRTILE: The court reporter is all set up and I think we best start off by introducing ourselves. My name is Mort Fairtile and I'm the NRC project manager for Yankee Rowe.

MR. NICK: My name is Joseph Nick, or Joe Nick, I'm a radiation specialist in Region I assigned to Yankee Rowe to do periodic inspections.

MR. WILLIS: I'm Charley Willis, health physicist with NRC and a teacher at Georgetown University also in radiation safety.

MR. HALLISEY: I'm Bob Hallisey. I'm the Director of the Radiation Control Program for the Massachusetts Department of Public Health.

MR. BLOCK: John Block, attorney for Citizens Awareness Network.

MR. KATZ: Fred Katz, researcher for Citizens Awareness Network.

MS. KATZ: Debbie Katz, president of Citizens Awareness Network and health coordinator.

MS. DONALD: Kathryn Donald, Citizens Awareness Network.

MR. SCHAKTMAN: Harvey Schaktman. John and I are Charleton residents, small town right next to Rowe,

1 Massachusetts.

2 MS. MCEWEN: Christian McEwen, interested citizen.

3 MS. YOUNG: Mitzi Young, attorney with the Nuclear
4 Regulatory Commission.

5 MR. BELL: I'm Larry Bell, I'm a section leader in
6 the facility decommissioning section of the NRC.

7 MR. PARROTT: Jack Parrott, staff member in the
8 facility decommissioning section of the NRC.

9 MR. FAIRTILE: Jack is also going to take over for
10 me in about four months.

11 MR. BAJWA: I'm Singh Bajwa, section chief
12 radiation section for the NRR NRC.

13 MR. MULLINS: Charles Mullins, senior attorney,
14 Office of General Counsel at the NRC.

15 MR. MCGEE: So-called Bill McGee from Yankee
16 Atomic.

17 MR. ANASTASI: My name is Brian Anastasi, I'm with
18 WTTT in Amherst, radio station.

19 MR. MITCHELL: Tom Mitchell, I'm an aid to State
20 Senator Stan Rosenberg.

21 MS. STREETER: Sandy Streeter.

22 MR. ROGERS: Jeremy Rogers, West County News.

23 MS. RAYBUCK: Ginny Raybuck, Greenfield, The
24 Recorder.

25 DR. KNORR: My name is Bob Knorr, I'm Deputy

1 Director for the Bureau of Environmental Health Assessment
2 at the State Health Department of Massachusetts.

3 MS. KATZ: There may be some more people coming.
4 As I said, Dian Quigley should be here from the Childhood
5 Cancer Research Institute.

6 And Paul Gunther had wanted to attend this
7 meeting, from Nuclear Information Resource Services but was
8 unable to, and we were unable to set up a telephone hookup
9 for him, which we feel is unfortunate because Paul
10 participated in the last meeting we had last August and was
11 instrumental and very effective in terms of raising issues
12 that we feel are important with this process.

13 So first I want to thank you all for coming here,
14 we appreciate this meeting. We do see this as a second
15 meeting after the August teleconference we had last year,
16 only this time we are going to get to see everyone in public
17 and across from each other, which we appreciate. And also,
18 that's why I said more than this question answer, we hope
19 there will be a dialogue about these issues. Because one of
20 the things that was so difficult about the teleconference
21 was that we had no relationship to who was on the other end
22 of the phone. And I think it's important that we can see
23 each other and see who is talking.

24 We just want to make clear that, because there
25 seems to be some confusion about who set this meeting up,

1 that as far as we he know, this meeting was set up through
2 contact of the NRC and Bob Knorr who is the deputy director
3 of the Environmental Health Assessment unit. And we are
4 happy to participate in this meeting and we are very
5 grateful to be here, but we hadn't asked for the meeting, as
6 far as I know. Somebody else from CAN did who I don't know
7 about.

8 MR. FAIRTILE: The meeting was an NRC initiative
9 and what was behind it was this: In the two sessions that
10 we had yesterday, they were both focused only on the
11 decommissioning plan. We did not want CAN or any other
12 members of the public to feel that they were being squelched
13 in voicing their concerns to the NRC. So we felt that we
14 would arrange for this meeting and also to have the meeting
15 transcribed, as we did the phone call back last August so
16 that we have record of what was said. And the record will
17 be put in the public document room. And, of course,
18 everybody on our service list will get a copy of the
19 transcript.

20 MS. KATZ: I want to acknowledge -- one of the
21 things I would like you all to think of in -- before leaving
22 this place is that if you would look out the window when you
23 go downstairs, that is the Deerfield River right out there,
24 and that is the river that's had effluent released into it
25 for 31 years. And, in fact, The Recorder states that over

1 500,000 people a year use that river for recreational
2 purposes. And people swim and boat and fish in it and
3 houses are along the Deerfield and I just want everyone to
4 take that in. It's very different to talk on the phone
5 about an abstract manner and to have it right in front of
6 us. So, that is important to us.

7 I want -- I had sent an agenda to Mort on what we
8 wanted -- some of the issues we wanted to cover, we included
9 the river and health concerns. And we, in fact, have some
10 -- also questions that we gave out, health questions that
11 are that are specific that we can get in to, questions about
12 the river, and questions in terms of ALARA and safety
13 issues.

14 MR. FAIRTILE: Debbie, I was able to distribute
15 your agenda to the various NRC people that are here, but not
16 the material you gave me last night.

17 Now, I read it and it looks to me like it's
18 enveloped by the other material and I think it fits in. So
19 even though the other NRC people haven't had an opportunity
20 to see it, I think we can handle it.

21 MS. KATZ: We felt it was a way of clarifying the
22 issues and trying to create a degree of specificity about
23 through these questions of looking at some of this. So that
24 one of the things, we'd raised the issues of ALARA at the
25 last meeting, we had raised the health issues and the need

1 for a health study to be done. We also raised the issues of
2 the dosimetry for tritium and the issues of the reevaluation
3 of those standards to see tritium in terms of the effects on
4 a cellular level rather than on an organ level and need for
5 microdosimetry. We have also raised the issues of ALARA and
6 questions of decommissioning and how the conflicts that
7 could arise in terms of that.

8 So that I don't know how much we'll get through
9 this. I would like to try to leave 45 minutes or a little
10 longer for each topic so we can attempt to get to it; one
11 may go longer than another. One of the things I would like
12 for us to talk about, and the health questions deal with
13 that, maybe we could begin with the health, and that also
14 relates to the river, is that is -- is that -- I just --

15 We want to talk about Mr. Willis' paper that we
16 got and I just wanted to acknowledge because we were really
17 concerned about and upset that Mr. Willis' paper found its
18 way into the court case before it was in fact sent to us,
19 and we really didn't feel that was a reasonable approach
20 or --

21 MR. FAIRTILE: Well, hold it, Debbie, you have to
22 realize something there. We didn't know you were going to
23 court, it had absolutely nothing to do with it. That was
24 just a coincidental effect.

25 MS. KATZ: That may be, but it had an effect on

1 it.

2 MR. FAIRTILE: But, it was an unintended effect
3 that we had no knowledge -- we had no idea that you were
4 heading for court and we just did things in a normal
5 progression. I just want you to understand that.

6 MS. KATZ: That may be, but I feel like you should
7 know that it really undermine, looking at Mr. Willis' work,
8 since the judge wound up seeing that before we did.

9 MR. FAIRTILE: That's unfortunate.

10 MS. KATZ: Yes, it was unfortunate.

11 MR. FAIRTILE: That's just the way it worked out.

12 MS. KATZ: but that was critical turning point for
13 us, what Mr. Willis' paper was about.

14 But what we would like to do is look at some of
15 the issues that were raised under the health questions as a
16 way to begin this. And we raised certain issues last night
17 about the Deerfield River and the contamination in Sherman
18 Pond and Sherman Spring and the releases that went into the
19 river. Mr. Willis' paper, in fact, talks about and
20 acknowledges that over 10,000 curies of tritium were
21 released between, I think it's '67 and '73 into the
22 Deerfield, and amounts after that.

23 One of the concerns we have is for the releases of
24 tritium that took place between 1961 and 1966, that's
25 actually under, we can say item 5 of the health questions.

1 MR. FAIRTILE: Debbie, I looked into that and
2 asked the licensee about records of those releases, and
3 indeed there are records and they're in the licensee
4 operations reports starting back in 1961, I guess when the
5 plant first started operating. And let me find my reference
6 here somewhere -- and they're all in the local public
7 document room and there are 67 of these reports that cover
8 the interval of time you asked questions about. And they're
9 called operations reports number 1 through number 67, and
10 you should be able to recover those. I'm trying to find
11 more definitive stuff here, if I can't find it I can send it
12 to you by fax. But it's operations reports number 1 through
13 number 67, and that will have a history of all tritium
14 releases from the plant in your area of interest.

15 In discussing with Yankee Atomic, what they told
16 me, was that those releases were less than the 10,000 curies
17 that were released in the 1963 to '72 era, and that
18 post-1973 they used the maximum release they ever had for
19 doing their calculations, which is very conservative.

20 MR. BELL: Mort, can I make a suggestion because
21 it's going to be hard for me. Could we go down in some kind
22 of order so we can touch each issue?

23 MR. FAIRTILE: I'm letting Debbie.

24 MR. BELL: I understand that, that's why I'm
25 making the suggestion. Maybe we can just talk about things

1 in some kind of order so we know where we are instead of
2 bouncing all over the place.

3 MS. KATZ: Well we had concerns -- I can put it
4 under the umbrella and then you can answer some of the
5 questions --

6 MR. BELL: We've got limited time, we've got to
7 catch an airplane today. I think it would be helpful for us
8 to go down the list and list them out so we know where we
9 are and we can try and be responsive.

10 MS. KATZ: One of the questions we had about Mr.
11 Willis' document is why were none of the experts contacted
12 in regards to this? Dr. Knorr, who is the deputy director
13 of the environmental health at the Department of Health was
14 contacted only once by the NRC at the beginning of this
15 investigation, ostensibly, and never recontacted. And, in
16 fact, was told that there were allegations potentially with
17 NRC, but that we had not asked for a health study. So that
18 Dr. Knorr may, in fact, be -- want some information as well
19 from this meeting, but we would like to know why Dr.
20 Spangler wasn't contacted; why Dr. Cobb was not contacted;
21 why Dr. Knorr was not contacted.

22 MR. FAIRTILE: Actually the NRC has had at least
23 two conversations in the recent past.

24 Two Bob? How many times -- we've talked, spoken
25 in the recent past.

1 DR. KNORR: Couple times in the past week.

2 MR. FAIRTILE: So we have been in contact. And
3 one of the things we did discuss was the scheduling.
4 Because early on last year, last summer of '93 Bob was
5 talking about the possibility of a study in this area, and
6 he sort of mentioned it as being August of '93. And
7 apparently that's been put off for some 12 to 18 months from
8 that August '93 date.

9 Is that right, Bob? Did I characterize it
10 properly?

11 DR. KNORR: I think that what we were saying is
12 that we were planning start a more intensive investigation
13 of Down's Syndrome last year and that was put off because of
14 other priorities at the department, and so we are starting
15 that now.

16 MR. FAIRTILE: But the point, Debbie, that I
17 wanted to make was there has been contact with various state
18 officials in the commonwealth. Not only with Bob, but
19 others.

20 MS. KATZ: But the people who we handed in
21 information on like Dr. Spangler and Dr. Cobb --

22 MR. FAIRTILE: I did call Harvard, I contacted --
23 I have been in conversations with Harvard, with the school
24 of public health in Boston; yes, we have --

25 MS. KATZ: When did that happen, could you give me

1 a sense when that took place?

2 MR. FAIRTILE: It was shortly after you provided
3 us with a copy of the paper. I called the Harvard School of
4 Public Health and spoke to them about their study. So, I
5 have been in touch with them.

6 MS. KATZ: But Mr. Willis, in writing this, was
7 not in touch with these people.

8 MR. FAIRTILE: I can't speak for Charley, I have
9 no idea.

10 MS. KATZ: We are concerned that these experts,
11 these people who have various concerns who have asked for a
12 large scale study to be done and more investigations were
13 not contacted, and that the process was not elaborated on in
14 terms of your review of the material.

15 MR. WILLIS: We had a decision to make when we got
16 your paper and there are two ways to handle a thing like
17 this. One, is for to us try to respond with the information
18 we have in a timely manner. The alternative approach that
19 is commonly used by NRC is to go out, get a contractor to
20 make a detailed study of something of this nature and you
21 get your answer response in a couple of years.

22 The choice that was made in this instance was to
23 try to respond on the basis of the information that we did
24 have, and that is that the paper that I sent to you -- I
25 didn't send it to you, I gave it to Mort. The paper you

1 have is the result of that study. I did make phone calls
2 and try to talk to people, I did not -- I do not have
3 detailed logs of those phone calls. I have Dr. Spangler's
4 phone number written down on the paper that I reviewed, that
5 sort of thing. So yes, I did make some contacts. The
6 details of this I did not include in the paper because I
7 wanted to get something out in a reasonable length of time.

8 MR. KATZ: Could you tell us, Dr. Willis, when you
9 started working on the paper that you produced, and when you
10 finished it? When you began working on it?

11 MR. WILLIS: It's probably in the record. I
12 started working on it shortly after Mort gave me the paper,
13 and it ended when I sent you a copy, but --

14 MR. FAIRTILE: Yes.

15 MR. WILLIS: -- but those dates I don't have.

16 MR. KATZ: When was that, when did Mort give you
17 the material?

18 MR. WILLIS: I'm sorry, I just don't have that
19 kind of a memory.

20 MR. FAIRTILE: I would guess it was around fall of
21 '93, and you worked on it for what, about two months?

22 MR. WILLIS: Something of that nature, yes.

23 MR. FAIRTILE: I think Charley finished his first
24 draft, maybe it was January of this year, does that ring a
25 bell, Charley? But we can -- that's a detail.

1 MR. WILLIS: I do not remember.

2 MR. FAIRTILE: We can dig that out for you, we
3 have records on those sorts of things.

4 MS. KATZ: One of the issues for us, in terms of
5 that not happening and I'm going -- Mr. Bell, I'm going to
6 question 4 under the health issues. It ties in to this,
7 issues of aerosolization which are central both to Dr.
8 Spangler and Dr. Cobb, and, in fact, to Dr. Knorr in terms
9 of process of understanding the ingestion of tritium and the
10 organically bound tritium in the body was not calculated in
11 your response, or at least I don't see it calculated. Was
12 it calculated, the process of aerosolization, and
13 organically bound tritium?

14 MR. WILLIS: I used what is the NRC standard
15 methods of determining these doses, and these methods have
16 been open to the public, they've been in use for well over a
17 decade. And so far as I know they have been verified as at
18 least conservative, if not terribly accurate; conservative
19 in the sense of giving high doses. So these are accepted
20 methods. And I did look at what was done in the way of
21 aerosolization, if that's the proper term, the evaporation
22 of tritium, and as far as I can see, there is no special
23 problem here. You have a river with some agitation, just as
24 most rivers have. The fraction of the water that evaporates
25 from the river is infinitesimal.

1 MS. KATZ: So you don't agree with Dr. Spangler,
2 the meteorologist who is in fact an expert for the NRC, has
3 been qualified as an expert.

4 MR. WILLIS: The Harvard study and mine come
5 basically to the same conclusion, that the doses to the
6 people in this area from the releases from the plant are
7 orders of magnitude less than the doses they received from
8 nature. And how much further we want to go to refine this
9 is questionable. There is a very serious problem with going
10 into great detail about something that is small compared to
11 what's already there.

12 MS. KATZ: Well, Dr. Spangler actually sees it
13 differently and believes the study is warranted and believes
14 that there is a possibility that the major doses that were
15 accumulated from people came from aerosolization. I would
16 just like you to know that this river is used for white
17 water rafting. It's not just a little water, it's used for
18 white water rafting at this point, which there is a lot of
19 spit and spume given off by the river consistently or during
20 the times when they release the water. And that in fact
21 through the process of aerosolization these, whatever comes
22 up in the spit and spume is trapped over a third of the time
23 in this valley. And that is part of Dr. Cobb's design model
24 and questions which Dr. Spangler accepts as needed to be
25 investigated.

1 So we may just disagree on it, but Dr. Spangler
2 believes this needs to be investigated and does not believe
3 the dose calculations can really take place without that
4 work being done.

5 MR. WILLIS: If I remember his paper correctly,
6 the -- it concluded with the statement that such an
7 evaluation should be considered, and certainly I have no
8 quarrel with anyone doing any research that they'd like to
9 do. But there is a limited amount that can be done in
10 evaluating doses from tritium that occurred in the distant
11 past.

12 Tritium is one of the, perhaps best understood
13 radioactive materials. It has been with us always of course
14 as all -- most all of the radioactive materials have been --
15 but tritium is an important part of the natural radioactive
16 environment. It was discovered as an independent nuclide
17 back in 1934, and it has been used in medical studies and
18 research and various other ways. In fact, it's probably the
19 most widely used material as a source of radiation in the
20 world. So, we are not talking about something that is
21 little known or little understood.

22 Yes, ma'am.

23 MS. QUIGLEY: Diane Quigley, from Childhood Cancer
24 Research Institute. Perhaps you feel that your
25 understanding of tritium is pretty good, but I think what we

1 are dealing with here is what the potential health effects
2 could be.

3 Obviously you believe in the main stream
4 scientific opinion about low-level radiation effects, which
5 many of us are not comfortable with, that we feel there is
6 still a lot of uncertainty there. And there is a lot of
7 uncertainty about genetic affects from these low doses, and
8 particularly what can be happening with tritium. And I
9 think that the issue is that you're saying you don't have
10 resources to do any further investigation of this, is that
11 the case? Or -- because obviously the community is not
12 comfortable with this, and they're still very concerned
13 and --

14 MR. WILLIS: There is two -- there is two
15 questions there. One is the -- the health effects issue,
16 what is known and what isn't known, and the other is the
17 availability of resources. I personally don't have
18 resources. The Nuclear Regulatory Commission, if Congress
19 so decides, can have vast resources. It's a matter -- the
20 question becomes one of the allocation of resources, where
21 is the priority. Now that is not my decision, so take that
22 up with your congressman and I'm sure that the NRC would be
23 happy to spend all of the taxpayers' money that he wants
24 spent.

25 As for the health effects, let me take a moment on

1 this. I don't want to belabor the point, but radiation
2 effects are something that have been quite controversial,
3 but there is a lot that isn't well known because information
4 is generally not the thrust of what people are interested
5 in, it's emotion. But the information is fairly
6 straightforward.

7 First, radiation has been with us always --

8 MS. QUIGLEY: Sir, we've heard this a lot of times
9 and I don't want to hear it again.

10 MR. FAIRTILE: Please, give him a chance.

11 MS. QUIGLEY: Yes, but I've heard this so many
12 times, it's natural radiation.

13 MR. FAIRTILE: You may have but there are other
14 people here, so please let Mr. Willis go on.

15 MR. WILLIS: I don't mean to insult your
16 intelligence --

17 MS. QUIGLEY: You said that our opinions come
18 probably more from emotion than information and I think
19 that's what we feel a little bit offended by. Because it's
20 a lot of separate information from different parts of the
21 scientific community and I think that you need to --

22 MR. WILLIS: I think you slightly misquoted me or
23 perhaps I didn't make myself clear. I certainly have no way
24 of knowing where your information comes from or what your
25 position is. I am familiar with what is generally available

1 to the public in terms of information about health effects
2 of radiation.

3 MR. KATZ: Well, you did say that what people were
4 interested in getting was emotion and not information, you
5 actually made that statement. And that, I think, is what
6 Diane is responding to. We are not in interested in
7 emotion, we are interested in information.

8 MR. WILLIS: Thank you. And if that's the case,
9 let's me say just a little bit about the background of the
10 radiation knowledge. And that is, that radiation was
11 discovered, ionizing radiation was discovered in 1895. Now,
12 1895 was a long time ago in some senses and is an extremely
13 long time ago in the sense of understanding of medical and
14 biological phenomena.

15 The first toxicological studies on radiation
16 effects were done just 10 years after the first
17 toxicological studies on animals on any substance.

18 By 1911, essentially all of the radiation effects
19 -- ill effects that have ever been identified were
20 identified. It was not until '27 that the world was really
21 convinced of the genetic effects, but the reports were
22 published much earlier.

23 MS. KATZ: I think I would like to focus -- Mr.
24 Willis I understand what you're saying and I don't want to
25 interrupt you but I think our focus -- we gave you a

1 bibliography. A bibliography on exposure of low-level
2 radiation, that's what we are referring to, is that
3 bibliography that we submitted to your agency. So we are
4 well aware of the historical references you have, and I
5 think it would be more constructive for us if we can just
6 focus on that bibliography which we submitted to your
7 agency. And also what we hope will come from, in terms of
8 tritium documentation that we have submitted today, which
9 gives an annotated bibliography on the tritium stuff that in
10 fact we submitted to your agency.

11 So if you would like to comment on the tritium
12 reference we make to Straume and to others, Mewissen and
13 other investigators that raised issues about organically
14 bound tritium and the effects that are being seen by a
15 number of researchers that cause concern to them, that would
16 be helpful at this point.

17 MR. FAIRTILE: Debbie, you ^{said} at the start of this
18 meeting said there will be a dialogue.

19 MS. KATZ: Yes.

20 MR. FAIRTILE: Now I think you're putting a muzzle
21 on us and I don't think that's very fair. That's not a
22 dialogue, you're trying to restrict what we are saying
23 without any restrictions on what you say, and we agree you
24 can say anything you please. I repeat, let Charley complete
25 what he started. Not everybody here may have the knowledge

1 and background that other members of CAN or your consultants
2 have. Please let Charley finish unrestrained.

3 MS. QUIGLEY: Sir, that can go on for a long
4 time. We've done a lot of education with the community.

5 MR. FAIRTILE: That's fine, it's on the record.

6 MS. KATZ: If you want it on the record.

7 MR. FAIRTILE: Please, Charley, would you
8 continue?

9 MR. WILLIS: I'm sorry if I'm boring you, but the
10 truth of the matter is not necessarily well known to
11 everyone, and as a school teacher I guess I'm in the habit
12 of repeating things that I think people should know.

13 But the point that I think is important here is
14 that radiation started out being a very interesting
15 scientific study, so not only was radiation in use worldwide
16 within a few years of its discovery, biological experiments
17 were being done within a few years of its discovery. And
18 the experiments have continued on, things changed
19 dramatically with the second world war in that a new
20 phenomena was added, and that was an extra source of money.
21 So the amount of biological investigation that has been done
22 in this area is phenomenal.

23 By 1956, the National Academy of Sciences was
24 asked to review this information, and they concluded that
25 radiation was the best understood of the environmental

1 hazards. And the radiation effects have continued to be
2 studied at a very high level and there has been no
3 diminution. What do we know? We know very clearly that at
4 high doses, that is doses certainly above 100 rem, 100 rad,
5 or some people claim above 25, that ill-effects are
6 discernible in populations. A lot of populations have been
7 studied very intensively. So, we know that there are
8 ill-effects at high doses.

9 It is generally assumed to be prudent to assume
10 that there is a linear relationship that the doses -- the
11 effects at low doses are proportional to the dose. This is
12 not something that can be demonstrated, this is something
13 that is assumed as prudent, conservative, a way of getting
14 an upper bound measure of the health effects, and that's
15 what we have to work with.

16 What we do know is that if there are any
17 ill-effects at these low doses, say below 10 rad or
18 something like that, they are so infrequent as to be
19 indiscernible in the most expensive, careful,
20 epidemiological studies that we've been able to perform.
21 The populations have been studied, probably upwards of 20
22 groups that have been evaluated in great detail. And of
23 course the group that is most useful in terms of determining
24 radiological hazards, are the survivors of the atomic bombs
25 in Hiroshima and Nagasaki. And so most of our risk numbers

1 are based on those studies. We do not know -- we cannot see
2 any ill-effects from doses in the environmental range.

3 Now, there is a substantial body of scientists,
4 group of scientists who believe that the effects at low
5 doses are probably more beneficial than harmful, even if we
6 look at -- I first encountered this in graduate school back
7 too long ago to admit -- but we saw the effects on cells.
8 And as recently as a year ago, the radiation effects
9 foundation in Japan published the result that among the
10 irradiated male survivors of the Hiroshima/Nagasaki bombs
11 they did have a higher cancer mortality, but their overall
12 mortality rate was lower than would have been expected for
13 that same group if they had not been irradiated. So there
14 is a serious question about this.

15 But the NRC does not approach -- does not base its
16 risk estimates on this, because it is still unproven. We do
17 use the linear hypothesis, this has been open and discussed
18 at great length in many regulatory hearings, so there is
19 nothing new about it. So, as far as I can see, we are being
20 as responsible as we can be.

21 Now, let me say a word about this bibliography
22 before we go on. I know I'm taking a lot of your time and
23 I'm sorry.

24 MR. MEYER: Has there been a study done around an
25 area outside a nuclear power plant for 30 years and then was

1 decommissioned? Is there a study that you already have of
2 that somewhere?

3 MR. WILLIS: Senator Kennedy, as I understand it,
4 wanted such a study done.

5 MS. HARRIS: No, it hasn't been done.

6 MR. WILLIS: I'm sorry if I speak too slowly, but
7 the answer is yes, a study has been done. This was done at
8 the instigation of the U.S. Senate, the study was conducted
9 by the National Cancer Institute, they looked at the people
10 who lived in the vicinity of all nuclear power plants and
11 all major DOE facilities. It was one of the more massive
12 studies that is available to us, and they concluded that
13 there is no indication of any ill-effect from any of these
14 plants.

15 MS. KATZ: They've also concluded that their study
16 had faults with it, which is that it went county by county
17 rather than studying the effluent pathway. And what I think
18 John is asking is about an effluent pathway study of the
19 community that lives in that pathway around a reactor for 31
20 years.

21 MR. MEYER: I think as a teacher and professor and
22 all that you would be very interested in a microcosm. Since
23 this is a closed area, there is one power plant up there,
24 comes down the river. To be able to study that on a small
25 population seemed like that would be -- you would be racing

1 to do something like that rather than sitting here and long
2 winding about what happened 100 years ago. Don't you want
3 new information?

4 MR. WILLIS: Scientists, in general, concentrate
5 on what is unknown, which is something that influences much
6 of our thinking in this area, and I am quite main stream in
7 that regard. If I am setting out to set up a research
8 program or get a graduate student going on a research
9 program, the emphasis is just as you say, on what is not
10 known. Because what is known is for the applied people and
11 for engineers. What is not known is the area of interest
12 assigned it.

13 MR. MEYER: So you are doing a study about this?

14 MR. WILLIS: We have to -- when we look at
15 questions of this sort, and the NRC has done this, I can't
16 cite the report numbers, but we've done this on a couple of
17 occasions, looked at groups that might be studied to learn
18 something additional about radiation effects. And so far we
19 haven't identified any group that showed itself to be really
20 suitable that we could conduct studies on.

21 MR. MEYER: What's unsuitable about this --

22 MS. YOUNG: Excuse me, but --

23 MR. WILLIS: The --

24 MS. YOUNG: Wait, hold it.

25 MR. WILLIS: I'm sorry.

1 MS. YOUNG: I don't think our meeting here is
2 going to be extremely conductive if -- I have a way of
3 cutting off people when I talk too, but it's really tough
4 for somebody to keep their train of thought. You're asking
5 all these questions and --

6 MR. MEYER: I thought we were in a dialogue-type
7 atmosphere.

8 MS. YOUNG: Yes, but it's happening in the middle
9 of the sequence, and he talks slower than you argue, so you
10 have to give him a chance.

11 MR. MEYER: I am.

12 MS. YOUNG: It's not you so much, there is another
13 question that popped in over here as he was speaking. If we
14 can show each other more courtesy.

15 MR. MEYER: I thought it was a dialogue.

16 MS. YOUNG: Some people probably respond very
17 easily, but I think you're making it real hard for him to
18 keep his train.

19 MR. WILLIS: The problem with doing a study in a
20 small area such as this -- I say it wrong. The problems,
21 plural, one, is the small numbers. When you look at an
22 epidemiological study you have to look at it on a
23 statistical basis. And with everything you see, there has
24 been an associated uncertainty. So if you see a few effects
25 you've seen nothing. Whether if you see a half a dozen

1 Down's Syndrome cases, statistically you don't really know
2 whether this was 1 or 10. You know that you believe that
3 you're in that range somewhere. So, you need larger numbers
4 for the statistics to tell you anything.

5 Then there is a great deal of variation in what
6 causes the phenomena that we are interested in. With
7 radiation effects, the principal concern is cancer, and
8 there are many things that affects cancer rates. One of the
9 most important is genetics. One family will have a lot of
10 people dying of cancer, while where as the next family will
11 not, it's just a matter of their genetics. We know this to
12 be the case. We can see it in many studies.

13 Another thing is life-style. There is even the
14 argument that ethnic background makes a big difference. In
15 the Israel Tinea Capitis study, ringworm studies, they found
16 that they got an increased number of skin cancers among
17 whites, people with dark skin did not show this increase.
18 So, there are these little variations in a population that
19 make it very difficult to draw any conclusions from small
20 groups. There are a lot of other things, other than
21 radiation that cause cancer, and if you don't have large
22 numbers you have to go back and control for all of these
23 things, and generally, it is not possible.

24 So it is very difficult to get useful results from
25 an epidemiological study of a small group like this. You

1 can get suggestions, and many of these things have been
2 published, but real information, it's hard to get there.

3 MS. KATZ: I would just like to try to focus -- I
4 would also like to give a suggestion that each person is
5 limited to three or four minutes to comment on a question
6 for all of us so that we limit the time so we can try to get
7 through as much, because I understand that you have a lot to
8 say Mr. Willis, but there is a way in which we can be
9 focused on that, and in some sense, some of the issues that
10 issues that we are all here for, may wind up getting short
11 shift. So, can everyone agree on that? That we attempt to
12 limit what each of us says to, at most, five minutes, does
13 that seem reasonable?

14 MR. FAIRTILE: Yes. And also, let's let people
15 that have a deeper interest in the subject have something to
16 say, like Ms. Quigley and Bob Knorr.

17 MS. KATZ: That's what I want to get to.

18 MR. FAIRTILE: Let's defer to those two maybe now
19 that Charley has finished his.

20 Would you like to make some further comments?

21 MS. QUIGLEY: I guess I really developed, after
22 awhile, because obviously --

23 MR. FAIRTILE: Now you're proving his thesis.

24 MS. QUIGLEY: Well I want to tell you why because
25 his point of view is very -- what we consider a bias point

1 of view. He's talking about studies, that the A bomb
2 survivor study; we can certainly provide you published from
3 peer review journals that show faults of that study and say
4 that, you know, we have so much about radiation. Well we
5 may know a lot about high-dose effects but we don't know a
6 lot about low-dose effects and human studies of low-dose
7 effects. We have these very small epidemiological studies,
8 some that support the A bomb survivor conclusions and some
9 that disagree with them. And it doesn't give comfort to a
10 community. And most of the funding that there exists for
11 education on radiation effects is usually coming from the
12 Department of Energy or the NRC, with a biased opinion. So
13 the community has heard a lot about that opinion --

14 MR. FAIRTILE: Also from NIH or National Cancer
15 Institute, as Charley pointed out.

16 MS. QUIGLEY: Right. And I recognize that their
17 opinion isn't too different than DOE or NRC; however, we are
18 now working with the Center for Disease Control radiation
19 studies, which is having more of an open mind to different
20 perspectives on radiation risks.

21 What's hard for a community is to be having to
22 hear that opinion over and over again when they're upset and
23 concerned about health effects, and that's why they're here
24 today.

25 MR. FAIRTILE: That's understood.

1 MS. QUIGLEY: They want to know that you have an
2 open mind in this. And that if you're not going to keep
3 pointing out studies that you favor and support, versus
4 studies that may validate their concerns about health risk,
5 then I guess I've seen this all over the country in so many
6 communities, and it does really unnerve me after awhile.
7 And I apologize for my emotion on that, but that's where I'm
8 coming from.

9 MR. FAIRTILE: Bob Knorr, do you have any -- I'm
10 sorry.

11 MS. YOUNG: Well, what happened with Debbie's
12 question is -- John?

13 MR. MEYER: John.

14 MS. YOUNG: John popped in and said before you go
15 to the bibliography I want you to answer this, and I don't
16 think he ever addressed your initial question. I'm not sure
17 if you want that waived or what have you, but that's part of
18 what happens when people pop in.

19 MS. KATZ: I'm almost afraid to get into it
20 because we can wind up -- I mean, the danger of detail at
21 this moment is that we'll never get out of it.

22 MS. YOUNG: And that's the same thing, point that
23 she had, right, about hearing the studies, that may or may
24 not support NRC's position. There were things you were more
25 particularly interested in and you were trying to get the

1 conversation started.

2 MS. KATZ: The issue of the bibliography had
3 importance to us, and I would first like Bob Knorr to speak
4 about some of the issues, because he's been involved in the
5 health study and preliminary investigation.

6 MR. FAIRTILE: Yes.

7 MS. KATZ: He has questions about Mr. Willis'
8 report and how to work with it. And then maybe we can go
9 back to that, because the bibliography is actually important
10 born to us, but it may, you know -- it may be dealt with
11 through this process.

12 MR. FAIRTILE: Let's let Dr. Knorr's opinions get
13 on the record also.

14 Bob, do you have any comments.

15 DR. KNORR: First, I just want to go back to one
16 thing regarding Dr. Spangler's report, just to clarify. I
17 think what his position was that he acknowledged gaps in the
18 work that he had done, that he had underestimated the dose
19 and that his recommendations were that further work could be
20 done to refine those estimates. And to be fair to him, and
21 he's not here to speak for himself, I don't think he's taken
22 a position as to whether that work was done, whether it
23 would change his conclusions at all or not, it's just that
24 he recognized that was a gap in his work.

25 I would also like to just agree with one thing

1 that was said by Diane with regard to the epi studies that
2 are out there. I'm an epidemiologist, there are lots of
3 controversies about epidemiologic methods when they're used
4 in studies. They say that the state -- state -- that the
5 tree for epidemiologists is the hedge because you can go --
6 epidemiologists can take issues on either side of the study
7 or an issue, but there have been, I think, legitimate
8 criticism to some of the methods that are used in the
9 studies that are used to establish risks that the NRC and
10 others use to establish standards. And that's the reason
11 why a lot of epidemiologists, in particular, are taking a
12 second look and reconsidering what the health effects of
13 low-dose levels, or even moderate-dose levels, might be from
14 radiation.

15 And I just wanted to say also something about what
16 Dr. Willis had said about studies. I mean it's true, I've
17 talked to CAN and Debbie a lot about the problems of doing a
18 study in this area because of the relatively small
19 population, rarity of the outcomes, but there are other
20 reasons to do studies. It's true scientists like to do
21 studies to deal with the unknown. I think there are reasons
22 to do studies to establish -- to establish -- to erase an
23 unknown, a scientific unknown, but there is also unknown in
24 this community with regard to this plant and the exposures
25 that are perceived as to what the unknown health status of

1 the community is. And that's what people are really nervous
2 about. They've got perceptions from a lot of anecdotal
3 information because the state doesn't have really good
4 information to share with people.

5 You know, it's true in the best of studies, in the
6 atomic bomb survivor studies themselves there is controversy
7 about what the conclusions of those mean. Are they
8 definitive conclusions or not? So naturally with a smaller
9 city you're going to have that problem. But you're also in
10 the process of doing a study, you're collecting information
11 that, yes, it's not going to be a definitive, it's not going
12 to be conclusive and say -- be able to allow you to point
13 the finger at something, but it pulls information together.
14 It doesn't exist right, but the community is worried about,
15 and reaching conclusions about, and is driving a lot of the
16 discussions that you have to deal with without having the
17 facts. I mean, you can talk about theoretical risk
18 estimates and models but it's not really something you can
19 grab a hold of. And it just breeds controversy because it's
20 not accepted by all, epidemiologists and others.

21 I'll just stop there for now.

22 MR. FAIRTILE: Are there any members of the public
23 that want to make some comments on this issue?

24 MS. HARRIS: At the Pilgrim reactor a study was
25 conducted because there was an increase in adult Leukemia,

1 and the end result, I believe, was to lower the air emission
2 standards for Massachusetts because the NRC's were obviously
3 not restrictive enough. It still hasn't been done, but
4 that's what we are left with. Knowing that, in fact,
5 perhaps the standards are not low enough and we have proof
6 of that in the other end of the state. And so that is also
7 some of is our discomfort in just allowing that the bomb
8 victim information is adequate enough to protect us.

9 It's not really a question.

10 MR. WILLIS: I don't feel that I have the time or
11 really the inclination to go into the details of that study,
12 but it's certainly one that we've looked at in some detail,
13 and our conclusion is that that study is certainly less
14 definitive than the other studies that we have available to
15 us, and that it was not a suitable basis for changing the
16 NRC standards.

17 DR. KNORR: If I can just make one statement about
18 that since I'm one of the co-investigators of that. It was
19 peer reviewed and it was concluded that generally it was not
20 -- those findings weren't consistent with the larger body
21 of scientific evidence. It was felt that the results were
22 implausible, given the exposures that may have taken place.
23 I mean I don't -- the department doesn't agree with -- that
24 there is conclusive information about what exposure actually
25 did take place, there was no dose reconstruction, there is

1 concern about what the levels were in the '70s plant.

2 But I think that study, though, is an example. It
3 certainly wasn't attacked, it was validated from a
4 methodologic standpoint as good epidemiologic study and no
5 one faulted the results, it was just what the interpretation
6 of it meant was not clear, it was inconsistent with what
7 other studies -- most other studies had found. But it's an
8 example of -- a lot of other studies fall into that category
9 now that are coming up into scientific literature that show
10 an inconsistency with the main stream.

11 And it's true, as Dr. Willis said, we know there
12 are gaps in our knowledge. Whether these inconsistent
13 studies that are perceived as inconsistent are going to come
14 together and finally change scientific thinking is yet to be
15 determined. It may be that there is some flaw in all of
16 these studies, or it may be that it is filling a gap in our
17 understanding, and that's yet to happen. But again, it's
18 part of what's driving the discussions, is that we don't
19 know the answer to those things yet.

20 MR. FAIRTILE: Anybody else?

21 MS. STREETER: I'd like to ask the NRC to just
22 look out our windows here today; see what kind of a day this
23 is. And to know that we have this kind of day about 40
24 percent of the time, I believe. Now the radiation that's
25 escaping into the air today that you all think is going to

1 heaven is hanging right in here. So, go out and take a nice
2 deep breath, please.

3 MR. FAIRTILE: Thank you.

4 MS. KATZ: See, in a certain way we realize that
5 the issues we are raising, in a sense are controversial, and
6 that it doesn't go along with what has been completely
7 accepted. I'll go back to the bibliography, because I think
8 that's part of what this is about. We present the
9 bibliography, we didn't present the bibliography with all
10 the epidemiological studies that would show that there is no
11 effect. We know about them, we've read a number of them,
12 but we felt that there is mounting evidence and there is
13 grave concern in this community and in other communities
14 about the health effects of long-term exposure to low-level
15 radiation.

16 There are scientists who believe that there is a
17 threshold below which the effects of radiation are not
18 sensed by the body, and thereby large amounts of radiation
19 can slowly build-up over time and, in fact, can have a very
20 costly effect on the person's life and also on fetus, on the
21 dermoblast. And these are issues that, in fact, were raised
22 in the bibliography in terms of Straume's work, Mewissen's
23 work. There was Dr. Steven Wing's work with Oak Ridge
24 workers in which Wing did a study for the DOE, in which, he
25 found after 25 years the studies ran from 15 years -- and

1 I've spoken to Dr. Wing about it -- that after 25 years he
2 found that workers who had been exposed, on average, to 140
3 millirem lifetime doses had a 63 percent increase in risk of
4 Leukemia and 33 percent risk in terms of other cancers.

5 The BEAR 5 report itself raises the issue that, in
6 terms of fetuses there may be no threshold below which
7 radiation does not affect a growing fetus. And since one of
8 our concerns here is, in fact, the issue of the 10 Down's
9 Syndrome children who have been born in the last 10 years,
10 and with possibly another seven that were born in the
11 previous 10 years in a community in which there should have
12 been, according to statistical analysis, 1 and a half
13 children born. We have concerns that something is going on
14 in our community. These children -- these children who were
15 born live within a three mile radius of each other. This is
16 a very small community. As you say, it's a very small
17 population, yet within a three-mile radius 10 children were
18 born. I think three or four lived on the same block.

19 So even though, in terms of looking at it on
20 paper, it may not mean much to the NRC, but to us this is
21 very serious to us, just as the cancer which has been found
22 that there is statistical significance in cancer found in
23 the Deerfield River Valley in a population that should not
24 show statistical significance. And when we started with
25 Bob, he swore we would not find statistical significance,

1 and Dr. Cobb swore he would not find statistical
2 significance, and Dr. Spangler. And yet, when they went
3 over the work, they found issues that concerned them about
4 what was happening here.

5 There is a 95 percent increase in breast cancer in
6 Shelburne Falls, it is the second highest area of breast
7 cancer in the state. We live in a pristine rural
8 environment for the most part. And yet, we have been
9 affected by this. And we feel that what -- since Yankee
10 Rowe started as an experiment, that we have become part of
11 that experiment. And I would love to find out, in the long
12 run, after a study is done that it doesn't have to do with
13 radiation. It would an enormous relief to me and my
14 community to know that, but we are gravely concerned about
15 this because our community is suffering, and suffering
16 deeply at this point and afraid. And we do not feel that
17 the powers at be have been very responsive to that process,
18 and this is a grave concern to us.

19 The Department of Health has been working with us
20 on preliminary investigations for two years, and they have
21 been struggling with us to find ways to deal with this and
22 piecemealing together the ability to make a study, because
23 of lack of funds.

24 And so, we came with these issues because we felt
25 that it would be important for the NRC to know about this,

1 and we felt you would be interested in process of what's
2 going on around this conversation. And we felt that the
3 issues of tritium that we had raised, in terms of the issues
4 of microdosimetry which we directly asked you to re-evaluate
5 would be very important, given the work of Straume, given
6 the work of Goodhead, given the work of Dobson and other
7 researchers in the field who are raising the issue of
8 whether the view of tritium as being a benign radionuclide
9 has to be re-evaluated at this point. Even though it is
10 accepted that it's a benign radionuclide, there are
11 certainly researchers working directly with it. And
12 Straume, who is at the Lawrence Livermore Labs when he did
13 his research, and found that tritium is two times as
14 carcinogenic, 2 to 5 times as mutagenic and 2 times as
15 teratogenic as originally believed. Well this is a grave
16 concern to our community. Since Yankee was a pressurized
17 water reactor and it released large amounts of tritium as
18 you, yourself said, into the Deerfield River for 31 years.
19 And certainly released consistently for 31 years, large
20 amounts, for those years and consistently released amounts
21 into the river.

22 So that our wanting to comment on the dosimetry of
23 tritium and, in fact, reevaluation and the bibliography is
24 tied into those issues. And we can talk about it in that
25 light, it can possibly be helpful. And you talk to Mr.

1 Willis, and maybe others, who have information on this and
2 that can talk about it, and I would just like to open it up
3 for the NRC as well.

4 MR. WILLIS: A word on the bibliography. Our
5 communications were not good on this point. I received the
6 bibliography, I looked at it, your letter to Mort said you
7 wanted to see this in the public document room. I had no
8 objections to it being in the public document room, neither
9 did I see anything unusual about it. This bibliography is
10 quite small compared to bibliographies that are generally
11 available. I suspect -- in fact I pulled together a
12 bibliography as a recommendation for a health physicist
13 library about 20 years ago that had something like 10 times
14 as many references in it. I couldn't find any real thread
15 to what you had. There, and so my reaction was if you want
16 to put it in the public document room I have no objection.
17 If you wanted to make an argument that these reports prove a
18 certain point, that you didn't make that point and I didn't
19 try to respond to it. Perhaps I should have been more
20 sensitive, but I didn't get that issue.

21 MS. QUIGLEY: Debbie is probably not asking you to
22 believe that all the reports are definitive.

23 MS. KATZ: No.

24 MS. QUIGLEY: And I think what probably the
25 community is asking you again, is to have an open mind that

1 there can be something happening that scientific research
2 has not been able to prove yet than in the large amounts of
3 bibliography that you would feel more comfortable with. And
4 I think that's really the point of having this discussion
5 with you today, is just to see that you're going to have an
6 open mind with the community that is very, very worried and
7 follow up with a request for dosimetry review.

8 MS. KATZ: Yes. That's one of the major things we
9 asked for in that conference, was a reevaluation of tritium,
10 and at least a response to what we were raising.

11 MR. WILLIS: As a scientist, of course I'm very
12 interested in any new approach or suggestion to it, and I
13 believe that I'm about as open minded as one can be on these
14 matters, but we reach a point where decisions have to be
15 made, and what the NRC has consistently done, and what seems
16 to me to be the best available approach is to have these
17 review studies done by the best authorities, the best
18 scientists that we can get to do them.

19 There have been three groups that have been most
20 active in this area, and we don't need to go back to the
21 1931 League of Nations Study because that really doesn't get
22 into the heart of the matter. But since the '50s, there has
23 been a United Nations Scientific committees on atomic
24 radiation that has periodically reviewed the biological
25 effects of radiation and published reports. The most recent

1 came out in '93, and I understand there are supplements due
2 to it this fall, I haven't seen them yet, to go with this
3 international study, complement it. There are studies
4 conducted by a committee of the national academy of
5 sciences, these are not people that are representative of
6 the utilities or a regulatory agency. For the most part,
7 they are academics and representatives of the highest level
8 of science that we can get.

9 The first reports were, I think the first was '56,
10 and then a couple years later by the old BEAR committees
11 then they changed the name to the BEIR committee, and
12 they've gone through a number of different versions of
13 this. And the findings, while they vary from year to year,
14 are generally consistent. There is also the International
15 Commission on Radiation Protection, these are experts in the
16 specific areas. They get together periodically, they've
17 been in business actually under different names, but in
18 business since 1928. And so, yes, we're very interested in
19 new studies. And the best efforts possible are made to
20 incorporate the recommendations of the authorities.

21 So what I have said here is not what Charley
22 Willis happens to think or my feelings about things, my
23 knowledge just as limited as the next scientist in this
24 area. But when it comes to a position, an allocation of
25 resources, we have to make use of the best information

1 that's available to us.

2 MS. KATZ: That was five.

3 MR. FAIRTILE: Pardon me? I didn't hear you.

4 MS. KATZ: I think that was five minutes.

5 MS. YOUNG: She's rights.

6 MS. KATZ: His statement is -- myself as well.

7 Well maybe since we have so little evidence that we
8 presented, I can just go through some of it to find out what
9 you may have read, which -- have you read Mr. Cahill on the
10 Tritium Irradiation of a Mammalian Fetus, or Mr. Carsten?

11 MR. WILLIS: Let my plead ignorance on this. Many
12 of these documents I have read. The number of reports that
13 we get is quite high. I try to keep up with what is
14 published in radiation research, the Journal of Health
15 Physics Society; the publications of the Radiation Effects
16 Foundation Group and other publications that get a lot of
17 attention. But as to the details of an individual report, I
18 will not comment on without the documents in front of me
19 because my memory is just not that good.

20 MS. KATZ: I'm just concerned because these are
21 the ones we submitted to you. These were not in general,
22 these were specifically part of our bibliography on tritium,
23 which included Carsten, Dobson, Goodhead, Kirchman, Laky,
24 Lasky, Mewissen, Straume and a number of others. So that
25 these were very specific as well as on other issues. So did

1 you read the references that we submitted to your agency on
2 this work?

3 MR. WILLIS: Certainly not all of them. A few of
4 the documents you have there are apparently unpublished and
5 unavailable to me. But beyond that, most of these documents
6 are referenced and the results incorporated in the studies
7 of the National Academy of Sciences and in the UNSCEAR
8 United Nations Scientific Committee study. And no ma'am, I
9 did not go back and redo -- restudy all the of these
10 reports.

11 MS. QUIGLEY: I'm still feeling this tension of
12 the committees that you're naming are usually committees
13 that do dismiss any effects at low doses as being
14 insignificant and we are trying to move research in this
15 country, particularly through taking it out of the
16 Department of Energy and putting it into centers for disease
17 control to get a more balanced viewpoint.

18 Now, I'd like to go back to the issue of -- that
19 you feel that because these committees have made these
20 recommendations and that these low doses are significant,
21 that your agency itself doesn't want to allocate resources
22 to something that doesn't seem to be a problem according to
23 these committees.

24 MR. WILLIS: I would not propose to speak for the
25 commissioners. I rarely even speak to the commissioners, so

1 what -- how they decide to allocate their resources I can't
2 address that. I know a little bit of what we have been able
3 to do in the way of spending money, and the NRC has funded a
4 fairly extensive study that developed models for estimating
5 biological consequences. I can get the report numbers for
6 that if you want, but basically we have not gone out and
7 done fundamental epidemiological studies.

8 MS. QUIGLEY: Right. I think that they're not
9 asking you to do an epi study, they're asking you for review
10 of dosimetry. And I guess I'd like to suggest that if the
11 NRC feels that it doesn't have the time and resources for
12 this, this issue is of concern to the Department of Energy
13 as well as, and also to the CDC because there are many
14 weapons plants where communities are suffering from health
15 effects that may be associated or may not it be associated
16 with tritium releases. So we just wondered if perhaps, with
17 your support, you could ask one of these other agencies to
18 undertake something that you feel you can't undertake at
19 this point.

20 MR. WILLIS: Well, I don't believe that my
21 recommendation is going to carry a great deal of weight
22 with, let's say, the Center for Disease Control. I do know
23 some people there, Charley Miller is a good friend. But
24 they have their basis for addressing these things, and if
25 they -- I'm sure that if they feel there is something to be

1 gained, they will do so, do the studies. And they'll
2 certainly not get any objections from us.

3 MS. QUIGLEY: Would you endorse a letter asking
4 them to review this? Charley Miller is a good friend of
5 mine too, so maybe could get Charley's staff to do this.

6 MR. WILLIS: To the extent that a case can be made
7 that we have a problem here that needs to be investigated,
8 certainly. Now, the paper that I looked at would not lead
9 me to see this as a radiation problem. I'm not even sure
10 that there is a health problem, because the -- a fundamental
11 omission from that study is the age effect.

12 MR. FAIRTILE: You're talking about the Cobb
13 study?

14 MR. WILLIS: The Cobb study yes, I'm sorry.

15 Anyway, if you look at the biological data, you
16 see that, as we all know, there is a dramatic change in the
17 rate of diseases as we age. So if the population in the
18 areas that you're finding high levels in is a little bit
19 older, either on the average or if it has a larger number,
20 larger fraction of older people than the population you're
21 comparing it to, then the comparison is not valid. If this
22 is not the case, then it certainly -- it certainly should be
23 so identified in the document before it's published.

24 There are a number of other confounding factors
25 that go into an epidemiological study, such as: How did you

1 collect the data? It isn't stated in the paper. If, for
2 example, the communities that you're looking at -- some of
3 them have more hospitals than others, that certainly biases
4 the data if you're looking at the place where a person dies
5 or a person -- a place where the person is identified with
6 having a certain disease. Those things happen in
7 hospitals. And if you have more hospitals in an area you'll
8 have more deaths in an area. If this has been taken into
9 account in the study, then fine. The paper should report
10 it. And if you have done these things, then you may have a
11 much better actual study than we have a report on.

12 MS. KATZ: One of our struggles -- I'll just
13 respond to it because I think that's important.

14 First of all, what doctors have reported and in
15 fact, wrote to the Department of Health at certain points
16 was that these were younger people dying of cancer, not
17 older people dying of cancer. And they say they lead
18 healthy life- styles and expressed concern that these people
19 who lead very healthy life-styles were dying of cancer.

20 There are also very few hospitals in this area
21 and, in fact, most people, in fact, have to go to New
22 Hampshire, Boston, Connecticut to get hospital care. Very
23 little hospital work goes on in this area in fact. Because,
24 as you can see, we are a small rural population and in fact,
25 with the issues of Down's Syndrome, the people at that time

1 in the '70s were going to Connecticut and Boston and up, all
2 the way to New Hampshire, not around here. One of our
3 struggles, as you can see is, that people -- most of the
4 medical service does not take place in this area.

5 So to identify the problem, and what we have done
6 to identify the problem, it may even be larger, but it's
7 very hard for us. And I -- those issues you're raising --
8 the information we gave you from Dr. Cobb was done as a
9 roughly analysis, you know, on his part, it was not a -- a
10 completed study. Our work with the Department of Health is,
11 in fact, around this process. And the struggle is that
12 there is so little money and time and it's a bunch of, you
13 know, local citizens in our community and different
14 organizations in the community working to try to understand
15 this problem. And in part, that's why we brought it to you,
16 to enlist your help in this to understand it.

17 So, those things are two things we looked at, and
18 raised more questions because of them, because we don't have
19 hospitals and these are younger people who are dying. And
20 we are trying to get the statistics together. In fact, the
21 Department of Health is working on getting some of the
22 cancer statistics together. But of course we have no birth
23 defects registry in the State of Massachusetts. And the
24 cancer registry started in '86, so there are limits about
25 the background of information on what's available in terms

1 of this, especially since so much of this has taken place
2 throughout, possibly, three states.

3 DR. KNORR: If I can just add a little bit.

4 First, I just wanted to acknowledge or discuss
5 this with CAN and with Dr. Cobb that some of the numbers of
6 in his report, the department hasn't been able to replicate
7 them. We had some of the same questions about the sources,
8 and that's something he did as a crude approach to kind of
9 get some thinking going and get some activity going from the
10 department and others. And it's part of what stimulated the
11 department to look into some of the numbers.

12 I can talk more about the numbers at some point,
13 but, I guess one of the things that I'm hearing is that -- I
14 guess I've heard a little bit mentioned earlier -- is just
15 the fact that Dr. Cobb's report was out there and numbers
16 were communicated and you had some questions about it.

17 I think what people have concerns about -- we are
18 -- the Department of Public Health is just as guilty of
19 this often, is that here people are expressing a concern.
20 They have fears about what's going on in the community.
21 Agencies that are supposed to protect them and they're
22 looking for a certain response from are reaching or making
23 decisions that they feel aren't -- don't have all the
24 information. In other words, you have questions about how
25 Dr. Cobb got his numbers, but no one asked him where he got

1 his numbers, I presume. And you said, as an example, in the
2 same with the Department of Public Health, I think that's an
3 important process, I think, that the department needs to try
4 to do. And I'm hearing it what sounds like maybe the NRC
5 needs to do in dealing with these issues is to -- in order
6 for there to be a sense of trust so that if your conclusions
7 are to be believed and people can move forward, they have to
8 understand that there has been, you know, some full
9 evaluation of the information that they've communicated.

10 And I would just, I guess, pass that on as kind of a
11 suggestion. That this, as I said, the Department of Public
12 Health, in dealing with the community, we are guilty of -- a
13 lot of times ourselves we get information back and I half
14 look at it sometimes, I admit that, and that's wrong to do
15 that. Because we have -- they're putting our trust in us to
16 reach -- to help them, to be responsible for them for
17 protecting their health.

18 And that's some of the reason that I talked with
19 you more about this meeting, was because there wasn't this
20 dialogue going on. I realize that you've had dialogues with
21 CAN a long time and with Bob Hallisey of the Department of
22 Public Health, but not with health issues, the
23 epidemiological side of things. And I thought we kind of
24 needed to get that going so that I can be informed in the
25 work that I'm doing and you can be informed about the things

1 that are going on here that will help in your decision
2 making too.

3 It wasn't a question, I just --

4 MR. FAIRTILE: No, that's fine.

5 MR. WILLIS: I'm not sure about timing here, but
6 my colleagues have a plane to catch this afternoon, I'm
7 going to be available until in the morning, so if you'd like
8 to shift emphasis to some other area and get back to me
9 later in the day, I'm happy to do so.

10 MS. KATZ: Is it possible for us to work on
11 setting up a committee, a small follow-up committee to work
12 and resolve some of these concerns, and see if there is a
13 way that it can be worked on, including the Department of
14 Health and the Cancer Research Institute, so we can do that
15 and then work on it.

16 I heard someone start to raise something.

17 MR. BELL: That's all right, I'll raise it.

18 MR. WILLIS: To the extent that NRC management
19 supports it, I'm happy to participate in any such activity.
20 I have a pretty full plate, I usually work from 7:30 to 6:30
21 and I'm available by phone any time, if you would like to
22 call. But, as for participating in a committee activity, I
23 obviously have to get management approval for that.

24 MS. KATZ: You were going say something, Mort?

25 MR. FAIRTILE: We'll bring your suggestion

1 forward.

2 MS. YOUNG: The best way to get your suggestion to
3 the attention of whoever is working on it -- bring your
4 suggestion to the attention of more than just working level
5 people. Write it down, write, you know, make some type of
6 proposal in which you think some citizen government
7 committee could perform. Because I know that there have
8 been -- the Advisory Committee Act -- I don't know -- the
9 TMI, for example, there was a citizens advisory group that
10 worked with NRC and had briefings before the Commission. I
11 don't know all the details on that, but there are vehicles
12 that have been used in the past where the Commissioners are
13 convinced that something like that needs to be done in a
14 particular area.

15 So rather than having Mort forward your request,
16 risking that he may or may not accurately put your request,
17 and to the extent that you came up with an idea that you may
18 not even have thought through all the way, it will be best
19 if it's something in writing.

20 MR. BELL: You always have the prerogative to
21 write directly to the Commission itself to voice your
22 concerns.

23 MS. YOUNG: To the extent that you can get local
24 support, whether it be a mayor, governor, attorney general,
25 Department of Health official, what have you, I think those

1 type of requests get quicker responses than just a
2 individual citizen writing. It's just the reality of the
3 way things work.

4 MR. WILLIS: One comment along those lines. We
5 have an interesting situation now in that one of our
6 Commissioners, Dr. Gail de Planque is a health physicist who
7 is personally knowledgeable about such things and who very
8 well might be interested in your proposition.

9 MR. BELL: I would highly recommend that as a way,
10 in addition to going through Mort, as to get ways to the
11 highest level -- puts you on the same level as the folks,
12 you can write directly to them.

13 MR. FAIRTILE: I would support that idea too. I
14 think it's a good idea and I wish you had brought it up
15 about two years ago.

16 MS. KATZ: Well, two years ago we were completely
17 ignorant. Two and a half years ago we were in a kind of
18 bliss about this, we just woke up.

19 MR. FAIRTILE: I'm really impressed, by the way,
20 with the extent of your knowledge, of the area of your
21 knowledge, absolutely. And the way you present things, it's
22 very impressive.

23 MS. KATZ: Thank you. We've unfortunately had to
24 develop it. But thank you, we appreciate that. Maybe we
25 could turn to issues of ALARA and the issues of safety

1 issues around Yankee Rowe.

2 One of the issues we had raised was that the NRC
3 maintains -- and this may get more of you guys involved --
4 NRC maintains that the SAFSTOR and the decon are both
5 acceptable decommissioning options. And there's a question
6 that CAN had that ALARA would logically require SAFSTOR as a
7 decommissioning option increment that yields significantly
8 lower exposures.

9 And some of our concerns are in terms of the
10 exposure of workers during this project, since at the
11 beginning, Yankee and even the NRC, talked about that these
12 exposures were going to be lower, they thought they were
13 lowering. And in the cutting up of the 1 million curie
14 baffle, the exposures turned out to be higher than
15 expected. There were -- and it took longer than expected to
16 cut it apart and put into the spent -- the irradiated fuel
17 pool. And there were also issues which we can get to, but
18 maybe people can just begin to talk about that and comment
19 on that.

20 MR. FAIRTILE: I can start, and then Joe Nick, who
21 was a key inspector in the area you discussed.

22 As far as the SAFSTOR, you're absolutely right.
23 There would be less exposure under SAFSTOR than partial
24 dismantlement, there is no question about that. But, what
25 we use as our guidance in that is the generic and

1 Environmental Impact Statement which provides an envelope of
2 overall exposure, no matter what method the licensee may
3 select, and it is the licensee's choice. We don't interact
4 with the licensee as to what choice he makes. And he chose
5 to do part of this job as early component removal, as you
6 know. And then as he lost the ability to get into a
7 low-level waste disposal he's sitting on this stuff.

8 So anyway, his doses came in far below the
9 envelope in the generic Environmental Impact Statement, and
10 he was free under that policy to do it. Now as far as the
11 component removal program of cutting up of the high level
12 stuff, I'll turn that over to Joe Nick who is a regional
13 inspector.

14 MR. NICK: Debbie's correct. The exposures were
15 higher during that component removal project than were
16 originally estimated. I think by, approximately, 25 percent
17 higher. I noticed in the agenda you had some data that may
18 not be accurate, I can talk to you about that later.

19 MS. KATZ: Sure.

20 MR. NICK: The total does as of mid June was 42
21 person rem for that project. The highest individual for the
22 year was 2600 millirem or 2.6 rem. These are -- since that
23 was the highest individual exposed, they were well within
24 the regulatory limits that Mort had alluded to. They have
25 had no occurrences of exposures above the regulatory limits

1 during this project.

2 MS. KATZ: We didn't think they had.

3 MR. NICK: Okay.

4 MS. KATZ: I only thought of the 2.6 rem as
5 being --

6 MR. NICK: It is.

7 MS. KATZ: -- since 5 rem are allowable limits.

8 MR. NICK: That's correct.

9 MS. KATZ: We were just concerned, though, that it
10 in fact it proved to be higher and how can this be lowered
11 in the future. And certainly it turned out that working on
12 the baffle was somewhat experimental in ways and --
13 experimental in the sense that the exposures were higher,
14 that, in fact, during this period there were -- it looked
15 like there had been contaminations during this process.
16 None of them were high level contaminations, but that there
17 were contaminations, I was wondering if these contaminations
18 were also -- whether the percentage was higher for
19 security. They sent in security guards getting
20 contaminations because they've raised the issue that they
21 did not get enough radiation training in the process. The
22 union has raised this, because it turned out that there were
23 problems. Yankee didn't foresee it and it wasn't their
24 fault, and they were open with it. And in fact their
25 limits, as far as I know, are stricter than your limits in

1 terms of exposure.

2 MR. NICK: That's right.

3 MS. KATZ: So within that context I wanted to talk
4 about what came up there.

5 MR. NICK: I don't know where to start.

6 MR. FAIRTILE: Start at the beginning.

7 MR. NICK: There are two issues with ALARA, I
8 think, that you're bringing up. One is that overall you're
9 saying they could have saved dose by choosing the SAFSTOR
10 option. Notwithstanding that discussion that Mort
11 addressed, that we also require the licensee to have an
12 ALARA program for their ongoing work, that's what I
13 inspected, that regulation. The licensee does have a very
14 good ALARA program, in my opinion.

15 They evaluated the job and estimated, I thought,
16 using realistic values, but it's not an exact science, it is
17 tough to do, there were a lot of unknowns. So the values --
18 the actual dose accrued did come out above their estimates.
19 They also did have an increase in skin contaminations and
20 clothing contaminations, both. And that was a minor concern
21 of mine, I wanted to make sure that they had control of
22 that. But you have to realize, with these contaminations
23 there is a very small dose assignment associated. And in
24 the overall total dose they are very insignificant part of
25 their dose assignment.

1 But it's still, nonetheless, it is somewhat of a
2 concern. It may mean that work practices were getting a
3 little loser or something, we didn't determine that, but we
4 wanted them to make sure they had a handle on it.

5 As far as the guards, we looked at the training
6 for the guards and we had no problem with their radiological
7 work training. I reviewed it myself, I thought it was a
8 good program. The guards had been assigned to do
9 radiological -- let me take -- the guards had been assigned
10 to do work in radiological areas before, this is not the
11 first time they had done that. I was there the first day
12 they assigned a guard to oversee the opening of the transfer
13 canal --

14 MR. FAIRTILE: Can I break in for a minute, Joe?
15 We are getting, now, into a safeguards area. The reason
16 that security people were in the containment at all was for
17 a safeguards purpose, and a safeguards purpose only.

18 MR. NICK: I was going to explain that.

19 MR. FAIRTILE: Oh, I'm sorry.

20 MR. NICK: That's okay, that's exactly where I was
21 going.

22 They were requested to be there to observe, for a
23 safeguards purposes, that nothing could enter the spent fuel
24 pool through this path. Again, I raised the concern that
25 day. These people could get significant dose just standing

1 there. That's all they did, they stood there and watched,
2 they didn't handle any material. They were dressed out in
3 protective clothing to make sure that they didn't get
4 contaminated, but they did no physical work. And the
5 licensee did respond and they were in the process of by
6 themselves, the licensee was in the process of reviewing it
7 themselves and they determined that they could use some
8 remote surveillance, but sometimes it had to physically and
9 this is because of their safeguard --

10 MR. FAIRTILE: Safeguards plan.

11 MR. NICK: Their commitments to the safeguards
12 plan, yes, that they had to have this person present. So
13 again, we are looking at the overall program and this is a
14 very small part but, where we determined they should be
15 keeping these exposures as low as reasonably achievable and
16 still perform the work that they needed to do, and they did
17 do that, in my opinion again.

18 As far as the number of guards be contaminated,
19 there may have been a slight increase, but since their work
20 was hands off, I doubt that it was very large. I didn't
21 look at it in that detail who had the contaminations.

22 MS. KATZ: One of the things you did raise
23 yourself was in terms of using shielding -- if shielding had
24 been used from the beginning of the work in the containment
25 sphere the doses would have been lower in this process. And

1 I wonder if -- it's like lessons learned from Yankee Rowe in
2 terms of this. And one of the struggles is making an ALARA
3 program as you're sort flying by the seat of your pants,
4 even though you've done a lot of work, you haven't done
5 decommissioning work. And this is a concern to us. Not
6 just for us in the community, but also for the people who
7 work at the reactor in terms of this process.

8 So that, you know, you in fact talk about and
9 Yankee had put the shielding in, but it's these issues that
10 are of concern to us in terms of, you know, even what Mr.
11 Austin was talking about and a number of people referenced
12 last night in terms of how are you going to set up the ALARA
13 program for decommissioning. How can you set it up after it
14 happens? And if you set it up while it's happening, how can
15 you make it accurate or a reliable judgment because it's the
16 ALARA program that's going to protect the workers, so. And
17 that's probably a very big struggle you're in at this point.

18 MR. NICK: Oh, it is. That's the struggle with
19 ALARA, you've kind of summarized it. Tasks that have not
20 been performed before obviously are not going to be able to
21 predict everything that can happen. But what you do in the
22 arena of ALARA planning is you try to take similar jobs, you
23 try to take dose estimates based on the data you have, and
24 you try to apply as much as possible.

25 The other part of any good ALARA program is

1 lessons learned, not only from yourself, but from other
2 places. And the industry does have groups that meet
3 periodically and discuss big tasks like this like steam
4 generator removals. There is literature published on it,
5 trade journals, et cetera, where they do share the
6 information, so it's not a total unknown when you're going
7 into a job. Obviously there are unknowns, like I said, but
8 they try to narrow that down so they can plan as much as
9 possible.

10 MS. KATZ: Have they conducted of a baffle before,
11 has that taken place and have security guards been used in
12 the containment sphere before at Yankee?

13 MR. NICK: At Yankee, yes, they have. Every time
14 they open that transfer canal shoot they need those security
15 guards present. So this is not the first time. The
16 activities levels obviously fluctuated over time, they may
17 not have been the same as they were during the component
18 removal, but guards, yes, have been used before for that
19 purpose. And Mort can address whether or not there has been
20 other plants that have had to do the cutting.

21 MR. FAIRTILE: Yes. It turns out that the
22 contractor that Yankee Atomic hired to do their underwater
23 cutting makes a business out of this, and they've been in
24 that business since 1970, and they've done some very big
25 jobs similar -- very similar to this. For instance, they

1 cut up some of the contaminated core components in the TMI
2 reactor, which I think was even bigger and had more dose
3 impact -- much more, Joe corrected me -- had much more dose
4 impact than cutting up the core baffle plate.

5 There have been lots of very similar underwater
6 work done at many reactors, various repairs; a lot. It's
7 not an experimental job, it's something that's pretty well
8 known. There are people that earn a living specializing in
9 this kind of work. And there was nothing unique in the
10 Yankee job as to tools, people, radiation protection, and I
11 wish Joe would make some comments about what I thought was a
12 very thorough coverage of radiation protection, and how well
13 the licensee reacted to problems.

14 MR. NICK: Yes, I'll just take a minute or two. I
15 do believe they have a strong program. They are very
16 experienced people, they've brought in people who have done
17 work similar to this in other areas. They have brought
18 inexperienced vendors whenever they could, they haven't --
19 they haven't tried to just do it by the seat of their
20 pants. A lot of good planning has taken place. Like I
21 said, you can't always predict everything and there is going
22 to be some unknowns, but they have done a very good job
23 overall, and that's pretty much reflected in my reports. I
24 try to give summaries as well as very specific instances
25 where they've done -- they may have weaknesses, I've pointed

1 those out too, but overall, a very good job.

2 MR. KATZ: I sort of think that what happened is
3 we've sort of bypassed something that has always been very
4 intriguing to me about ALARA, which is that it seems really
5 contradictory and inconsistent for the NRC to allow a
6 utility select between the two decommissioning options, one
7 of which in certain parameters, yields a magnitude of
8 increase in the amount of exposures over another. That is,
9 in fact the problem is why -- how can they have the choice
10 when ALARA would seem to require or mandate it? And I just
11 wondered what the thinking and what the discussion was that
12 -- how it came to pass that this could be somehow
13 optional,, rather than mandated.

14 MR. FAIRTILE: Okay I'll handle it -- let me take
15 this one Charley.

16 MR. WILLIS: Sure.

17 MR. FAIRTILE: The reason for that is there is two
18 aspects to radiation protection in a plant. ALARA is a sort
19 of a global protection for all the workers in the plant.
20 And what we do there is try, as we said last night, to drive
21 down the dose that any individual may see, and that's really
22 the key, is to hold down the individual dose.

23 The doses that individuals see is controlled by
24 our 10 CFR part 20. And whether or not a plant is operating
25 at full power, or whether it's in the decommissioning

1 process, they use that same level of protection that's
2 afforded by 10 CFR part 20, and that mandates what the
3 maximum doses an individual can see in some time limit, and
4 that's really the critical thing.

5 As far as ALARA, the purpose of an ALARA program
6 is to hold those doses down by forcing the licensee to study
7 ways of keeping the dose down. Now what Yankee does is two
8 things, and both very good. They have set internal limits
9 that are below the NRC limits, that's one thing they do
10 that's very positive. And a second thing that they do,
11 which I think they do effectively, is planning. They plan
12 head on these jobs to keep the individual doses down.

13 When you look into the future there is no way you
14 can be perfect in your planning, otherwise we'd all be
15 millionaires by buying stocks. We could figure out what
16 stocks are going to go up and which are going to go down,
17 and that's impossible. And it's just as impossible to have
18 a perfect plan involving future events, but Yankee does do a
19 good job. Do either of you have anything to add?

20 MR. MULLINS: Charles Mullins, OGC. I promised
21 Mr. Block I would do everything I could not to say
22 anything.

23 I think the question Mr. Katz is getting to is --
24 the answer to the question that I think that we are missing
25 is ALARA doesn't necessarily dictate the choice of options

1 that Yankee chooses to undertake. What ALARA does is, it's
2 supposed to, once they choose that option, it governs how
3 they carry out that choice. In other words, the fact that
4 there is an ALARA program or ALARA requirement doesn't mean
5 that they have to choose SAFSTOR as opposed to decon. It
6 means that whenever they choose decon, they have to carry
7 out the decon program in a certain manner. That, I think,
8 is what -- you're asking why, if there is an ALARA
9 requirement, can they do a decon, and that's the answer.

10 MS. YOUNG: And if I could speak back on that for
11 a moment. I think last time we met, with the statements I
12 made, had to do with the Commission having a generic
13 environmental impact statement, and that looked at the
14 variety of ways you could decommission the facility. And we
15 found two of the three ways they examined to be acceptable
16 in terms of the doses that might occur. And those two were
17 decon and SAFSTOR.

18 So, in terms of the way the NRC regulatory scheme
19 is set up, it is perfectly acceptable for a licensee to
20 choose immediate dismantlement or SAFSTOR up to 60 years
21 because we've got this generic Environmental Impact
22 Statement that says the doses for those two types of
23 activities, or some combination of those two, are
24 acceptable. It doesn't mean that because of ALARA
25 considerations you have to pick one or the other. It's just

1 that we have two different options that a licensee can use
2 some variety on that have acceptable consequences.
3 Whichever option they choose they must take those steps that
4 will keep the doses that are experienced in that particular
5 option as low as reasonably achievable.

6 MR. KATZ: So perhaps we have to find a different
7 word, because ALARA, as it would be reasonably understood by
8 an ordinary person, would not necessarily kick in the
9 thinking that would include everything that has been said to
10 me, you say --

11 MR. BELL: I think what you have to look at is
12 there are doses, dose limits, and what our regulations go to
13 in saying as long as the utility is maintaining doses below
14 that limit, that's perfectly acceptable to us.

15 MR. KATZ: But that is a very different standard
16 than as low as reasonably attainable, so that's different.
17 See, what I'm saying is that ALARA is very confusing, that,
18 in itself, it would tend to serve the purposes of really
19 obscuring, for an ordinary person who didn't spend a lot of
20 time investigating what the actual meaning of ALARA is
21 because it's taken me three years to really understand what
22 it means. And so I've been so confounded by everything that
23 I've discovered in this process that ALARA is really
24 confusing. And one might say or somebody might say, well,
25 ALARA is utilized as a method of obscuring rather than of

1 clarifying.

2 MR. FAIRTILE: I'd like to make one more point.

3 The NRC, in regulating our licensees, tries to get
4 the licensees as much flexibility as we possibly can in how
5 they carried out their day-to-day obligations to meet their
6 license. The license contains a lot of restrictions, in the
7 body of our rules and we try to give them flexibility to
8 operate within that. And also, the licensee has primary
9 responsibility for the safe operation of this plant. It's
10 his responsibility to keep that plant operating underneath
11 our rules, so we try to give them flexibility, not only in
12 this issue of picking SAFSTOR or decon, but in many of his
13 operational things. We don't get involved in his day-to-day
14 operations, we have to give him that flexibility.

15 Or as Joe Nick just whispered to me a minute ago,
16 there not -- there couldn't be a nuclear industry if we were
17 that restricted.

18 MR. KATZ: See, the IRS is a voluntary system.

19 MR. FAIRTILE: Is it? I didn't know that.

20 MR. KATZ: Well, the IRS goes under the assumption
21 that, you know, that people are going to file voluntarily
22 and honestly go about their reporting of the income. And,
23 of course, the IRS can't be involved in the day-to-day
24 operations of everybody's business. But, in fact the IRS
25 process really, if a citizen would look at it and look into

1 their own hearts and the hearts of theirs neighbors, it's
2 not very reassuring in terms of a protective device for the
3 control of radioactivity in the environment.

4 MS. YOUNG: We could throw taxes out the window
5 for a moment, I think the point we were trying to make is
6 ALARA does not take dictate a decommissioning option, that's
7 all really we were trying to say. ALARA applies to the
8 activity that you're doing, it does not decide what activity
9 you will do.

10 MR. FAIRTILE: Charley?

11 MR. WILLIS: I tend to look at this from a
12 different perspective not being a lawyer, but it's one thing
13 to say that we are -- this operation is being conducted in
14 accordance with our regulations, and I believe you've heard
15 that. But my interest is that it is generally being
16 conducted in accordance with the ALARA principal and
17 philosophy. This is something that has been an essential
18 part of radiation protection since, at least 1939. I don't
19 go back much farther than that, but it's been with us this
20 long. And it is intended as an additional precaution, the
21 recommends limits that we have, the part 20, are set at such
22 a level that we expect no discernible ill-effect on the
23 individual worker in his lifetime, and so far, this has been
24 borne out by studies that we'd have.

25 And -- but it has been standard practice to try to

1 keep the doses as far below the limits as could be done
2 without severely impacting the operation. Various people
3 use different dollar values as to where they make that cut
4 off, but the principal has been followed, just as it, I
5 think, should be.

6 MS. KATZ: I would -- the cameraman has asked me
7 if he could break for a minute so he could change his film.

8 [Recess.]

9 MS. KATZ: I just wanted Tom McEwen, maybe to
10 speak and represent Congressman Rosenberg?

11 MR. MITCHELL: It's Tom Mitchell.

12 MS. KATZ: Tom Mitchell, I'm sorry.

13 MR. MITCHELL: That's okay, and it's Senator
14 Rosenberg.

15 MS. KATZ: This has been going on a long time and
16 I've had meetings for two days and I don't know if I have my
17 own name straight, but I apologize.

18 MR. MITCHELL: Tom Mitchell, aide to state Senator
19 Stan Rosenberg. He regrets that he couldn't be here today
20 so he sent me, for what that's worth, in his place.

21 But he did want me to convey that he is supportive
22 of the effort to have the epidemiological studies
23 conducted. His position is that that information is vital
24 to help the community reach some level of comfort with this
25 situation. And without it, there will continue to be

1 questions and those questions will reach a concern, and the
2 concerns that have been raised thus far are reasonable and
3 legitimate and there should be some mechanism to have those
4 answered, and he is in support of that.

5 MS. KATZ: Thank you, we appreciate it.

6 Actually, Bob Hallisey was just helping me, which
7 I really appreciate in terms of clarifying two issues that
8 we had gone over, and maybe we could just touch on those and
9 then turn to the river. And what time we have left, we can
10 focus on that, which is one of the things we would like is
11 for the NRC to look at the issues of dosimetry on tritium,
12 and to take in our bibliography and take a look at that and
13 respond to it. And to the bibliography, both the annotated
14 and the other bibliography, and actually take that seriously
15 and look at it.

16 If we can get a statement that you're willing to
17 do that or that you'll let us know if you're willing to do
18 it.

19 MR. FAIRTILE: We hear what you said.

20 MS. KATZ: I don't know what that means though.

21 MR. FAIRTILE: Well I have to discuss it.

22 MS. KATZ: So you're going to get back to us on
23 whether you're willing to do it.

24 MR. FAIRTILE: You realize these are big
25 expenditures of time and you know how long it took for us to

1 answer your last August teleconference concerns because of
2 the depth of details in your concerns, took quite a bit of
3 effort on our part to respond. I just want you to
4 appreciate that.

5 MS. KATZ: I understand. What I would like to
6 know is whether you will make a commitment to do it, and
7 then if it takes time, we understand it would take time. So
8 if the commitment could come in a timely fashion or if
9 you're not going to do it, let us know in a timely fashion.

10 MR. FAIRTILE: Everything that's on this
11 transcript that happened at this meeting will be responded
12 to, everything. You may not like the responses, but we will
13 respond.

14 MS. KATZ: And the person who will be in charge of
15 communicating with us, since I know you may be shifting
16 position in terms of the project and on Rowe, who would be
17 the point person that we would deal with around these
18 issues?

19 MR. BELL: Let me respond to that. As long as the
20 facility is prior to approval of the decommissioning order,
21 Mort's the person. It would be communicated when the
22 transfer to NMSS will occur. And when that occurs, Jack
23 will be the person in charge.

24 MS. KATZ: I figured it was going to take time for
25 you to respond so I figured Mort wasn't going to be in

1 charge at that point.

2 MR. FAIRTILE: It will take about four months for
3 that transfer, but I'm pretty certain that if my group --
4 Mr. Bajwa and I start this response, we will undoubtedly
5 finish it, even though project responsibility is transferred
6 over to Larry Bell and Jack Parrott, we probably will have
7 the task of completing the response.

8 Is that true, Singh?

9 MR. BAJWA: Yes.

10 MR. BELL: Yes.

11 MS. KATZ: Thank you, we appreciate that.

12 And the other thing was a letter of support in
13 terms of our approaching the CDC and even what Joe Nick gave
14 me in terms of ATSDR, that we could have your support, not
15 your commitment, but your support that there have been
16 concerns raised here that are important that are worthy of
17 investigation.

18 MR. FAIRTILE: That represents the organization
19 that Dr. Austin brought up last night.

20 MS. KATZ: Yes.

21 MR. FAIRTILE: You understand that?

22 MS. KATZ: Yes. So is it possible.

23 MR. BELL: I think the Commission, if you want
24 give him a direct call, and I think you can do that.

25 MS. KATZ: Okay, thank you.

1 So maybe we can try to turn to the river which we
2 sit by at this moment in terms of this. And there were a
3 number of concerns that we had about the river and the
4 contamination of Sherman Pond and Sherman Springs. Some of
5 this started to be raised last night.

6 Harvey, I think, in fact began to question how
7 this would be dealt with, and I also gave out a thing -- I
8 don't know, it should be here, which is about tritium
9 reductions in drinking water in Ontario. And the fact that
10 that the provincial advisory committee in Canada has
11 recommended that tritium levels allowed in drinking water be
12 drastically cut from the current 40,000 becquerels of
13 tritium per liter of water, to -- I think it is -- I think
14 it's either 100 or 300, a reduction of 400 times. The
15 Advisory Committee on the Environmental Standards, which
16 advises Bud Wildman, Canadian Minister of Environment and
17 Energy released its recommendation. And they are asking, in
18 fact, that tritium be re-evaluated. And we would like the
19 NRC, in fact, to take this into account. These may already
20 be in account, and they may even help the Department of
21 health.

22 Did you get one of these, Bob?

23 MR. FAIRTILE: Debbie.

24 MS. KATZ: But they were concerns to us in terms
25 of their relation to the river and the fact that --

1 MR. FAIRTILE: Debbie, I wanted to make a point
2 here. This responsibility belongs to the EPA, not the NRC.
3 And when it comes to drinking water standards, we use the
4 EPA regulations that set these standards.

5 MS. KATZ: But I'm sort of confused, because when
6 I talked to the EPA about it they said the NRC deals with
7 the issues of radiation. And in fact, they don't have
8 information on radiation in the Deerfield River, they only
9 have information on chemicals that could be in the river.
10 And, in fact, they don't have the direct -- Bob was trying
11 to set up access. Do they have radiation.

12 MR. HALLISEY: They have radiation dyes EPA does
13 for drinking water radiation.

14 MS. KATZ: For drinking water.

15 MR. HALLISEY: For radiation.

16 MS. KATZ: But not in the terms of the Deerfield
17 being a recreational facility in which it's not directly
18 drinking water except kids gulp a lot of water as they go
19 swimming, you see.

20 MR. FAIRTILE: The EPA only has drinking water
21 limits. And I would imagine when it came to any limits
22 dealing with a recreational use of a state facility, it
23 would be the state would have control of that, rather than
24 any federal agency.

25 Is that right, Bob?

1 MR. HALLISEY: Yes, It mostly likely would be.
2 Remember also, this is drinking water here.

3 MS. KATZ: Yes.

4 MR. HALLISEY: And I don't know if this is -- I
5 think this is probably consistent with the EPA drinking
6 water.

7 MR. FAIRTILE: Probably.

8 But anyway, the point I'm making is that --
9 drinking water limits are a federal responsibility, but the
10 federal agency involved is EPA, not NRC. And as far as use
11 of recreational waters, I would view that, outside of
12 national parks, as a state responsibility.

13 MR. BELL: I'm confused. I'm not sure we are all
14 on the same wave length. I don't quite understand what we
15 are saying here.

16 MR. FAIRTILE: Debbie had handed out this document
17 which contained some Canadian proposed drinking water limits
18 for tritium. And I just wanted to point out to her that
19 it's not NRC's role to establish drinking water limits. And
20 then the point -- another point was brought up about the
21 radiation limits in recreational waters. And I said that
22 would be a state possibility, not a federal responsibility,
23 except for national parks.

24 MR. WILLIS: Comment.

25 MS. HARRIS: Is your reason for introducing this

1 report to show that there may be heightened concerned for
2 exposure to tritium, and not so much that we need to lower
3 our drinking water standards?

4 MS. KATZ: Yes. That there are concerns of that.
5 In fact, there is reevaluation going on in different
6 countries about allowable tritium levels.

7 MS. HARRIS: So how would you like the NRC to
8 proceed with this?

9 MR. BELL: The primacy is over releases to the
10 river, and that's controlled by 10 CFR part 20, and I
11 guess --

12 MS. KATZ: That's what was my confusion.

13 MR. BELL: And I guess that's what I was confused
14 over. And I just want to make that -- those two points.
15 The EPA controls and we use the EPA limits on drinking
16 water, but NRC reviews releases to the river and that's --
17 of course radiation -- radiation, nothing else, okay?

18 MR. WILLIS: We limit -- we have limits on
19 effluent concentrations, and I presume that there is some
20 major change in other agency's limits we will certainly look
21 at them. But yes, we do limit effluent concentrations.

22 MS. KATZ: One of the concerns we have had, and
23 has come up in terms of the health effects we are dealing
24 with about the contamination that is in the Deerfield River,
25 which we are very concerned with. And we are concerned with

1 the contamination in Sherman Pond and Sherman Spring, and
2 also in an EPA document in the '70s, which I have, but it's
3 under a lot of papers at this point.

4 There was a question of contamination, I think, in
5 Sherman Reservoir as well, and in fact the EPA at that
6 point, had felt that further analysis might be helpful in
7 terms of understanding it. And I would just like to open a
8 discussion about this, you know. This may touch somewhat in
9 Yankee's response to you but I haven't gotten a chance to
10 analyze, but maybe we could open up and talk about it
11 because we are really concerned about any contamination in
12 the river.

13 MR. FAIRTILE: Okay. Larry Bell and Jack Parrott
14 have this under review currently, and you know they did send
15 a question to Yankee on this. And in our meeting yesterday
16 at the Greenfield Community College, Yankee clarified their
17 response with some questions, further questions that the
18 staff had. And speaking for Larry and Jack, I would say
19 until we complete our review and get our safety evaluation
20 and environmental report completed, I think we'd defer
21 that. Am I speaking out of turn, generally?

22 MR. PARROTT: No. What our comment was about was
23 that they have detected radionuclides there. Based on the
24 concentrations that they reported in the environmental
25 report, it looks like right now that it would fall below our

1 criteria -- criteria or any proposed criteria. But the gist
2 of my question there was that they weren't proposing to do
3 any more analyses other than what they already do as part of
4 the environmental monitoring program.

5 And so, obviously when it comes down to when we do
6 this radiation survey, we are going to have to get together
7 with them and see, you know, just exactly how much we're
8 going to have them do there.

9 MS. KATZ: Well, one of the concerns that we've
10 had in this is following NEPA regulations. I guess you guys
11 are in charge of that. Are you the guys who are going to be
12 handling the environmental assessment.

13 MR. BELL: Yes.

14 MR. PARROTT: Yes.

15 MS. KATZ: So maybe you can give us some sense of
16 what that would entail, what environmental assessment
17 entails. Have you begun that assessment, how, you know --
18 we were concerned because they actually took out a large
19 part of the reactor without doing an assessment, and before
20 the whole site was looked at as a whole, and maybe you could
21 talk about the assessment and some of the issues involved in
22 that.

23 MR. BELL: Maybe I can address a piece of that
24 component. The major component removal piece of that is not
25 part of this environmental assessment. We are doing an

1 environmental assessment based on what's posed in the
2 decommissioning plan. And our environmental assessment, we
3 looked at Yankee specifically and how it would -- to see if
4 it is, in fact, it is bounded about the generic
5 environmental assessment that was done for all the reactors,
6 that's how we would attack it. We will do that. We are
7 looking at what the environmental impact of what would be
8 included and the decommissioning will have -- the impact
9 that will be seen as a result of doing the decommissioning.

10 MS. KATZ: That would entail this issue of how the
11 site would be left?

12 MR. BELL: Right. In other words, a piece of both
13 the safety evaluation and the environmental assessment is
14 final survey. And the way the regulations are written,
15 while the facility is wanting to SAFSTOR they don't have to
16 address that issue in great detail because they're not ready
17 to do the final survey. When they come in with updates to
18 the decommissioning plan and start the dismantlement process
19 and are ready to roll into releasing and determining the
20 part 50 license, then we will gear up, take a look at that
21 program for doing sampling in the environment to assure
22 ourselves that they have an adequate sampling program in
23 place. We will review the results of that environmental
24 surveys, the characterizations and then we will, in addition
25 to that, send out our own contractor to provide us with some

1 kind of assurance -- confirmatory assurance that the
2 licensee, in fact, did do a credible job in evaluating or
3 characterizing in most of the areas affected --

4 MS. KATZ: So will you be doing your own
5 independent testing or have the contractors do their own
6 independent testing?

7 MR. BELL: Yes.

8 MR. KATZ: This isn't necessarily on the river,
9 the discussion on the record, it may not -- it may be out of
10 place at this time, but there was an issue that came up at
11 the afternoon meeting and it was put forward that the
12 decommission plan would take the place of the final safety
13 analysis report.

14 MR. BELL: That's not clear yet from the
15 administrative perspective on how that's going to be
16 handled.

17 The way I view it now is that the licensee is free
18 to reference his FSAR any way he wants to, and that both
19 documents will continue, until I'm told differently, to be
20 part of the license and basis documents.

21 MR. KATZ: So this was an idea that was put
22 forward by the utility?

23 MR. BELL: It was an idea that even we may have
24 promulgated in some past decommissionings but that may not
25 be entirely accurate, and may not be entirely accurate of

1 the way we are going about it.

2 MR. KATZ: I wanted to get some understanding,
3 some history on it because it seemed very --

4 MR. BELL: The gist of it is right now both will
5 be considered as part of the licensing basis.

6 MR. FAIRTILE: The FSAR describes the plant, how
7 it was. The decommissioning plan describes the plant how it
8 will be and the path followed to get there. So while
9 they're in this stage of transition, some information is
10 still valid in the FSAR, and ^{day} ~~they~~, by day -- the
11 decommissioning plan gets to be the more valid document.

12 The concern that was really brought up, I think,
13 was references that they may have in their technical
14 specifications, which is part of their license. They may
15 have had some references to the FSAR, which may or may not
16 be valid, I'm not clear on that point myself.

17 MR. KATZ: Well, will the FSAR describe taking the
18 plant a part?

19 MR. BELL: No.

20 MR. FAIRTILE: No.

21 MR. BELL: We are allowing the FSAR for the
22 systems descriptions, additional information that may be
23 there that we don't have plant diagrams and so forth.

24 MR. KATZ: I was actually in the documents room
25 yesterday and the last entry into the FSAR that I was able

1 to find yesterday was from 1989, so I just wondered if it
2 was just a question of the volume being misplaced or that no
3 entries had been made into it, or it's not up-to-date.

4 MR. FAIRTILE: It's not up-to-date, I would
5 suspect. I think the last update was in 1991, I believe, is
6 the last update. And in 1992 we issued an exemption which
7 permitted them not to do any further updates of the FSAR, so
8 I would say the last update would be dated '91.

9 MR. KATZ: '91.

10 MR. FAIRTILE: And they just update every year, it
11 was an annual thing. So I would say that you were, like,
12 two years behind, but there should be a '90 and '91.

13 MR. KATZ: I just wondered if there was anything
14 in the tech specs that described taking it a part.

15 MR. FAIRTILE: No. Tech specs don't address --
16 the original tech specs did not address anything to do with
17 decommissioning, but they now have a set of tech specs in
18 force called the defuel tech specs, and those tech specs
19 address the current state of the plant.

20 MS. KATZ: Maybe we could just go back to our
21 concerns about a contamination study of the river to try to
22 get an understanding of the effects of what the 31 year
23 history of the radioactive emissions into the Deerfield may
24 have had upon the river, which is a great concern to our
25 community.

1 We've seen this river as a pristine rural
2 environment and three years ago we found that effluent was
3 released routinely and regularly, we were all very shocked.
4 And we could say that was our ignorance and our stupidity
5 that we didn't know how a reactor worked, but it suddenly
6 came as a surprise to us to realize that it had gone on.
7 And so we are very concerned about what may be in that river
8 in the sediment. And one of the things we are working on in
9 terms of the health department, is seeing about a
10 contamination study of the river in terms of the deep
11 sediment to see if we can get an understanding of what's in
12 the river and what has been in the river. And part of that
13 entails issues of the struggles that Yankee was having with
14 their fuel rods in the '60s and '70s which released more
15 tritium into the river than happened since then.

16 And also, there was a -- there are three tritium
17 leaks on the property and we were wondering how this could
18 affect the ground water and eventually the river. And also
19 the problems in the ion exchange pit, and I was wondering if
20 we could talk about those in terms of -- I know there was a
21 crack and the problem, and I wanted to get a sense of what
22 the calculations may be about what tritium found its way
23 seeping through into the ground water under the ion exchange
24 pit and what other radionuclides.

25 MR. PARROTT: As far as contamination that would

1 escape from the ion exchange pit and may be in the ground
2 water, we will make sure that that's characterized by the
3 licensee. As you know, we asked a question on that.

4 MS. KATZ: Yes.

5 MR. PARROTT: And it's still not resolved with us
6 what's going to happen. They've made a commitment to
7 characterize underneath the spent fuel pit and ion exchange
8 pit and --

9 MR. WILLIS: Comment on the releases.

10 As you were all aware, there were relatively large
11 tritium releases in the early days, and the reason for that
12 is also quite well-known. When this plant started up it,
13 like a few other plants such as San Onofre, had stainless
14 steel for cladding on the fuel rods. Stainless steel turns
15 out to be very -- almost transparent to hydrogen at these
16 temperatures and pressures. So, the tritium leaked out, and
17 as a consequence, the cladding has been changed, they
18 used --

19 MS. KATZ: Zirconium.

20 MR. WILLIS: -- zirconium cladding for a very long
21 time. But the fact that there was a lot of tritium being
22 released in those days does not necessarily that there were
23 a lot of other radionuclides being released.

24 MS. KATZ: No. Our focus, in fact, is in terms of
25 the tritium. In terms of the ion exchange pit we were

1 concerned with what other radionuclides may have also been
2 released during the release that they had there. That was
3 more focused on the ion exchange pit. And see, what we are
4 concerned with is not what's happening now. There is
5 statistics given now on what's Sherman Pond like in 1970,
6 you see? Because that actually faces the issues of the
7 health study. It's like we think -- we don't have questions
8 that Yankee didn't do a good job. Yankee did a good job and
9 they're not to blame in this. They had faulty fuel rods,
10 that wasn't their fault. But these faulty fuel rods may
11 have created problems that we are struggling with today,
12 that's part of our concern.

13 And so what we are trying to find out is not
14 what's happening now, but what happened in '67, '69, '72,
15 '75 '78, because we are trying to get an archeological
16 perspective on how this tritium may have found its way
17 through this valley. And I'm sure it wasn't thought of at
18 that time because -- in terms of how this could affect all
19 the people living by -- everyone lives along the river.
20 Everyone uses the river all the time. So that what we are
21 trying to get, and the NRC may be able to help with this,
22 this archeological perspective of what's happened. And this
23 is part of the struggle that the EPA has engaged in with us,
24 trying to figure this out. Literally to look at a problem
25 that certainly took place over a long period of time in

1 which no one was looking at them. And now we are trying to
2 look back at it and look at it that way. And so it seems
3 like we're literally turning to you for help in this in
4 terms of a kind of technical approach as to what are some
5 perspectives, and do you have any help you can give us in
6 terms of this.

7 MR. FAIRTILE: Yes. The staff is reviewing this
8 now and it will show up in our environmental assessment and
9 safety evaluation.

10 MR. BELL: That component during operations of
11 this facility may not be a part of our safety evaluation.

12 MR. FAIRTILE: She's interested in the residual.

13 MR. BELL: I understand, but I just want to make
14 it clear what we are doing here. Records are available,
15 annual or semi-annual reports to the Commission have been
16 coming in since this plant started operating and you can get
17 the curie releases to the river.

18 MS. KATZ: We have them.

19 MR. BELL: In relationship to spills and events
20 that went on during operation, we are interested from the
21 site characterizations what still may be in the soil and how
22 events and spills had impact on that site, okay? And we
23 will capture that in our SER and environmental assessment.

24 MS. KATZ: Well is there anyone in the NRC that
25 can help us? If your job is different than that and I can

1 understand that, is there expertise that we could draw on
2 from the NRC who might be able to offer some assistance in
3 looking at this problem?

4 MR. BELL: To be perfectly honestly right now I'm
5 trying to understand which problem you want us to look at.
6 I'm saying that from the entire period the facility operated
7 that that was spills or unusual occurrences that
8 contributed to contamination of the site, we will be trying
9 to capture that in our environmental assessment and our
10 safety evaluation, okay? What got into the river from
11 normal operations will not be captured in our safety
12 evaluation and environmental assessment.

13 MS. KATZ: I guess what I'm trying to get at, is
14 there a way -- and you may not have an answer to it, of
15 extrapolating back let's say 10 years, 15 years, let's say
16 if there are 700 -- I don't know hypocuries whatever
17 millicuries in terms of the water left on site. Is there a
18 way of extrapolating back to 10 years to thinking how much
19 was there at that point that this amount was decay ab, to
20 what it is now. But you may not be able to answer this but
21 this is something we are struggling with.

22 MR. FAIRTILE: Debbie, there should be records in
23 the various reports filed by the licensee who takes water
24 samples, and there should be water sample records available
25 in the public document room, that information. You should

1 be able, for any year, to look at the graph sample that they
2 took of the water and see what content it had.

3 MS. KATZ: Well, we've had some difficulty finding
4 the information we need. We may need to try harder. But in
5 terms of sediment sampling of the deep parts of the river,
6 we haven't gotten a lot of analysis.

7 MR. NICK: We are just agreeing.

8 MS. YOUNG: Agreeing to what, it's not going to
9 show on the transcript?

10 MR. NICK: We are agreeing to what she's saying.
11 It's going to be hard for her to find sediment sampling
12 where she wants to find it in their records.

13 MS. KATZ: Yes.

14 MR. NICK: They only did certain locations.

15 MR. BELL: Part of the environmental monitoring
16 program. They provide and that information is available,
17 the annual environmental reports to the agency, and you
18 should have that. Information outside of that is going to
19 be hard to come by and I think that's what --

20 MS. KATZ: That's the information we are looking
21 -- see, we can find the 31 year history of Yankee Rowe and
22 the effluent, what we are trying to find is information that
23 is not readily available that maybe nobody thought of doing
24 all of these years, but that in terms of understanding what
25 has happened in this community, we need to understand.

1 MR. BELL: Sure.

2 MS. KATZ: And what we are struggling with is
3 finding experts to help us understand this. And I think
4 that what we're working on, this has not happened before.
5 We are actually working on a problem that may not have been
6 conceived of ever existing. That we are now saying we have
7 to literally make tools in terms of epidemiology, in terms
8 of radiation investigation, that hasn't happened. And so
9 each time we work on a piece of this we have to invent a new
10 tool. And I don't think there is a tool to help in this
11 process of making a tool to look at it.

12 So we are just trying to get deep water samples
13 because, in fact, the EPA, itself, said since most of what
14 comes out of the reactor goes into the water, well we don't
15 have to do -- they don't have to do a lot of sampling or,
16 you know, sampling of things that would be affected by the
17 area. And yet since our thesis is that it's the process of
18 aerosolization and the meteorological effects of this air
19 being trapped in the valley for over a third of the time,
20 that in fact aerosolization and the air is very important to
21 us. And yet the sampling was limited understandably, by
22 what seems like the logical approach, was this is a
23 pressurized water reactor.

24 So then we are then struggling to try to gain
25 information from all sorts of sources to try to put a very

1 difficult and complex puzzle together, and that may actually
2 come clear to you now. Some of what we are struggling with.

3 MR. BELL: I think I understand what you're
4 struggling with now and I guess what I want to be clear on
5 is may be of the things is outside the scope of what we were
6 charged to do.

7 MS. KATZ: I think that's probably true. And
8 that's very sad that we can't get you to help us.

9 MR. BELL: And it may be that help is available in
10 some other avenue but not necessarily this avenue.

11 MS. KATZ: That's part of the thing that we are
12 trying to struggle with and figure out going through this
13 process, is what the NRC may be able to help us with in this
14 process and what they can't. But I think we may wind up
15 being a lesson learned on that in terms of the struggles to
16 set up effluent pathway studies around the reactor and
17 looking at the long-term history of how that reactor
18 operated. A goods reactor operated. At Seabrook they're
19 actually beginning base line study now, the Department of
20 Health of Massachusetts, to begin from the beginning looking
21 at issues to see the long-term effects.

22 Well, when Yankee began nobody thought of that in
23 that way. And we are only thinking of it now, and it is at
24 the point of its closing, we are starting to question how
25 you would actually monitor this process to get a sense of

1 the long-term exposure of low-level radiation.

2 But I think our time is just about up, and so we
3 want to thank you all for coming and participating in this
4 process and trying to keep yourselves open to it. And I
5 hope in some sense that through this you've gotten a clearer
6 sense of what our concerns are about.

7 MR. FAIRTILE: I think so. I think we've learned
8 a couple of things we didn't realize you were involved in
9 and what your concerns were, and that's really the reason we
10 wanted this meeting -- one of the reasons, was to learn
11 those concerns. And I think the meeting accomplished its
12 purpose.

13 MS. KATZ: So I want to thank you all for coming
14 and my hope is that if there is any avenues that we still
15 have to work on, that it's possible for us to engage again
16 in this. I think it's much better for it to be in direct
17 contact because I think it really forges the ability to talk
18 to each other, which we accomplished today. For all the
19 struggling over that talk I think it was very successful and
20 very helpful for everyone. So thank you.

21 MR. FAIRTILE: Thank you.

22 [Whereupon, at 12:40 p.m., the meeting was
23 concluded.]

24

25

REPORTER'S CERTIFICATE

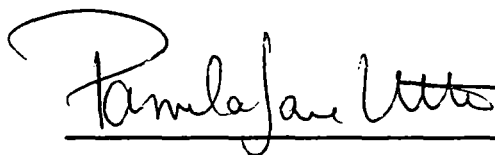
This is to certify that the attached proceedings before the
United States Nuclear Regulatory Commission

in the matter of:

NAME OF PROCEEDING: MEETING ON YANKEE ROWE DECOMMISSIONING
PLAN

PLACE OF PROCEEDING: SHELBURNE FALLS, MASSACHUSETTS

were held as herein appears, and that this is the original
transcript thereof for the file of the United States Nuclear
Regulatory Commission taken by me and thereafter reduced to
typewriting by me or under the direction of the court
reporting company, and that transcript is a true and
accurate record of the foregoing proceedings.



Official Reporter

Ann Riley & Associates, Ltd.

CITIZENS AWARENESS NETWORK

Box 83 Shelburne Falls, MA 01370 413-625-9881 FX:413-339-8768

HEALTH QUESTIONS

1. Why were none of the experts contacted in regards to their concerns and evaluations that a full scale health investigation was warranted?
- 2.. Why was there no reference in your analysis to the bibliography submitted to your agency?
3. The analysis created by Mr Willis is lacking substance, thoroughness and detail. Why did he not review cancer statistics from the MDPH to determine whether there were elevated statistics?
4. What methods were used by Mr. Willis to determine the dose calculations for the Deerfield River Valley [DRV]? The calculations did not appear to include the dose residents may have received through the process of aerosolization and ingestion of organically bound tritium. Since organically bound tritium can remain in the human body for 450 to 650 days, these calculations would be relevant . Why were these calculations not included? Why was the dose response to those living in the effluent pathway not calculated?
5. Why were there no calculations for the years from 1961-1966 for the tritium released into the river? Did NRC attempt to get information from YAEAC to ascertain the tritium effluent in the river during those years? Why was an estimate not made if the information was not available?
6. Why was the data for the Deerfield River towns not verified?
7. Mr. Willis refers to MacIntosh et al in terms of the dose estimates. No reference is made to their estimation that tritium was 1000x greater in the Deerfield River valley than outside the valley. Nor was it mentioned that Dr. Spengler in addition to Dr. Cobb states that further investigation is warranted.
8. Although Mr. willis describes the scientific community as being in agreement concerning the health effects of exposure to low-level radiation, there is in fact controversy as to the effects. Scientific evidence is mounting which questions the linear extrapolation technique used in calculating risk.

Would NRC comment on Dr. Steven Wing's study of Oakridge workers and on the BEIR V report on low-level radiation and Down syndrome? Would NRC comment on the Sheehan study, increases in Down syndrome observed in high background radiation communities, and other studies included in the bibliography?

9. The "radiation injury" the Dr. Cobb refers to is the long term exposure to low-level radiation. The effects of this "injury" would not be seen for twenty to thirty years [see bibliography] and would refer to increases in cancer, immune defiance diseases, etc. The effects of long term exposure to low-level radiation in the DRV would be seen in the effluent pathway of the reactor after twenty-five years. This increase in disease would not emerge in other reactor communities until that length of time had elapsed. What research has been done in effluent pathway around nuclear power stations?

10. Can asked for a re-evaluation of the dosimetry for tritium given the research that has accumulated. Why was a analysis not included by Mr. Willis of the tritium research in the bibliography? CAN is submitting a new document to NRC The Carcinogenic, Mutagenic, Teratogenic, and Transmutational Effects of Tritium. It includes an annotated bibliography. We request that this document be placed in the Public Document Room of NRC. In addition we request a further meeting to discuss the issues raised in this document..

What microdosimetry calculations that NRC use to evaluate the effects of radiation on the cell? on a fetus?

11. What was the amount of tritium present in Sherman Pond and Sherman Spring during the period of greatest contamination in the 1960's through the 1970's? What was the level of CO60 contamination in Sherman Pond? In an EPA study "Radiological Surveillance Studies at Pressurized NuclearPower Reactor" done in 1971, radionuclides attributable to YAEK were dispersed throughout the bottom deposits at the south end of Sherman Reservoir. Are these radionuclides still present in Sherman Reservoir? In what quantities?

12. The EPA analysis states that few measurements are performed on land since YAEK releases its effluent into the water. What analysis was done of airborne contamination in the effluent pathway from the effects of aerosolization in the DRV?

CITIZENS AWARENESS NETWORK ■■■■■■■■■■

BOX 83 • SHELBURNE FALLS, MA 01370 • Telephone 413-825-9881 • Fax 413-339-8768

Questions Concerning ALARA And Safety Issues:

NRC maintains that SAFSTOR and DECON are both acceptable decommissioning options [reasonable]. ALARA would logically require SAFSTOR as the decommissioning option implemented as it yields significantly lower exposures.

- 1. Unforeseen events during the Component Removal Project lead to greater total exposures to workers than anticipated and an unfortunate number of worker contaminations. Were these contaminations proportionately higher for the security guards working in the containment sphere?**
- 2. Can any ALARA program be effective in controlling procedures in which the results are unforeseeable due to their experimental nature? How does this impact on the NRC assessment that the CRP did not involve "unreviewed safety issues"?**
- 3. Was the use of security guards in the containment sphere an "unreviewed safety issue"? If guards have been used in the containment sphere before, could NRC cite where and when? The United Government Security Officers of America have requested NRC investigate safety concerns of the local union. Some of these were related to radiation and lack of radiation training. How will NRC oversee the education of the Burns Security guards?**
- 4. Given the experimental nature of the CRP, would it not require NRC to rethink the use of a full time NRC resident inspector and the use of 50.59 to justify the early CRP?**

Contact: BUND (Friends of the Earth Germany), Dunantstrasse 16, 79110 Freiburg, FRG / information for journalists: same address / c/o Dr. Georg Löser, scientific coordinator of FoE Germany, tel.: +49-761-885940

HEALTH

TRITIUM REDUCTIONS IN DRINKING WATER ONTARIO

(414.4106) WISE-Amsterdam

An independent provincial advisory committee in Canada has recommended that tritium levels allowed in drinking water be drastically cut from the current 40,000 becquerels of tritium per litre (Bq/l) of water to 100 Bq/l, a reduction of 400 times. The Advisory Committee on Environmental Standards (ACES) which advises Bud Wildman, Canadian Minister of Environment and Energy, released its recommendations on Friday, May 27. The ACES report breaks new ground in the control of radioactive pollution. The Committee has also recommended that the level be cut to 20 Bq/l within five years. This proposed standard would require a shift to alternative water supplies if exceeded.

Current levels of tritium normally found in the Great Lakes are under 10 Bq/l. Emissions and accidents at nuclear facilities result in tritium levels in local drinking water supplies exceeding 20 Bq/l regularly, and exceeding the 100 Bq/l level at least annually. The August 1992 spill at Pickering resulted in the Toronto, Scarborough, Ajax and Whitby water supply plants all exceeding the 100 Bq/l level. The peak level measured due to that accident was over 1,000 Bq/l at Ajax.

The ACES report makes additional recommendations about the need to include tritium and other persistent and toxic radioactive elements in the province's Priority Pollutant List; about the need for timely public reporting of tritium levels in drinking water; about the need for Ontario Hydro and Atomic Energy of Canada Limited (AECL) to reduce tritium emissions from their nuclear facilities; and about the need for additional

health studies.

The ACES report notes that the proposed standard recommended by the Ministry of Environment and Energy Standards Branch of 7,000 Bq/l (based on the World Health Organization standard of 7,800 Bq/l) could result in 340 fatal cancers per million people exposed for a lifetime. The 100 Bq/l standard could result in 5 fatal cancers per million.

Tritium is a radioactive form of hydrogen which builds up as an unwanted by-product in CANDU reactors. Like all radioactive substances, tritium is carcinogenic — a cancer causing agent. Tritium is routinely released in huge quantities to the air and water at these facilities. Accidents can result in additional massive increases of tritium over a short period of time in downstream community drinking water supplies.

In Ontario, communities in the vicinity of the Pickering and Darlington nuclear stations in Durham Region east of Toronto, as well as the Bruce Nuclear Power Development on Lake Huron, and the Chalk River Nuclear Laboratories on the Ottawa River all face elevated levels of tritium in their drinking water. Port Elgin, downstream from the Bruce site, consistently has the highest tritium levels of any community in Ontario, followed by Ajax, downstream of Pickering; and by Pembroke, downstream of Chalk River. Pickering, Darlington and Bruce are operated by Ontario Hydro, while Chalk River is operated by AECL.

For more information, contact Irene Kock, Durham Nuclear Awareness (DNA) P.O. Box 2143 Oshawa, Ontario Canada L1H 7V4 phone /fax: +1-905-7251565. E-mail: web:mucaware

For a copy of the ACES Report: Advisory Committee on Environmental Standards (ACES) 40 St. Clair Avenue West, Suite # 401 Toronto, Ontario Canada M4V 1M2 phone +1-416-314-9265; fax: +1 416-314-9270

90,000 PEOPLE RELATED TO CHERNOBYL DIED BETWEEN 1988-1993

(414.4107)

Ukrainian Health Ministry data shows over 90,000 people who were affected by the Chernobyl disaster died between 1988 and 1993, and almost 4,000 workers sent to the area immediately after the accident in April 1986 to clean up, died in the same period, according to Valeriy Kyrkorov, the chairman of the council of Chernobyl town, Kiev city and oblast invalids, who cited information from the Ukrainian Health Ministry.

Interdepartmental expert councils have concluded that since 1993 805 (60 percent) of clean-up workers' deaths have been linked to the effects of the accident. Kyrkorov told journalists at a joint sitting on 19th May of the council and representatives of Ukraine's health and Chernobyl ministries and Kiev radiation and health bodies.

Source: UNIAN news agency, Kiev 20 May, 1994

Contact: Zeleny Svit, Kontaktova 4, Kiev 70, Ukraine. Tel: +7 044 416 5218/4170283; Fax: +7 044 4174383. *e-mail: eazzelcaysvit@gluk.apc.org. Or: MAMA 86, Michailovskaya Str. 22-A, 502 001 Kiev, Ukraine. Tel & Fax: +7 044 228 3101. *e-mail: mama86@gluk.apc.org.

PROLIFERATION

NORTH KOREA UPDATE

(414.4108) WISE-Amsterdam

During the last weeks there have been some new developments on the Korean Peninsula. So following an update on the international quarrel over the inspection of the North Korean Yongbyon reactor (see also WISE NC 413.4092 & 411.4072).

Yun Ho Jin, the North Korean representative to the IAEA, has said his country would "never" allow inspections of two storage sites for nuclear waste at the Yongbyon nuclear complex. Inspection of these sites had been suggested as an alternative way of verifying that no material has been diverted for the manufacture of nuclear arms. Previously, (WISE NC 413) North Korea had already refused the IAEA supervision of the repla-