

ORIGINAL

**OFFICIAL TRANSCRIPT OF PROCEEDINGS**

**Agency:** Nuclear Regulatory Commission

**Title:** Informal Hearing -- Yankee Rowe  
Decommissioning Plan

**Docket No.**

**LOCATION:** Greenfield, Massachusetts

**DATE:** Tuesday, August 16, 1994

**PAGES:** 1 - 106

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

3  
4 INFORMAL HEARING  
5 YANKEE ROWE DECOMMISSIONING PLAN  
6

7 Franklin County Court House  
8 Superior Court Room  
9 425 Main Street  
10 Greenfield, Massachusetts  
11

12 Tuesday, August 16, 1994  
13

14 The above-entitled hearing commenced, pursuant to  
15 notice, at 7:00 p.m  
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1 PRESENT:

2  
3 On behalf of the Franklin County Commissioner's Office:

4 MARY FORBES, Franklin County Commissioner

5 JOHN J. STOBIERSKI, ESQ., Franklin County  
6 Commissioner

7 JAY DIPUCCHIO, Franklin County Administrator

8  
9 On behalf of the U.S. Nuclear Regulatory Commission:

10 BRIAN GRIMES, Director, Division of Operating  
11 Reactor Support

12 JOHN H. AUSTIN, Ph.D., Chief, Low-level Waste and  
13 Decommissioning Projects Branch

14 MITZI A. YOUNG, ESQ., Office of the General  
15 Counsel

16 CHARLES E. MULLINS, ESQ., Senior Attorney, Office  
17 of the General Counsel

18 MORTON FAIRTILE, Senior Project Manager

19 S. SINGH BAJWA, Chief, Decommissioning Section

20 LAWRENCE BELL, Section Leader Facilities  
21 Decommissioning Section, NMSS

22 JACK PARROTT, Project Manager, NMSS

23 SUSAN FRANT SHANKMAN, Deputy Director, DRSS,  
24 Region I

25 JOSEPH NICK, Radiation Specialist, Region I

1 PRESENT: [continued]

2

3 On behalf of the U.S. Nuclear Regulatory Commission:

4 PAUL HARRIS, Vermont Yankee Resident Inspector,  
5 Region I

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7 On behalf of Yankee Atomic Electric Company:

8 RUSSELL A. MELLOR, Yankee Project Manager

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

[7:00 p.m.]

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2  
3 MS. FORBES: Good evening. The meeting will come  
4 to order, we are ready to convene.

5 I'm Mary Forbes, and I am the Franklin County  
6 Commissioner and welcome to all. This evening, John  
7 Stobierski, who is my fellow commissioner will moderate.  
8 I'm going to ask for some simple housekeeping rules, and one  
9 is that if you have stated your position tonight on a given  
10 issue and you have new information, please feel free to  
11 speak again. If it's restating what you have already said,  
12 we have heard you. In the interest of moving through the  
13 large agenda that we have I'm also going ask that you  
14 identify yourself, and if any organization that you  
15 represent, before you speak. I think that's more  
16 interesting to all of us to know where you're coming from.  
17 And John will have other duties of the evening.

18 And so at this point I will turn the meeting over  
19 to John. Welcome.

20 MR. STOBIERSKI: Good evening. I will be  
21 moderating tonight's informal hearing. And one of the  
22 things I'm going to request from everybody who is here that  
23 we stick very closely to all the time limits outlined in the  
24 agenda, including the NRC, Yankee and the people who are  
25 testifying. I pulled in the sign-in for comment sheet that

1 was -- there is a comment period between or sign-in period  
2 between 6:30 and 7:30 and we had 11 people signed in. If  
3 anyone else would like to talk, I urge you to sign up.

4           What I'm trying to do with this sign-in sheet is  
5 give everybody an equal opportunity to voice their opinion  
6 to give informal or to give testimony today. We have, from  
7 the public comment period, 110 minutes allocated between  
8 7:40 and 9:30. As we have 11 people, I've arbitrarily  
9 allocated 8 minutes to each person who will be giving public  
10 comment today. That means 88 of the 110 minutes will be  
11 used, which gives 22 minutes in reserve for people who come  
12 in late or for issues that have been raised during the  
13 hearing which somebody wants to comment on. I estimate that  
14 that's three people, and we'd run a few minutes over.

15           So, there is a comment sheet outside, it says late  
16 sign-in so, what I'll do is I'll take the first three  
17 people. If there aren't three people we will just move this  
18 along a little early.

19           MS. BLAZER: Is there an agenda for us?

20           MR. STOBIERSKI: I have one here and Jay Dipucchio  
21 -- I don't see him. Let me orally --

22           MS. FORBES: Copies?

23           MR. STOBIERSKI: I will orally review it now for  
24 people who we don't have copies available here. Between  
25 6:30 and 7:00 was the public sign-up time. It's expired but

1 we are trying to provide some later period of time. At 7:00  
2 is the beginning of the informal hearing, the introductory  
3 remarks run to 7:10, we're three minutes away from that.  
4 Between 7:10 and 7:20, the NRC is to briefly describe the  
5 decommissioning plan review process, that's 10 minutes.  
6 Between 7:20 and 7:40 is 20 minutes for the Atomic Yankee to  
7 present future plans covered in the decommissioning plan,  
8 and review the items completed in the early component  
9 removal process. And then for the next, close to two hours,  
10 7:40 to 9:30 is the public testimony. I'm sorry, at 9:30 is  
11 the licensee response to any of the public testimony that's  
12 been given, there is 15 minutes allocated for that. And  
13 between 9:45 and 10:00 p.m. is the NRC's closing comments.  
14 And basically there will be a statement and I'll say it now  
15 that for 10 days after the close of this informal hearing,  
16 the NRC will be accepting written comments for anyone who  
17 wants to elaborate on a point they weren't able to, or  
18 provide additional information. Just so you know this is  
19 not the only opportunity, there is a written comment  
20 period. And that will be the agenda.

21 So, in order to get as much time as we can for  
22 public testimony, I'm going to move this on a little early  
23 and ask the NRC to briefly describe the decommissioning plan  
24 review process. And just one last item of housekeeping.  
25 That will be the place where public comments will be given

1 from. It will be recorded. The stenographer is there so  
2 she can capture all your comments and be sure to identify  
3 yourself when you do so. And I'm going to ask everybody,  
4 including folks from the NRC and Yankee, to also use that  
5 place to give their presentation from.

6 MR. GRIMES: I'm Brian Grimes, I'm Director of the  
7 Division of Operating Reactor Support at NRC headquarters  
8 and I have charge of the reactor aspects of the  
9 decommissioning process. I just want to say a couple  
10 opening remarks and then I'm going to turn it over to John  
11 Austin of the NRC to describe the decommissioning process.

12 Some of you were at our meeting this afternoon  
13 with Yankee Rowe. We met for about two hours to discuss  
14 with Yankee their responses to some written questions we had  
15 given them, and written responses we received, and went over  
16 a number of items where we thought we needed some  
17 clarification.

18 The purpose tonight is to receive testimony on the  
19 decommissioning plan and the environmental report on the  
20 decommissioning plan. And so the chairman has described how  
21 we will do that tonight. The decommissioning plan itself  
22 and the environmental report have been available in the  
23 local public document room, which is at the Greenfield  
24 Community College library for the last months. And as he  
25 mentioned also, we're inviting written as well as the oral

1 testimony tonight.

2 So with that, I'll introduce John Austin, who will  
3 go through the process we use and what happens from here on  
4 in our decommissioning plan review.

5 MR. AUSTIN: Thank you, Brian.

6 I'm John Austin, I'm Chief of the Low-level Waste  
7 and Decommissioning Projects Branch in the Office of Nuclear  
8 Materials Safety and Safeguards, which is an office parallel  
9 to the office that Brian represents.

10 Our branch is responsible for preparing the safety  
11 evaluation report and the environmental assessment on the  
12 Yankee Rowe decommissioning plan. We are the primary  
13 authors of the questions that went to Yankee Rowe that we  
14 just received the responses to, and we are the subject of  
15 the meeting earlier today. We use this process of  
16 requesting additional information to provide us a better  
17 documented basis for preparing our safety evaluation and our  
18 environmental assessment. And where we go from here is to  
19 more closely examine the responses, reflect on the  
20 additional information we heard today and then we have to  
21 make a decision as to whether we go back in writing to  
22 request additional information or -- and/or to have a  
23 meeting with Yankee Rowe to provide further elaboration on  
24 their decommissioning plan and environmental report.

25 In all of this, our documents are prepared based

1 on the written record, not on verbal communications. If we  
2 have to rely on a bit of information to resolve an issue in  
3 the safety evaluation report, we would get that information  
4 from the licensee in writing so that there is a complete  
5 record for the bases for our preparation of the documents.

6 We will then prepare an order that would authorize  
7 decommissioning in accordance with the decommissioning plan  
8 as revised based on our correspondence with Yankee Rowe.  
9 The full contents of that order we have not settled on. For  
10 those of you that were there at the meeting earlier today,  
11 there are questions about what documents are still licensing  
12 basis documents or regulatory basis documents once we  
13 approve the decommissioning plan. There is an issue about  
14 the ultimate decommissioning criteria for the site. Yankee  
15 Rowe has proposed a standard of 30 millirem per year  
16 exposure from all reasonable pathways, 30 millirem is about  
17 one tenth the natural background radiation. That exposure  
18 rate would be calculated based on human intrusion into -- on  
19 the site, including a postulated family farm being  
20 constructed on the site growing crops, 25 percent of the  
21 crops consumed on the farm, postulated drinking well, in  
22 which we would assume that a person drinks 2 liters a day of  
23 the ground water. We sum up all of these exposures and  
24 their proposal is that that sum be 30 millirem or less.

25 We ask at this meeting earlier today why that

1 number should not be lower, and why is that number as low as  
2 reasonably achievable. We expect to have additional  
3 dialogue with Yankee Rowe and eventually in writing, resolve  
4 the matter about the ultimate decommissioning criteria.

5 MR. STOBIEFSKI: Mr. Grimes, could I ask you to  
6 sum up.

7 MR. AUSTIN: I am Mr. Austin.

8 MR. STOBIEFSKI: Excuse me.

9 MR. AUSTIN: I was just about to say, that's the  
10 process.

11 MR. STOBIEFSKI: Thank you. Now it's Yankee's  
12 opportunity. Mr. Russ Mellor.

13 MR. MELLOR: If it pleases everyone I'll just  
14 stand, it's a lot easier for me if I stand. I'm Russ  
15 Mellor, project manager for Yankee Atomic Electric Company  
16 and I'm going to keep my remarks brief. And I know that's  
17 going to please a lot of you who have gone to public  
18 meetings with me in the past where I haven't been so brief.

19 The first thing I'm going to go over is our  
20 successful component removal programs in which we have been  
21 able to demonstrate that decommissioning can occur using the  
22 existing processes and procedures and licenses that were  
23 done -- that were in place during operations. And we had  
24 two phases and still have one phase ongoing of that  
25 particular component removal process. Phase one, which we

1 consider to be the removal of the four steam generators, the  
2 pressurizer, which is in the center, the foreground; and the  
3 reactor internals depicted here in gray. All of the  
4 material which is down below in the visual here, all the  
5 colored material are all active systems. All of those above  
6 the colored material are all inactive systems and no longer  
7 needed for decommissioning or to support the spent fuel  
8 storage.

9           The second phase of our component removal program  
10 is based upon removing certain systems that are no longer  
11 necessary, such as our charging and feed and bleed system,  
12 our emergency cooling system, which is up in the left-hand  
13 corner there, and a couple of other systems that are no  
14 longer necessary for operations. So certainly the systems  
15 are inside of our containment, those are systems are  
16 predominantly piping systems. They're not contaminated on  
17 the inside, they have minor contamination on the outside of  
18 the piping.

19           Overall through this process we've been able to  
20 demonstrate that effective decommissioning can occur using  
21 the processes that are in our decommission plan. We  
22 establish the processes, we use the processes that are in  
23 the decommissioning plan. And we were asked tonight to talk  
24 about two items, the second is what's the future of  
25 decommissioning.

1           Let's take a look at where we were back in the  
2 1992 time frame, just after shutdown, so this time back  
3 then. When we believed that we would be able to have a  
4 low-level waste sight available to Yankee and to  
5 decommission Yankee beginning in the year 2000, and then  
6 store in a dry fuel storage facility our fuel all the way up  
7 to the year 2018, that was on the basis of our then  
8 understanding with the Department of Energy they would begin  
9 to take our fuel 1998 and that it would take them  
10 approximately 20 years in that time frame to bring the  
11 remainder of the fuel off-site.

12           Since that time we've had some discussions with  
13 the Department of Energy and some correspondence with the  
14 Department of Energy, and our last correspondence in the  
15 latter part of June leads us to believe that the Department  
16 of Energy is not ready to take our fuel in 1998, and indeed  
17 is delaying that on out through perhaps the year 2007, with  
18 a subsequent taking of fuel off-site in a much longer  
19 schedule of time, which brings it out to approximately the  
20 year 2033 or 40 years after the shutdown of Rowe before the  
21 Department of Energy fulfills their obligation to the people  
22 of this county and the people of this state to remove the  
23 fuel from the Yankee plant.

24           Now that's a potential scenario, it doesn't have  
25 to be the only scenario and that's not our perspective on

1 this. Our contract with the Department of Energy requires  
2 them or allows them, if you want to put it another way, to  
3 take our fuel early or on a priority acceptance schedule.

4 So two things really should happen here in order  
5 to have a policy that works for the citizens of Franklin  
6 County, the citizens of the state and the citizens of the  
7 U.S., and that is first they should take the fuel when they  
8 said they were going to take it, that's January 1998, and  
9 they should take that fuel on a priority acceptance basis,  
10 that is in a four year time frame, which we feel is a very  
11 valid shipping schedule for fuel. At that point, we should  
12 be able to decommission the facility in much the same  
13 schedule or manner as we had outlined in 1992; very, very  
14 similar schedule. With that process we would be able to  
15 finish the decommissioning of the Yankee plant in July of  
16 2004 or 29 years sooner than we currently estimate this  
17 2033. This is a responsible approach, it's an approach that  
18 not only is recognized by Yankee as a responsible public  
19 policy, but is recognized by the Franklin County  
20 Commissioners when they wrote to President Clinton to ask  
21 him to intervene with DOE for the same basic process. And  
22 it was in the minds of our congressional district --  
23 congressional -- excuse me Congress people, the House of  
24 Representatives, the State of Massachusetts who banded  
25 together and also wrote a letter to Secretary O'Leary asking

1 her for exactly the same kind of process.

2 This is our priority, in the near future our  
3 short-term priority is approval of the decommission plan in  
4 early fall. This will allow to us move forward and to  
5 conduct the decommissioning activities as we've outlined in,  
6 we hope, the bottom scenario. Decommissioning plan approval  
7 in the fall, scenario of priority acceptance will remove the  
8 Yankee site -- to a green field by the year 2004. I don't  
9 have any more.

10 MR. STOBIEFSKI: Thank you. If we have extra time  
11 I will save that time for public comment, public testimony  
12 at the end, and I must apologize to the NRC, I think I cut  
13 you off a little early.

14 As a result, public testimony will begin, and I  
15 also would like to say that if anyone signs up who finishes  
16 their remarks early or would like to pass their time on to  
17 someone else, they can so state. Debbie Katz is the first  
18 one on the list. Thank you.

19 MS. KATZ: First I want to thank the county  
20 commissioners for having this meeting and for the NRC for  
21 coming and actually giving us a hearing, which we are  
22 grateful for; and for Yankee for being here and presenting  
23 their material.

24 We feel that this is a very important time and  
25 that the NRC is at a crossroads, and this crossroads

1 involves the potential for the meltdown of democracy.

2           Whether Yankee should have chosen the SAFSTOR  
3 option for decommissioning is moot at this moment. What has  
4 become clear is that no community may have input into the  
5 utility's choice if the experiment at Rowe is codified.  
6 Without a change in the rules, there are no hearings for  
7 citizens except at siting.

8           Without a change in the NRC rule making, the early  
9 component removal project, the removal of major components  
10 are allowable without a decommissioning plan or compliance  
11 with NEPA requirements. In fact, no decommissioning plan  
12 would be required, no hearings offered, no community input.

13           This is the destruction of constitutional  
14 government, the meltdown of democracy.

15           We have concerns with the CRP and Yankee did a  
16 very good job in this process, there was no resident  
17 inspector on site during decommissioning, and Massachusetts  
18 Department of Health made only monthly or six week visits to  
19 the site. Exposures during the CRP were on the high end,  
20 workers received 2.6 rem exposures from January through June  
21 1994. This was due to the cutting of the 1 million curie  
22 baffle under water.

23           This is -- the techniques used during the  
24 component removal or experimental, such as underwater  
25 cutting of internals and the baffle. The NRC was unable to

1 provide Citizens Awareness Network or Nuclear Information  
2 Resource Service with the curie count for the internals of  
3 the baffle before the procedures were undertaken. Over  
4 136,000 curies were sent to Barnwell, South Carolina in 59  
5 shipments.

6 Security of guards were used in the containment  
7 sphere where underwater cutting was performed. They were  
8 used to monitor the packing and shipping of internals to the  
9 irradiated fuel pool and to Barnwell, South Carolina. Their  
10 union maintains they were not provided adequate training in  
11 radiation safety. There is an investigation by OSHA for  
12 worker exposure to asbestos during the component removal  
13 project.

14 NRC regulations state that the way to control the  
15 decommissioning is through the plan. The plan provides the  
16 only protection for workers and the public. There were over  
17 110 cases of worker contamination in April through May,  
18 1994.

19 The containment sphere had to be evacuated during  
20 the cutting of the baffle because the levels of airborne  
21 radioactivity exceeded Yankee's acceptable limits.

22 There were 37 effluent releases into the Deerfield  
23 River during the component removal project, 23 releases  
24 occurred in April and May. Although these releases were in  
25 micro and millicuries, we are concerned with the cumulative

1 dose incurred by local citizens over the 31 year history of  
2 the reactor.

3 CAN raised health and safety issues at a  
4 conference with the NRC in August 1993 for citizens living  
5 in the effluent pathway of the reactor and workers on site  
6 at Yankee. We remain concerned. We are concerned for the  
7 continued releases into the river. Our community has been  
8 exposed to effluent from Yankee on a routine and regular  
9 basis for 31 years. We are concerned with the cumulative  
10 effect.

11 These 37 effluent releases into the river during  
12 the CRP were, in general, lower than when the reactor was  
13 operational. In fact they are much lower, but we are  
14 concerned with the long-term exposure to low-level  
15 radiation.

16 We want all radioactive releases into the river to  
17 stop. There is an epidemic of disease in the Deerfield  
18 River Valley, including 50 percent increase in five cancers;  
19 a 40 percent increase in heart disease leading to mortality,  
20 and 110 percent increase in infectious disease leading to  
21 mortality, and a 10 fold increase in Down's Syndrome.

22 CAN wants the NEPA requirements to be followed.  
23 NRC should do an environmental assessment of the Deerfield  
24 River Valley. This would include but not be limited to a  
25 radiological study of contamination in Sherman pond and

1 Sherman Spring. We ask that U.S. Geology participate in  
2 this process. We've already contacted them about it and  
3 they are willing to participate.

4 We want an understanding of the leaks of tritium  
5 that are at the reactor site, and we want an understanding  
6 of the original contamination that took place in the 1960s  
7 in the ion exchange pit.

8 CAN wants to know how the NRC will determine  
9 whether the water loss in the irradiated fuel pool is  
10 related to the tritium leaks or from evaporation. If it is  
11 evaporation, where is the radioactive effluent being  
12 released to. Is it going up the stack, and if it is, how is  
13 that being monitored and by who?

14 CAN wants a health study done of the Deerfield  
15 River Valley to understand the health effects of 31 years of  
16 exposure to low-level radiation. We have submitted an  
17 annotated bibliography of tritium and low-level radiation to  
18 the NRC. Tritium has been found in recent research to be  
19 two times as carcinogenic, 2 to 5 times as mutagenic, and 2  
20 two times as teratogenic as originally believed. We believe  
21 this study is required under NEPA.

22 CAN believes that a resident NRC inspector must be  
23 present during decommissioning. This would include the  
24 component removal project, the removal and shipping of the  
25 reactor vessel, as well as the dismantlement of the

1 buildings and the dry casking of the irradiated fuel rods.

2           What procedures will be used to decontaminate the  
3 reactor. What effects will this process have on the river.  
4 Will chemicals as well as radionuclides be released into  
5 river. Yankee intends to reduce its volume from 90 cubic --  
6 90,000 cubic feet of radioactive materials to less than  
7 39,000 cubic feet. This volume reduction will take place  
8 through decontamination. Yankee projects incineration and  
9 melting procedures to reduce waste volume further. How will  
10 the effluent from the decontamination, smelting and  
11 incineration be contained and monitored, and will this be  
12 done on site? It may have actually been answered this  
13 afternoon but I wasn't there.

14           Will NRC be responsible for the cleanup of the  
15 building housing the irradiated fuel, or will the DOE? Why  
16 have standards been relaxed for nuclear power stations  
17 concerning decommissioning. The walls of the irradiated  
18 fuel pool buildings at Shoreham and Fort St. Vrain were  
19 found to be more radioactive than expected. The NRC is  
20 allowing greater concentrations of tritium and other  
21 radionuclides to be carted away as radioactive rubble. Why  
22 have these standards been relaxed? How will this effect  
23 Yankee? Is this waste above class C?

24           What method will be employed in the breaking apart  
25 of the buildings?

1           What effect does the storing of the 1 million  
2 curie baffle have on the irradiated fuel pool's water  
3 exchange with the Deerfield River Valley, what is the curie  
4 count of the irradiated fuel rods in the pool. If, as  
5 Yankee intends, the irradiated fuel is removed from the pool  
6 and dry casked how will this process be performed? I hope  
7 this provides some structure to ask further questions.

8           MR. STOBIEFSKI: I would now like to call on Ira  
9 Helfand from the Physicians for Social Responsibility. If I  
10 pronounced that right.

11           MR. HELFAND: My name is Ira Helfand. I'm the  
12 North American Vice President of International Physicians  
13 for Prevention of Nuclear War, which won the 1985 Nobel  
14 Peace prize for our work in this field. And I'm a member of  
15 the Executive Committee of the National Board of Directors  
16 of Physicians for Social Responsibility, United States  
17 affiliate of IPPNW. I'm also an emergency room physician in  
18 Northampton and I apologize in advance if my remarks move a  
19 little bit less eloquently than I would like. I did a  
20 14-hour night shift last night and I haven't quite caught up  
21 yet.

22           I do want to also thanks the both the County  
23 Commissioners and the Nuclear Regulatory Commission and  
24 Yankee Atomic for participating in this hearing. The  
25 Nuclear Regulatory Commission and the nuclear industry have

1 historically, demonstrated a rather un-enviable ability to  
2 convince the public that they are not concerned with public  
3 health. And I'm afraid that as Debbie, as her remarks so  
4 eloquently explained, the recent history of the  
5 decommissioning here has done little to improve public  
6 perceptions of where the interest of the NRC and the  
7 industry lie. The numerous safety issues that were raised  
8 in her presentation, I think, need to be addressed and  
9 haven't been. And the fundamental point that these  
10 operations should not have been undertaken without prior  
11 hearing, without a prior plan, simply stands as an  
12 indictment of the way the NRC and the industry have done  
13 business. And I think that point has to be underlined and  
14 appreciated by everyone. This ought not to have happened  
15 and I think there is a lot of explaining to do as to why it  
16 has.

17 As a physician, I have many concerns about the  
18 decommissioning process. I, in the interest of time, would  
19 only like to talk about one, which is the absence, so far as  
20 I've been able to determine, in the planning that has taken  
21 place so far, of any provision for an adequate autopsy of  
22 this plant.

23 Yankee Rowe did not die a natural death. This  
24 plant was licensed and was supposed to operate for four  
25 years. It had to be shutdown eight years early because

1 there was serious problems with the construction of the  
2 plant and serious concerns about the safety plant. There  
3 were also a lot of questions about how bad the problems  
4 were, and it would seem to me that there is a critical  
5 knowledge for those questions to be addressed.

6           When a patient dies prematurely or unexpectedly,  
7 we don't just bury the evidence, we conduct an autopsy, a  
8 post-mortem examination, especially if there is a concern  
9 that the cause of death may pose a public health hazard to  
10 other individuals. That clearly is the case here. There  
11 are many other reactors which are approaching the same age  
12 as Yankee; there are many that have the same design  
13 features, and we need to know as much about the safety  
14 problems of those reactors pose to their community as we  
15 possibly can.

16           It is -- it would seem to me absolutely incumbent  
17 upon the industry and upon the Nuclear Regulatory Commission  
18 therefore, to, as part of the plan for decommissioning, to  
19 have, clearly at the forefront of their efforts, an attempt  
20 to look at this plant and figure out how unsafe it was.  
21 Perhaps the dangers that we all felt were exaggerated, I  
22 don't think so but that's possible. If it is the case, then  
23 we could be less concerned about the safety of people living  
24 around other operative plants.

25           Perhaps the dangers were underestimated, in which

1 case the people living around plants that are still  
2 functioning are living in a greater state of danger than we  
3 appreciate. That's an incredibly important question to  
4 figure out. There are millions of people living in close  
5 proximity to the reactors which are still operational, and I  
6 have not heard any plan put forward to adequately look at  
7 this plant and learn from it what can be learned to protect  
8 the health and safety of those people.

9 And that is the one point that I would like to add  
10 in addition to the remarks that were raised previously by  
11 Deborah. Thanks very much.

12 MR. STOBIERSKI: Thank you.

13 Fred Katz is next from CAN.

14 MR. KATZ: Hello. I'm Fred Katz, and I live in  
15 Rowe, Massachusetts, and I'm a researcher for the Citizens  
16 Awareness Network. I have a great sense of reality --  
17 unreality today and that's because of this Alice In  
18 Wonderland sense of everything being extra ordinarily  
19 beautiful. That, in fact, when I hear that and read that  
20 response that Yankee Atomic gives to the NRC to certain  
21 questions to certain issues that need to be clarified, that  
22 during the SAFSTOR period, preparations for dismantlement  
23 and volume reduction and other such processes will be going  
24 on, I don't know how to think, since my understanding is, as  
25 I will elucidate in this -- in this material that I'll

1 read.

2 Immediate dismantlement and removal of the steam  
3 generators and reactor vessels of the internals, maximized  
4 radiation exposures to workers and is contrary to the  
5 Commission's own regulations, the ALARA principle.

6 According to the Commission's regulations, 10 CFR  
7 part 20.1 c, the ALARA principle states: In accordance  
8 with recommendations of the Federal Radiation Council,  
9 approved by the President, persons engaged in activities  
10 under licenses issued by the Nuclear Regulatory Commission,  
11 pursuant to the Atomic Energy Act of 1954 as amended and the  
12 Energy Reorganization Act of 1974 should, in addition to  
13 complying with the requirement set forth in this part, make  
14 every reasonable effort to maintain radiation exposures and  
15 releases of radioactive material and effluents to  
16 unrestricted areas as low as is reasonably achievable.

17 The term as low as is reasonably achievable means  
18 as low as is reasonably achievable, taking into account the  
19 state of the technology and the economics of improvements in  
20 relation to benefits of the public health and safety and  
21 other societal and socioeconomic considerations and in  
22 relation to the utilization of atomic energy in the public  
23 interest.

24 In addition to occupational exposures, the public  
25 is exposed to radiation along transportation routes.

1           MR. STOBIERSKI: Mr. Katz, could you speak up a  
2 little bit?

3           MR. KATZ: To reduce the external dose rates to  
4 acceptable levels, workers have to install additional  
5 shielding around the steam generators, thereby increasing  
6 occupational exposures, as compared to the SAFSTOR option.  
7 Shielding of shipping containers attenuates but does not  
8 completely eliminate radiation, which still escapes the  
9 packaging. If the plant had been dismantled following 30  
10 years of storage, the amount of radioactivity to be shipped  
11 would have been greatly reduced, thereby reducing public  
12 exposures.

13           A prudent course of action would have had the  
14 company evaluate the decommissioning alternatives in a  
15 decommissioning plan. Subject to careful review by the  
16 Nuclear Regulatory Commission and the public before the  
17 issuance of a possession only license, had a decommissioning  
18 plan been issued before the precipitous removal of these  
19 highly radioactive components and subjected to public  
20 scrutiny and hearings, followed by an environmental  
21 assessment or Environmental Impact Statement, these issues  
22 would have been addressed and carefully considered by  
23 Commission staff. I am positive that the worker and public  
24 exposures would have been greatly reduced.

25           Contrary to Commission regulations the option of

1 SAFSTOR for 30 years following shutdown is no longer  
2 possible. This is contrary to the Commissions July 9th,  
3 1992 decision, in which a possession only license was  
4 granted and the component removal project allowed providing  
5 that, "until the decommissioning plan is approved, the  
6 licensee refrains from taking actions that would materially  
7 and demonstrably affect the methods or options available for  
8 decommissioning, or that would substantially increase the  
9 costs of decommissioning. This may allow the licensee to  
10 dismantle radioactive portions of the facility, but would  
11 not permit actions that are irreversible from the standpoint  
12 of decommissioning alternatives."

13 This precipitous action, which essentially  
14 foreclosed the SAFSTOR decommissioning alternative, was  
15 unnecessary.

16 So that at this point, after all public review has  
17 been eliminated and from the process, we are told, that  
18 this, in fact, is a hearing and that gives me an additional  
19 sense of unreality since I do not accept that this, in fact,  
20 is a herring. It is unconvincing that this is a hearing. I  
21 don't really believe that the legal requirements for a  
22 hearing have been met, so that I would not like my  
23 participation at this meeting to be construed in any way as  
24 satisfying the requests and demands that we have been making  
25 for three years for a hearing on the decommissioning.

1 Thank you.

2 MR. STOBIERSKI: Thank you.

3 MS. FORBES: Thank you.

4 MR. STOBIERSKI: Next on the list is Jean-Claude  
5 van Itallie.

6 MR. VAN ITALLIE: van Itallie.

7 MR. STOBIERSKI: You might want to spell your name  
8 because I couldn't pronounce it even.

9 MR. VAN ITALLIE: It's spelled, the first name is  
10 spelled Jean-Claude, J-e-a-n-C-l-a-u-d-e, last name is  
11 v-a-n, another word, I-t-a-l-l-i-e. My friends call me  
12 Jake.

13 I live in Rowe, Massachusetts, I have known the  
14 house that I have live in since I was 12, which is more  
15 decades than I care to count. And I've lived there and  
16 known since before the reactor at Rowe was built. I'm a  
17 member of Citizens Awareness Network.

18 I'm here as a person, a confused person. I  
19 respect the remarks that were made previously, I don't want  
20 to try to repeat them. I would like to make contact with my  
21 feelings and to communicate them to you. I'm grateful to  
22 the County Commissioners for this opportunity to do so.

23 I'm a person who loves where he lives, I relate  
24 tremendously to the nature, to the beauty of where I live.  
25 I have a great deal of difficulty connecting that with what

1 I know to be going on here. And by, when I say here, I mean  
2 all issues to do with radioactivity.

3 I understand Fred Katz' reference to Alice in  
4 Wonderland, I feel myself frequently to be at an Alice in  
5 Wonderland world when I come to meetings as the waste  
6 management board or public relations meetings that Yankee  
7 Atomic has held. I feel that I -- I feel -- I feel -- I  
8 come from a feeling-full place and what I hear are words  
9 that seem to have some knowledge behind it -- or behind  
10 them -- but somehow confuse me. I would add to the  
11 literary references not only Alice in Wonderland, but Kafka;  
12 the wandering through the corridors of information screaming  
13 help, help. And what are we screaming help, help about?

14 First of all, I don't understand the -- I don't  
15 even know how to say it. The schism between the  
16 decommissioning plan which is now being proposed, and the  
17 component removal, which I gather is, means that taking away  
18 what's radioactive is it 90 percent done, so why are we  
19 talking about a decommissioning plan? Does that not make  
20 sense? I don't understand. I don't understand. I won't  
21 elaborate.

22 When we are told about the natural background  
23 radiation being increased only by 10 percent on a farm that  
24 could be built on the site of the reactor, I wonder if we're  
25 taking into account the fact that the background radiation

1 of the Earth has probably doubled since 1950 when we've been  
2 doing all these experiments in the air with atom bombs.  
3 When we've exploded 40,000 of them as equal to the Hiroshima  
4 bomb, and then we add to the background radiation, I can't  
5 think that anybody really believes that someone is going  
6 build a farm on that site and drink the water from the well  
7 at the rate of -- what was it that was said, two liters a  
8 day. It boggles my generalists mind. I can't believe it.

9           And that whole principal of ALARA which Fred Katz  
10 brought up. We have to speak of it as if itself were  
11 reasonable, as low as is reasonably achievable. But we are  
12 learning more and more that radiation kills, more and more  
13 studies are being made that radiation kills, that people who  
14 live near nuclear reactors, whether they're functioning or  
15 they're being dismantled are in grave danger.

16           We hear all these words being spoken, statistics  
17 being quoted as if we knew something. I do not have faith  
18 in our scientists and our science. The reason I don't is  
19 because they change their figures and they revise them every  
20 number of years. That which was considered safe 20 years  
21 ago is not considered save now. You go and get an x-ray at  
22 the dental office, they'll say, oh well, it's just a tiny  
23 bit of nothing, but it's many times more than that tiny bit  
24 of nothing which they spoke about many years ago.

25           We are learning that long-term exposure to

1 low-level radiation kills, brings disease. We are learning  
2 it more and more, and that seems to be what's not being  
3 said. It's not being said enough, it's not being heard. It  
4 seems to be the great secret. If we really know this then  
5 we need to learn more about it, because we really don't know  
6 enough, science claims not to know enough, study it. Let's  
7 find out, give us a health study. We want to know and we  
8 want you to know. But my intuition is that is what's  
9 happening. We don't want radiation, we don't want  
10 radioactive effluents to breathe in our air and we don't  
11 want them in the river, it's as simple as that. We don't  
12 want them.

13 I had always thought -- this is another element of  
14 my confusion. I had always thought that the Nuclear  
15 Regulatory Commission, being an arm of the government, was  
16 there to regulate for the peoples benefit, for my benefit,  
17 for the benefit of the children. But it seems more and more  
18 an action that they are there to regulate at least as much  
19 for the corporate interests of the nuclear industry. That  
20 does not make sense to my simple mind, that is part of my  
21 Alice in Wonderland questioning here.

22 I would like us to have bona fide hearings. I  
23 would like to have the people have an input. I would like  
24 to say what I've just said again and again, and to hear the  
25 many voices of people who want to say the same thing,

1 because basically we live in a time when we don't know when  
2 we are playing with fire, no one knows what to do with  
3 radioactive waste. No government in the world knows what to  
4 do with radioactive waste. So many schemes have been set up  
5 as to what to do with it, but we know only that it will  
6 probably last as long as 250,000 years. And yet, we are  
7 playing with this stuff as if we were talking about business  
8 as usual. About an ordinary business doing business as  
9 usual, it's not that, it's extraordinary stuff.

10           Maybe radioactivity will one day take us to the  
11 stars, but for the moment we are tiny infants playing with a  
12 fire that can kill the entire population of the Earth. I  
13 love the Earth. As I said before, I'm into beauty, I'm into  
14 nature, let's keep it this Earth. It's really beautiful.

15           Thank you.

16           MS. FORBES: Thank you.

17           MR. STOBIERSKI: Thank you.

18           Sandy Streeter.

19           Just so everybody is aware of this, we are moving  
20 -- going a little quicker than what I had thought. So if  
21 there are people who are interested in testifying, be sure  
22 you sign up because there will be some time at the end.

23           MS. STREETER: My name is Sandy Streeter. I am a  
24 member of Citizens Awareness Network; however, for 48 years  
25 before I was a member I was a just plain citizen, a very

1 naive just plain citizen.

2 Mostly what I have to say tonight is questions. I  
3 attended the meeting this afternoon, and since we were not  
4 allowed to ask questions then I wanted to ask them tonight.

5 This afternoon, if I heard correctly, you said  
6 that rubble from the building tear-down on site can be  
7 buried on the site. I would like to know if that's  
8 correct. I would also like to know will the ALARA standard  
9 be decided before or after final testing of the soil on the  
10 site, and will the standard be upped if economics dictate.  
11 I would like to know why there was a new SECE released on  
12 tritium, has the standard been lowered again? I would like  
13 to know how the NRC can really control dilution of the soil,  
14 the ground around the site without a resident inspector, who  
15 is there to tell us what's really happening.

16 I would like to know what happens when competition  
17 such as what's going on in Florida -- I mean in California  
18 right now has been enacted and comes to New England, what's  
19 going to happen? Users will be freely able to shop for  
20 electricity and nukes are too expensive. These companies  
21 are going to be going bankrupt, what happens to the site if  
22 it's not brought into specs and you could just leave it as a  
23 farm, I mean what's going to happen?

24 I would like to make this one statement. 2,000  
25 nuclear tests on their own people, 45,300 military and

1 industrial sites contaminated in 50 states. The DOE, the  
2 Atomic Energy Commission and now the NRC has committed many  
3 atrocities, I feel. How do we know you are different now?  
4 Who's protecting us?

5 I found something in an article in the Boston  
6 Globe that broke my heart, I don't know if I'll ever be the  
7 same. It's about a man named Rudy Florentine who was  
8 originally from New Jersey, and he was aboard the U.S. Jack  
9 Miller in the Pacific when the nuclear bomb was dropped on  
10 Nagasaki. His mission was to pick up 9,000 POWs, and in  
11 doing that he was exposed to radiation.

12 After the war his first son was born premature.  
13 He died in a week. Next, they had a miscarriage, then a  
14 daughter with a variety of health problems. Another  
15 daughter born with leg deformities and a son with cerebral  
16 palsy. Five pregnancies, five problems. And this is going  
17 on in my neighborhood. Why? I want to know why.

18 MR. STOBIERSKI: Thank you.

19 Karen Blazer is next.

20 MS. BLAZER: Hi. My name is Karen Blazer and --  
21 let's see, I'm going to be brief because Jean-Claude said,  
22 much more eloquently what I could have said and some of the  
23 things I wanted to say. I'm looking for something that --  
24 here it is.

25 This is something that I copied from Killing Our

1 Own by Harvey Wasserman and many other people. And it looks  
2 really small, but all of those dots that you see are -- like  
3 Sandy said, they're either commercial reactor operating,  
4 commercial reactor on order, under construction, military  
5 reactor, dumps, research reactor, nuclear waste dumps,  
6 uranium mining and milling, which means tailings all over  
7 the place, and that's like -- I mean I might want to move to  
8 New Mexico some day and that's loaded, and it's everywhere.  
9 Every single state is loaded.

10 So I'm coming to this information from a very  
11 emotional standpoint too, that I'm scared and there is  
12 nowhere I can move that I can be away from this stuff. And  
13 I guess I just want to -- I don't know who to turn to  
14 either. And the county commissioners -- I guess I would  
15 just like to ask you if you could help protect us from,  
16 first of all, the plan of Yankee Atomic to make this a  
17 potential farm or drinking well site.

18 I want to know that that place will never be used  
19 for drinking water or for cows to graze on. And I would  
20 like somebody to tell me that they will work with me on  
21 that. So that, to me, is just atrocious. And whenever I  
22 hear the green field I can't stand it. I want you to know,  
23 too, that I'm speaking for myself at this moment, not for  
24 any group or anything.

25 And I also would like to know what's going on with

1 the Apache nation; I heard that they did come up here. And  
2 I know that the Apache nation itself, the people, are very  
3 concerned down there in New Mexico about the high level  
4 waste, yet some of the people from either the Bureau of  
5 Indian Affairs or whoever the government is have been up  
6 here. And I'd just like to say that I think it's atrocious  
7 also that we can't just let things sit -- that Yankee Rowe  
8 cannot let things sit on site to be less radioactive over a  
9 period of however many years. They can't do that, and  
10 rather they would like to pollute Indian land, and I think  
11 we've done enough to the Indians. So, again, I don't know  
12 who to turn to about that, I feel like that is wrong.

13 So those two things right now I'm thinking a lot  
14 about, and I don't have much else to say. Thank you.

15 MR. STOBIERSKI: Karen, would you like to put into  
16 evidence the graph that you showed?

17 MS. BLAZER: Yes. Put.

18 MR. STOBIERSKI: Yes. I think that Sandy  
19 Streeter, if you'd like to put those articles into evidence  
20 maybe we can get somebody to copy them here.

21 Bea Cevasco is next on the list, is Bea here?

22 MS. CEVASCO: I'm Bea Cevasco. I live in Colrain  
23 and I have cancer. So I just wanted to be one of the people  
24 who has a real grievance about this situation. I happen to  
25 live --

1 MS. FORBES: Bea, could you speak up, please.

2 MS. CEVASCO: I happen to live 10 miles from Rowe  
3 and 10 miles from Vernon, and three times a week I go to the  
4 oncology department and I receive shots which are supposed  
5 to hopefully keep my blood so I won't need repeated  
6 transfusions. I have something called myelodysplastic  
7 syndrome, which is really the beginning of Leukemia. But  
8 they tell me I'm lucky, because at my age, it is more likely  
9 to be chronic. However, you can visualize, for the rest of  
10 my life, three times a week, I have to get these shots. It  
11 doesn't make life very attractive.

12 I was a very healthy person before I came to this  
13 area; the worst I had was four kids, and I enjoyed them. I  
14 was never sick. Now I'm 77 and I'm sick. So I just wanted  
15 to present myself as an example of what happens when you  
16 have material about which you don't know enough.

17 MS. FORBES: Thank you.

18 MR. STOBIERSKI: Thank you.

19 John Meyer is next.

20 MR. MEYER: My name is John Meyer and I'm a  
21 Charlemont resident. I would like to speak publicly, bring  
22 to the awareness, that the Deerfield River, since the  
23 closing of the atomic plant as being used --

24 The Deerfield River, since the closing of the  
25 atomic plant is being used more and more for recreational

1 purposes, boating canoeing, rafting, and I was at the first  
2 component removal, and I had a conversation with Russell and  
3 Tim Henderson, which I understood from that, there were  
4 going to be releases into the river, and they told me that  
5 it would be during times of no recreational use on the  
6 river. And I thought that meant maybe they would have a  
7 moratorium from maybe March to October or something like  
8 that. And I was surprised to find out that it happened  
9 during April and May. And I would just like to bring it to  
10 everybody's attention that since this, tourism has become my  
11 town's main thrust in all of this, that there could be a  
12 moratorium on the dumping of effluents in the river for the  
13 recreational period I would certainly appreciate it. And I  
14 know a lot of my town people would appreciate it. And  
15 that's really all I had to address.

16 Thank you.

17 MR. STOBIERSKI: Thank you.

18 MS. FORBES: Thank you.

19 MR. STOBIERSKI: Kate Harris is next on the list.

20 MS. HARRIS: Hi. I'm Kate Harris and I also live  
21 in Charlemont and -- in the evacuation zone. And became a  
22 member of a group that we've since called Citizens Awareness  
23 Network, so I've done a number of these hearings with a  
24 number of different acronyms, and you start to lose faith  
25 after awhile that people are listening and -- but I still

1 keep coming because I feel like someone has to tell you how  
2 people feel in this area and hope that I'm speaking for more  
3 than just myself when I do.

4           There has been a level of fear since we first  
5 became aware of effluent releases into the river, and I  
6 realize that it was ignorant on a lot of our parts not to  
7 realize that that comes with the territory when you have a  
8 reactor, you have emissions. But I don't think most people  
9 do realize that, and I don't think that the industry makes a  
10 large effort to make people aware of that.

11           So, here we are swimming in the river, eating the  
12 fish from the river, boating in the river, letting children  
13 swim in the river, dogs, and all of a sudden realizing that  
14 there is a lot of sickness, and there were other fears as  
15 far as the reactor safety. And here we are three years  
16 later and we are still having meetings and we're still  
17 having hearings, and we're still talking to acronyms. And  
18 it doesn't feel like the public safety has yet to be the  
19 priority it deserves to be this whole arena. And that's all  
20 we are asking for, is that we are the priority we deserve to  
21 be, and not economic decisions.

22           This is an industry for profit, yet they've been  
23 carried, since their beginnings by the federal government  
24 because they make bomb grade material. We don't need bomb  
25 grade materials anymore, so I think it's time to take them

1 off of the public budget and let them try and make it on  
2 their own, it's time to grow up.

3 And I realize that as a regulatory body that would  
4 not exist without this industry that that puts you in a sort  
5 of delicate situation. So, there is some area of distrust  
6 on our part in that you are absolutely taking our health and  
7 concerns to the -- with the kind of concern that we would  
8 like. I'm a little nervous even after doing this so many  
9 times.

10 So here we have a reactor that we  
11 hurried-hurried-hurried and tore it apart, which is not what  
12 we were told was going to happen because the dumps going to  
13 close. Oh my God, the dump's going to close, we've got to  
14 get rid of this stuff. Because, economically, we are trying  
15 to save you guys money. But I think most people want to  
16 know what's happened to us over these 30 years, why the  
17 reactor closed early, let's do the studies, like Ira Helfand  
18 mentioned, why aren't we looking at what the safety concerns  
19 of that reactor were at the time that it was shut down, did  
20 it need to be shut down. Those are important questions.  
21 Taking it apart in a hurry doesn't make sense with respect  
22 to that.

23 Putting it in an unlined dump in South Carolina  
24 does not seem like a moral decision on the part of a lot of  
25 people that are aware of that's what we're doing with it.

1 We're sending it to a bunch of Indians that continue to not  
2 be able to keep their heads above water without taking  
3 radioactive trash.

4           And I'd like to suggest that maybe some of the  
5 money that we've saved on this decommissioning be put  
6 towards the health study that the Department of Public  
7 Health can't afford to conduct. Why is it that these bodies  
8 that are supposed to protect us don't have the money to do  
9 that? And why isn't the industry that we feel that's  
10 threatening our life held responsible financially to prove  
11 that they're not harming us? I think that the level concern  
12 has been raised to a degree that the Department of Public  
13 Health would agree that a study needs to be done but there  
14 isn't enough money. So, let's provide the money one way or  
15 another and get the study done.

16           And without doing that how can you make a  
17 decommissioning plan? You have to know what level our  
18 health has been harmed to this point and how much harm  
19 you're doing with the hurried decommissioning. And you  
20 can't assume to know that without doing a public health  
21 epidemiological study.

22           So let's slow down and do it the right way so that  
23 the rest of the decommissionings aren't done in the same  
24 way. And years from now they look back and it's like we're  
25 looking at the people that have been making victims out of

1 the military and mental institution patients, et cetera.  
2 That's a horrible thing and that's what we are going to be  
3 looking at in 30 to 50 years from now what we are doing  
4 right now. So let's let our consciences rule.

5 Thank you.

6 MR. STOBIERSKI: Thank you.

7 MS. FORBES: Thank you.

8 MR. STOBIERSKI: Janet Sinclair.

9 MS. SINCLAIR: I don't have anything to add.

10 MR. STOBIERSKI: Okay.

11 Kathryn Donald.

12 MS. DONALD: I'm Kathryn Donald and I've been  
13 sitting here listening and I came to another hearing  
14 before. Frankly, I was kind of insulted by the farm idea.  
15 Like I felt like my intelligence was being insulted because  
16 radiation doesn't disappear, it doesn't go away. There is  
17 pools up there in Rowe, these are where the spent fuel rods  
18 are, there is all sorts of things -- the whole reactor has  
19 been sitting there, it's not like it's going to go away, the  
20 radiation doesn't disappear. And I thought I heard you  
21 saying that and I thought, do they think I'm stupid. But  
22 then I thought well maybe they just don't realize. How  
23 could you put a farm where a reactor was, that's like giving  
24 them a death sentence, that's crazy. I just think are they  
25 stupid or do they think I'm stupid.

1           The NRC was originally created to protect the  
2 people I thought, and watch over the industry, but it seems  
3 to me as if they've been bought out, I don't trust you. Why  
4 are there no grass roots representatives on the NRC?

5           I wanted to address Russ Mellor's comments on --  
6 oh, yes. You were talking about a successful  
7 decommissioning process and how great it was. And you  
8 talked about how horrible it would be to have the waste  
9 there until 2033 and how it's more responsible to sort of  
10 spread it all around and get it out of there, and give it to  
11 somebody else, like in an unlined dump or -- you know, in  
12 Hanford, a lot of the drums they put on that farm, some are  
13 empty because they've leaked out into the environment. They  
14 have leaked out into the Columbia River. So I was kind of  
15 struck by that.

16           I'm 27 years old, my mother's best friend -- I  
17 just had my birthday. My mother's best friend had a baby  
18 two days before me who was born with Down's Syndrome, so we  
19 are basically the same age. She looks 10 years younger, her  
20 mind is that of maybe a 12 year old, maybe not, maybe 10.  
21 She's 27 too and now she's dying of Lupus. They don't live  
22 that long, they only live about 30 years or so, it's rare to  
23 see them live longer. And when I moved to Shelburne Falls I  
24 was struck by how many Down's Syndrome kids I saw. Right on  
25 my street there is two, and on the other street I know of

1 another one. And there is another one on another street.  
2 They're there.

3 And if you listen to what Debbie said you could  
4 hear the statistics about how tritium is directly linked to  
5 Down's Syndrome and how the statistic in the Deerfield River  
6 Valley it's 100 fold increase, I believe, in Down's  
7 Syndrome. So I'm just very struck because I know what it's  
8 like to have a child with Down's Syndrome, I was raised with  
9 a family who had one. And this is one of the effects of  
10 living in the effluent pathway of a nuclear power plant.

11 And I just think the whole process is very  
12 irresponsible of the industry and only geared to the  
13 short-term profits. And frankly it's quite scary and it  
14 saddens me because the alternative and the effect of what's  
15 going to happen if this goes on is really horrible, and I'm  
16 only 27. If I get cancer from living here I won't know  
17 until maybe I'm 60. But I don't want to get cancer when I'm  
18 60 either.

19 That's all I have to say.

20 MR. STOBIEFSKI: Thank you.

21 If anyone else would like to -- two additional  
22 speaks speakers have signed up. If anyone else would like  
23 to certainly, I think we have three.

24 The next person is Jim Markham, I believe? Jim.

25 MR. MARKHAM: My name is Jim Markham. I got here

1 a little late so -- I was coming back from Boston so I  
2 missed the beginning of it. I'm also a little nervous  
3 because I've never been at a hearing like this before. And  
4 I have so many things to say, but I think I'll keep myself  
5 focused to a couple things.

6           And it seems to me that, in general, the nuclear  
7 industry basically acts and portrays itself as many  
8 businesses would in this country through their marketing or  
9 packaging the way they present themselves to the public, and  
10 that the energy is -- the plants are called safe and clean,  
11 but I can't see -- I can't understand any reasonable person  
12 who would be able to back that argument up. I think they're  
13 patently unsafe, patently unclean.

14           And I think that -- to an article I was reading in  
15 the paper a couple days ago to talk about returning the site  
16 of Yankee Rowe to a "green field" open for any use is  
17 ridiculous. I think -- first of all, I think it's  
18 impossible. Even if it is possible, you remove everything  
19 out of there and excavate enough contaminated soil so that  
20 there is no radioactivity, which I don't believe can be  
21 done, but even if it can, it's only moved somewhere else.  
22 So, we have a green field but somebody else has a dirty  
23 field. And I think that's inherent in the nature of nuclear  
24 energy. There is nowhere else to put it, there is nowhere  
25 else to put this stuff. We can't put it into bombs any

1 more, where is it going to go?

2           So I think the whole thing is really a big -- is a  
3 big farce and its reason for being has expired. And I think  
4 that -- I'll just stop there. I think that the whole green  
5 field argument is basically a marketing and packaging ploy  
6 which is a lie. If we happen to end up with a green field,  
7 somebody ends up with a dirty one. So that's -- that's what  
8 I have to say.

9           Thank you.

10          MR. STOBIERSKI: Thank you.

11          MS. FORBES: Thank you.

12          MR. STOBIERSKI: Nina Newington.

13          MS. NEWINGTON: Hello. My name is Nina  
14 Newington. I moved to this area last fall with -- my  
15 partner and I bought a house in Buckland. And I had heard  
16 rumblings about Yankee Rowe, and I had a friend who died of  
17 brain cancer at the age of 31 who grew up in Vernon. Three  
18 of the children on her street also died of brain cancer;  
19 aged about the same.

20                 I suppose I heard that; I knew her, I watched her  
21 go through the process of dying, but somehow I didn't quite  
22 take it in when we were buying our house what we were moving  
23 near to, and what was the hidden secret about the health  
24 issues of the Deerfield River Valley. My partner and I are  
25 hoping to have a child. I started to read the snippets of

1 information about what effects where we lived might have on  
2 that hope, might have. We don't have the exact  
3 information. Don't we have the exact information? Why  
4 hasn't there been a study done?

5           At this point there seems to be so much indication  
6 that there are problems that have arisen by living and -- by  
7 people living within the effluent field of this reactor and  
8 other reactors, it's completely incomprehensible to me why  
9 this area of Massachusetts has not been treated as a test  
10 place to learn about the effect of a nuclear reactor. It  
11 seems to being used as a test case for how fast a plant can  
12 be decommissioned without public interest and information.  
13 But it is not being used as a place where that -- where the  
14 information that could be learned about the effects of that  
15 plant can be gathered. It could be gathered. This is a  
16 good place to do that study.

17           This is one of the oldest plants, why isn't it  
18 being used? It seems ideal. If it turns that there was  
19 nothing to worry about, great, wonderful, but we can't know  
20 that without the studies being done. I don't understand  
21 it. I don't understand why those studies have not been  
22 done.

23           I don't understand how it is that a judge can talk  
24 about the NRC's behavior in this context by comparing it to  
25 Dickens Office of Ministry or Office of Misinformation.

1 I've had very little involvement with this issue, but what  
2 I've learned in the last six months or so has been quite  
3 enough to scare the hell out of me. I want to know, I want  
4 the information to be out there. I don't have much faith in  
5 the NRC at this point because everything I've learned  
6 indicates that they are in the service of the nuclear  
7 industry, not in the people, not in the service of the  
8 people. Who do we turn to then? Well, the people I've  
9 turned to have been the people locally who are involved in  
10 this issue. Yes, I started to get involved with CAN, I  
11 wasn't involved with CAN until a couple months ago. There  
12 needs to be some kind of bridge between a small citizens  
13 awareness group with limited resources and what's happening  
14 at a federal level with people who, in theory, should be  
15 protecting us and, in practice, are protecting the interest  
16 of the nuclear industry.

17 I don't know what can be done, I don't know how to  
18 make the bridge between the local group and what's happening  
19 at a federal level. Maybe these kinds of hearings can help  
20 or maybe they're a farce that's just intended to be a sop,  
21 to suggest that a hearing has been had, when in fact, the  
22 hearing is coming too late.

23 It's incomprehensible to me to find out that the  
24 decommissioning of Yankee Rowe was done by suspending all of  
25 the provisions, pretty much, that the NRC or other agencies

1 have previously agreed were necessary for safety. What  
2 happened? Why did it suddenly become safe to decommission a  
3 nuclear plant without any of the provisions that have been  
4 carefully thought out. Was it magic, did something happen?  
5 Did nuclear power suddenly become safer? Did radioactive  
6 waste suddenly become less of a health hazard? No, of  
7 course that's not what happened. So you think well, what's  
8 the point of the NRC; what's the point of those carefully  
9 thought out decommissioning safety plans; what's the point  
10 of the -- oh yes, of course the public will be consulted.  
11 It didn't happen.

12 I want to know what we can do -- what can we do to  
13 make a better bridge where we feel represented because I  
14 don't believe it's going to come from the top down, so it's  
15 going to have to come from us up, I guess that's why I'm  
16 here.

17 MS. FORBES: Thank you.

18 MR. STOBIEFSKI: Thank you. There is a gentleman  
19 who stood up. Yes, in the blue shirt. Could you please  
20 state your name.

21 MR. STILES: My name is Bill Stiles. I'm now from  
22 Amherst.

23 I was a selectman in the Town of Shelburne prior  
24 to the shutdown of Yankee Rowe. And at the time of the  
25 shutdown we were living in Florida and welcomed the news, of

1 course, and thought that we had something to do with it.  
2 But subsequently we found out it was actually an economic  
3 concern and they really didn't care about our safety or care  
4 about the pressure vessel, but it was simply an economic  
5 decision, which I don't really believe. Maybe that's true,  
6 but maybe they found that the exploration of the tank was  
7 actually impossible, and that, in fact, we were right and  
8 there were safety concerns and they decided to give up.

9 Now, it seems like it continues and -- I'm no  
10 longer an official, I'm no longer speaking in any official  
11 capacity and I'm not a member of CAN, but -- and I'm not  
12 sure what the procedure is right now, and I think it should  
13 be known by the people here and by yourselves, that the  
14 people who spoke here really have something to say. And  
15 even the fact that there -- just because it's emotional and  
16 not technical, it should not be discounted, and they really  
17 do have a huge body of information that they've assembled on  
18 their own without little help from anyone. And I think it's  
19 important that these people have a constant and continuing  
20 involvement in this process and be listened to in order for  
21 us all to be protected. Because I'm sure you all have  
22 children too, and all have people who have been affected by,  
23 what we think, is the problems with radiation.

24 It's all up and down the river, it's a fact, it  
25 hasn't been supported by -- there has been millions of

1 dollars spent, but it hasn't been supported by health  
2 studies that wouldn't cost near half of that.

3           Why there isn't somebody from NRC at the plant  
4 during the decommissioning is beyond me. With all the  
5 millions of dollars being spent, why can't somebody be  
6 there. What a small cost, what a small thing it would be to  
7 have NRC knowing what's going on and reporting to the grass  
8 roots.

9           I also think at this point there really should be  
10 a grass roots liaison member, some member of CAN or somebody  
11 who has the time to work directly with the NRC to watch what  
12 you do. Because it's obvious from the time that I started  
13 coming to these meetings when I was a selectman that people  
14 still have not -- you still have not gained the trust of the  
15 people. And these are honest people, people that have  
16 worked in the valley, people who live in the valley who  
17 don't want to be here. We don't want to come here on nights  
18 like this, we don't want to deal with this but it's a real  
19 issue, and you have to listen to them and you have to  
20 respond to them, and you can't -- the main thing I want to  
21 say is you can't let this hearing stop here. It has to be  
22 on a continuing basis because these people aren't going to  
23 go away. I can tell you they're not going to go away and  
24 you can see the amount of energy, whether it's dressing up  
25 in a gorilla costume or whatever, they will do anything to

1 bring this issue up and protect the other people who are not  
2 willing to get up and say anything.

3 I can't tell you how many people came to me while  
4 I was a selectman and thanked me for my position on this  
5 case. And they said we don't have time, we are afraid to  
6 come out and say anything but we appreciate what you -- and  
7 so it isn't just a small band of people that are making this  
8 point. Behind this small band of vociferous people are a  
9 lot of people who are afraid to come out. And if you have  
10 this many people saying something, you know that in Congress  
11 when they get a few letters about something, that represents  
12 a large number of people. And I think you want to keep that  
13 in mind.

14 So I encourage you to continue a dialogue with  
15 these people who have put such an infinite amount of effort  
16 into this process.

17 Thank you.

18 MR. STOBIERSKI: Thank you.

19 MS. FORBES: Thank you.

20 MR. STOBIERSKI: Will Sparks.

21 MR. SPARKS: Hello. My name is Will Sparks and  
22 I'm a resident Charlemont. I live in the village, I live  
23 about 150 feet from the river. I didn't plan to speak  
24 tonight -- I'm not a speaker, but I would like to, at least  
25 say while I'm here, that you have to understand --

1 understand the level of resentment and distrust for the  
2 reactor and the -- not so much the people who have worked  
3 there, our neighbors that we've had to live with, but for  
4 the system.

5           They've lied, they've changed positions, it's just  
6 -- they have -- whenever they have been up against the wall  
7 they've gotten away with it. They just tend to forge ahead,  
8 neutralize the position, these beautiful, caring, sensitive,  
9 dedicated people, neutralize it with a few PR comments and  
10 then forge ahead with whatever they damn well please to do.

11           One thing came to my attention recently was that  
12 it was spoken at a small meeting in shall Charlemont that  
13 decommissioning cannot go on without releases into the  
14 river. I just can't find that -- I just don't think that's  
15 true? And I would like somebody to answer that, is that  
16 true. I've heard one person say that, but that person has  
17 always lied about other things concerning the reactor.

18           And am I mistaken but aren't the taxpayers picking  
19 up the tab now for decommissioning? So just tax us, don't  
20 put it in the river. One of the hottest summers ever and my  
21 kids aren't in that river. You think I don't resent that?  
22 That's our river. It's not their river; it's ours, the  
23 people that live there in that town.

24           And wake up, wake up and smell the resentment and  
25 become heroes.

1 Thank you.

2 MR. STOBIEFSKI: I have no other person on the  
3 list -- then I was going to ask if somebody from CAN would  
4 like to make a closing remark. But before they do, I would  
5 like to see if anyone else would like to speak and there is  
6 someone raising their hand, so.

7 MR. SNOW: I'll put myself on tape because  
8 sometimes I fall apart making a statement, but I'll try not  
9 to do that.

10 MR. STOBIEFSKI: Please, tell us your name.

11 MR. SNOW: My name is Keith Snow, and I live in  
12 Williamsburg. And I returned to the state in February --  
13 returned to the country in October. The place has changed,  
14 it's really changed.

15 It's funny how little incremental things that I  
16 see in my neighborhood have become these major issues now.  
17 The point is I don't think people recognize what they're up  
18 against when they talk about the environment, about the  
19 effects of technology and the world on the local systems.

20 What is cancer? We've lived with cancer as this  
21 unknown thing. It's like AIDS, we don't know what it is.  
22 Well, perhaps it's some product of technology, some ugliness  
23 that we don't know anything about yet. Maybe we may never  
24 -- we may never have that chance. It's my belief that we  
25 may have already tripped a switch which will leave us in a

1 state where we can no longer survive. We may wake up and  
2 find darkness, we may find something much more ugly than  
3 that.

4 I've got my bag of tricks here, I'm just going to  
5 pull them out quickly and try and go through them. This is  
6 a story from Harper's about China, they didn't know how to  
7 use the tractors that they had. The engineers had never sat  
8 on a tractor, never driven a tractor around, but they had to  
9 build them. The tractors couldn't turn, but the engineers  
10 wouldn't get on them and do it because it was manual labor.

11 And the American guy came along and showed them  
12 that if they got on and learned how to do it, then maybe  
13 they could actually design a tractor so that it worked.  
14 It's kind of interesting. It's kind of like people who  
15 don't know much about public document rooms, and suddenly  
16 start reading these little microfiches and find that, wow,  
17 look at what this microfiche says.

18 At the Watts Bar Nuclear Power Plant in Tennessee  
19 four weeks ago I learned about nuclear power. Before that I  
20 didn't know anything about nuclear power. I'm 34. Where  
21 was I in 1970 when nuclear power was coming out where the  
22 anti-protests, what happened? I don't know, I was living on  
23 a little farm in Williamsburg and had sheep. And now there  
24 is a saw mill every morning at 7:30. I have a right to  
25 sleep I don't have to listen to a saw mill.

1           The Carcinogenic, Mutagenic, Teratogenic and  
2 Transmutational Effects of Tritium by the Citizens Awareness  
3 Network. Well, it's quite a document, it's quite a  
4 bibliography. It uses words like the Mass Department of  
5 Public Health. But people can look at it and say it's just  
6 someone's opinion. And then there is someone else's opinion  
7 on the other side, you've got two extremes. They've got an  
8 opinion that these plants -- or the Yankee plant has cost  
9 health effects. And the NRC has said for years that there  
10 aren't any health effects.

11           Well, I don't have the book I was going to pull  
12 out called Safety Second, which was written by the Union of  
13 Concerned Scientists in 1986, everyone should read that  
14 document. I'd like to know how many people from the NRC and  
15 Yankee have read that. It's quite an indictment against the  
16 nuclear power industry. I wonder if any of the people from  
17 the industry side and the NRC take their notes and go back  
18 and try to devise schemes to address the problems that  
19 citizens raise. It's an interesting thought.

20           I met a guy down in the Watts Bar Nuclear Power  
21 Plant named Tim, he was the plant operator. When that  
22 thing comes on-line it's a 1260 megawatt reactor, it's not  
23 a little tiny Yankee. I stood there and looked into the  
24 reactor core, and it's never loaded fuel; it's taken 24  
25 years. In 1985 all of the people who worked there came

1 forward with 6,000 safety concerns about the plant; 4,000  
2 people are employed there. It's \$6.8 billion -- that's \$6.7  
3 billion overrun.

4 There is 4,000 people employed there, if it ever  
5 comes on-line there will only be 1,000. And I've been told  
6 by the citizens there that they will never let it come  
7 on-line because 3,000 people will lose their jobs. They  
8 were serious.

9 This is the Mescalero Utility Fuel Storage  
10 Initiative, what a beautiful document. Actually inside I've  
11 tucked a little thing by the Franklin County Commission  
12 which says -- to the President and copies to the senator,  
13 "Please don't leave the Yankee plant in our yard, take it  
14 away, take the rubbish away. Take the spent fuel and give  
15 it to someone else; take it away."

16 Sorry, doesn't cut it.

17 This is a nice document, it's printed on,  
18 supposedly, recycled paper. Well, I'm shaking. I picked it  
19 apart technologically, but Kerns and West from Washington  
20 D.C. has paid -- is probably going to be paid millions of  
21 dollars to make sure this thing goes through. Indians down  
22 there are not economically devastated, they've got ski  
23 areas, 100 million I think border feet of forest going into  
24 production each year. These aren't people who need this  
25 mess. I mean it's a nice document. Hopefully the Indians

1 won't get it either. I don't know, I don't think anybody  
2 should get it.

3 This was on the bulletin board, a Zoar Outdoor  
4 film series. Wow, Zoar outdoor festival had 50 people going  
5 in the river the day I started investigating this story. Do  
6 these people know? They have a right to know.

7 A university of Massachusetts professor of ethics  
8 said they have a right to know in a big way, but why don't  
9 they know? Who's not telling them?

10 In search of ancient eastern forest, did this --  
11 whitewater rafting. It's all about vested interest. What's  
12 my interest? Well I take off my hat, I'm not a journalist  
13 right now. I've lost it. You can see that I'm telling you  
14 what it's all about, in my perspective.

15 This the Citizens Awareness Network put along the  
16 Deerfield River. I mean another University of Massachusetts  
17 professor, he was my hero because he had written this book  
18 that I was using as my Bible how to write. I sat there and  
19 interviewed him and he melted before my eyes because the  
20 first thing he said was who wrote it, who are these people,  
21 people in a garage in Deerfield? I give this a D minus as a  
22 journalism professor. He sits on the boards -- Simms,  
23 Norman Simms. He sits on the Board of Directors New England  
24 -- no the Board of the Appalachian Mountain Club. He wants  
25 whitewater rafting and he's glad that all the people there

1 make their money from it. I feel for those people in  
2 Charlemont. A woman who is trying to earn enough money to  
3 feed her kids, you know, I really feel for her, but I think  
4 people have a right to know what they're getting into and I  
5 think there is people that are not telling them.

6           What else do I have in this thing? I don't know,  
7 rule making issues, I've gone over that in detail and detail  
8 and detail.

9           And there is this one, looks like something we  
10 used in aerospace technology meetings when I worked for GE.  
11 It's got all these great nothings. I read the thing four  
12 times, I can't figure out what it says. But I wasn't there,  
13 there were a lot of things left out I suppose.

14           Quickly we have the court statement by Judge  
15 Ponsor from Springfield claiming that the Citizens Awareness  
16 Network -- the terrorists, I have been told, have a right to  
17 know what's going on. And that, I only brought a little  
18 piece with me, that goes on.

19           And there is this great report in Harper's.  
20 Chernobyl, it's going to happen in the United States. And  
21 it relates to decommissioning is just a way to get the thing  
22 out of here so that more people can bring more plants  
23 on-line as soon as possible. And I've been told that that  
24 means as soon as the year 2000 comes they're going to bring  
25 in the young votes so they don't remember TMI and they don't

1 remember Chernobyl.

2           Three Mile Island was real. People say a reactor  
3 -- the guy at Watts Bar plant told me these things are  
4 safe, we have got all these design systems. But -- and he  
5 said TMI, nobody got hurt there, right? People forget that  
6 nobody got hurt there. It's going to sit there for how many  
7 years? Does anybody want to go there with me?

8           Someone today at the meeting from the NRC told the  
9 Yankee people that they want to make sure -- they want to  
10 make it very clear that they want to make sure that the  
11 decommissioning process, if you can call it a  
12 decommissioning process at this point, they want to make  
13 sure that it happens in such a way that -- if my  
14 interpretation was wrong it was because I haven't sat  
15 through the technicalities for awhile -- they want to make  
16 sure that it happens correctly the first time and they don't  
17 have to suddenly have this problem to address and straighten  
18 out.

19           And that's pretty much what's been said in this  
20 book, Safety Second, about the first 20 years of the  
21 industry. It's pretty ugly.

22           I don't know, my bag of tricks has got something  
23 else here; Mr. Bill McGee. Sorry Bill, I'd like to join you  
24 on that golf course. The Mescalero Indians, he's going to  
25 be playing golf when somebody has to make these decisions.

1 I have a problem with that. I don't play golf, I'll never  
2 play golf.

3 This is the union of concerned scientists' debate  
4 with the NRC about the mainline steam breaks due to the  
5 Westinghouse multiple steam generator tube leaks.  
6 Unresolved -- the tube leakage debate between Robert Pollard  
7 and the NRC about the Westinghouse -- I believe it's an  
8 unresolved safety issue, one of perhaps many; what were  
9 formerly 495, until the wordings were changed and whittled  
10 down to some six unresolved safety issues. I don't know,  
11 495. There is 489 unresolved safety issues out there in  
12 these plants.

13 Has anybody got a dollar? Journalists don't make  
14 money when they make speeches like this.

15 MR. STOBIERSKI: Thank you.

16 MR. SNOW: I appreciate the opportunity to make  
17 the statement.

18 MR. STOBIERSKI: You're welcome.

19 Anybody else who would like to make a statement?  
20 If there isn't, before I call on CAN to make a closing  
21 remark, Mary, would you mind moderating? I'd like to make a  
22 statement and I'm going to comply with the same rules that I  
23 set down for everybody else.

24 I'm John Stobierski and I'd like to make one  
25 comment to the NRC. That is that I suggest that you take a

1 serious look at your rule making and regulations with  
2 regards to the decommissioning plan. I know that Yankee  
3 took advantage of the rules and they were doing their job  
4 for their customers and ratepayers to undertake the  
5 component removal process early; I believe that that  
6 foreclosed public comment and public debate on a large part  
7 of the decommissioning. And I hear a lot of public comment  
8 here about that and I think that's the role of the NRC, is  
9 to provide for public input to represent the people and by  
10 having regulations that are strongly enough worded that  
11 you've permitted part of the process to go without public  
12 comment. And I think for any of these future  
13 decommissionings that the NRC should propose new regulations  
14 that prohibit this from happening again.

15 Thank you.

16 At this point what I'd like to do is see if -- I  
17 think Debbie was motioning that she would like to make a  
18 concluding remark, and I'd call Debbie Katz, please.

19 MS. KATZ: I just want to end talking about the  
20 issue of the waste stream because I think the issue of the  
21 waste stream in America is the danger we are in as more and  
22 more reactors will decommission in America.

23 We have lived in the waste stream of Yankee Atomic  
24 for 31 years and there was an illusion that as Yankee Atomic  
25 ran that we weren't exposed to radiation. And this was an

1 illusion because the Deerfield river was the radioactive  
2 waste dump for the reactor.

3 As in Vernon, the air is the radioactive waste  
4 dump for the Vernon reactor. But what is really of concern  
5 is that the waste stream that is at Yankee and at all other  
6 reactors has to be dealt with in America at this point, and  
7 we don't have solutions for it, that's very clear in this.  
8 Yankee doesn't have a real solution to it. Their idea of  
9 shipping the waste to another community is, in fact,  
10 unacceptable to CAN.

11 And the issue of the Mescalero Indian reservation  
12 becoming the short-term repository, but fearfully the  
13 long-term repository for the irradiated fuel rods because  
14 nobody else in America seems to want to take them. And  
15 Yucca mountain does not seem to be an adequate repository is  
16 something that is very frightening to all of us. And the  
17 Mescalero may, in fact, accept these fuel rods, that's the  
18 truth of it. But I don't know if that is an adequate  
19 solution, and I'm very concerned that the industry is  
20 setting policy for America, that 37 reactors will determine  
21 what happens to the irradiated fuel rods in America. And  
22 this we feel is unacceptable.

23 It is the federal government and the NRC and the  
24 Congress who must set policy on irradiated fuel as well as  
25 what is classified as low-level radioactive waste. And we

1 don't feel that a very good job is being done, nor do we see  
2 anyone coming out and be willing to even work on the problem  
3 in an adequate way, which, in fact, forces Yankee, in a  
4 situation which I understand their position. They were  
5 promised by the DOE that they could unload their fuel rods,  
6 and they're being told they can't, and they're stuck, and  
7 they shouldn't have to be stuck. And 30 years ago we were  
8 promised there would be a solution to the waste problem;  
9 there is none, and we are stuck with it. And I think this  
10 process needs a lot of deep consideration by all parties.

11           There is no longer, you know, when I started this  
12 I was, you know, I lived in my community for 17 years  
13 without being a nuclear activist of any kind. And do you  
14 know there was a time when I thought well, am I an  
15 anti-nuclear activist, and I don't think that title is even  
16 reasonable any more. There is nuclear waste and people are  
17 going to have to work together to solve this problem because  
18 there is no way out of it. There is just no way out of it.

19           I would like to comment on the issue of the 30  
20 millirem a year that Yankee would like to leave on site,  
21 because I'm concerned because I remember at the ERA meetings  
22 that were set up by the NRC in which a 10 to 15 millirem  
23 limit was set with a design model of 1 millirem a year left  
24 on site. I am very hard pressed to understand how this is  
25 now in negotiation for 30 millirem a year. And in fact

1 people I've spoken to who have participated in the ERA  
2 meeting are horrified to hear that this negotiation is  
3 taking place between Yankee and the NRC.

4 Well there is public comment going on about the  
5 design model for the 15 millirem a year, so I'm really  
6 confounded by this. I'm also confounded that in the ERA  
7 meetings last year and the NRC at this point, in which Chip  
8 Cameron is participating, that community boards are being  
9 set up or want to be set up around decommissioning reactors  
10 so that citizens and stake holders can participate in this  
11 process, and yet what happened at Yankee Rowe? What  
12 happened, guys?

13 You're involved in making a process to include  
14 citizens, and at the same time in Rowe, we are excluded from  
15 the process. And this is, at best schizophrenic, at worst  
16 it's opportunist. So I don't know anymore if you're wanting  
17 citizens to be involved in this process is real, because  
18 it's not being acted on in Rowe. And you are making  
19 attempts to deal with us but only because you are pressed  
20 to, time and time again.

21 We are concerned that this process in Rowe will  
22 set a precedent throughout this country, and a dangerous  
23 precedent in the meltdown of democracy in rule making, in  
24 the meltdown of democracy in public participation, in the  
25 meltdown of democracy of citizens having any control over

1 their lives. And maybe the jig is up. Maybe the truth is  
2 we have no control. May be it's over. But I would, at  
3 least, like to know that.

4 As Judge Ponsor said, if we are not going to be  
5 given a hearing, if you are going to dust this off, then you  
6 have the responsibility to do it as quickly and decently as  
7 possible.

8 Thank you.

9 MR. STOBIERSKI: Thank you, Debbie.

10 What I think we'll do now, I'm going to take a  
11 little license with the agenda, is that we had NRC closing  
12 comments and licensee response. Licensee response was  
13 first. That since we have a little extra time,  
14 approximately 45 minutes, that a number of questions were  
15 raised, and I saw a lot of pens writing pretty feverishly,  
16 if any of those questions can be answered I would like to  
17 extend the time for the licensee response and the NRC  
18 closing comments greater than what's provided to give them  
19 an opportunity to answer as many questions as they feel  
20 appropriate.

21 So, perhaps.

22 MR. MELLOR: Sure. I think the function of this  
23 meeting is to really air all of the thoughts and feelings  
24 that people have, and I think it's really done a world of  
25 good in that direction.

1           I think we have tried to deal with these questions  
2 in the past at six or seven open meetings, we've tried to  
3 provide answers. Many of the answers to the questions are  
4 inside the decommissioning plan. It is a thorough plan, it  
5 is a workable plan. We've demonstrated that it can work  
6 over the course of the component removal project.

7           With regard to the direct questions, there are not  
8 that many that we have not answered in the decommissioning  
9 plan. The process is inside the decommissioning plan. The  
10 process of component removal uses the existing procedures,  
11 the existing plans, the existing licenses that we have in  
12 place all to protect the environment, and that is what's  
13 going on. Releases are substantially lower than they were  
14 during operations by orders of magnitude. This is a process  
15 that is working positively for the decommissioning of  
16 Yankee. It is unfortunate that the DOE is not working  
17 towards the same process, which is getting control of the  
18 waste situation and having a place to put it and moving  
19 Yankee's fuel expeditiously. That's the focus of our  
20 efforts, along with getting the decommissioning plan  
21 approved and moving forward with the DOE primary acceptance  
22 absence.

23           The issue of the Mescalero is one which is  
24 pending. It is not solidified solution, however it is a  
25 potential solution which mimics or comes very close to the

1 priority acceptance of DOE. It is an interim solution. We  
2 would anticipate DOE would receive our fuel from the  
3 Mescaleros in that situation. They do, however, still need  
4 to focus on the waste issue.

5 I don't really have a lot of additional remarks.  
6 If there are specific questions that I missed in these I'll  
7 be glad to get them.

8 MR. STOBIERSKI: Rather than take questions now,  
9 let's lit the NRC make their response. I knew that a lot of  
10 the testimony that was given was directed to the NRC, and  
11 maybe they have some answers to some of the questions.

12 MR. GRIMES: I'd like John Austin to briefly  
13 address the questions that was raised on the standards for  
14 final release of the site and give a little more information  
15 on the process where the NRC is going through to try to  
16 determine what standards should be used in general and at  
17 Yankee Rowe.

18 MR. AUSTIN: First on the standard. Our  
19 regulations now do not have a numerical standard on what is  
20 an acceptable residual contamination following  
21 decommissioning. The rules are silent on them. We have to  
22 enforce the rules that are on the books, not things that  
23 come to my mind at night or on the weekend, because the  
24 licensee and the public have rights under our rules.

25 The rules sometimes may seem incomplete, not fair,

1 but the rules are the rules, they were adopted according to  
2 the Administrative Procedures Act. If we misstep them  
3 people can take us to court and direct any procedural.

4 So the rules do not contain a number. The  
5 licensee is free to propose a number. We have branch  
6 technical positions on various criteria for decommissioning,  
7 that is what our preference is. Our branch technical  
8 positions articulate one way the licensee could satisfy the  
9 regulations, and in this case the regulation is unrestricted  
10 use. So we put on the table a number which we say we have  
11 found acceptable in the past. Licensee, if you pick that  
12 number, you will find the review a lot easier. If you pick  
13 a number less stringent than what we put on the table, we  
14 will have some hard discussions about who is going to  
15 prevail.

16 If we try to impose a number that is a branch  
17 technical position on a licensee that does not want to  
18 accept it, they can request at hearing, it's their right,  
19 and then we go into administrative procedures hearing, and  
20 they put their cards on the table and we put our cards on  
21 the table. That is why I have to say we will negotiate,  
22 because that's what the rules call for now.

23 As you know, there is a rulemaking under way that  
24 should be published in the federal register by the end of  
25 this month that would propose a numerical standard for

1 acceptable residual contamination remaining.

2           What I'd like to do now is talk briefly about  
3 where these numbers come from; 10 millirem, 30 millirem; are  
4 they hazardous, just what is the basis for these.

5           NRC has, in general, adopted internationally a  
6 developed radiation protection standards. They are  
7 codified, quantitatively in our regulations and that is what  
8 we enforce on all of our licensees, regardless of cost. And  
9 if there our regulations say, that no member of the public  
10 will receive more than 100 millirem per year from all  
11 sources involving licensed activities as well as unlicensed  
12 activities, that's the limit, not negotiable. Then we are  
13 faced with a licensee wants to do something over here. Now  
14 how much of this 100 millirem can we partition over here  
15 such that this 100 is never exceeded. Oh, the regulations  
16 also say that the actual exposures to the members of the  
17 public will be as low as reasonably achievable, that is, we  
18 drive it down.

19           Our regulations would allow in air emissions that  
20 are calculated, assuming a person inhales the exhaust  
21 containing the radioactive material -- the person would  
22 receive 50 millirem from the air pathway. EPA has performed  
23 a survey of actual practice. How has ALARA driven that down  
24 from 50 from the air pathway, and it's something like 95  
25 percent were well below 1 million, that is enforcing ALARA.

1 And that's what we are going to be looking for here.

2 But again, on this 100 millirem internationally  
3 accepted radiation protection standard driven down as far as  
4 practical through regulatory practices through inspections,  
5 through enforcements, through branch technical positions, we  
6 drive it down. And all these are small fractions of that  
7 dose that every member of the public receives from natural  
8 background.

9 As a person at a symposium at one of the  
10 universities in the Washington D.C. area asked me -- it was  
11 an activist brought together Native Americans from all over  
12 the country and from Canada. And he thought it would be a  
13 good idea to see what an NRC person was like, and invited me  
14 there for the luncheon speech on one day's notice, two day's  
15 notice; I went. And an individual there was tape recording  
16 everything I had to say, it was fine with me. Sat behind me  
17 with his hand held tape recorder and said, why do you  
18 regulate based on body count. Why don't you protect the  
19 sacred environment. And I looked at him and I said, you  
20 know, if you'd have chosen to tape record anybody anywhere  
21 at any time, that's your choice. Your tape recorder has a  
22 battery in it. The battery has hazardous chemicals. You're  
23 going to dispose of that. The landfill could leak, the  
24 hazardous chemicals could migrate to a river. A fish could  
25 eat the hazardous chemicals, people could eat the fish and

1 then they have a probability of dying of cancer. Now that's  
2 the kind of calculation I was telling you about that we do,  
3 to make sure that whatever is left behind has an acceptably  
4 low risk.

5 It's very conservative, it is consistent with the  
6 way the Environmental Protection Agency goes about reviewing  
7 hazardous chemicals of landfills, sanitary landfills, Super  
8 Fund with one exception. We consider human intrusion in  
9 spite of putting four feet of clean soil over it we drive  
10 the industry up the wall by assuming mathematically the cap  
11 is gone and the farm is constructed. They can put deed  
12 restrictions in, they don't work, the farm is built. And  
13 again, we calculate those risks from all pathways to ensure  
14 that they are acceptably low, based on internationally  
15 accepted standards.

16 What we will do from here is we have asked that  
17 there be a transcript kept of this. We will take that and  
18 we will segregate out concerns and questions regarding the  
19 decommissioning plan and the environmental report for Yankee  
20 Rowe, and we will prepare response to those and attach it to  
21 our safety evaluation report. And I would offer this  
22 opportunity, if you don't think we have responded fairly,  
23 let me know.

24 MR. GRIMES: If I can add a few words also.

25 MR. AUSTIN: And I would say that we have heard --

1 I have heard some genuinely felt concerns here and we will  
2 try to be responsive. I hope you recognize that we are a  
3 nation of laws, we have certain things we can do and certain  
4 things we can't do, but we will try to be responsible.

5 MR. GRIMES: I'm Brian Grimes again, to just wrap  
6 up the NRC comments.

7 As John said, we will take the comments  
8 particularly on the decommissioning plan, which was the  
9 focus of tonight's meeting into account as we write our  
10 safety evaluation, our evaluation of the Yankee Rowe  
11 proposal. In addition, there are a lot of health effects  
12 questions tonight on the Deerfield Valley things. There  
13 will be a meeting with CAN tomorrow morning at 10:00 --  
14 Mort, remind me where it is, please?

15 MR. FAIRTILE: Shelburne Falls. It's in the  
16 McCusker Market Building. It's on 3 State Street.

17 MR. GRIMES: Thank you.

18 MS. KATZ: Third floor.

19 MR. FAIRTILE: Thank you.

20 MR. GRIMES: And we will have an NRC health  
21 effects expert there and perhaps there can be a little more  
22 dialogue at that time on the health effects issue.

23 I guess the last thing I wanted to say that County  
24 Commissioner Stobierski's points are well taken about the  
25 public process. We've been going on in this process, from

1 my standpoint, there are two aspects. One is the technical  
2 aspect and the other is the public responsiveness aspect.  
3 And from my own standpoint and knowledge of the process, I'm  
4 convinced that the -- both Yankee Rowe and the NRC staff has  
5 done a good technical job, both in the component removal  
6 and, from what I've seen in planning, the decommissioning  
7 plan.

8 But I think clearly we have -- the process has not  
9 been optimum and could be much improved from the standpoint  
10 of getting public input and public interaction in the  
11 future. The NRC staff is, right now, in a dialogue with our  
12 Commissioners on how the process might be changed.

13 One other remark, someone remarked about the  
14 desirability -- or perhaps two people about the desirability  
15 of resident inspectors. I think that's a good comment,  
16 although we did have, as of this spring, there were over 45  
17 different NRC inspections at the site during early component  
18 removal. But from the standpoint of both communications  
19 with the licensee and communications with the public, I  
20 think the point is well taken that a resident inspector is a  
21 very valuable part of the process.

22 So thank you, that concludes our remark.

23 MR. STOBIEFSKI: At this point, there was a note  
24 in the agenda that I would be allowed to ask people from the  
25 audience to ask any clarifying questions. And if there are

1 any questions, I'd like to people who already had their  
2 opportunities make statements, so I'd like these to really  
3 be confined to questions of the NRC or of Yankee. If anyone  
4 has any additional questions at this point in time, if you  
5 could just raise your hand I'll call on you and then state  
6 your name.

7 MR. STOBIERSKI: There is one question. Go ahead  
8 Mr. -- Mr. Katz.

9 MR. KATZ: Yes, I had a question. There were --  
10 there is this variation of 30 millirem a year that was cited  
11 by Yankee Atomic, here, and this afternoon at Greenfield  
12 Community College, in the amount of emissions as background  
13 in this region. And I am not certain as to -- and I would  
14 like to know what studies this figure is based upon, and who  
15 made this study. And when this study was made that  
16 established this figure of 30 millirem as a variation on the  
17 amount of background radiation in this region.

18 MR. MELLOR: For years, Yankee has had an  
19 environmental monitoring program in place. And as part of  
20 that environmental monitoring program, indeed, is part of  
21 the emergency response program. The utility, as well as the  
22 NRC and comparable number, have placed about 40 dosimeters  
23 around the Yankee Rowe site to determine quantitatively  
24 determine what the dose rate is at the various areas. It's  
25 there for both environmental monitoring purposes and was

1 there for emergency planning when it was needed. It's no  
2 longer needed for Rowe.

3 That creates a large database of information  
4 that's not only available to Yankee, but to the NRC, and  
5 that's where we determine the variation in background based  
6 upon the large numbers of data points over the seasons of  
7 the year and over different locations, that there is  
8 variability in background from site to site on the border of  
9 30 to 40 millirem a year. And that's true throughout New  
10 England, based upon the changes that were --

11 MR. KATZ: So what I understand you to be saying  
12 now is that there hasn't never been an independent study of  
13 background radiation in this particular area that  
14 established this figure.

15 MR. MELLOR: Yankee's numbers in the  
16 decommissioning plan are based upon Yankee's work.

17 MR. KATZ: Since the reactor opened, but never  
18 before it opened. So this variation was never determined by  
19 independent study.

20 MR. MELLOR: But, remember, this goes out for 20  
21 or 30 miles without where there is no influence.

22 MR. KATZ: Okay.

23 MR. STOBIEFSKI: Any other questions?

24 MS. NEWINGTON: I gather from people's comments  
25 earlier that it might be true that the decommissioning of

1 Yankee Rowe had proceeded to a point where on-site storage  
2 is no longer an option, is that true?

3 MR. MELLOR: On-site storage of what?

4 MS. NEWINGTON: Well the on-site storage of what's  
5 there now and not having to be taken somewhere else.

6 MR. MELLOR: On-site storage is always an option  
7 at any point in time. In fact, the plan is structured that  
8 way. If you look at the plan, the plan is structured with  
9 storage, and if there is availability of technology to  
10 process waste or to dispose of waste, then it can be  
11 utilized until the point of the final survey, which is the  
12 real purpose of the interaction between Yankee, NRC and the  
13 decommissioning plan to make sure that that site is below  
14 the levels that are established in the decommissioning plan  
15 ultimately.

16 MR. GRIMES: If I could clarify, do you mean  
17 on-site permanent storage and never removed?

18 MS. NEWINGTON: Yes.

19 MR. GRIMES: That would have to be -- the site  
20 would have to be licensed as an on-site -- as a permanent  
21 storage site as any other low-level waste burial site under  
22 the NRC rules. And Massachusetts, for example, would have  
23 to pick that as a site and propose and get it licensed and  
24 go through a process to do that. We would not allow that  
25 without that kind of a process to go forward. I think Russ

1 was speaking of storage during the SAFSTOR period, there can  
2 be storage on-site, but we expect by the end of about 60  
3 years that this material will be removed from the site and  
4 it will be released for unrestricted use.

5 MS. NEWINGTON: So safe storage for, say, 30 years  
6 is still an option?

7 MR. GRIMES: Yes.

8 MR. STOBIEFSKI: There is a woman there -- yes.  
9 Could you just state your name?

10 MS. MILLER: Yes. I'm Sunny Miller of Amherst.

11 I'd like to follow up on Mr. Katz' question. In  
12 addition to knowing no independent study of background  
13 radiation levels, is it true then that there was no  
14 assessment of radiation levels in the northeast prior to the  
15 huge contamination that was carried on during nuclear  
16 testing?

17 In Troy, New York, for example, during one after  
18 -- shortly after one of the atomic blasts in the southwest,  
19 radiation levels at a reservoir were 2,000 times  
20 background. And that massive exposure of the entire  
21 northeast then seems to be, and I know it is officially  
22 considered natural back -- it's been called background --  
23 within the very next year after any such additional burden  
24 is placed on the environment.

25 So, not only are we hearing that this assessment

1 of what is acceptable is coming directly from Yankee Atomic,  
2 we are also hearing that the assessment comes after  
3 essential bombardment and fall out from the home of their  
4 weapons testing program, and that this is a level that we  
5 are proposing to maintain rather than reduce, is that  
6 right?

7 MR. MELLOR: We are proposing to reduce the  
8 residual radioactivity on the site to the 30 millirem level  
9 with the additional caveat that we use an ALARA approach  
10 down to 10 millirem. That hasn't come forward at this  
11 particular point, but that is inside the decommissioning  
12 plan. That we use that ALARA process down to the 10  
13 millirem, so there is an additional drop and reduction  
14 through. I think what Mr. Austin has indicated is a very  
15 effective process, the ALARA process down to the 10 millirem  
16 level.

17 As I said, the data is based on Yankee, but it is  
18 in concert with recommendations by the Health Physics  
19 Society, the American Nuclear Society, relative to the site  
20 and these criteria rules. So we are not arbitrarily picking  
21 that number.

22 MS. MILLER: I understand it's not arbitrary. I  
23 must say that I cannot find these levels to be acceptable in  
24 any way, and that continuing the rate of breast cancer for  
25 example, in Shelburne Falls, which is 95 percent above the

1 expected rate, is an unacceptable continuation of policy of  
2 random murder perpetuated by the NRC and the Atomic Energy  
3 Commission before you.

4 MR. STOBIEFSKI: The gentleman with the camera.

5 MR. SCHAKTMAN: Mr. Mellor --

6 MR. STOBIEFSKI: Could you please state your name?

7 MR. SCHAKTMAN: Yes, Harvey Schaktman. It's come  
8 to my attention recently, gratis the NRC diligently doing  
9 their job, that Yankee Atomic has contaminated Sherman  
10 Pond. Sherman Pond is contiguous to and feeds into the  
11 Deerfield river.

12 I understand -- well I certainly don't approve of  
13 you using backhoes and bulldozers and loading up trucks with  
14 contaminated soil or rubble, our your steam generators or  
15 whatever else you want to take out of here and truck it to  
16 some other community or landfill or burying it on site or  
17 whatever your plan, but how the hell are you going clean up  
18 a pond that feeds into a river?

19 MR. MELLOR: The contamination that's in the  
20 Sherman Pond has been monitored for many, many years has, as  
21 part of our environmental assessment, we reported on an  
22 annual basis to the NRC. The cleanup of that pond is a  
23 process that we don't deem or don't feel, rather, is  
24 necessary, because, as we explained, in our response to the  
25 NRC one there is no dose significance to that material in

1 that location, that's fairly fixed, it's not moving, it's  
2 not moving out.

3 Second, if you were to do your proposal of  
4 dumpsters and backhoes and whatnot and move all of that  
5 material right to the shore line, estimates of --

6 MR. SCHAKTMAN: What?

7 MR. MELLOR: Right to the shoreline, right to the  
8 shoreline if you were to do that hypothetically, estimates  
9 that are done in accordance with NRC codes indicate that the  
10 dose to any person who stood there 1700 or more hours a year  
11 would be well less than 1 millirem. Well less than even the  
12 limits that are proposed in the citable waste criteria. So  
13 that remediation of that is really not warranted.

14 MR. SCHAKTMAN: Is 1 millirem a common figure of  
15 contamination in your view?

16 MR. MELLOR: In terms of dose of common  
17 terminology, yes.

18 MR. STOBIEFSKI: John Mayer?

19 MR. MAYER: I would like an answer to the question  
20 that I posed earlier as to the moratorium on the effluent  
21 dumping in Deerfield River during recreational periods, say,  
22 from May to October, have you looked at that more or?

23 MR. MELLOR: We haven't discreetly looked at a  
24 moratorium, John, and I honestly don't remember that exact  
25 conversation. I know we had a lot of discussions at these

1 meetings on CRP about what could be done, what can be done.  
2 In operating a nuclear power facility, which we still have  
3 an operational role to safely store the spent fuel and to  
4 contain any drainages that may come from just the storm  
5 system, the roof drains, water does need to be processed,  
6 but it's not a function -- it's not necessarily always a  
7 function of being able to hold that water.

8           And that's -- so, from an operational perspective,  
9 because certainly these releases are, at least over 1,000  
10 times lower than they were during operation, excuse me about  
11 300 times lower during operation, and 1,000 times lower than  
12 the license limit that we have in our tech specs in our  
13 license. These are really, are not harmful to the  
14 environment and that's what our monitoring program over 34  
15 years is showing. There is no negligible impact on the  
16 environment from these releases.

17           MR. MAYER: But it's harmful in the fact that it  
18 can impact business in Charlemont. If releases are  
19 directed, I think if you can make a little machine with  
20 regard to the fallout off the reactor site, you can store  
21 waste water for three months somewhere and then release it.  
22 If you're in that river and you happen to have a release and  
23 you happen to have your mouth open and something goes in  
24 there, even a trace amount, you don't know 20 years down the  
25 line if it's justifiable or not and it's a very simple thing

1 for you to do to uphold this. It's not asking for anything  
2 extreme. It's not telling you not to do it, it's saying to  
3 work with the community in doing it.

4 In other words, hold it during the time when there  
5 are -- I don't go in the river much but a lot of people use  
6 that river every weekend, every day and there are literally  
7 thousands and thousands a year. And it just seems a prudent  
8 thing to do if you're really concerned for safety, and it's  
9 not very difficult to do.

10 MR. MELLOR: I don't think there is a safety issue  
11 here, John, and it's not one -- I'm not being argumentative  
12 here, I don't really think it is a personnel safety issue  
13 related to the release which is thousands of times below the  
14 regulatory requirements. But I hear what you're saying and  
15 I will try to listen and try to think of -- about a way to  
16 do it.

17 MR. MAYER: It doesn't seem like a very hard thing  
18 to do.

19 MR. MELLOR: Well, the operational perspective if  
20 you talk to the operators it's not as easy and as simple as  
21 you say it to be.

22 MR. MAYER: But not as difficult as some of the  
23 things you've already done, correct?

24 MR. STOBIEFSKI: Just so people know, I'm going to  
25 call on hands that I haven't -- people who haven't spoken

1 first and then people who have spoken, I'll call on them and  
2 try to do rounds. I saw Debbie Katz' hand. I don't see  
3 anybody else's hand up who hasn't spoke before.

4 MR. TEIGUN: Dan Teigun. I live in Connecticut,  
5 but my question is about the -- this number 30 you have as  
6 far as the exposure.

7 MR. STOBIERSKI: I'm sorry, I can't hear you.

8 MR. TEIGUN: As far as this number 30 that you've  
9 come to for exposure per year, is that based on an average  
10 adult, average male, child? I mean, because there is a  
11 difference between a five-year-old child and a grown adult.

12 MR. MELLOR: When we do the analyses to  
13 demonstrate that we have met the final release criteria,  
14 whatever they may be, it will have to be done, at least  
15 under the current philosophy to the most critical path, at  
16 least that's what the current guidance has indicated. I  
17 don't know where the site release criteria regulation will  
18 end up.

19 MR. STOBIERSKI: I have a list of names. Debbie  
20 Katz is first up. I'm keeping a list as I recognize people  
21 raising their hands. Everybody who has raised their hands  
22 have got on the list so far.

23 MS. KATZ: Russ, I'm sure it's in the  
24 decommissioning plan but I want you to know that's a really  
25 hard document for me to read because I'm not a scientist and

1 I got really confused going through that, and I really tried  
2 to read it. So I hope maybe you can elucidate some of it  
3 for me now and for other people, which -- and it's involved  
4 with the issues of decontamination in the river and the  
5 processes that are going to go on during this time in which  
6 Yankee is going to decontaminate the reactor or parts of the  
7 reactor. I'd like to know what parts you're planning to  
8 decontaminate, what chemicals will go in the river, what  
9 processes are going to be used. I know some of the things  
10 are going to be likely being asbestos sent off-site and  
11 brought back that way, but I'm concerned with what's going  
12 to go in the river and what chemical is going to be used and  
13 what that process is, and when it will take place. And  
14 about how many releases there will be.

15 MR. MELLOR: Let me try to dissect that.

16 First of all, we have no plans to do chemical  
17 decontamination of the reactor. Chemical discharges are  
18 strictly controlled by the national pollution discharge  
19 elimination system permit that's issued to us by the EPA and  
20 by the -- at the time when it was last issued, the  
21 Department of Environmental Quality Engineering, I believe  
22 it's now the DEP, what would be issued, the next version.  
23 They have limitations on each of the release pathways for  
24 various pH conductivity, various things like that, and they  
25 have overriding limitations on chemical discharges that are

1 not within your permit that are not specifically allowed  
2 within your permit. So from that perspective, if there were  
3 small system decontaminations, all of that would have to be  
4 contained and processed and not released. Ultimately the  
5 water could be released if it was shown to not have those  
6 chemicals.

7 MS. KATZ: So that only the radioactivity can be  
8 released?

9 MR. MELLOR: And that's being released at the  
10 very, very, minute levels. And the processing of the  
11 chemicals would remove the radioactivity.

12 MS. KATZ: With the processes they were going  
13 continue to use outside the irradiated fuel pool, which I  
14 understand is released -- there is a small interchange  
15 that's going on, do you plan to be doing any work that will  
16 put more radiation in the river outside the irradiated fuel  
17 pools?

18 MR. MELLOR: The processing of the water itself is  
19 a process that we've used since the beginning of the plant,  
20 and it's an evaporative process and we've used that process  
21 on all the water in our tanks. There is still residual  
22 radioactivity in our tanks and that will still be the  
23 process we have utilized.

24 MS. KATZ: About how many releases do you think  
25 you will need to make in the next six months for that

1 reactor to continue this process?

2 MR. MELLOR: I don't know the answer to that  
3 exactly. I can say as I've looked back in time the numbers  
4 of releases have been a third to a half of what they were  
5 during normal operations. And the values of radioactivity  
6 in those releases have been substantially lowered by orders  
7 of magnitude, and that I can't project how much rain water  
8 is going to come down, and how much rain we're going to  
9 have, it's been tough out there these past few months, and  
10 that creates the need to process water.

11 MR. STOBIERSKI: Harold Stiles I think. The  
12 gentleman -- okay, the next person was Jean-Claude, I said  
13 it right this time.

14 MR. VAN ITALLIE: Yes. I have two questions.  
15 Actually the first really it's become,  
16 unfortunately, a rhetorical question and it's for Yankee,  
17 it's for you, Russ. Have you heard me, prior to tonight,  
18 ask you for prior notification as it relates to effluent.  
19 We're asking at least let us know when you're going to dump  
20 a batch of radioactivity into the river, tell us, on such  
21 and such a day we will dump it, so that we can choose not to  
22 swim in the river, not to let children go in the river on  
23 that day if we want to. I've asked you that for, I think,  
24 three years, as long as you and I have been facing each  
25 other at these meetings across tables. You always said you

1 will take it under advisement. So I would like to say that,  
2 NRC as visible witnesses here, that also has been asked  
3 for.

4 My other question was for the first gentleman who  
5 spoke for the NRC. You spoke, sir, about international  
6 standards of radiation as if they were sacrosanct, and I  
7 suppose they'd have to be taken in sacrosanct sense by you.  
8 I wonder what they're based on, because something that's  
9 international doesn't make it either permanent or  
10 necessarily applicable. It seems to me to people who have  
11 been irradiated, albeit by small amounts, we hope over 30  
12 years, what about cumulative effects?

13 If we are experimental, as I assume we are since  
14 Yankee was the first operating power reactor, then how can  
15 these standards, which are based on something else, perhaps  
16 bombs exploding, perhaps high levels of radiation at one  
17 blow rather than cumulative smaller levels, how can you take  
18 those standards and apply them to us? And I would  
19 appreciate a Commission report -- or perhaps my  
20 understanding is wrong -- but I would appreciate that, so  
21 that you would tell us that indeed this is experimental.

22 And also, I'm curious how often those figures,  
23 those international figures that you base yourselves on, and  
24 which our lives depend on, how often they're revised.

25 MR. AUSTIN: Well, these international standards

1 are revised in one manner or another every few years.  
2 Reports are coming out at about that frequency in which the  
3 most current thinking is reflected in it, either on the  
4 total annual exposure rate, or on aspects of certain  
5 radionuclides that say, emit alpha particles or beta  
6 particles.

7           The bases for the international standards, in  
8 large part, is from the follow-up studies of the  
9 Hiroshima/Nagasaki, of which that study is still ongoing,  
10 and it has had a significant influence on developing  
11 standards.

12           There are other situations in which individuals  
13 have been exposed to radiation, such as the old radium dial  
14 painters, there have been studies of that to see how that  
15 might influence the calculations. And then what the  
16 international community does is assume that there is a  
17 linear, no threshold dose response curve. And that is, you  
18 take the data that you have at higher exposure rates and  
19 extrapolate it down to 0, without a threshold. Which means  
20 that the theory, not scientific proof, the theory is that  
21 any radiation exposure could result in a probability of  
22 contracting cancer sometime in the future. Some believe  
23 that is an overly conservative approach and that there  
24 should be a threshold, such that an exposure to an  
25 individual of 1 microrem per year should not be calculated

1 to create a probability of cancer from that microrem per  
2 year. But, nonetheless, the community stays conservative  
3 and assumes the linear nonthreshold, that's how they were  
4 developed.

5 MR. VAN ITALLIE: I appreciate the clarity of  
6 your. Answer, I still wonder if we are basing our -- you're  
7 basing your calculations on Hiroshima/Nagasaki figures, but  
8 it isn't basing it on a one time exposure or even over a  
9 period of a year. So that a one-time exposure to a high  
10 amount of radiation, what about the people like us who may  
11 have been exposed to a low amount over a long period of  
12 time. Does it necessarily follow that the calculations  
13 would be the same in both cases?

14 MR. AUSTIN: The cumulative exposures are a  
15 consideration in developing the standards. We used to have  
16 a formula that we required workers to stay beneath a  
17 cumulative radiation exposure that would be calculated based  
18 on that equation in the regulation.

19 Recently we changed our radiation protection  
20 standards to reflect the more recent international thinking,  
21 lowering, one more time, the upper limit on allowable annual  
22 radiation exposures; but the equation for cumulative was  
23 removed, rather we control it by conservative annual. So it  
24 is a factor. The cumulative exposure is a factor in making  
25 these decisions. But recall that the background radiation

1 is, on average about 300 millirem per year. So a person who  
2 lives 70 years gets a total of 21 rem, if my math is  
3 correct.

4 MR. VAN ITALLIE: Excuse me, just one more concern  
5 that I have here. It's not only the cumulative amount of  
6 radiation, but also the possibility, and I've seen a study  
7 that suggests that low-level radiation might be more harmful  
8 than high level radiation, if exposure is over a long period  
9 of time. That frightens me very much and I wonder if that  
10 comes into your calculations.

11 What happens if suddenly that is proved to your  
12 satisfaction and suddenly all the standards which you held  
13 to protect us has become invalid?

14 MR. AUSTIN: National committees are formed in  
15 this country for purposes of debating this very point. Our  
16 national committees develop a position, they carry that  
17 position into the international community where it is  
18 discussed, debated. The data on one hand suggests lower is  
19 worse -- lower exposure rate is worse. Present data where  
20 the lower is none at all, and hash it out and then come up  
21 with this consensus. These are issues that are addressed in  
22 the debates that set the national standards and the  
23 international standards.

24 And again, the prevailing view is it's linear  
25 nonthreshold, which means that it's not worse or it's not

1 nonexistent, it's just straight down, 0 dose, 0 effect any  
2 dose of little effect.

3 MR. VAN ITALLIE: You understand my fears?

4 MR. AUSTIN: I understand your fears and I -- as I  
5 said, it is debated in the national and international  
6 community. And the consensus coming out of it is that it's  
7 better to cling to the linear nonthreshold hypothesis.

8 MR. GRIMES: If I could also comment. One of the  
9 things you usually see in these international and national  
10 reports is a comment on the fact that there are wide  
11 variations over the U.S. and over the world of natural  
12 background radiation, and that long-term studies of these  
13 populations don't seem to support any correlation with those  
14 changes in background radiation. So that's one thing that  
15 you can relate to in terms of low levels of continuous  
16 radiation.

17 MR. STOBIERSKI: I have Karen Blazer next.

18 MS. BLAZER: Yes, a few brief questions.

19 One is what is an informal hearing, which is what  
20 we are at tonight. I don't really understand the term. To  
21 me it doesn't seem like a hearing, it seems like a meeting  
22 to me; but what is the definition of -- what's defines an  
23 informal hearing?

24 MR. GRIMES: For the NRC, we wanted to distinguish  
25 this meeting from an adjudicatory process with lawyers and

1 cross-examination, and to indicate that it was not that, but  
2 rather that it was an opportunity to take and record  
3 concerns to which the NRC staff would -- which the NRC staff  
4 would evaluate and respond to in our review process of the  
5 decommissioning plan. So the word informal is used to make  
6 sure people understood that it was not a formal adjudicatory  
7 hearing.

8 MS. BLAZER: Okay, and Harvey's question to Russ  
9 earlier, and Russ, when you answered that if a person stood  
10 right in front of a bunch of this rubble that was collected  
11 from the lake and this and that, that anything they would be  
12 exposed to is such a very small amount, I'm confused. So I  
13 know that radiation comes in different ways, gamma radiation  
14 can penetrate certain things; and plutonium, if you stand  
15 next to it, it's not dangerous unless it's been exploded,  
16 but if you eat it then you can get cancer from a very, very,  
17 very infinitesimal amount -- or you will get cancer from an  
18 infinitesimal amount. So what about if you swam in that, or  
19 if you drank that rather than just stood next to it.

20 MR. MELLOR: Well, first of all, the contamination  
21 is in the sediment, in the mud.

22 MS. BLAZER: Sediment.

23 MR. MELLOR: And if you swam in that area,  
24 certainly the dosage you would get would be substantially  
25 less than you would get if you were standing on all that

1 material for a year, if you don't swim in that area for a  
2 year. So we are talking extremely small because we are  
3 talking, I think it's tens of feet below the surface of the  
4 pond that we are talking about.

5 MS. BLAZER: That goes in to what could be  
6 drinking water, I mean this sediment --

7 MR. MELLOR: There is no indication that Sherman  
8 Pond or in any of the downstream sampling of any gamma  
9 emitters. And the contamination we are talking about, as  
10 indicated in the decommissioning plan is very, very low  
11 levels of cobalt 60, much lower even than the current  
12 regulations on release surveys would indicate you would have  
13 to look.

14 MS. BLAZER: Cobalt 60 is a gamma emitter.

15 MR. MELLOR: It is a gamma emitter, that's how the  
16 doses are configured.

17 MS. BLAZER: Okay, it still doesn't make me feel  
18 very comfortable. The last one is brief also, and that is,  
19 there was a question earlier directed at the NRC that the  
20 money that was saved on decommissioning, could that possibly  
21 be used towards a health study. I don't know if someone  
22 answered that.

23 MR. GRIMES: I guess it's not our money that was  
24 saved, it was Yankee's money that was saved in this case. I  
25 think the NRC and the various agencies of the federal

1 government are interested in various types of health  
2 studies, and there have been large amounts of money spent on  
3 radiation health studies over the years.

4 We asked our staff expert whether the types of  
5 effects that have been seen here in the Deerfield Valley  
6 would likely be related to radiation, the answer was no, as  
7 was communicated in writing to CAN, and you'll have an  
8 opportunity to interact a little bit on that tomorrow if you  
9 come to the meeting tomorrow.

10 But from our standpoint, at this point at least,  
11 and we understand CAN is going to provide us some more  
12 information which we will evaluate. We haven't seen a  
13 reason to go forward as the NRC. There are other agencies  
14 that also may be interested in these types of things, even  
15 proving negatives, and we think this could be brought to  
16 their attention. But at this point we don't plan on  
17 anything. As far as the money that's saved, again, that is  
18 the ratepayers' money through the Yankee rate process.

19 MS. BLAZER: My understanding was different than  
20 that, that it's not the ratepayers that saved Yankee money.  
21 Okay.

22 MR. AUSTIN: If I could follow on to your question  
23 -- and a number of people brought up health effects studies  
24 in this area. In our branch we have a site that is also  
25 undergoing decommissioning, it's not a power reactor, it was

1 a fuel fabrication facility. And a lot of citizens  
2 expressed concern about health effects in that area.

3 It turns out in the Department of Health and Human  
4 Services at the federal level there is an agency that I  
5 cannot remember it's name, but I think it is something like  
6 the Agency for Disease Registry and Health Effects Studies  
7 -- and that's an approximate name -- the acronym doesn't  
8 remember -- or doesn't seem right, but it's a name like  
9 that, and if you give me your phone number I could go home  
10 and find out what it is and let you know.

11 And their function in life is, in part, to do  
12 health effects studies around Super Fund sites. And my  
13 understanding is that it is -- frequently they conduct  
14 studies based on request. The only question is who does the  
15 requesting. And I do not know their process or procedures  
16 or what it takes, but that's what their role in life is and  
17 I'll get you the name and you might want to contact them and  
18 --

19 MR. STOBIERSKI: Commissioner Forbes would like to  
20 say something and we'll go back to questions afterwards. I  
21 have two people still on the list for questions.

22 MS. FORBES: I'd like to speak, and I'd like to  
23 thank everyone. I know this isn't the end of the meeting  
24 and we can continue with questions, but I would like to  
25 address as much of the whole body as possible tonight.

1 I want to thank you for your input, I want to  
2 thank you for a very enlightening evening. I know some have  
3 questioned the worth of this, it is great worth to us to  
4 hear -- to hear all of this set forth before us.

5 This is our land, this is our community, we are  
6 all here together, and the county commissioners represent  
7 the total community. We are very aware of this and I'm  
8 breaking the rule tonight. I have conferred quickly with  
9 John, at a hearing we take information and we do not make  
10 dispositions. At this point I'm breaking my rule and I'm  
11 saying it on a one-time basis only. I've spoken to John and  
12 it seems like it would be very feasible to have a health  
13 study done. And I'm hearing John respond and I would like  
14 to take a proactive stance and to facilitate and aid you in  
15 this process and following through.

16 I also heard Brian speak and said that it perhaps  
17 would be feasible that an NRC -- am I correct -- now don't  
18 let me put words in your mouth -- but that perhaps there  
19 could be a monitor on site at the -- a resident inspector at  
20 the Atomic plant.

21 MR. GRIMES: What I said was, lessons learned, if  
22 we were to do this again I would want to have somebody,  
23 during the major component removal activities on site, and  
24 that may be true at some time in the future. I would not  
25 see that during times when there are no major activities

1 going on. But in periods of time, such as what we just went  
2 through with the steam generator removals and things, I  
3 believe that is a very constructive thing to do.

4 MS. FORBES: Is it feasible to say that when there  
5 is activity there, that in the future there would be someone  
6 on site?

7 MR. GRIMES: I can't commit that for the NRC, but  
8 I will say that it seems to me it should be given serious  
9 consideration.

10 MS. FORBES: All right, thank you.

11 Thank you.

12 And the third thing I've said, and I think that's  
13 obvious to you is, we're taking a proactive stance here and  
14 that we'd like to work as the liaison for all to bring us  
15 together on these issues so that we can have some  
16 resolutions.

17 And I thank everyone here tonight because I think  
18 it was an outstanding meeting, and not to interrupt the  
19 meeting I'll direct it back to John.

20 Thank you.

21 MR. STOBIERSKI: We want to give everybody as much  
22 opportunity to ask questions as we can. I have a couple  
23 people down. The woman from Amherst, I'm sorry, I forgot  
24 your name, but I remember --

25 MS. MILLER: Sunny Miller.

1 I'd like to ask the names of the gentleman that  
2 I'd like to address from the NRC.

3 MR. AUSTIN: John Austin.

4 MS. MILLER: Austin?

5 MR. AUSTIN: Austin, yes, as in Texas.

6 MS. MILLER: I have to say that I'm very  
7 disappointed in your answer regarding the international  
8 health studies on radiation. You said there are studies and  
9 the figures are revised one way or the other every so many  
10 years. In fact that is a deception because you have not  
11 told the public that those international communities looking  
12 at radiation risk have revised the standard downward and  
13 downward and downward, is that not so?

14 MR. AUSTIN: That's correct. Oh, but on some --  
15 the dose conversion factor for some individual radionuclides  
16 is occasionally raised and it is occasionally lowered for  
17 different radionuclides. So it's the overall limit on total  
18 exposure regardless of source; yes, it has come down  
19 consistently over it the years.

20 MS. MILLER: I was also disappointed in your  
21 response on the question of when you said that the standard  
22 that we are now following, we're following the mode of a  
23 linear --

24 MR. AUSTIN: Nonthreshold.

25 MS. MILLER: -- nonthreshold assessment of risk.

1 And you said some people feel that that's, you know,  
2 excessive. You did not mention those people who perceive  
3 this to be an excessive standard of risk, and that is an  
4 imbalance -- in your reporting to us that is an imbalance.

5 And I would say like to say to the public that Dr.  
6 John Gallman has, who you probably may even know, has worked  
7 years past at isolating the very first materials used in a  
8 nuclear weapon, and has since gone on to study radiation  
9 effects. And has said that there is a supralinear dose  
10 response pattern and it is inappropriate for you to mention  
11 to us that there are those who doubt and say this is an  
12 excessive assessment of risk, and not to say there are other  
13 people who say this is an a inadequate assessment of the  
14 true risk. And I challenge you to not take advantage of the  
15 public trust and present convenient support for your present  
16 position.

17 I would also like to say that in terms of the  
18 risk, I don't know whether people -- I missed the first part  
19 of the meeting, I'm sorry that I missed it, but were you  
20 informed that during an eight year period the incidence of  
21 breast cancer in Shelburne Falls is nearly twice the  
22 national average, were you informed of that earlier?

23 MR. AUSTIN: I don't recall that being mentioned  
24 earlier.

25 MS. MILLER: Before I spoke of it, it was 95

1 percent above suspected incidence.

2 Now, you should know how you said that there are,  
3 the Department of Public Health in Massachusetts has not  
4 responded positively about a health survey and that your  
5 interest in a health survey, I would hope that you may, in  
6 your ability to levy fees you might consider. Because we  
7 all know the government won't undertake things it doesn't  
8 find money for. It would be very appropriate for you, as an  
9 agency who assesses fees of Yankee Atomic, to determine that  
10 a fee should come from Yankee Atomic for this health study.

11 Thank you.

12 MR. AUSTIN: If I could just comment on your  
13 comment about presenting one side of an argument. I thought  
14 I agreed with Jean-Claude that there are people who do  
15 believe that low exposures could be more hazardous than this  
16 linear hypothesis, and I tried to explain that these very  
17 debates the Goffman proposal, the Tamplin proposal, the  
18 Stuart proposal, all of these, some that are much more  
19 conservative than linear hypothesis, some that are a lot  
20 less conservative than linear hypothesis, these are all the  
21 debated in the national arena and then in the international  
22 arena. And it's from that debate that the scientific  
23 community takes either the consensus or the vast majority  
24 view as a basis for establishing regulatory limits. But  
25 again, I thought that was presenting both sides when I

1 agreed with that previous comment. I was not trying to --

2 MS. MILLER: Thank you for the clarification,  
3 maybe I was confused.

4 MS. KATZ: I had wanted to comment on a couple of  
5 things the NRC said, and then I want to ask a question  
6 because, in fact, there have been studies of high background  
7 radiation in China that have found statistical significance  
8 in Down's Syndrome.

9 And in fact there are worker studies by Stephen  
10 Wing who did it for the Department of Energy who found that  
11 after 25 years of exposure to 140 millirem lifetime dose,  
12 140 millirem lifetime dose, they had a 63 percent increase  
13 in risk of Leukemia and a 33 percent risk of other cancers.  
14 And this was only after 25 years would you see the effects  
15 of long-term exposure of low-level radiation. And this is  
16 the work that Dr. Wing is in fact continuing to do for the  
17 DOE in terms of these issues. So that, I think that you  
18 clarified that.

19 And in light of that I have a concern, and I had  
20 raised it in terms of Shoreham and Fort St. Vrain in terms  
21 of the relaxation of standards in terms of decontamination  
22 of the irradiated fuel pool and the allowing of greater  
23 amounts of tritium and I can't remember the --

24 MR. AUSTIN: 155.

25 MS. KATZ: But instead, where they could do less

1 decontamination, and in fact strip it, and put it in a waste  
2 dump, and I'm really concerned about it. Given the issues  
3 that are being raised about tritium that have come up from  
4 Lawrence River labs and other places, this is a concern in  
5 part because we are here with tritium and what happens in  
6 our community, but why is this happening? I don't really --  
7 and I'm sure Yankee is going to applaud for the same ability  
8 to leave more, a hotter reactor behind, than a hotter  
9 reactor in waste sites.

10 MR. AUSTIN: It's tritium and iron 55. The  
11 commonality between tritium and iron 55 is that they are  
12 both weak beta-emitters. And our branch technical position  
13 or regulatory guide, it has been developed for allowable  
14 surface contamination to be left behind, is bracketed in the  
15 nature of certain kinds of radionuclides, certain emitters;  
16 there are some specific radionuclides identified and at so  
17 many disintegrations per minute per 100 square centimeter  
18 and you get the number there.

19 There is a category of radionuclides call beta  
20 gammas, and what it says at the bottom of this table, is  
21 that if you haven't found the radio nuclide of interest up  
22 here where you get a number, you come down here and look for  
23 beta gamma, and that applies to all other beta gammas. And  
24 then there is a number, I believe it's 5,000 dpsm,  
25 whatever. Now, you have strong beta-emitters and you have

1 very weak beta-emitters and it's applied equally. And the  
2 argument was made one, tritium and iron are pretty hard to  
3 detect unless there is a lot there.

4 MS. KATZ: Yes, I know.

5 MR. AUSTIN: Two, that if you apply -- if it is  
6 acceptable for the strong beta to be at whatever, 5,000, why  
7 is it that on a risk basis you would make it 5,000 for a  
8 very weak beta. So, it is a lower risk factually because of  
9 the energy of the particle coming out, factually it's a  
10 lower energy, and that was the technical argument.

11 MS. KATZ: But given the issues that are coming up  
12 around tritium, that in fact, even though it's a low  
13 beta-emitter, that in fact, acts like soft x-rays and in  
14 fact, packs quite a punch to it that it may, in fact, be  
15 more serious than what was originally thought, seeing it's a  
16 relatively benign radionuclide, and there is evidence  
17 mounting.

18 In fact, the Canadian government is now  
19 restricting the standards on tritium and making them higher  
20 because of their concerns about radioactive releases into  
21 bodies of water that have been used for drinking around  
22 nuclear power stations; this is happening right now. I'm  
23 concerned that the NRC appears to be doing just the opposite  
24 of what the Canadian government is in the process of  
25 re-evaluating. As they go strict, we seem to be relaxing.

1 And since tritium is used in the weapons industry and  
2 they're taking apart missiles and it's released from all  
3 pressurized water reactors, and it is, in fact, I guess in  
4 all irradiated fuel pools, you know, in the buildings, that  
5 I would think that these standards might need to be made  
6 stricter at this point rather than the relaxation process  
7 that's taken place.

8 MR. AUSTIN: Well, I don't know the circumstances  
9 of what Canada is doing, but --

10 MS. KATZ: I can give it to you. I can give it to  
11 you tomorrow if you'll be here.

12 MR. AUSTIN: I won't, but if you could explain it  
13 to one of the individuals in the branch they can tell me.  
14 But I mentioned that we just changed our basic radiation  
15 protection standards a couple of years ago. It became  
16 effective January 1 of this year, that is everyone had to be  
17 implementing it. Those numbers in our radiation protection  
18 standards are concentrations for every radionuclide, for  
19 quantities of radionuclides that are addressed in it. They  
20 were calculated based on these internationally accepted  
21 standards that we've talked about here tonight. We use that  
22 one for tritium that is current. In making this  
23 conservative calculation if it is left behind in the surface  
24 of concrete or on the surface of the steel or whatever and  
25 it's scuttled off or whatever, what is going to be a -- the

1 dose, and we calculated it to be very, very low, even if we  
2 increased the amount of how much could be left behind.

3 MR. STOBIERSKI: I see one further last question.  
4 Mr. Katz.

5 MR. KATZ: Yes. I somehow feel that Debbie left  
6 something out. I think what she wanted to bring up, and I  
7 think she simply forgot, was the problem with tritium is  
8 that it readily combines with carbon, and because of this,  
9 it is ingested and becomes a part of any individual who  
10 encounters it in this matter. And that ingested it's a far  
11 more serious a problem because it is -- and I think that  
12 Debbie would give you studies based on this process of the  
13 combining of tritium and carbon.

14 MS. KATZ: Organically bound tritium.

15 MR. AUSTIN: I believe the most likely combination  
16 of tritium -- my dissertation happens to be on tritium  
17 diffusion through claddings, and I believe it would wind up  
18 as being water -- heavy, heavy water and then absorption  
19 into the body.

20 MR. KATZ: A lot of water weight?

21 MR. AUSTIN: My weight did not triple when I  
22 worked with tritium.

23 MR. STOBIERSKI: Well, I see no further questions  
24 and I'm going to close the hearing now. I would like to  
25 make a couple quick closing remarks.

1           Thank you all for coming. I kind of feel that  
2 some of the people here act as the conscience of the public  
3 of Franklin County in making sure that the process is done  
4 right, that the issues are examined, and that you're a big  
5 part of what happens here. Also, thank you for your  
6 civility in terms of making this feasible for the county  
7 commissioners to do things like this. And if we have  
8 another opportunity to do so we certainly will.

9           Thank you.

10           MS. FORBES: I would like to just personally thank  
11 all of the board here, Mitzi and Brian and John and Russ,  
12 and thank you for being here tonight. All participants,  
13 this was very, very bountiful, thank you. And when I said  
14 this was good for us -- when I speak us I do it in the  
15 literal sense, I mean the county. It gets the information  
16 out for the county and that's what we are here for. So  
17 thank you all.

18           [Whereupon, at 9:46 p.m., the hearing was  
19 concluded.]

1 REPORTER'S CERTIFICATE  
2

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

5  
6 in the matter of:

7 NAME OF PROCEEDING: INFORMAL HEARING ON YANKEE ROWE

8 DECOMMISSIONING PLAN

9 PLACE OF PROCEEDING: GREENFIELD, MASSACHUSETTS  
10

11 were held as herein appears, and that this is the original  
12 Transcript thereof for the file of the United States Nuclear  
13 Regulatory Commission taken by me and thereafter reduced to  
14 typewriting by me or under the direction of the court  
15 reporting company, and that transcript is a true and  
16 accurate record of the foregoing proceedings.  
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#### NRC MEETING ON DECOMMISSIONING

NRC is at a cross roads:

1. This cross roads involves the potential for the Melt down of democracy. Whether YAEC should have chosen the SAFSTOR option for decommissioning is moot what has become clear is that no community may have input into the utility's choice if the experiment at Rowe is codified. Without a change in the rules, there are no hearings for citizens except at siting reactors.

Without a change in NRC rule making, the early Component Removal Projects, the removal of major components, are allowable without a decommissioning plan or compliance with NEPA requirements. In fact no decommissioning plan would be required. No hearings offered. No community input. This is the destruction of constitutional government. The melt down of democracy.

#### Concerns With CRP:

1. There has been no resident inspector on site during decommissioning. MDPH makes only monthly visit to reactor.
2. Exposures during CRP were on the high end. Workers received 2.6 rem exposure from January through June 1994. This was due to the cutting of the 1,000,000 curie baffle under water. This included a one order of magnitude increase of releases into the DRV.
3. Techniques used during CRP were experimental such as under water cutting of internals and the baffle. NRC was unable to provide CAN or NIRS with the curie count for the internals or the baffle before the procedures were undertaken. Over 136,000 curies were sent to Barnwell, SC in the CRP in 59 shipments.
4. Security guards were used in the containment sphere where under water cutting was performed. They were used to monitor the packing and shipping of internals to the irradiated fuel pool and to Barnwell, SC.

Their union maintains that they were not provided adequate training in radiation safety. There is an investigation by OSHA for worker exposure to asbestos during the CRP.

5. NRC regulations state that the way to control decommissioning is through the plan. The plan provides the only protection for workers and the public. There were over a 110 cases of worker contamination in April and May 1994.

The containment sphere was evacuated 3 times during the cutting of the baffle because the levels of airborne radioactivity exceeded YAEC's acceptable limits. There was a contaminated shipping cask sent to YAEC. It was decontaminated repeatedly. It was found to be radioactive when it reached Barnwell, SC.

6. There have been 37 effluent releases into the Deerfield River during the CRP. 23 releases occurred in April and May. Although releases were in micro and millicuries, we are concerned with the cumulative doses incurred by local citizens over the 31 year release history of the reactor.

NRC acknowledges over 10,000 curies of tritium were released into the river between 1966-1973. This does not account for the tritium releases between 1961- 1965. NRC did not require records of these releases from nuclear power stations until 1965.

#### **Concerns for formal Decommissioning.**

1. CAN raised health and safety issues at a teleconference with NRC on 8/4/94 for citizens living in effluent pathway of the reactor and workers on site at YAEC. We remain concerned. We are concerned with continued releases into the river.

Our community has been exposed to effluent from YAEC on a routine and regular basis for 31 years. We are concerned with the cumulative effects of long term exposure to low-level radiation. These 37 effluent releases into the river during the CRP were in general lower than when the reactor was operational.

We want all radioactive releases to stop. There is an epidemic of disease in the DRV including a 50% increase in 5 cancers, a 40% increase in heart disease leading to mortality, a 110% increase in infectious disease leading to mortality and a 10 fold increase in Down syndrome.

2. CAN wants the NEPA requirements to be followed. NRC should do an environmental assessment of the DRV. This would include but not be limited to a radiological study of contamination in Sherman Pond and Sherman Spring. We ask that US Geology participate in this process.

3. We want an understanding of the three tritium leaks at the reactor site. We want an understanding of the original contamination in the 1960's in the ion exchange pit which is the origin of these.

4. CAN wants to know how NRC will determine whether the water loss in the irradiated fuel pool is related to these tritium leaks or from evaporation. If it is evaporation, where is this evaporation going? Is it remaining in the fuel pool building or is it leaving the building through the vent stack? Is the vent stack monitored?

5. CAN wants a health study done of the DRV to understand the health effects of 31 years of exposure to tritium. We have submitted an annotated bibliography of tritium to NRC. Tritium has been found in recent research to be 2x as carcinogenic, 2-5x a mutagenic, 2x as teratogenic as originally believed. We believe this study is required under NEPA.

6. CAN believes that a resident NRC inspector must be present during decommissioning. This would include the component removal projects, the removal and shipping of the reactor vessel as well the dismantlement of the buildings and the dry casking of the irradiated fuel rods.

7. What procedures will be used to decontaminate the reactor? What effect will this process have on the river? Will chemicals as well as radionuclides be released into the river? YAEC intends to reduce its volume from 90,000 cubic feet of radioactive materials to less than 39,000 cubic feet. This volume reduction will take place through decontamination. YAEC projects incineration and melting procedures to reduce waste volume further. How will the effluents from the decontamination, smelting, and incineration be contained and monitored?

8. Will NRC be responsible for the clean up of the building housing the irradiated fuel or will DOE? Why have standards been relaxed for nuclear power station concerning decommissioning? The walls of the irradiated fuel pool buildings at Shoreham and Fort San Verain were found to be more radioactive than expected. NRC is allowing greater concentrations of tritium and other radionuclides to be carted away as radioactive rubble. Why have standards been relaxed? How will this affect YAEC? Is this waste above class C?

9. What methods will be employed in the breaking apart of the buildings?

10. What effect does the storing of the 1,000,000 curie baffle have on the irradiated fuel pool's water exchange with the DRV? What is the curie count of the irradiated fuel rods in the pool? If as YAEC intends the irradiated fuel is removed from the pool and dry casked, how will this process be performed?

# Electric utilities enter era of competition

By H. JOSEF HEBERT  
Associated Press

SEATTLE — The nation's electric utilities, long safe and content with captive customers, have been jolted into a new world of competition. It could lead to rate relief for some customers, but others worry they may be left paying more.

From Maine to New Mexico, utilities have been under unprecedented pressure to cut costs, reduce electric rates and in many cases cater to the demands of large-volume customers threatening to pull the plug and shop for a better bargain.

The rapidly changing world of the once-stable utility industry is expected to have both winners and losers, say industry executives. They debated the era of new competition at the annual convention this week of the 190 private companies that supply about three-fourths of the nation's electricity.

Congress triggered dramatic changes in electricity distribution and marketing two years ago when it required utilities to open their transmission lines to competitors and expanded the ability of wholesale buyers of electricity to shop around.

Recently California regulators proposed to extend the freewheeling competition to the retail level, allowing large industrial users to freely shop for electricity beginning in 1996 and residential users by 2002.

While many details remain to be worked out and the California approach has both supporters and strong critics, utility executives agree their industry has been changed forever.

"The competitive genie is out of the bottle," Stanley Skinner, chairman of California's Pacific Gas & Electric Co., said in an interview Tuesday.

"The threat of competition is changing the culture," agreed Bill Lee, chairman of North Carolina-based Duke Power Co. No longer can a company feel it is entitled to a profit no matter what.

Large industrial customers are stepping up pressure to bargain for lower rates, threatening to go elsewhere if a local utility doesn't comply.

"Most utilities want their customers being captive. It's nice being the king," argues John Anderson, executive director of the Electricity Consumers Resources Council, a Washington-based group that represents large industrial electricity.

But increasingly that king is losing his monopoly power. For example:

- In Maine, the small community of Madison pulled the plug recently on the Central Maine Power Co., arguing that it could get cheaper electricity rates from Northeast Utilities. Maine Power must transmit the electricity on its lines. Madison community leaders predict rates will drop 40 percent.

- Last April, the village of Romeo, Mich., where Ford Motor Co. has a plant, began studying whether to drop Detroit Edison as its supplier after a study showed a possible savings of \$16 million over 10 years including average annual savings of \$150 for residential users.

- Massachusetts Electric Co. not long ago lost the Boston transit system as a customer after the state legislature declared the transit authority a franchised utility so it could buy power wholesale from a cheaper source.

- Las Cruces, N.M., is throwing out its long-time electricity supplier, El Paso Electric and forming its own distribution system to buy cheaper power from Southwestern Public Service Co. City officials say residential rates could be cut by 40 percent.

But in another twist, El Paso Electric, which has some of the highest rates in the region, has been bought by Dallas-based Central & South West Corp., a holding company that recently offered to freeze Las Cruces rates in hopes of winning them back.

Some consumer advocates and environmentalists worry about the new competitive pressures.

"Large industrial users are going to be able to get cheaper rates," says Ed Rothschild, an energy analyst for the consumer group Citizen Action, "but who's going to pay for that? It's going to be dumped on the residential and small business customers."

Ralph Cavanaugh, an energy expert for the Natural Resources Defense Council, expressed concern that if there is too much emphasis on lowering rates to keep or attract customers, utility executives may abandon energy efficiency programs needed to reduce pollution.

Nevertheless, many utility executives say the expansion of competition to retail purchases is inevitable.

John Hayes, chairman of Western Resources, which owns three utilities that provide electricity in Kansas and Oklahoma, said in an interview that he is convinced residential as well as large industrial customers in the not too distant future will be able to shop around for their power as well.

"The electric utilities today buy and sell power. Companies do that every day among themselves," said Hayes, adding that one day using the new information highway and home computers retail customers will be able to do the same.



"We took some pictures and they all had these spots on 'em, fogged by radiation," said Rudy Florentine of Ventnor, N.J. "We were gung-ho cause we were getting out POWs" from Nagasaki. He and his family suffer a variety of health problems.

## STREETER TESTIMONY

The life expectancy of the whole country is dropping."

During a two month, 20,000-mile journey to the bomb fields of the United States, Russia and Kazakhstan a nightmarish picture emerges. The two super-powers acted with callous disregard for their own people. And they did it in a strikingly similar fashion. As a result both are in deep plutonium.

In 1943 in Hanford, Wash., President Franklin D. Roosevelt gave 1,500 residents 30 days notice to move and brought in 95,000 workers to secretly produce plutonium for an atom bomb. The plutonium produced there was used in the Trinity Test, the first nuclear detonation, and in Nagasaki. At its peak in 1964, nine plutonium production reactors were operating at Hanford. The waste ended up in the ground, in the Columbia River and in tanks that leak to this day.

In 1945, Josef Stalin ordered 70,000 labor camp inmates to build the Mayak Chemical Complex in the Ural Mountains to produce plutonium. By 1949 they were testing bombs in Kazakhstan. Mayak (also known as Chelyabinsk-40) appeared on no maps and formed the backbone of the Soviet nuclear weapons complex. At Mayak waste was dumped directly in the Tezha River, in lakes and into tanks that still leak. Lake Karachay is considered the world's most radioactive

site. A person standing on its shores would receive a lethal dose of radiation in one hour.

In 1957, one storage tank exploded and hundreds of thousands were exposed to the fallout. The CIA knew about the disaster but kept it quiet to avoid a closer inspection of US bomb-making facilities.

The United States tested bombs and marched its soldiers through the fallout in Nevada and the Marshall Islands. The Soviets did the same near the village of Totskoye in the Ural Mountains. Cancer, birth defects, and weakened immunity are the tests' legacy.

According to Department of Energy documents, from the 1940s through the 1970s, the United States used its own citizens as guinea pigs for radiation experiments, without their consent. From 1961 to 1965, for example, 20 elderly subjects at the Massachusetts Institute of Technology were injected with or fed radium or thorium, a radioactive element. And from 1945 to 1947, 18 patients in hospitals throughout the country were injected with plutonium to measure how much their bodies would retain.

In Spokane, Wash., a former motel used by prostitutes still houses flesh, but it's not for sale. The National Human Radiobiological Tissue Repository is a collection of 20,000 pieces of irradiated human parts.

In Semipalatinsk, Kazakhstan, medical personnel collect deformed infants and fetuses, including one with only one eye and another with two heads. Near Three Mile Island in Pennsylvania, a farmer's wife keeps a mounted two-headed calf in her closet, next to a hat box. Her neighbor has a collection of deformed plants, including a 2½-foot dandelion leaf.

Rudy Florentine of Ventnor, N.J., was aboard the US Jack Miller in the Pacific when a nuclear bomb was dropped on Nagasaki. His mission was to pick up 9,000 POW's. And in doing that, he says he was exposed to radiation.

"My first son was born premature," he said. "He lived a week. I buried him Christmas Eve, the day of the baby shower."

Next came a miscarriage, a daughter with a variety of health problems, another daughter born with leg deformities and a son with cerebral palsy. "Five pregnancies, five problems."

But under current government regulations, he is not eligible for compensation. "How much proof do you need? I've had health problems ever since but it's not cancer so the government doesn't want to hear it."

Talk to some of the 200,000 US Atomic Veterans -

Americans exposed to radiation at Hiroshima, Nagasaki, or at nuclear test sites - and over and over you hear a story of miscarriages and birth defects. Cancers and cataracts. Government lies and shattered pride. And finally, bitterness and distrust. Compensation depends on proof of exposure and type of cancer. As of July, 14,920 radiation-related claims had been filed. Less than one-third have been settled.

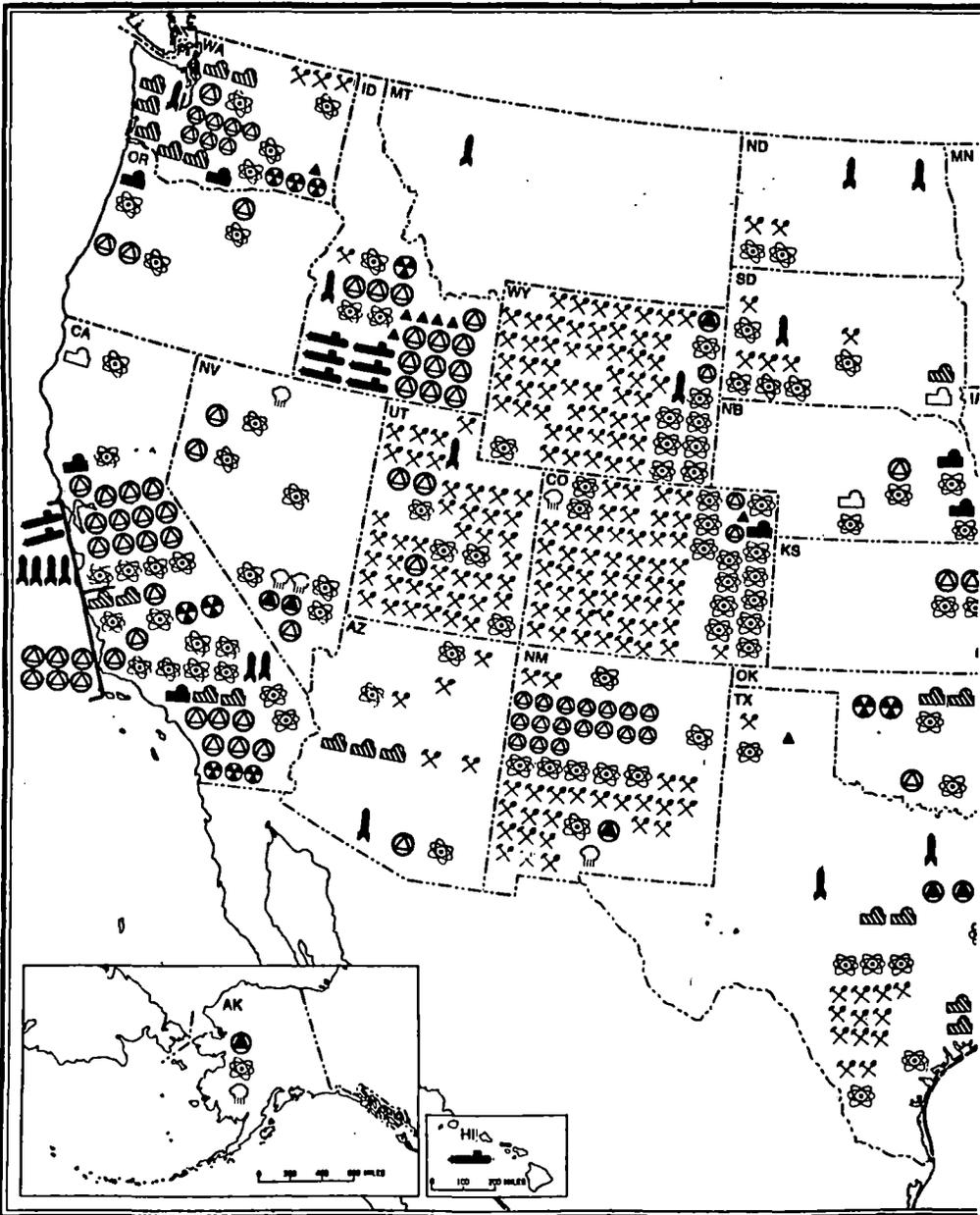
"They said by dropping two bombs that we saved a million lives. Well, if I had a choice, I'd gladly have died on the shores of Japan rather than live the life I've lived. We were shot with invisible bullets and the damage to our bodies is unknown. I want care for my children when I die," Florentine said.

Another veteran, Sheldon Johnson, was in the Philippines and dreading the invasion of Japan. "When I heard the words 'atomic bomb' I thought it was some magic thing that caused the war to cease," said Johnson, who lived downwind from the Nevada Test Site. "I thought it saved my life. Then I went home to St. George, Utah, and they were testing this great thing in my neighborhood. You'd see the sky light up, you'd hear the rumble like a sound barrier: wa wa waaaa."

Between 1951 and 1992 the United States exposed

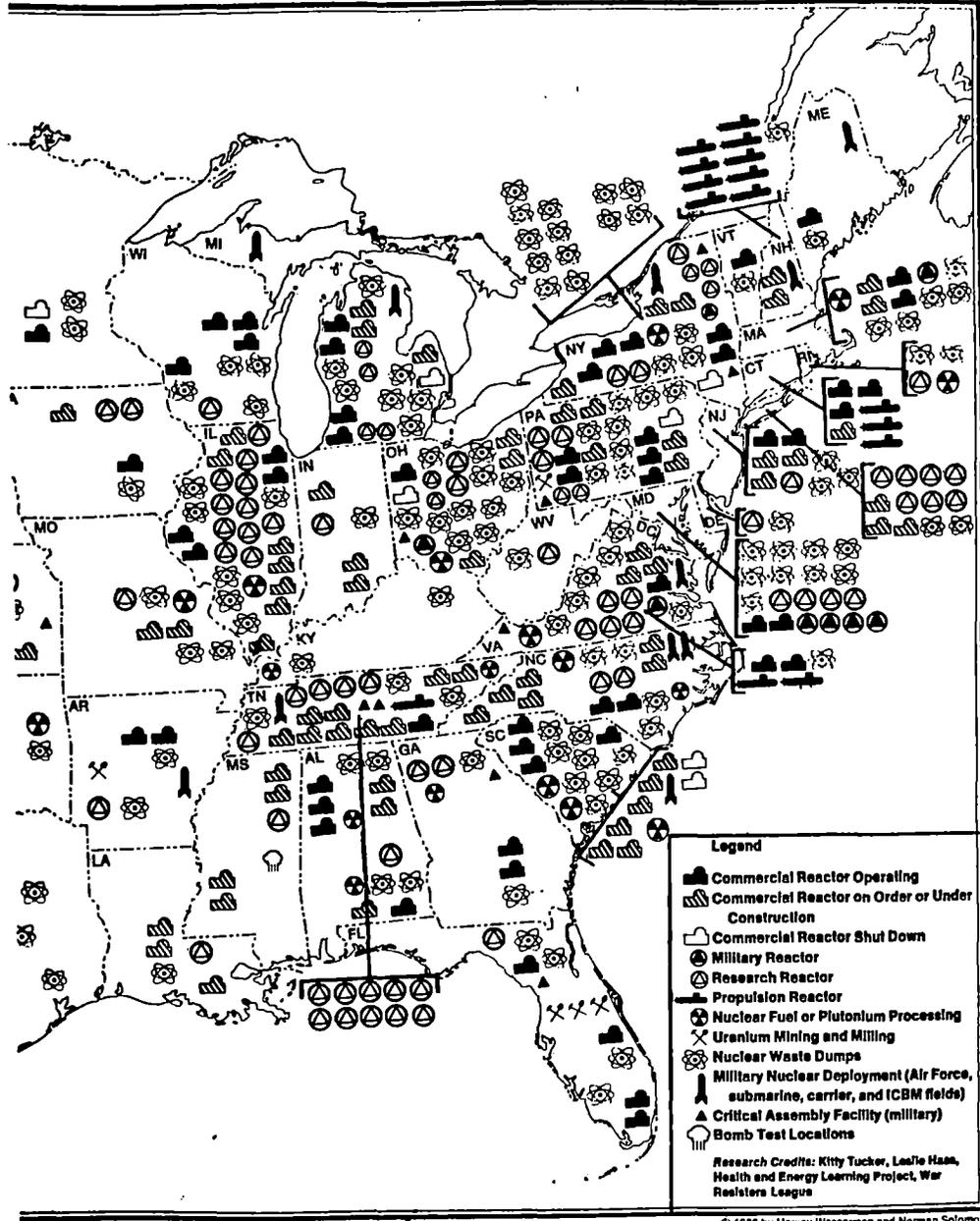
Continued on next page

# KILLING OUR OWN



Base compiled by U.S. Geological Survey. Shoreline by the U.S. Coast and Geodetic Survey.

# Radiation in America



Representational map: symbols do not denote precise locations or quantities.

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UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF MASSACHUSETTS

CITIZENS AWARENESS NETWORK, INC., )  
Plaintiff )

v. )

C.A. NO. 94-30071-MAP )

U. S. NUCLEAR REGULATORY )  
COMMISSION )

Defendant )

MEMORANDUM REGARDING PLAINTIFF'S MOTION  
FOR A PRELIMINARY INJUNCTION  
(Docket No. 06)

May 20, 1994

PONSOR, D.J.

I. INTRODUCTION.

This complaint arises from the Nuclear Regulatory Commission's oversight of the decommissioning of the Yankee Rowe Nuclear Power Plant, one of the first nuclear facilities to be shut down in the United States. Plaintiff, Citizens Awareness Network ("CAN"), alleges that the Nuclear Regulatory Commission ("NRC") violated the National Environmental Policy Act ("NEPA"), 42 U.S.C. §§ 4321 et seq. and related federal regulations, by failing to conduct an environmental impact study ("EIS") prior to NRC approval of Yankee Rowe's early component removal plan. Implementation of this plan, CAN maintains, will result in the removal of approximately 90% of the nuclear waste from Yankee Rowe's facility without any independent assessment of the risks to the environment, particularly the local community.

CAN has requested issuance of a preliminary injunction against

the NRC, which would stop further implementation of Yankee Rowe's early component removal plan and enjoin the disassembly and shipment of nuclear waste to a treatment facility in Barnwell, South Carolina. The NRC denies that it violated NEPA and, more importantly, asserts that this court lacks subject matter jurisdiction to hear this claim. Defendant claims that the Hobbs Act, 28 U.S.C. §§ 2341 et seq., requires that plaintiff's claims be heard by the court of appeals.

## II. FACTS.

The relevant facts are as follows.

In February of 1992, Yankee Rowe Nuclear Power Station ("Yankee Rowe"), located in Rowe, Massachusetts, notified the NRC of its decision permanently to close down its facility. By August 1992, NRC amended Yankee Rowe's operating license to a possession only license ("POL"). Federal regulations require Yankee to submit a decommissioning plan within two years of cessation of its operations. 10 CFR 50.82.

Prior to January of 1993, the NRC held the position that the decommissioning of a nuclear plant could not begin before the NRC formally approved the decommissioning plan. It is undisputed that this approval process would include NEPA review and preparation of an EIS. In January of 1993, the NRC changed its position regarding the permitted scope of a licensee's decommissioning activities prior to NRC's final approval of a decommissioning plan. According to the NRC's current interpretation of its regulations, Yankee is entitled under the terms of its POL and without further NRC

approval, to undertake any decommissioning activity that does not (a) foreclose the release of the site for possible unrestricted use, (b) significantly increase decommissioning costs, (c) cause any significant environmental impact not previously reviewed, or (d) violate the terms of the licensee's existing license or 10 CFR § 50.59.

In February of 1993, Yankee Rowe requested NRC approval of early removal of nuclear plant components from its facility. NRC met with Yankee Rowe and members of CAN in June of 1993 to discuss various aspects of the early decommissioning plan. In July of 1993, NRC informed Yankee Rowe that its possession only license permitted the early component removal plan and that Yankee's license did not need to be amended to carry out the plan. The upshot of this change in policy was that Yankee Rowe, through its early component removal plan, would be permitted to carry out a large part of the physical work of decommissioning before the final decommissioning plan was formally approved by the NRC.

On three separate occasions, members of CAN requested formal hearings to discuss its safety and environmental concerns regarding Yankee's early component removal plan. On March 31, 1994, NRC issued an order denying CAN's request for an adjudicatory hearing, reasoning that CAN was not entitled to an adjudicatory hearing. According to the Commission, Yankee's early component removal plan was being performed pursuant to 10 CFR § 50.59, which permits a licensee to make changes in its facility as long as the changes do not present "an unreviewed safety question." The Commission

concluded that, in removing the nuclear waste from its facility, Yankee Rowe was properly acting under its possession only license which permitted transportation of certain hazardous materials without prior NRC approval. As such, the NRC reasoned, CAN was not entitled to an adjudicatory hearing.

On the same day that CAN received the letter from the NRC denying their request for a hearing, it filed suit in this court seeking to stop Yankee's early component removal plan until NRC complies with NEPA and performs an appropriate plan EIS.

### III. DISCUSSION.

The Hobbs Act provides, in part, that the court of appeals has exclusive jurisdiction to set aside, suspend, (in whole or in part), or determine the validity of, all final orders of the NRC under 42 U.S.C. § 2239. 28 U.S.C. § 2343(4). Section 2239, in turn, makes reviewable "the granting, suspending, revoking, or amending of any license." 42 U.S.C. § 2239. In Florida Power & Light v. Lorion, 470 U.S. 729 (1985), the Supreme Court broadly interpreted this jurisdictional grant, holding that decisions that are ancillary to licensing decisions may be challenged only in the court of appeals.

In this case, CAN is, in essence, challenging a final order by the NRC in a licensing or related proceeding. As such, the court of appeals, not the district court, is the appropriate forum to address the merits of plaintiff's claims.

On March 31, 1994, the NRC sent CAN representative Frederick Katz a letter informing him that CAN was not entitled to receive an

adjudicatory hearing regarding the activities at Yankee Rowe. See Defendant's Exhibit 3. In this letter, the NRC explained that the Commission had issued a decision denying a request by a similar group, Environmentalist, Inc., for an adjudicatory hearing regarding ongoing component removal activities at Yankee Rowe. The letter continued

The Commission has now issued a decision in response to that petition. As you can see from that decision, a copy of which is enclosed for your review, the Commission has ruled that the Component Removal Program ("CRP") at Yankee NPS does not involve any activity that requires the offer of an adjudicatory hearing. Therefore, the Commission has denied your renewed request for an adjudicatory hearing regarding the CRP for the reasons stated in the attached order and in the Commission's letters to you dated November 18, 1993 and January 4, 1994.

This letter constitutes the Commission's final response to your letter of December 13, 1993.

Defendant's Exhibit 3 (emphasis added).

Despite its citation of NEPA, CAN's complaint essentially attacks NRC's decision that Yankee's possession only license permits it to perform early component removal of nuclear waste without requiring amendment to Yankee's license and without formal environmental review. In other words, NRC's alleged failure to prepare an environmental analysis of the early component removal plan (which forms the basis of the NEPA violation) cannot be separated from NRC's decision that Yankee Rowe's possession only license entitled Yankee to engage in early decommissioning activities.

CAN maintains that its NEPA claim is based simply on NRC's failure to prepare an environmental analysis of Yankee's early

component removal plan. According to CAN, the complaint is not challenging Yankee Rowe's scope of authority to undertake decommissioning activities. NEPA requires the NRC to prepare an environmental analysis whenever there is a "major Federal action significantly affecting the quality of the human environment." 42 U.S.C. § 4332(C). However, in order to determine whether NRC engaged in "major Federal action," the court must determine first whether Yankee Rowe's POL authorized them to engage in decommissioning activities prior to NRC final approval of a decommissioning plan or whether an amendment was required to Yankee Rowe's POL. Under the Hobbs Act, the court of appeals has sole jurisdiction to hear such challenges to final agency orders. In short, plaintiff -- for perhaps understandable reasons, as will be seen below -- is attempting to stick a NEPA label on a Hobbs Act claim.

The NRC has provided the court with several cases, both published and unpublished, which persuasively hold that a district court lacks subject matter jurisdiction in these circumstances. See e.g. State of Michigan v. U.S., 994 F.2d 1197 (6th Cir. 1993); Center for Nuclear Responsibility v. Nuclear Regulatory Commission, 781 F.2d 935, 937-38 (D.C. Cir. 1986); West Chicago, Ill. v. Nuclear Regulatory Commission, 701 F.2d 632 (7th Cir. 1983); Center for Kelley v. Nuclear Regulatory Commission, et. al., No. 4:93-CV-7, (W.D. Mich. May 10, 1993); Macias v. Kerr-McGee, et. al., No. 92-C-3389 (N.D. Ill. Oct. 8, 1993).

To conclude, although plaintiff claims that its NEPA claim is not based on a challenge to NRC's decision regarding the scope of

decommissioning activity allowable under Yankee Rowe's POL, in order to reach the NEPA violation the court must address NRC's decision that Yankee Rowe did not have to amend its license in order to engage in extensive early component removal prior to NRC's approval of a decommissioning plan. Judicial review of this decision must rest with the court of appeals.

The court makes this decision with a heavy heart. The plaintiffs have been diligently attempting for months to get a hearing on the appropriateness and competence of the NRC's actions. Many of them live near the site of the decommissioned nuclear plant. They and their families are the most directly at risk if the job of removing contaminated materials is bungled. Moreover, if they do suffer harm, its full extent may not be known for years or decades.

Not only have the plaintiffs been denied the opportunity to present their concerns and to hear the response of the NRC at a formal hearing, they have not as yet even been afforded a forum in which to argue their entitlement to a hearing. They had no incentive to seek a hearing when the NRC originally issued the POL, because at that time it was the policy of the NRC to require final approval and NEPA compliance before authorizing early component removal. Months later, the NRC now concedes, this policy changed and the NRC decided to view the POL as itself authorizing early component removal without more. Requests for hearing at this point were denied. It was only on the day this lawsuit was filed that the NRC issued what it now characterizes as a "final decision"

entitling the plaintiffs to review before the First Circuit Court of Appeals, and not before the district court. It was only a few days prior to the hearing on plaintiffs' motion for preliminary injunction that the defendant finally submitted a report by an agency expert purporting to rebut the opinion offered by plaintiffs of risk to the community.

→ This course of conduct suggests a concerted bureaucratic effort to thwart the efforts of local citizens to be heard about an event that vitally affects them and their children. It calls to mind the activities of Charles Dickens' fictional Office of Circumlocution in Bleak House. The prospect that this tactic may be used nationally, as more nuclear plants shut down, and more local citizens groups express concern about the impact of the process on their lives, is, to put it mildly, disquieting. It would seem no more than simple fairness -- as a matter of policy, if not of strict law -- to give local people the opportunity to be heard when something of this magnitude occurs in their community. If they are not to be given any voice, community members at least have a right to be told why, promptly and clearly, by some disinterested adjudicatory body.

Having said this, the court must nevertheless conclude that this district court is not the proper forum for such proceedings. All the courts since Lorion that have addressed the issue have concluded that this kind of NRC decision-making falls under the Hobbs Act and may be reviewed only by the court of appeals. NEPA may not be used to avoid this well established review procedure.

Plaintiffs have the right to seek prompt review of this court's decision and, if they feel it appropriate, to request expedited action by the court of appeals. If this court is incorrect in its estimate of its power, the case may be remanded for further proceedings. Alternatively, or in addition, plaintiffs have the right to seek review by the court of appeals of the NRC's March 31, 1994 decision. In that event at least, the defendant will be unable to hold up a jurisdictional bar, and the plaintiffs will get an opportunity for the hearing they have sought in vain for so long.

IV. CONCLUSION.

For the reasons stated above, the motion for preliminary injunctions is denied and plaintiff's complaint is dismissed for lack of subject matter jurisdiction. A separate order will issue.

  
MICHAEL A. PONSOR  
U.S. District Judge

JUL-26-1994 14:29 FROM NIRS-WASHINGTON, DC

TO

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# Inside N.R.C.



An exclusive report on the U.S. Nuclear Regulatory Commission

Vol. 14, No. 15—July 25, 1994

## COMMISSIONERS HIT STAFF PROPOSAL FOR NEW DECOMMISSIONING GUIDELINES

A staff proposal that would set out activities utilities could accomplish between the time they shut their nuclear units permanently and their decommissioning plans are approved by NRC hit the skids last week, as the commissioners said it appeared to focus less on health and safety and more on procedures that would give the public more input in a licensee's decommissioning activities.

The staff and the Office of General Counsel (OGC), during a July 21 commission briefing, recommended that the commission approve the proposed rule, which generally would prohibit utilities from undertaking significant dismantlement activities at their permanently closed nuclear units before NRC formally approves a decommissioning plan.

To give utilities and the commission some flexibility, the rule proposed that a utility could apply to NRC for approval of a "partial decommissioning plan" for activities where major structural changes to major radioactive components are warranted prior to formal NRC approval of the decommissioning plan. The commission would grant such requests case by case.

Staff and OGC had proposed the concept of licensees submitting a preliminary proposal of their planned

INSIDE N.R.C. — July 25, 1994

decommissioning activities shortly after their units are permanently shut so that NRC could hold an informal public hearing to let residents near the site know what activities the utility intended on accomplishing before its decommissioning plan is submitted and approved.

NRC has been roundly criticized by some public interest groups for ignoring the public input process in decommissioning activities associated with Yankee Atomic Electric Co.'s Yankee and Portland General Electric Co.'s Trojan. Both utilities have undertaken or are in the process of removing large radioactive components from their units and shipping them off site to low-level radioactive waste (LLW) disposal facilities.

By removing these components—the steam generators, pressurizer and reactor internals—the utilities would remove most of the LLW from the site before their decommissioning plans are approved by NRC.

Current regulations under 10 CFR 50.59 have been the basis for these significant decommissioning activities. Yet due to ambiguities in the regulations, the public has been unable to voice its views on these activities because they are not afforded the opportunity to comment until NRC is near approving utilities' decommissioning plans.

The only other alternative avenue for the public for a say in the decommissioning process has been through the courts. But, in the Yankee case, a federal judge in Massachusetts dismissed the lawsuit on jurisdictional grounds, though he took NRC to task for effectively negating public input in the decommissioning process.

The commission has not objected to major dismantlement activities by utilities under Part 50.59 regulations as long as they do not foreclose the release of the site to unrestricted use; increase the cost of decommissioning significantly; cause any significant increase in environmental impact not previously reviewed; or violate the terms of the utility's existing license.

Staff and OGC, however, reevaluated the commission's position in light of a federal court decision involving Yankee, Citizens Awareness Network (CAN) v. NRC, C.A. No. 94-30071-MAP D.Mass. In dismissing on jurisdictional grounds, CAN's complaint that NRC violated the National Environmental Policy Act (NEPA) and related federal regulations by failing to conduct an environmental impact statement before approving YAEC's early component removal plan, U.S. District Judge Michael Ponsor wrote that "this course of conduct suggests a concerted bureaucratic effort to thwart the efforts of local citizens to be heard about an event that vitally affects them and their children."

Consequently, staff and OGC provided supplemental provisions for commission approval that would restrict the range of decommissioning activities a licensee may undertake before its decommissioning plan is approved by the agency. In addition, the provisions, as outlined as Option 2 in a July 7 recommendation on the proposed rulemaking (Secy 94-179), would add Subpart L, providing for an informal public hearing at the decommissioning plan approval stage, and codifying in Part 50.82 the availability of a 2.206 petition at license termination.

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(CONT.)

INRC 7/25/94

Commissioner Kenneth Rogers at the July 21 commission briefing, congratulated staff on making a "good attempt" at addressing previous commission directives to formulate a rule that would address issues affecting licensees who shut their nuclear units prematurely, but likened the proposed rule to "build[ing] a boat in the basement."

"It seems to me that safety is primary, that that should be our focus," Rogers said. "What troubles me about this approach is that safety is not the primary focus." Rogers added that public participation should not be the primary focus of NRC role in the decommissioning process. Commissioner Gail de Planque concurred.

However, Chairman Ivan Selin appeared to defend the general approach of the staff and OGC rule proposal in that he said the commission has been criticized often for ignoring the environmental consequences of decommissioning activities. But he said the staff/OGC proposal didn't really explain in detail how the commission could satisfy its decommissioning obligations under NEPA.

Staff defended its approach to the rulemaking, saying that utilities under current 50.59 regulations could essentially remove all radioactive waste from a power plant before NRC has had a chance to review and approve their decommissioning plans, thereby precluding the public from having any say in those activities. Also, staff said the proposed restrictions on Part 50.59 activities, as outlined in Option 2 of the staff paper on the matter could give decommissioning workers a say in how a utility chooses to dismantle its plant.

According to the Secy paper, utilities under current requirements can conceivably disassemble and remove all radioactive material from a reactor before they ever submit a decommissioning plan to NRC. The cumulative effect of this action could lead to effective foreclosure of selection of long-term storage (SAPSTOR), an NRC decommissioning alternative.

Utilities with heavily contaminated units could reduce occupational doses, radioactive wastes and decommissioning costs significantly by choosing to place their reactors in long-term storage, the Secy paper states. Hence, there are valid reasons for prohibiting licensees from conducting some decommissioning activities prior to decommissioning plan approval, the paper states.

The commissioners suggested that the staff take another look at its decommissioning rule proposal with a primary focus toward health and safety, with some balance regarding NRC's oversight role in relation to NEPA and the need for greater public input.—Richard R. Zuercher, Washington

INSIDE N.R.C. — July 25, 1994

**NRC DECOMMISSIONING POLICY TOOK MAJOR SHIFT IN 1993, OI REPORT STATES**

An Office of Investigation (OI) probe of NRC's handling of Yankee Atomic Electric Co.'s (YAEC) controversial early component removal program, found that in January 1993 NRC's decommissioning policy took a significant turn away from previously held views that a shutdown reactor remain virtually intact until a formal decommissioning plan is approved.

The June 27 audit report, "Decommissioning the Yankee Rowe Nuclear Plant: NRC Policy at a Crossroads," states that this new policy shift, which addresses the concerns of utilities that opt to shut their nuclear units permanently before their operating licenses expire, largely left the public near the Yankee station out of the decommissioning process.

According to the report, prior to NRC's January 1993 policy shift favoring the request by YAEC to remove four steam generators, pressurizer, and reactor internals from Yankee, utilities were allowed to conduct only minor component disassembly, decontamination, and storage and shipment of spent fuel prior to decommissioning plan approval. However, issues raised from Long Island Lighting Co.'s decommissioning of Shoreham contributed to NRC's policy shift away from earlier views.

NRC granted YAEC's component removal request because the utility had an 18-month window to dispose of most of the unit's low-level radioactive waste (LLW) at Chem-Nuclear Systems Inc.'s Barnwell, S.C. disposal facility before the site would close to out-of-region generators. After July 1, 1994, YAEC would have no access to a LLW disposal facility and its decommissioning costs would rise significantly.

The new criteria the commission gave staff for granting YAEC's major component removal program allowed the utility to use 10 CFR 50.59 requirements for decommissioning activities prior to formal NRC decommissioning plan approval.

"With this change, utilities can now remove major systems and components, and thus significantly dismantle nuclear power plants prior to the agency approving their decommissioning plan," OI said. "According to NRC staff, the decommissioning of the Shoreham nuclear power plant, and NRC's subsequent 'lessons learned' study, served as a mechanism for the agency to alter its decommissioning policy."

The report states that both YAEC and NRC staff believe the component removal program at Yankee has been conducted in a prudent manner, adequately minimized worker exposure to radionuclides, and protected public health and safety. But the report notes that the utility did encounter some problems in shipping LLW and cutting reactor vessel components, and public interest groups expressed concerns and requested adjudicatory hearings related to the component removal project.

Under the Atomic Energy Act, NRC is required to conduct an adjudicatory hearing during the plant construction phase, even if there is no opposition to nuclear plant construction. After that, NRC must notify the public for a hearing opportunity when a utility seeks a license amendment, and grant one if a requester has established standing and at least one legitimate contention.

While NRC published in the Federal Register a notice of comment on YAEC's large component removal program, it did not conduct adjudicatory hearings because it received no comments or requests for them. OI said that a representative of an unnamed public interest group said the group did not file a hearing request because the information NRC presented in the Federal Register notice did not explain the scope of proposed activities at the plant.

NRC has denied the organization's request for an adjudicatory hearing regarding the decommissioning of Yankee, but this request was not associated with a license amendment, the report said. NRC said in response to the petitioner's request that the group did not address criteria set by the commission to hold a discretionary hearing, and failed to cite any regulatory action which would mandate the offer of a hearing.

"NRC has instead held a public meeting on the decommissioning of Yankee Rowe, and an August 4, 1993, teleconference with two public interest groups," the OI report said. It noted that one of the groups, Citizens Awareness Network, filed suit in March against NRC in U.S. District Court for the District of Massachusetts to restrain YAEC's component removal project. However, that suit was dismissed on May 20 for lack of jurisdiction.

OI said the organization has filed a new petition for review to the First Circuit Court of Appeals, as well as an appeal of lower court's jurisdictional ruling. Final resolution of this issue, hence, remains with the judicial system, the OI report states. —Richard R. Zuercher, Washington

## DECOMMISSIONING AND THE MELTDOWN OF DEMOCRACY

### **FAST,CHEAP, AND ILLEGAL**

The desire to have the Rowe reactor dismantled rapidly is understandable but dangerous.

Decommissioning mobilizes and disperses the radionuclides left in the reactor. The societal problem is how to immobilize and isolate this material with the least worker and public exposure; the least human sacrifice.

The utility's problem is to fulfill it's requirements as cheaply as possible. Because of the inherent danger, an elaborate and clearly defined system of regulations were developed by the NRC(Nuclear Regulatory Commission).

The nuclear industry is determined to push it's next generation of reactors. The obstacles they face are the uncertainties associated with decommissioning, radioactive waste, and the storage of spent fuel rods. The CRP(Component Removal Project) at Yankee Rowe is the NRC's attempt to control these unpredictable factors.

The first phase of the CRP mobilizes and transports 90% of the non-fuel residual radioactivity before a decommissioning plan has been approved. After completion Yankee will attempt a second, and possibly third CRP.

90% of the task of decommissioning without a plan! A decommissioning plan, according to the NRC's own regulations, is the primary control to protect the health and safety of workers and the public. When approved, Yankee's plan will only cover the 10% that remains after the CRP.

There are only two options for decommissioning a nuclear reactor. Rapid decommissioning(DECON), results in increased radiation exposure to workers, the dumping of long-lived radioisotopes in rivers, lakes, and oceans, the risk of exposure from accidents or leaks as radioactive waste is trucked over highways and rail-lines, and poisoning of earth and ground water as "hot" reactor components are dumped in leaking, unlined rad-waste dumps like Barnwell and Hanford .

The SAFSTOR option delays dismantling for thirty years, during which natural decay of radionuclides takes place. NRC's own studies found that employing SAFSTOR reduces radiation exposure of workers from 544 man/rem to 14, and reduces the volume of contaminated waste and rubble removed and buried from 18,340 cu.yds to 1,830. SAFSTOR also reduces exposure to the public along waste transport routes, citizens living in proximity to the reactor and also reduces releases into the Deerfield River. There have been 31 radioactive effluent releases into the Deerfield River since the CRP began.

To expedite the Component Removal Project, the NRC has disregarded regulatory requirements, making specific definitions, licensing stages, and controls mutable and unclear. The NRC has allowed decommissioning without an approved plan, without an environmental assessment, without a resident inspector, without public hearings! This is the meltdown of democracy!!! This is criminal!!!!

This experiment provides the data the nuclear industry needs in "state of the art" techniques of underwater cutting, social engineering, and the financial costs necessary to attract investors in the next generation of nuclear reactors.

25 reactors face premature shutdown in the next 10 years. The Trojan reactor in Oregon is applying to the NRC for a Component Removal Project based on the precedent set at Yankee Rowe.

Yankee Rowe is an experiment. It sets a dangerous and illegal precedent. The nuclear industry and the NRC are confident that they can pass on the enormous financial, human, and environmental costs associated with DECON to the public. We will continue to pay our electric bills at the medical centers.

**THE STORY:** FAST, CHEAP AND ILLEGAL DE FACTO POLICY, CREATED BY CONSPIRACY BETWEEN THE NUCLEAR INDUSTRY AND THE NRC, DRIVEN BY PROFIT AND NOT THE HEALTH AND SAFETY OF THE PEOPLE AND THE PLANET.

**FOR MORE INFORMATION-OR-IF YOU CAN MAKE A CONTRIBUTION**

**CAN  
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Citizens Awareness Network (CAN) is a grassroots organization. We work out of our homes have no paid staff, and are funded by the generous support of concerned citizens. We organized to shut Rowe down! That fight was between David and Goliath. The decommissioning and waste-wars now being fought are between David and Goliath. We now understand that the future of nuclear power is being determined right here in rural, poor Western Massachusetts.

*Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it's the only thing that ever does.*

*-Margaret Mead*

# The Boston Globe

SATURDAY, JUNE 25, 1994

## Yankee Rowe woes

When Yankee Atomic decided to pull the plug on its pioneering but aging nuclear power plant in Rowe, it started a decommissioning process that will eventually be followed by more than a hundred other reactors around the country. Even on its way to the grave, the Rowe plant offers lessons that may be useful not only in handling other decommissionings but also for potential new plants sometime in the distant future.

The design and operation of nuclear plants have been opposed by groups convinced that nuclear facilities can never be completely safe and their radioactive detritus will inflict unacceptable hazards for centuries to come. Yankee Rowe has the distinction of drawing litigation in its closing stages from a citizens group that argued that the Nuclear Regulatory Commission failed to provide adequate public hearings on issues connected with the plant's dismantling.

The opponents, the Citizens Awareness Network of Shelburne Falls, made progress in US District Court when a judge said he lacked jurisdiction but in effect sent the case to the Court of Appeals for the 1st Circuit in Boston, saying, "Not only have the plaintiffs been denied the opportunity to present their concerns and to hear the response of the NRC at a formal hearing, they have not as yet even been afforded a forum in which to argue their entitlement to a hearing."

Yankee Atomic officials point out that removal of all but the most radioactive materials at the plant (spent fuel and a few pieces of associated equipment) involved nothing more than would have taken place had the plant been refurbished and new machinery replaced old, which would have required no special hearings.

Indeed, most of the less-radioactive equipment and materials have already been stripped from the plant and trucked 5 miles to the Boston & Maine railroad tracks for shipment to the nuclear waste repository in Barnwell, S.C. The moves were accomplished without incident through the beautiful and lightly populated towns of Rowe, Monroe and Florida.

The speed with which the dismantling occurred was driven by an effort to maximize savings and by concern that Barnwell might soon become unavail-

able. Plant managers say they have spared rate-payers, who will ultimately bear the costs of dismantling, about \$4 million of a total burden that will eventually be well over \$100 million.

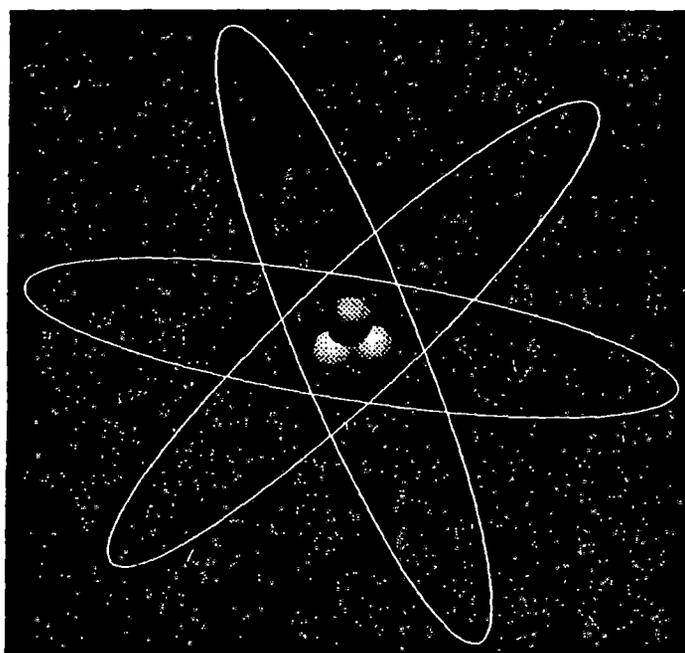
While the outcome of the appeal remains uncertain (the NRC is the defendant, not Yankee Atomic), the public policy question is whether the absence of hearings on dismantling is desirable even if the NRC's position is upheld. The issue deserves exploration. Although the industry makes a rational argument that dismantling is no different from replacement of parts on a piecemeal basis, the scale of operations may be of a different order, posing different problems at different plant sites. Whether to hold hearings is a question that Congress should explore more fully than the NRC has, taking care to distinguish between useful review and capitulation to every unfounded fear regarding nuclear materials.

Public sensitivity to nuclear issues does remain at a high level, and the industry will have to avoid the appearance of high-handedness with its neighbors if it is to deal effectively with future regulatory issues. Yankee Atomic has done a good job in briefing local residents on the details of its removal activities, but the speed with which the action was taken left some opponents convinced that the public has been given short shrift.

The NRC's handling of the Rowe dismantling might end up serving as model for future decommissionings. This would be a shame. Although the letter of the law might permit decommissionings without hearings, experience suggests that public concern, however irrational, can be reduced, if not eliminated, by hearings. It might not prevent litigation, but a fuller hearing process should make the court's task easier.

More basic, if nuclear power is to have a bright future with the development of safer reactors, the industry and the NRC will have to overcome public skepticism about the right of ordinary citizens to gain full access to the permit process. The NRC's handling of the Yankee Rowe case casts doubt on whether that lesson has been learned.

**THE CARCINOGENIC, MUTAGENIC,  
TERATOGENIC AND  
TRANSMUTATIONAL  
EFFECTS OF  
TRITIUM**



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# INTRODUCTION

Over the past two decades, residents of the Deerfield River Valley in Massachusetts suffered alarming health problems: an increased cancer rate, miscarriages, and a ten-fold increase in Down's syndrome (a congenital disease characterized by mental retardation and bodily malformation). Local health authorities were unable or unwilling to account for the region's growing pattern of health anomalies.

Attention soon turned to questionable safety of the procedures at the nearby Yankee Rowe nuclear power station—the nation's first "experimental" commercial reactor—and the effectiveness of the standard nuclear safety guidelines of the Nuclear Regulatory Commission [NRC]. During a series of public meetings, area residents learned that the Yankee Rowe reactor had used the nearby Deerfield River as a radioactive waste dump over the past thirty years.

Concerned citizens, realizing that the river had been widely used for well water, crop irrigation, and recreational purposes, began to question whether the increases in disease were due to the reactor's regular releases of radioactive materials into the river.

It was at this point that the Citizens Awareness Network [CAN] was formed as a grassroots organization primarily concerned with the health and safety of its community.

The Citizens Awareness Network began to investigate effluent releases from the Yankee Rowe reactor into the Deerfield River, and compiled a 30-year history of such releases. CAN found that large quantities of tritium had been released into the river, given its size and the degree of contact the community routinely had with its water.

The Massachusetts Department of Public Health [MADPH] initially denied that there was any cause for concern. After continuing pressure from CAN and the local community, MADPH agreed to a preliminary investigation of the diseases.

With the professional assistance of epidemiologist Dr. Sidney Cobb, and the work of concerned citizens, CAN coordinated research into state health statistics, effluent reports and meteorological data. Dr. Cobb analyzed the raw data and concluded that an epidemic indeed existed in the Deerfield River Valley, and that a full-scale epidemiological study was warranted.

An analysis of statewide statistics provided by MADPH confirmed a statistically significant increase in various types of cancer in the Deerfield River Valley.

CAN, community leaders and local legislators are working to create a new statewide birth defects registry, which was prompted by the deficiencies in MADPH's records for the incidence of Down's Syndrome.

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## INTRODUCTION

The Citizens Awareness Network has meanwhile continued its investigation of the nuclear reactor, leading to our current research on *tritium*, one of the nuclear isotopes regularly released into the Deerfield River.

We present this research with the experience of successfully influencing legislators and health officials thru thorough investigation and awareness. We believe that ordinary citizens can — and must — understand the scientific and social issues related to the production of nuclear power.

CAN believes that the standard operation of a nuclear power station causes untold harm, sickness and death. The focus on individual accidents results in misleading and diversionary arguments over the safety and effectiveness of existing technology. We believe that Yankee Rowe has been one of the "safest" reactors in the country, according to NRC guidelines. **It is the NRC guidelines that need re-evaluation.**

The epidemic of disease in the Deerfield River Valley did not become apparent until 25 to 30 years after operation began. We are now beginning to see the health effects of long-term exposure to low level radiation in our community, and in communities throughout the world.

We have all participated in an experiment without our knowledge or our consent. The data that can be ascertained from the investigation of Yankee Rowe and other nuclear facilities will provide the information to educate citizens as to the effects of radiation on the health of their generation and future generations.

# TRITIUM

**T**ritium is a radionuclide emitted as waste from pressurized water reactors, heavy water nuclear reactors and the new generation of nuclear reactors. It has been an integral part of the nuclear weapons industry: tritium was released into the atmosphere as part of weapons testing in the 1950's and 60's. It is a beta emitter and has a half life of 12.5 years. It decays to an isotope of helium, releasing a neutrino and a beta particle (an electron). The electron is slow-moving and has a very short range.

Tritium was believed to be a relatively benign radionuclide because of the weakness of the beta radiation emitted when it decays. The beta electron is a small particle that passes readily through most barriers. The dangers of tritium come from inhalation, ingestion, and absorption.

Tritiated water (HTO) passes through the human body in 12 days. However, when the radionuclide unites with carbon in the human body, plants, or animals, it becomes organically bound (OBT) and can remain in the human body for 450 to 650 days. One study found traces of tritium in the body 10 years after exposure.<sup>(24)</sup>

As tritium makes its way up the food chain it may become more concentrated. <sup>(16)</sup> Pigs fed with tritiated food themselves became tritiated, as did their offspring. The blood, heart, and kidneys of the piglets were more tritiated than the food they were fed.<sup>(23)</sup>

Tritium is carcinogenic, mutagenic, and teratogenic. <sup>(21)</sup> Human beings can receive chronic exposure to OBT through the ingestion of plants and animals exposed in an effluent pathway, in addition to direct uptake through inhalation, absorption and drinking contaminated water. Especially sensitive to the effects of tritium are rapidly growing cells such as fetal tissue, genetic materials and blood forming organs.<sup>(2, 12, 19, 21, 20)</sup>

Tritium is dense and has a short track length. It releases all its activity at one time. This makes it more potent and similar to soft x-rays which are more effective than hard x-rays. <sup>(15)</sup> When and where it deposits its radioactivity, it creates at least one lesion in the cell. This lesion must be repaired within 24 hours or when the cell eventually divides, it will be carcinogenic.<sup>(26, 30)</sup> There may be a threshold below which the repair mechanism is not activated in the body; <sup>(13, 15, 27, 32)</sup> thereby, low levels of chronic radiation exposure can accumulate in the body without the repair system being activated. <sup>(11, 25, 27, 30, 32, 36)</sup>

Tritium has a transmutational effect which is mutagenic. After the particle releases its radioactivity into the cell, a helium ion is formed. The helium springs away from the  $\beta$ -particle and severs the bond with the compound to which the tritium had attached itself. The compound acquires a positive charge and becomes chemically active.<sup>(22)</sup>

It then can attach itself to a ring of a protein precursor that will make up the chromosomal strands in the DNA. Depending on the ring it attaches to, it can affect the protein precursors and damage the DNA. This would create a mutational effect.<sup>(22)</sup>

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## TRITIUM

Radiological research has found a correlation between tritium and cumulative genetic injury. (21) There was found in successive generations a reduction in relative brain weight, reduction in litter size, and increased reabsorption of embryos. Correlations have been found in epidemiological research between tritium and Down's syndrome. Associations have also been found between low-level radiation and Down's syndrome.(6, 7, 8, 10, 31)

### **The Deerfield River Valley (DRV)**

Nuclear power stations *must* dispose of waste to operate. For pressurized water reactors (such as Yankee Rowe), the main effluent release is into a body of water. Thus the Deerfield River Valley becomes a radiation waste dump for the Yankee Rowe. When tritium is released into such an environment, plant, animals, and human beings in the vicinity can be contaminated.(17, 24)

The Deerfield River is a small winding river in western Massachusetts. It has white water and is fast running. The valley through which the river runs is 800 feet on either side, creating a tunnel in which inversions are held. Fog hangs in the valley for days at a time. There are air inversions more than 34% of the time.

The river has been used for recreational purposes over the 31 year history of the Yankee Rowe reactor, the nation's first "experimental" commercial reactor. Citizens swim, fish and boat in the river. Wells and cropland are adjacent to the river, and in times of drought, river water is used to irrigate crops. Each year 500,000 people use the river .

For 31 years the Deerfield River has been a dumping ground for low-level radioactive waste. During the 1960s and early 70s, Yankee Rowe had problems with fuel rods and dumped large amounts of tritium into the river. Up to 1,800 curies a year were released, nominally within NRC guidelines.

During the time of operation the estimated concentrations of tritium were 1,000 times greater in the DRV than outside the valley. There were approximately 5 batch releases per month. People in the community were generally unaware that the river was radioactive, although it had been noted that since the reactor opened, the river had never frozen.

### **Epidemic of Disease in DRV**

Increases in miscarriages, mental retardation, cancer and other health problems began to be noted in the 1980s through 1990s. There have been 10 children born with Down's syndrome since the 1980s, all to mothers under the age of forty. Affected families live within a three mile radius of each other in the effluent pathway, or have had extensive contact with the river during their pregnancies.

Down's syndrome occurs on average in one of 700 to 1,000 live births. Of the approximately 2,000 live births within the valley in the last 20 years, the incidence of Down's syndrome is closer to one in 100. There have been six chromosomally damaged children conceived during the same time

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**TRITIUM**

period. Two of these children were born. One died at 6 months; the other five years old with Down's syndrome features. Another of the chromosomally damaged fetuses was trisomic. The Massachusetts Department of Public Health has begun a preliminary investigation of the environs around Yankee Rowe, in the pristine rural environmental of the DRV.

There is a 50% increase in five different cancers; a 40% increase in heart disease; and a 110% increase in infectious disease leading to mortality.

Citizens Awareness Network (CAN) and Nuclear Information Resource Service (NIRS) have demanded that NRC fund an independent epidemiological investigation of the DRV. This would entail an effluent pathway study of the river. We have also demanded that NRC reevaluate their inadequate and unfounded dosimetry standards for tritium.

To understand the effects of tritium exposure—the effects of organically bound tritium (OBT), and tritiated water (HTO) must be calculated. Since the effects of tritium are on a cellular level rather than an organ level, microdosimetry is required.

The issues raised in this report about the operation of the Yankee Rowe plant have been forwarded to the Inspector General of the Nuclear Regulatory Committee for investigation.

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Effect of radiation on increase in Down's syndrome was greatest in subgroup where X-rays were received more than ten years before conception. There was significant increase of "ever" X-rayed mothers in Down's syndrome group. The size or dose of X-ray was less important than the cumulative effect, as if damage was not followed by repair.
- 2 V. Beir, "Health Effects of Exposure to Low Levels of Ionizing Radiation." *National Academy Press.* 1990.  
Report stated that there was no threshold for the effects of radiation when the brain is in its most sensitive stage of development. This was especially true from 8-15 weeks through 22 weeks of gestation.
- 3 Susan Harlap, "Down's syndrome in West Jerusalem," *American Journal Epidem.* 97, No. 4. pp. 225-232.  
Research found that there were environmental factors involved in the etiology of Down's syndrome. Harlap compared rates of Down's syndrome in different groups in Israel. For mothers aged under 35, the age-adjusted risk of Down's syndrome is increased eightfold in one group who used the ritual baths while for older mothers difference in risk is less than threefold.
- 4 N. Kochupillai, I.C. Verma, M.S. Grewal, V. Remalingaswami, "Down's syndrome and related abnormalities in an area of high background radiation in coastal Kerala." *Nature*, 262 (1976) : 60-61.  
Research compared high background population to control with low background radiation. The observed frequency was higher than in controls and significant. Higher frequency of cases of Down's syndrome born to mothers aged 30-39. Association suggested between low dose radiation exposure of older maternal age dependence suggests that the damaging event accelerates oocyte aging and causes primary trisomy rather than translocation trisomy.
- 5 CN Rasmey, Ellis, and Zeally, "Down's syndrome in the Lothian Region of Scotland 1978 to 1979." *Biomed & Pharmacother* 45 (1991) : 267-272.  
Observable increases in Down's syndrome were noted in Lothian Region of Scotland after the accident at Chernobyl. The highest rate of 27.12 in 1987 was significantly higher than average for the whole period. Increase in incidence peaked in late 1987 and subsequently returned to pre-1986 levels.
- 6 Sheehan, M. Patricia and B. Hillary Irene, "An Unusual Cluster of Babies with Down's syndrome Born to Former Pupils of an Irish Boarding School." *British Jour. Med.* 11 Dec. 1983 : 287.  
Sheehan found a cluster of children born with Down's syndrome (8) to mothers who attended a girls school as adolescents, during the Windscale fire at that reprocessing reactor. The school was in the effluent pathway and the radionuclide released was tritium. There were 30 birth abnormalities in all in this small population.

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Researchers found that a third of single strand DNA breaks caused by the decay of tritium in 6-thymidine were due to transmutation. This is over and above the radiational effect.
- 23 M. Van Hees, *et al*, "Retention in Young Pigs of OBT Given During Pregnancy and Lactation." *Radiat. Prot. dos.* 16, no 1-2, (1971) : 123-126.  
Pigs fed with tritiated food themselves became tritiated. They passed on tritium to their offspring. The blood, heart, and kidneys of the young piglets were more tritiated than the tritiated foods fed their mother.
- 24 H. Wasserman, and K. Solomon, "Killing Our Own," N.Y. Dell. (1982) : 190-193.  
There is a long residency period in the body of very low concentrations of tritium. A 1981 study of former American atomics workers showed a majority with tritium levels still ten times above normal. Study found that tritium can remain in the body for up to ten years.

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- 25 K.F. Baverstock, D. Papworth, and J. Vennart, "Risk of Radiation at Low Dose Rates." *Lancet*, 1, (1981) : 430-433.  
Researchers studied workers involved in assemblage of instrument-dials made luminescent with radium. Significance found for breast cancer induced by gamma radiation. Exposure at rate of 0.1 rad per 8 hours, allowing adequate time for repair from exposure. Although the luminizer appears to be a high dose study, it demonstrates the inability of the body to adequately repair after exposure to low-level radiation.
- 26 M.A. Bender, "Significance of Chromosome Abnormalities." (1984) : 281-289 in *boice*.  
Bender investigated the repair of chromosome breaks incurred through exposure to radiation. In discussing repair of chromosome breaks, he reports repair half-times which are "typical of the order of 1 or 2 hours."
- 27 L.W. Brackenbush, and L.A. Brady, "Microdosimetric Basis for Exposure Limits." *Health Physics* 55, (1988) : 251-255.  
Researchers state that "Since most cells repair radiation damage with a characteristic time ranging from a few minutes to a few hours, it is evident that irreparable or mispaired damage must dominate the low-LET radiation effect at low dose rates."
- 28 I.D. Bross, *et al*, "A Dosage Response Curve for the One Rad range: Adult Risk for Diagnostic Radiation." *Amer. Jour. Pub. Health*, 69, no. 2, (1979).  
Bross investigated the effects of diagnostic medical trunk X-rays on 220 men with non-lymphatic leukemia and 270 controls. Research suggests that most heart disease is "prompted" by radiation exposure. The doubling dose of radiation for leukemia to be 5 Rems.
- 29 Sidney Cobb, MD MPH., "Health in the Deerfield River Valley. Some Preliminary Looks," (9/29/1992).  
Dr. Cobb analyzed raw health statistics on the Deerfield River Valley to determine whether a full epidemiological investigation should be undertaken. Cobb investigated available data for cancer incidence, Down syndrome, and mortality. He found a 50% greater overall mortality, a 50% greater mortality from cancer (5), a 40% greater mortality in heart disease, a 70% greater mortality from "other" causes in the Deerfield River Valley. There was suggestive evidence that there might be an excess in Down's syndrome. His conclusions were that the health problems deserve immediate attention. These problems were consistent with radiation injury incurred between 1960 and 1972.

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Researchers demonstrated a significant dose-dependent increase in chromosome aberrations in peripheral blood leukocyte chromosomes in a population of monitored nuclear-dockyard workers, subject to occupational radiation exposure within maximum permissible limits 5 rem per year. The observed increase in dicentric aberrations is not large but is a direct expression of increased genetic damage caused by radiation exposure. It is possible to detect a biological effect at the chromosome level to ionizing radiation below the internationally agreed maximum permissible levels.

- 31 L.E. Feinendegen, et al, "Biochemical and Cellular Mechanisms of Low-Dose Radiation Effects." *International Journal of Radiation, Biology* 53, no. 1, (1988) : 23-27.

Researchers studied the ability of irradiated cells to repair themselves. Feinendegen states, "Whereas the majority of single-strand breaks and base changes are very efficiently and quickly repaired with half-times less than 1 hour, the reconstitution of a double-strand break probably lasts much longer, perhaps up to several hours, and not all double-strand breaks are fully repaired."

- 32 J. Gentry, et al, "An Epidemiological Study of Congenital Malformations in New York State." *Amer. Jour. Pub. Health*, 49, no. 4, (4/1959).

Congenital malformation rates were studied in association with high and low background areas in New York State. The areas with the highest background radiation had the highest rates of malformations (17.5). For unlikely rural areas the rate was 12.5. there was a relationship between malformation rate and use of water from wells and springs as opposed to large surface areas (lakes and rivers). A doubling of the prevalence of severe mental retardation was found. There was also a sharp increase in the incidence of Down's syndrome. AEC estimates that background radiation levels associated with igneous rock formations ranged from .07 to .11 Rems/yr.

- 33 D.T. Goodhead, "Spatial and Temporal Distribution of Energy." *Health Physics*, 55, (1988) : 231-240.

Goodhead studied the ability of cells to repair themselves after exposure to radiation. He suggests that the repair system may need a "kick" to get started. He states: "...it is conceivable that the cell would repair relatively more efficiently if there were more damage to stimulate its repair process."

- 34 A.J. Grosovsky, and J. Little, "Evidence for linear response for the induction of mutations in the human cells by X-ray exposures below 10 rads." *Proc. Natl. Acad. Sci., USA, Genetics* 82, (April 1985) : 2092-2095.

The induction of thioguanine resistance was studied in continuous human lymphoblast cultures exposed to daily X-ray exposures of 1, 2.5, 5 or 10 rads for periods up to one month. The effects of small daily fractions were additive suggesting that doses as small as 1 rad are mutagenic in human lymphoblasts. A linear increase in mutation frequency was observed over this dose range with no apparent threshold. Results suggest that for human lymphoblasts, the mutagenic risk of low dose of X-rays can be accurately estimated by linear extrapolation from high dose effects.

- 35 M. Otake, and W. Schull, "In utero exposure to A-bomb radiation and mental retardation; an assessment." *British Jour. Radiol.*, 57, (May 1984) : 409-414.

Otake and Schull studied the incidence of mental retardation in Japanese A-bomb survivors. They found that the 8th through the 15th week of gestation was especially significant. Implication that 1 rad absorbed by the fetus during this period may double the rate of mental retardation.

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Radiation exposure increased the risk of mongolism in parents. There was validation of the view concerning cumulative radiation damage to genetic material. Exposure was result of fluroscopic and therapeutic radiation.
- 8 K. Sperlind, J. Pelz, RD. Wegner, I. Schulzke and E. Srruck, "Frequency of Trisomy 21 in Germany before and after the Chernobyl accident." *Biomed & Pharmacother* 45, (1991) : 255-262.  
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- 9 Irene and Elizabeth Uchida, and J. Curtis, "A Possible Association Between Maternal Radiation and Mongolism." *Lancet*, (10/14/61) : 848-850.  
There is a strong association between the incidence of mongolism and a history of maternal abdominal radiation. Radiation effect may be age-dependent.
- 10 T. Zuftan and W. Luxin, "An Epidemiological Investigation of Mutational Diseases in the High Background Radiation Area of Yangiang, China." *J. Radiat. Res.* 27 (1986) : 141-150.  
There were increases in Down's syndrome found in high background radiation area. Increases in cancer were not found. Average background dose was 330 mR/yr and 114 mR/yr in control group. There was a higher rate of cancer in control group which had received a greater number of medical X-rays.

## Tritium

- 11 D.F. Cahill and C.L. Yuile, "Tritium Irradiation of Mammalian Fetus." *Radiation Research* 44 (1970) : 727.  
Offspring conceived by parents subjected to low level lifetime exposure manifest effects at HTO activity levels 10-100 times lower than those required during exposure in utero only.
- 12 L.A. Carsten and S.L. Cumberford, "Dominant Lethal Mutations in Mice Resulting from Chronic Tritiated Water Ingestion." *Radiation Research* 66 (1973) : 609.  
Two successive generations of mice were exposed to continued ingestion of tritiated water. In second generation females, there was a significant reduction in the number of viable embryos.
- 13 A.L. Carsten, *et al*, "1989 Summary Update of the Brookhaven Tritium Toxity Program with Emphasis on Recent Cytogenic and Lifetime—Shortening Studies in Proceedings of the Third Japan—US workshop on Tritium Radiobiology and Health Physics." (Edited by S. Okada), Institute of Plasma Physics. Nagoya University, Nayoga, Japan. IPPJ-REV-3.  
There may be an effect at very low doses where the radiation inhibits the repair mechanism. This may occur during tritium irradiation. Theory consistent with the track structure calculations of Goodhead using very weak X-rays. There was significant reduction in the number of viable embryos resulting from matings between animals maintained on tritium diet. There was no effect on breeding effectiveness.
- 14 R.L. Dobson and M.E. Cooper, "Tritium Toxity – Effects of low-level 3HOH Exposure in Developing Female Germ Cells in the Mouse," *Radiation Research* 58. p. 91.  
Adult female mice were maintained on tritium levels 8.5, 0.85 and 0.085 Ci/ml of body water from day of fertilization. In female offspring exposed to tritium from conception and sacrificed at 14 days, primary oocytes were decreased below control number by 90% at 8.5, and significantly at 0.085 level.

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- 15 D.T. Goodhead and H. Nikjoo, "Current Status of Ultrasoft X-ray and Track Structure Analysis as Tools for Testing and Developing Biophysical Models of Radiation Action." *Radiat. Prot. Dos.* 31, No. 1/4 (1990) : 343-352.

Authors conclude that ultrasoft X-rays are more effective than equal doses of hard X-rays. Their RBEs increase with decreasing X-ray energy down to very small track lengths of 7 nm. Low energy electron track ends are a predominate cause of cell inactivation in all low LET radiations. (Ultrasoft X-rays are very similar in energies and track lengths to tritium B-radiation).

- 16 Kirchman, *et al*, "1973 Studies on the Food Chain Contamination by Tritium." In *Tritium*, editors Moghissi and Cater, Messenger Graphics, Phoenix, AZ, US.

Tritiated grass eaten by cows has been shown to be effectively transferred to their milk. OBT levels in their milk were 10 times higher in cows fed on tritiated grass than cows fed on HTO.

- 17 D. MacIntosh, S. Lung, F. Tsai and J. Spengler, "A Preliminary Assessment of the Potential Human Exposure to Tritium Emissions from the Yankee Atomic Electric Company Nuclear Power Facility Located Near Rowe MA." *Harvard University School of Public Health, Dept. of Environmental Health* 7 (1993).

Graduate students, under the supervision of J. Spengler, conducted a preliminary assessment of potential exposures and doses to the Deerfield River Valley residents to tritium, released from the Rowe nuclear power reactor. Concentrations of tritium were found to be 1,000 time greater in the valley than the surrounding area. Researchers suggested that an investigation be undertaken to study the effects of organically bound tritium, the effect of the river rapids and falls on HTO evaporation, and OBT aerosolization.

- 18 J.W. Laky, *et al*, "Some Effects of Lifetime Parental Exposure to Low-Levels of Tritium on the F2 Generation." *Radiation Research* 56, (1973) : 171.

Research done on effects of low-level exposure to tritiated water. Continues exposure calculated as whole body dose rates 3 to 3,000 mrad/day produced a 30% reduction in adult F1 male testes, but no impairment in growth or reproductive ability. Statistically significant effects on F2 neonates were: reduction in relative brain weight, decreased body weight, decreased litter size and increased resorption. Brain and testes contained approximately 100% and 50% greater tritium activities than the average in other tissues.

- 19 J.W. Lasky, and S.J. Bursian, *Radiation Research* 67, (1976) : 314.

Rats were exposed to constant tritium activities of 10 uCi/ml of body water for 42 days beginning first day of pregnancy or birth. In males exposed from birth or first day, there was a significant reduction in the testes weight and sperm content. In females exposed there was a significant reduction in F2 litter size and an increase in the number of reabsorbed embryos. The group most sensitive to low-level exposure was the one exposed from first day of pregnancy.

- 20 D.J. Mewissen, "Cumulative Genetic Effects from Exposure to Male Mice to Tritium for Ten Generations." IAEA Symposium on Biological Implications of Radionuclides Released from Nuclear Industries, (1979).

Data established the existence of cumulative genetic injury and the existence of cumulative genetic injury at the 9th generation. Their F2 offspring (unexposed) exhibited a significant increase in dominant lethal mutations resulting in a decrease in litter size.

- 21 T. Straume, "Health Risks from Exposure to Tritium." UCRL-LR-105088, Lawrence Livermore Laboratory, Livermore, California, US 94550, (1991).

Tritium is more hazardous to health than other types of low-level radiation. Tritium is about 1.5 times as carcinogenic, 2-5 times as mutagenic, and 2 times as teratogenic.

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- 36 A. Upton, "Prevention of Work-Related Injuries and Disease: Lessons from Experience with Ionizing Radiation." *Amer. Jour. Indust. Med.*, (1987) : 300-301.

Upton analyzed the effects of ionizing radiation and the incidence of breast cancer in women from different sources, i.e., A-bomb radiation, therapeutic irradiation for postpartum mastitis, multiple fluoroscopic examinations, exposure occupationally to external gamma radiation in the painting of luminous clock and dials. Upton states that "The similarity of the dose-incidence relationships in all four groups of women, in spite of marked differences....in the duration of exposure, implies that the carcinogenic effect of a small dose on the breast is largely irreparable and that the effect of successive doses are additive." He states "....there may be no threshold in the dose-incident relationship."

- 37 C. Waldren, *et al*, "Measurements of low-levels of X-ray mutagenesis in relation to human disease." *Genetics*, 83 : 4839-4843.

Waldren and coworkers studied the direct measurement of the effects of low doses of radiation and other mutagens. Extrapolation procedures were not used to estimate effects. The data demonstrate "that the true mutagenesis efficiency at low doses of ionizing radiation that approximate human exposures is more than 200 times greater than those obtained with conventional methods." With increasing dose, a point reached, where the mutational effect can not be detected in the chromosomes because the cell is killed off. Unequivocal mutagenesis took place for dose as low as 2.4 rads. Waldren states that "observed mutational efficiency at low doses is considerably higher than that observed at higher doses."

# GLOSSARY

- A** **activity** – The number of atoms of a radioactive substance that disintegrate per unit time.
- air inversion** – A condition in which a dense substance lies over a less dense substance. In an atmospheric temperature inversion, the air temperature increases and therefore the density decreases with height. Such inversions occur locally in very still air and tend to be stable because rising air, warmed at the surface, loses its buoyancy and is trapped when it meets air at the same temperature and density as itself so tending to reinforce the inversion. Pollutants entering the air close to the ground level are similarly trapped, and so temperature inversions are sometimes associated with severe pollution incidents.
- alpha particle** – A positively charged particle emitted by certain radioactive material consisting of two neutrons and two protons, the nucleus of a helium atom. A dangerous carcinogen when inhaled or ingested.
- atom** – The smallest unit of an element, consisting of a dense central, positively charged nucleus surrounded by a system of electrons. The structure is usually electrically neutral and is indivisible by chemical reactions.
- atomic nucleus** – The core of an atom, composed of protons and neutrons.
- atomic waste** – Radioactive solids; gases and contaminated liquids produced by nuclear reactions. Generally classed as high, intermediate, or low-level waste, dependent on curie per liter count.
- B** **background radiation** – Ambient radiation from outer space [cosmic] and materials found at the surface of the earth.
- beta** – A type of radiation
- beta-emitter** – A radioactive element characterized by its beta radiation.
- beta particle** – A high energy electron emitted by decay in a radioactive nucleus. Can cause skin burns and, when ingested, cancer.
- C** **carcinogen** – A cancer causing substance or agent.
- chromosomal strands** –
- curies** – (radiation units). Units of measurement used to express the activity of a radionuclide and the dose of ionizing radiation.
- D** **decay** – Gradual disintegration of radioactive material over time.
- DNA** – (deoxyribonucleic acid). The genetic material of most living organisms which is a major constituent of the chromosomes within the cell nucleus and plays a central role in the determination of hereditary characteristics.
- dose** – The amount of energy absorbed in a unit mass, organ, or individual from irradiation.
- Down's syndrome** – A congenital condition characterized by mental deficiency and related to the tripling of certain human chromosomes.
- E** **effluent** – Liquid discharge from a nucleus.
- effluent pathway** – Fluid emitted from a source. A waste fluid produced by an agricultural or industrial process.
- electron** – A negatively charged atomic particle, lighter than a proton or neutron.
- epidemiology** – A branch of medical science that deals with the incidence, distribution and control of disease in a population.

## GLOSSARY

**etiology** – All of the causes of a disease or abnormal condition.

**exposure** – Being exposed to radiation.

**F** **fission** – The splitting of a nucleus into two lighter fragments, accompanied by the release of energy and generally one or more neutrons. Fission can occur either spontaneously or as a consequence of absorption of a neutron.

**fluoroscope** – An instrument used chiefly in industry and medical diagnosis for observing the internal structure of opaque objects (as the living body).

**fuel rod** – A single tube of cladding filled with uranium fuel pellets.

**G** **gamma ray** – High energy, short wavelength, electromagnetic radiation emitted by a nucleus.

**H** **half-life** – The time it takes for half of any radioactive substance to disintegrate. Half-lives range from seconds to millions of years.

**I** **ion** – An atom, molecule, or elementary particle that has lost or gained one or more electrons, therefore taking on an electrical charge. A positive ion has lost one or more electrons; a negative ion has gained one or more electrons.

**ionization** – The process of adding or removing electrons so as to form ions. Ionization can be caused by high temperatures, electrical discharges, or nuclear radiation.

**ionizing radiation** – Alpha, beta, or gamma radiation, which, when passing through matter can ionize it. Ionizing radiation can cause cell damage as it passes through tissue.

**irradiated** – Having been exposed to or treated with radiation.

**isotope** – A radioactive variant of a common element with a different atomic weight but equivalent atomic number. Isotopes are generally created by the fission process.

**L** **latent period** – The amount of elapsed time between exposure and the first sign of disease symptoms.

**low-level** – Refers to radioactivity of low intensity.

**M** **microdosimetry** – Dosimetry involving microdoses of radiation or minute amounts of radioactive materials.

**millirem [mr]** – One thousandth of a rem.

**molecule** – A group of atoms held together by chemical forces.

**mongolism** – See Down's syndrome.

**mutation** – A sudden variation; offspring differing from its parents in one or more heritable characteristics due to changes within the chromosome or the gene.

**N** **neutrino** – A subatomic particle of negligible mass, named by Enrico Fermi.

**neutron** – An uncharged particle in the nucleus of every atom heavier than hydrogen. A free neutron is unstable. With half life of 13 minutes, it will decay into a proton, electron and a neutrino.

**nondisjunction** – Failure of two chromosomes to separate subsequent to meta phase in meiosis or mitosis so that one daughter cell has both/and the other, neither of the chromosomes.

**nuclide** – Any atom that exists for a measurable length of time. A nuclide can be identified by its atomic weight, atomic number, and energy state.

## GLOSSARY

- O** **oocyte** – An egg before maturation: a female gametocyte.  
**organically bound** – Held in chemical or physical combination.
- P** **photon** – A “packet” of energy with energy with no mass, which travels at the speed of light. Photons range from very low energies [such as infrared and visible light], moderate energies [ultraviolet and X-rays] to high energy [gamma].  
**pressurized water reactor [PWR]** – A reactor in which the heat from the nuclear core is transferred to a heat exchanger under constant pressure to achieve a high water temperature without boiling. A secondary circuit produces steam for the generators.  
**proton** – A elementary particle with a single positive charge that is a part of all neucli.
- R** **rad** – A measure of exposure to, or the absorbed dose of radiation.  
**rad waste** – radioactive waste.  
**radiation** – The emission of neutrons, alpha particles, beta or gamma rays from a radioactive source.  
**rem** – The unit measuring an absorbed dose of ionizing radiation in biological matter; abbreviated from “Reentgen Equivalen, Man.”
- S** **soft x-rays** – (soft radiation) Ionizing radiation of low penetrating power, usually used in reference to x-rays of long wavelength.
- T** **teratrogenic** – (teratrogen) Any environmental factor that acts on a fetus to cause congenital abnormality.  
**transmutational** – The transformation of one element into another by bombardment of nucleus with particles. For example, plutonium is obtained by the neutron bombardment of uranium.  
**tritium** – A radioactive nuclear by-product, also known as  $H^3$ , consisting of a hydrogen nucleus, or proton, with two additional neutrons.