UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

***

REACTOR DECOMMISSIONING PUBLIC MEETING

U.S. Nuclear Regulatory Commission
11545 Rockville Pike
Room T-2B3
White Flint Building 2
Rockville, Maryland
Monday, June 7, 1999

The above-entitled meeting commenced, pursuant to notice, at 9:02 a.m.

ANN
RIL
EY
&
ASS
OCI
ATE

P R O C E E D I N G S

[9:02 a.m.]

MR. DUDLEY: Good morning. I am Richard Dudley, and I am a Senior Project Manager in the Reactor Decommissioning Section of the Office of Nuclear Reactor Regulation. On behalf of the NRC I would like to welcome everyone to this public meeting on reactor decommissioning.

On March 17, 1999 the NRC Commissioners met with the NRC Staff and with industry representatives from the Nuclear Energy Institute. We discussed a new approach to establishing rules for power reactors in the decommissioning process. At the meeting it was decided that the NRC would perform a special review of certain decommissioning issues to develop a risk-informed approach to issuing new regulations in these areas.

Since the March Commission meeting, the NRC Staff has had two additional public meetings to discuss this effort and to solicit input from stakeholders. The purpose of today's meeting is for the NRC to discuss the status and preliminary results of its decommissioning risk assessment.

This slide shows today's agenda. Extra copies of the agenda are available there at the table right in the middle there. In addition, copies of the slides that we will be using are also available at that table.

First, Stu Richards of NRC will give an overview of the status of the risk assessment. Next Vonna Ordaz, Diane Jackson and Glenn Kelly will summarize the preliminary results.

The NRC's presentation should be over by about 10:45, and then we will have a 30-minute period for questions and answers.

Next, Bill Huffman of the NRC will discuss ongoing efforts to improve and clarify the existing decommissioning regulations. A 15-minute period for questions will follow Bill's talk, then we will

ANN RILEY & ASSOCIATE

break for lunch until about 1:00 p.m.

After lunch, representatives from the Nuclear Energy Institute will speak for about an hour followed by a 30-minute period for questions, then stakeholders from the general public will be given an opportunity to speak.

We have a sign-up list for public speakers on the clipboard over on the table to my right, so all members of the public that wish to speak, if you would, please, sign on that clipboard. That way we make sure we allot time for everyone who wishes to speak, and when we know how many people, we will divide the time we have into segments and make sure everyone gets an ample opportunity to be heard. So if you want to speak, again please be sure that you have signed up on the clipboard to my right.

We are recording today's conversation so a transcript can be made of the discussions. Because of the transcript I will ask all speakers or people making comments or asking questions to first identify themselves before they speak so that the transcript will be accurate. If you forget, I will try to remind you.

Attendance sheets -- if you didn't sign an attendance sheet when you came in, we are circulating some clipboards so I would like everyone to make sure that they have signed the attendance sheet, everyone who is here. Thank you.

This is primarily a technical meeting. Therefore, before we get started with the technical part of the meeting, I would like to go around the room and have everyone to please introduce themselves and state their affiliation so we have a better understanding of who is present.

Again, I am Richard Dudley. I am a Project Manager in the Decommissioning Section in the Office of Nuclear Reactor Regulation.

MR. RICHARDS: I am Stu Richards. I am a Project Director

ANN RILEY & ASSOCIATE

in DLPM and NRR.

MR. BARRETT: I am Richard Barrett. I am Chief of the Risk Branch in NRR.

MS. ORDAZ: I am Vonna Ordaz in the Plant Systems Branch in NRR.

MS. JACKSON: I am Diane Jackson. I am a Reviewer in the Plant Systems Branch and a member of the Technical Working Group.

MR. KELLY: I am Glenn Kelly. I am a Senior Reliability Risk Analyst with the Risk Group in NRR.

MR. HUBBARD: George Hubbard, Section Chief, Plant Systems Branch, NRR.

MR. SHADIS: My name is Ray Shadis, a public participant from the state of Maine.

MR. MEISNER: Mike Meisner, Maine Yankee.

MS. HENDRICKS: Lynnette Hendricks, NEI.

MR. BRADLEY: Biff Bradley, NEI.

MR. RAY: Phillip Ray, Project Manager in Decommissioning Section.

MR. DUDLEY: They doesn't need to be in the transcript. There will be a written list.

MR. HUSTON: Roger Houston, Licensing Support Services.

MS. WYCHE: Altheia Wyche, SERCH Licensing/ Bechtel

MR. LOCHBAUM: David Lochbaum, Union of Concerned Scientists.

MR. DUDLEY: Mort?

MR. FAIRTILE: Mort Fairtile, MRR/DLPM.

MR. ARILDSEN: Jesse Arildsen, Senior Operations Engineer, NRC/NRR/DIPM.

MR. KENNER: Paul Kenner, Decommissioning Section, NRR.

ANN RILEY & ASSOCIATE

MR. WHEELER: Duke Wheeler, Decommissioning Section, NRR.

MR. SATORIUS: Mark Sartorius, Office of EDO, NRC.

MR. STOUDENMEIER: Joe Stockmeyer, Reactor Systems Branch, NRC.

MR. HANNON: John Hannon, Plant Systems Branch Chief, NRR.

MR. DAM: Scott Dam, DNFL.

MR. RUBIN: Mark Rubin, PRE Branch Head --

MR. HULLIHAN: Terry Hullihan, Director, Division of -- Safety --

MR. MARKLEY: Tony Markley, Rulemaking Branch, NRR.

MR. HUFFMAN: Bill Huffman, Decommissioning Section, NRR.

MR. BAGCHI: Goutam Bagchi, also just walked in.

MR. ROTHMAN: Bob Rothman also.

MR. DUDLEY: And Bob Rothman, thank you. They are of our Geosciences Group.

Now I would like to introduce Stu Richards, Director of Project Directorate 4 in the Decommissioning Project Directorate, who will have the opening remarks.

MR. RICHARDS: All right. Thank you, everyone, for coming today. I would like emphasize again that this is intended to be a working meeting. We picked this room today because we didn't know how many people would be here. It seems inevitably when you pick a smaller room for a working meeting you end up with 50 people and then you have to relocate, and so we decided to go bigger to be safer in anticipation of maybe more people than some of the smaller rooms could handle, so this is intended to be a working meeting with a discussion, and I know the microphones and all that kind of lend some formality to it, but that is not intended.

If we can have the first slide -- a little background. In the past as plants enter decommissioning, licensees typically come in

ANN RILEY & ASSOCIATE

and look for exemptions from our regulations, recognizing that a plant is no longer in operating mode. However, when they shut down their license of course is still an operating license so licensees seek exemptions from our requirements in order to reduce unnecessary costs at decommissioned plants.

We have been treating those exemptions requests on a case by case basis and we feel that is not the most efficient or effective way to do business. I think the industry agrees and we are looking for a better way to draw on the experience that the agency and the industry has gained in the decommissioning area and see if we can improve the way we do business, so hence we are engaged now in a process to try and streamline decommissioning rulemaking and the decommissioning process once a plant enters decommissioning.

In the past there have been some rulemakings underway and in particular security, financial protection, and EP. We are trying to look at those areas and see if we can bring it together into one integrated effort to go forward in the future. Next slide, please.

We met with the Commission back in March -- March 17th -- and at that time the Staff proposed to basically take a hiatus on the rulemakings that were in progress, to take a step back and try and look down the road a ways, see where we want to go, and come back to the Commission and make them a proposal for a new integrated risk-informed approach.

We told the Commission at the time that we intended to make it a public process where we would involve our stakeholders and members of the industry. We are attempting to do that and we have had a number of public meetings and this is a continuation of that series of meetings.

We hope that the approach we are taking results in an approach that is both safe but also is effective and efficient. We hope

ANN RILEY & ASSOCIATE

not to have to deal with decommissioning issues on plant by plant basis, but rather have it all codified in the end, so that everybody knows what our requirements are, what is expected, and the utilities can move promptly through the process and the public will know what our requirements are and what the basis for it is. Next slide, please.

We formed two working groups as part of this effort. One is a working group that is my responsibility and that working group's effort is to take a look at the rules associated with decommissioning, primarily looking at the process -- how do we deal with the decommissioning plants and is there a better way to approach this. That working group is led by Bill Huffman, over here to my left and he is on the agenda to talk later in the morning.

The second working group is under the responsibility of Gary Holahan. Gary is also here today.

The technical working groups' job was to take a look at the risk associated with decommissioning, primarily with the storage of spent fuel, and bring back to the Projects organization a technical basis to go forward with our rulemaking actions, so they play a key role in what we are doing here today and of course we have talked about their efforts in the last couple of public meetings we have had.

I think at the last public meeting we had, Gary Holahan discussed the scenarios that were being looked at the technical working group and today we are going to talk a little bit about the preliminary, the very early preliminary results of the technical working group's look at those scenarios.

Now our intention is to provide a status to the Commission by June the 18th of where we are at on both fronts, the process side under Bill Huffman and additional the technical working group side under Gary Holahan. I want to emphasize today that the results of the technical working group are very preliminary at this point. We are not

ANN RILEY & ASSOCIATE

ready to take any regulatory action on what the group has done. They have only had 60 days I guess to be working on this. They have been working extremely hard, but on the other hand, what we are talking about today has not had the benefit of reviews internal to the agency, the kind of peer reviews that we would expect their kind of work to have.

Additionally, we want to take this information and share it with our stakeholders, with the public, and with the industry and receive their feedback. I would be the first to acknowledge that I think the Staff probably doesn't have a lot of experience with the operation of a decommissioned plant, so we went into this with a lot of knowledge about operating reactors but I think we are still learning in the decommissioning area and hence the importance of getting some feedback from the industry on some of the assumptions made in our study and likewise going out to the public and other interested parties and seeing what they have to say about it.

So again, this is very preliminary results. This is just one more step in our public process of trying to share what we are doing with our stakeholders as we move on down the road. Next slide, please.

At the risk of repeating myself, again the goal here is to make some decisions on changing the regulatory process to make it more efficient and effective, yet maintain the appropriate level of safety. In order to do that, we need a technical basis to go down the road, so whatever we are going to do, we want to make sure that we are well informed basically on the science side before we move forward. Next slide, please.

We will get into more detail as we get into the presentation. As it stands right now, our intention is to get the technical working groups to draft a preliminary report out for comment, make it publicly available by August.

We are also going to go out to -- well, I should let them

ANN RILEY & ASSOCIATE

speak to it. This is kind of a work in progress, but we will probably be looking to a national lab for a peer group kind of a review, so we are looking for that.

We hope to get all the comments back and get our review of those comments by the end of the year and have the technical working group complete their assessment by March of the year 2000.

Okay. With that I think it is Vonna Ordaz's turn.

MS. ORDAZ: Thank you, Stu. I would like to give you an overview of what we have done. Up to this point the staff has reviewed the licensee's emergency preparedness exemption request on a plant-specific basis using criteria where air cooling of the fuel is adequate, or sufficient time is available to protective measures using local emergency response.

The technical working group has performed deterministic and probabilistic and assessments. Our preliminary results are based on site visits and current information on spent fuel pool configuration. As Stu alluded to, it is important to note that our preliminary results are provided for information and discussion purposes only and they can not be applied to the regulatory process at this time.

Now, Diane Jackson will discuss the preliminary deterministic results.

MS. JACKSON: Good morning. Our deterministic calculations analyze the heatup of the fuel and the clad to determine the potential for zirconium oxidation and ignition. The most extensive work to date we have found has been in support of Generic Safety Issue 82 to severe accidents for spent fuel pools, which was performed in the 1980s and was based on operating reactors.

Our starting point then was to look at this information to see if it was applicable to decommissioned plants. The studies we found provided good insights on zirconium oxidation. The studies identified

ANN RILEY & ASSOCIATE

the initiation of a zirconium fire in a spent fuel pool was highly dependent on decayed power and fuel storage configuration.

In our assessment we found that the operating practices since the '80s may affect the spent fuel heatup analysis results. In particular, there has been an increase in fuel burnup which results in higher decay power, and also denser fuel storage racking, which reduces your heat removal for air cooling. Next slide, please.

Our preliminary results indicate that on a generic basis the decay time required to allow air cooling only may be longer than the generic studies performed for operating reactor reactors. However, we find that previous plant-specific analyses which were done on the actual configuration for the spent fuel pools for decommissioned plants are unaffected by this.

The staff performed two types of analyses to identify potential review criteria. The first, the potential criterion, was for reviewing exemptions, is that a zirconium fire could not occur and that air cooling would be adequate. Our preliminary estimates using generic near-bounding thermal-hydraulic spent fuel heatup assumptions indicate that three to five years of decay time may be needed to reach a point where air cooling of the fuel is adequate. And, again, if the plant wanted to perform site-specific calculations on their fuel with their fuel configuration, this may yield shorter time estimates than the generic analyses.

We also found that for plant-specific analyses, that a maximum allowable temperature of 300 degrees C may be acceptable if certain analyses conditions were met.

MR. RICHARDS: Is that three or 800?

MS. JACKSON: Oh, I am sorry, 800. Another potential criterion for reviewing exemptions is the determination that sufficient time would be available to take protective measures using local

ANN RILEY & ASSOCIATE

emergency response after the fuel is uncovered. We performed generic bounding calculations correlating decay time of the fuel since final shutdown to the heatup time of the fuel after it is uncovered. The calculations were conservative, they were based on adiabatic conditions, which assumes no heat loss, using one fuel rod heating up from 30 degrees C to 900 degrees C.

Our preliminary generic results indicate that two years of decay time would be needed for a BWR and two-and-a-half years time would be needed for a PWR to allow approximately 10 hours available to take protective measures using local emergency responses. And, again, more realistic plant-specific calculations could yield shorter decay time estimates.

The 10 hours was chosen due to past emergency preparedness exemptions that we have approved, but they were plant-specific exemptions, so at this time it is not certain if 10 hours would be appropriate for every plant in the United States. It is just a gauge right now of how much time could be available to take protective measures.

And this concludes our presentation on preliminary deterministic assessment results.

Next is Glenn Kelly from the Probabilistic Safety Assessment Branch.

MR. MEISNER: Do you want questions and comments as you go along or hold them off?

MR. RICHARDS: Why don't we just wait until the end? I mean why don't we just lay it out on the table and then there is plenty of time for dialogue. We are not constrained by the clock. We laid out an agenda here. We have an agenda, but we will have plenty of time to talk through this.

MR. MEISNER: Okay.

ANN RILEY & ASSOCIATE

MR. KELLY: Good morning, my name is Glenn Kelly, I am with the PRA Branch. We performed a very intense two-month effort to evaluate the frequency of fuel uncovery and the consequences of a zirconium fire at a decommissioned nuclear power plant. The working group performed their preliminary analysis and looked at a large number of initiating events. We did not limit ourselves to just looking at seismic events.

A very important part of our analysis that we performed was that we had to consider what kind of equipment was available for providing makeup to the pools, for providing cooling to the pools and support systems to the pools. And, as a matter of fact, one of the things that we are going to be discussing later on with the industry is how and when they go about removing or abandoning equipment at decommissioned plants so that we have a better understanding of how they go about doing that and their basis for it. Next slide, please.

I visited four sites where they have decommissioned reactors, and we did our PRA analysis based on that information, plus information I received from the project managers of other decommissioned plants. The configuration that we modeled with our PRA showed a significantly reduced level of redundancy and diversity in the areas of makeup, cooling and support systems. This was, for example, we found that the plants didn't have emergency diesel generators, residual heat removal systems, generally, didn't have large volumetric makeup capability to the spent fuel pool, didn't have uninterruptable power sources.

An important thing to note, however, is that there are no plants today that match the conditions we have assumed in our risk assessment. They are all basically in a better condition today than what we assumed. This is on the basis of looking at the assumed heat load that we had, which was one year since the last fuel was transferred

ANN RIL EY & ASS OCI ATE

from the reactor, and also the combination of equipment being removed from service.

The conditions assumed here also do not apply to operating reactors. Operating reactors have the full complement of support systems, makeup systems and cooling systems, things like emergency diesel generators, RHR system, multiple off-site power lines, the normal spent fuel pool cooling systems, full fire protection, makeup sources with large flow rates, frequent operator access and NRC on-site oversight.

The frequency of fuel uncovery that we calculated is not equivalent to the frequency of a zirconium fire in spent fuel pools at decommissioned plants. There is some time after you uncover the fuel before the zirconium fire begins. There is potential for recovery in that area, but that period of time, we did not model that recovery. We assumed that once you uncovered the fuel, that you were going to be unable to stop the process at that point. Next slide, please.

Our working group's preliminary results indicate that a seismic event is probably not the largest contributor to spent fuel pool uncovery. There are, however, a number of credible initiators that we found. One of the important things to note as we get into this is that there are no one or two dominant scenarios that would be the -- potentially could be fixed by a single clever fix, or a couple of clever fixes, that there are enough initiators there that we see that it is not something that we can easily make go away, at least based on our preliminary result.

Based on my site visits, the current plant configurations in our PRA, we came up with a preliminary estimate of the frequency of uncovering fuel of about 1 times 10 to the minus 5 per year. Now, the important thing about this number is that on a generic basis, we found that we could not preclude -- again, this is our preliminary look at

ANN RILEY & ASSOCIATE

this -- we could not preclude concerns about spent fuel pool uncovery on a generic basis. Similarly, our preliminary calculations on a zirc alloy fire consequences indicated the off-site doses may be significant, and also could not be generically dismissed. Next slide, please.

This slide illuminates for you the types of initiators that we looked at, and we did look at broad range of initiators. Spent fuel pool and the support systems are configured in a manner similar to what I found in my site visits. All of these plants had been shut down for more than two years, that it, it has been more than two years since the last of their fuel was moved from the reactor to the spent fuel pool. These plants had cooling systems that were skid-mounted and I found that they had pretty good instrumentation, the operators were right on top of what was going on.

If you look here, the top six events represent about 95 percent of the contribution to fuel uncovery. There is no one event that really stands out above all the other events. The cask drop and the seismic event we consider to be the only events that would give you very rapid loss of inventory from the pools.

All of these evaluations are driven by assumptions. We have about three pages of assumptions in our detailed report that we are working on now, and that will probably be available for review and comment in early August. Next slide, please.

This is another way of taking a look at the contribution of the various contributors. And, again, it gives you an idea that there is no one contributor that really dominates the event. And that concludes my summary of the risk aspects of it.

MR. DUDLEY: I guess, next we would go into questions and answers, but before we do that, I noticed a number of late-comers. Everyone who has come in late, make sure you please sign either one of the clipboards at the center post or some other attendance sheet,

ANN RILEY & ASSOCIATE

clipboard circulating. So please make sure you have signed the attendance.

Now Stu Richards will do the summary. Thank you.

MR. RICHARDS: I'd like to remind everybody as we go through the discussion again, this is preliminary results for discussion. Like Glenn said, there's some three pages of assumptions you have got to make. Assumptions play a big role in how the results come out, and that is one of the things we are seeking some feedback in is how are these plants really configured out there, now do people do business, so there will be a lot of interesting discussion on that.

Again we are trying to look and bring this to a conclusion, at least for the technical working group by March of 2000.

That seems like a long ways away and depending on how things go, who knows, maybe we will do better than that, but in order to provide an agenda or a schedule to the Commission that is what we are presently proposing with what we know.

Of course our rulemakings that we have put on hiatus at this point are dependent largely on the results of the technical working groups so we are still looking at what we can do with the process under Bill Huffman's working group but until we get the results of the technical working group it somewhat puts a stall on going forward on our rulemakings. Last slide.

Finally, once we do get the results from the technical working group then we would go into the rulemaking process and of course rulemaking takes a period of time

Once we have the basis for what we are going to do, we will try to move smartly forward with that, but the agency's experience has been that it usually takes a year to two years in order to go through rulemaking, particularly if it is a rather large rulemaking that we will be undertaking.

ANN RILEY & ASSOCIATE

The last bullet is what do we do in the meantime. We will be drawing on the experience we are gaining from the technical working group. For instance, they noted that the Staff might be willing to accept 800 degrees C. -- whereas in the past I think it has been 565 -- on a case by case basis, but we will be continuing to deal with plants that come in for plant-specific exemptions on a case by case basis, and somewhat continuing down the road as we have before.

That completes our presentation and we are certainly hoping for a lot of discussion, so please --

MR. MEISNER: Well, I'll start off. Can we put this chart back up on the overhead?

MR. DUDLEY: Yes, and Mike, identify yourself, please.

MR. MEISNER: Yes. Mike Meisner, Maine Yankee.

I guess, Glenn, I am a little surprised by this, because many of these things can't happen in my plant the way you have got them laid out here, and I would like to spend a little time discussing how these events proceed and how you came to the conclusions you did.

You mentioned that cask drop and seismic were the only two rapid sources of loss of inventory so I assume the rest progressed fairly slowly. Can you describe the internal fire scenario?

MR. KELLY: I think the key with all of the slower events is that we based our initiating event frequencies on information such as we got from AEOD on actual events that had occurred at plants and we had initiators that were on the frequency of 10 to the minus 1 to 10 to the minus 2 per year for various types of problems.

Now what happens is that most of the concerns that you run into here with responding or recovering from an accident involve very low probability events -- we're talking about a 10 to the minus 1 or 10 to the minus 2 initiator, then the rest of this is really human error rates.

ANN RILEY & ASSOCIATE

We assumed it's long-term human error rates. This is exactly how we go about performing our PRAs for internal events and external events for operating reactors.

We have continued on that same process here in evaluating for decommissioned plants so what we see is although there is a long time available generally for recovery actions that there is a low probability that the recovery actions would not be successful or the operators would make mistakes or would miss things.

MR. MEISNER: You say there is a low probability that that would happen?

MR. KELLY: That's right. We consider something like one in a thousand or one in 10,000 times to be a low probability recovery event, and that is the reason in part why you get these type of numbers.

The other important thing that really drives your numbers here in our analysis and which I do believe is applicable at your site is that the systems are simple but they -- what they lack in their simplicity is levels of redundancy and diversity, which you have at operating plants. There are -- we have various levels that provide us protection there where we have a different series of barriers and that. You don't have the same kind of protection available at a decommissioned plant when you have gone to sled cooling and you have got, for example, most of your power coming off of one bus, which would be very untypical of anything you would find at an operating reactor.

So because of that and because there are a lot of single failure points in this typical type of system, one of the things that we would ordinarily see gives you better recovery results for an operating reactor is not something that you have available at decommissioned plants.

MR. MEISNER: Okay, so would you walk us through the internal fire.

ANN RILEY & ASSOCIATE

MR. KELLY: Okay, you want to go through the details of that?

MR. MEISNER: Yes.

MR. KELLY: I would like to call on Mike Cheok, who can give me the details on exactly those calculations that we have.

MR. CHEOK: This is Mike Cheok from the NRR Staff.

For the internal fires, what we did was to take the EPRI initiating event frequencies for operating reactors for pumps and electrical cabinets and got an initiating event frequency of 8 E minus 3.05. We also included in some cases for the cutting and welding that might be going on in a decommissioned plant if they were going to disassemble equipment from the plants. We took into account manual suppression of the fire, and in this case the manual suppression we chose was at a .05 percent probability. This takes into account the fact that the fire will not be manually suppressed and it also takes into account the fact that since we do not have runs to determine the effect of the fire on equipment in the room, since we do not have geometries of the room, since this is a generic study, we did take into account that in 10 percent of the time a fire will be large enough to break out either offsite power supply or the cooling pumps themselves.

Given the fact that you have a fire and no suppression, you need to now recover inventory using makeup sources because we assume no recovery of the cooling sources.

A recovery in these cases could come from your diesel-powered fire pumps or from any -- what we call the cool reaction, since you do have a lot of time for the pool to boil down.

MR. MEISNER: Why are we making up the --

MR. CHEOK: I'm sorry?

MR. MEISNER: You are talking about the boil-down time? --

MR. CHEOK: That's correct.

ANN RIL EY & ASS OCI ATE

MR. MEISNER: Okay.

MR. CHEOK: And like Ken said earlier, this may not be applicable to your plant. What we had done in this case was to assume that the fuel was one year old and at that point we do not have any makeup systems that an operating plant would have already, so when the fuel is one year old we still have the potential for boildown because the fuel is fresh enough.

MR. MEISNER: What kind of times did you assume for time to boil?

MR. CHEOK: We do have in excess of 120 hours.

MR. MEISNER: 120?

MR. CHEOK: Correct -- for pool boiling. Given the lack of --

MR. RICHARDS: Is that time to boil or time to boil down?

MR. CHEOK: That's time to go to boiling and then time to boil down. That includes both times.

MR. MEISNER: Thank you.

MR. CHEOK: Given the lack of procedures as to what -- we are not quite sure what the operators would do in this instance and I guess that is one reason why we have the public meetings is to find out more information from the operating plants. We are not quite sure what the plant operator would do in this one week, 120 hours, what he would be instructed to do, whether he would try to use the fire pumps -- if they were not available what is the next step, would he go out to the local hardware store and do a makeup pump and from a local reservoir would he call the local fire department? You are not quite sure what happens in this case.

What we had assumed in this analysis is a 5 percent probability of failure in the next 120 hours of not recovering this makeup.

ANN RIL EY & ASS OCI ATE

We have done sensitivity studies. If we had changed this 5 percent to 1 percent, this one E minus 5 number that Glenn had mentioned would go down to approximately seven E minus 6 and those numbers will again change depending on what the plant-specific procedures are. If there are specific procedures as to if this does not happen, if you do not recover cooling by the first 24 hours, do this, if this does not happen in the next 10 hours, do this. I mean I think if we have procedures like that, we can quantify our human actions a lot better given a lot of procedures, and we do not know what timeframes the operators would deal with before finally giving up and calling, let's say, the fire department. It is very hard to quantify a human error in this case.

MR. MEISNER: Tell me, if you are going to do a PRA for a power facility, operating facility, what kind of assumptions do you make when you have 120 hours of recovery time?

MR. CHEOK: The typical HRA methodology that is present today will not work for 120 hour recovery times.

MR. MEISNER: What do you assume in those cases?

MR. CHEOK: I would not assume anything less than 10 to the minus 4 because I do not think that we can quantify a 10 to the minus 5 or 10 to the minus 6 HEP.

MR. MEISNER: But in fact, don't you assume that when there is greater than 24 hours, or at least I know in the industry PRAs that is what we do --

MR. CHEOK: Right.

MR. MEISNER: -- if you've got greater than 24 hours to recover, then you don't take that sequence any further.

MR. CHEOK: I think in operating plants you have very set procedures. We can go down EOPs and say if you don't get this at a certain point, you do this. I do not see those kind of procedures. I

ANN RILEY & ASSOCIATE

mean there might be procedures like this out there right now. I just do not see them and given the lack of my knowledge of these procedures, I am not sure at what breakpoint an operator would some actions. The operator could wait through the weekend, for example, and say, hey, look, I have a week before this happens, okay? -- and I'll recover cooling, you know, in 24 hours or -- I am not sure.

This is why we have this meeting I think. Part of the reason as to why we have this meeting is to find out from the people who know better. They can tell us what their procedures are.

MR. MEISNER: Okay. Well, I guess I would make the observation that if you have got 120 hours to recover, you are applying criteria to the shutdown case that you wouldn't apply in an operating situation. I don't know why you are doing that --

MR. KELLY: It's not a matter that we wouldn't apply it. We are applying something different here. It's that in an operating case we have other scenarios which contribute and if in an operating case these numbers would not show up as your dominant contributors.

When we are performing our operating reactor PRAs, it is not uncommon for people to take 24 hours as their mission time when they are performing the PRA, but that doesn't mean that you shouldn't be looking at events that are longer than that. It's just a way of making it easier for people to perform their calculation.

MR. MEISNER: Of course. I guess I would have expected, though, maybe I said it incorrectly, that what you do in that case is identify the need to have some procedural controls and go on.

MR. KELLY: Right, and in this case we didn't have that and one of our things that we are trying to do here is to provide a technical basis and a risk-informed basis as to what do we see as the potential consequences and frequency of uncovery for decommissioned plants, and if we said, well, we are not going to look at anything that

ANN RILEY & ASSOCIATE

takes longer than the 24 hours then we wouldn't have anything for you because these events all take longer than 24 hours.

MR. MEISNER: I think that is the point.

MR. KELLY: Right, that's the point.

MR. CHEOK: And the other point you have to keep in mind, Mike, here is that we are talking about relatively low numbers. In an operating reactor, you are talking about 10 to the minus 5 numbers. I mean internal fires it jumps up because it is 28 percent, but it is 28 percent of 10 to the minus 5.

You are talking about something times 10 to the minus 6 as a frequency of uncovery, and when you talk about an HEP so close to 10 to the minus 4 we will be saying, hey, look, we are giving the operator 9,999 chances of actually mitigating this accident given in 10,000 chances, so we are not talking about something that is humongously large.

MR. MEISNER: It is still a criterion wouldn't apply to an operating facility.

MR. CHEOK: I am not sure, I mean like I said, I wouldn't go below 10 to the minus 4 in an operating facility anyway. I am not comfortable giving a 10 to the minus 5, 10 to the minus 6 HEP to any --

MR. MEISNER: I am just saying, applying that factor at all to a scenario, it takes a week to develop.

MR. CHEOK: I mean if I am not apply the factor, I am using zero which is smaller than 10 to the minus 4.

MR. MEISNER: Which you do for an operating facility?

MR. CHEOK: I am not sure we do it.

MR. MEISNER: How about the loss of coolant inventory?

MR. CHEOK: The loss of coolant inventory is based on some AEOD data, NUREG-1275, that shows loss of coolant inventory, initiating event frequency of 10 to the minus 3. Again, in this case we do have

ANN RILEY & ASSOCIATE

makeup, using the makeup pumps, or we can makeup using the fire pumps. We have alarms, indicator for alarms in the control room. Given failure of the alarms we take credit for operating walk-ins. Given failure of makeup using either the makeup pumps or the fire pumps, we do have enough time again, in excess of 120 hours for makeup through off-site sources, whether you go out and buy a pump from the hardware store or you use the fire brigade. Again, this is a 10 to the minus 6 type frequency.

MR. BARRETT: Mike, could you just describe what is the nature of a loss of inventory event? Is this a siphoning type of event or what is it?

MR. CHEOK: In the AEOD report in NUREG-1275, they give a lot of different types of initiators. It could be a siphoning type event. It could be a valve type failure or a gate type failure. Most of these errors are operator errors and in the AEOD report most of them are recoverable -- all of them are recoverable.

In the AEOD report we have I think about 50 events, I am not going to start quoting them just out of memory. Actually, I didn't bring the report with me.

MR. BARRETT: Mike, I didn't need that.

MR. CHEOK: In the report basically they have several events, the inventory loss was between one and five feet. There were two incidents where the inventory loss was between five and 10 feet. In a foreign reactor we had an inventory loss of 16 feet.

MR. MEISNER: How many of those were decommissioning plants?

MR. CHEOK: I don't -- I am not sure, but I don't believe any of them were.

MR. MEISNER: Have you looked at their facilities enough to recognize that things like siphoning can occur, there are opportunities for operator error?

ANN RILEY & ASSOCIATE

MS. JACKSON: Siphoning has occurred at a decommissioned plant, it happened at Big Rock. They lost a few inches due to a siphon. So it is something that could happen at a decommissioned plant. We did try and look for information. There is not a whole lot there since plants haven't been decommissioned for very long. So the best data we had available right now was for an operating reactor.

MR. MEISNER: Yes. I think -- well, you know, just like someone who made the point earlier that certain things didn't apply to decommissioning plants, previous studies, because they were operating reactors, the reverse applies as well. When you blind flange-off communication pathways, when you put in anti-siphon devices and the like, you preclude these events from occurring. And I will grant you that design will be different from plant-to-plant, but a lot of actions are taken in decommissioning facilities for just that reason, to preclude, not just minimize, but preclude these types of events.

MR. KELLY: We found in looking at these things that they are not always precluded. We found that there were times when people put on anti-siphoning devices that weren't adequate, where the break would occur in a line, for someone opening a valve and allowing you to drain it out. We have considered the fact that there is -- we are not looking at siphoning all the way down to the bottom of the pools. We are generally talking about siphoning a certain fraction of the way down, boiling down from there.

There have been plants who were configured in the past where you could have siphoned all the way down. We did a study a number of years ago where we went out and looked at plants, and I think we found that most everybody would be unable to siphon all the way down today. We are probably going to want to confirm that, that that is not a possibility.

There are lines that do communicate, some of them as low and

ANNRILEY & ASSOCIATE

below the fuel level. Some of these have been blind flanged and welded and other ones just have valves in place. So what we did here is, you know, we took a look at the numbers there and we attempted the best we could on a generic basis to see -- this whole idea when we performed this analysis was to see what is a PRA, and that is really just a systematic way of looking at the design, the potential problems you can have with it.

What is a PRA going to tell us about the potential problems that we can run into here? And it tells us that when we look at loss of inventory, it is not something that we can automatically dismiss, that maybe we want to look a little bit more closely at the anti-siphoning devices. We want to make sure that we don't have lines that are communicating all the way down, or near to the bottom of the pools.

We want to look at maybe some of the things that you might have done where there was a blind flange or something else that was done there, whether that is a problem. Is it something that sticks out and if someone was running there, -- let's say a forklift, if they ran into it, would that cause you problems associated with it? Most cases we expect it probably wouldn't, but it is the type of thing that we would say, let's take a look at it and make sure it is not problem.

MR. MEISNER: Yeah, and I understand that, and I think that has to be done, that is a good approach. What I am trying to get to is the idea that you can come up with a different set of numbers here if you make assumptions that certain things like procedures are in place.

MR. KELLY: Right. It is exactly right. And that is why we --

MR. MEISNER: These numbers, as you have laid them out here, are fairly startling, or could be startling to people.

MR. KELLY: Right. And we were -- the numbers came out larger than we thought they probably would come out before we started,

ANN RILEY & ASSOCIATE

and that was one of the insights that we came out with, that it was larger than we had thought about beforehand. But that is, you know, we didn't start out to come out with a load number, we just started out to do the analysis and see what the results were.

MR. MEISNER: Well, if you always assume the worst case, though, you are going to come out with a high number.

MR. KELLY: Oh, we didn't. Actually, we could make other assumptions that make a factor of 20 or more higher than this, looking at, if you were assuming -- see, right now the plants -- as I say, we modeled this based on what I found out at the plants when I visited them.

Now, I also recognize that there were a lot of things that the decommissioned plants were doing that made a lot of sense, but were not necessarily required by regulations. And so we also looked at it to see what would happen if people kind of took a minimalist approach, and then went and stripped away things that aren't required by regulation at this time. And, you know, not being ridiculous, but just looking, you know, what could I do if I just really wanted to kind of go real bare bones, and we saw that that could make a significant difference also.

So we are not taking worst cases by far. We were conservative in our deterministic analysis to help determine whether or not there was a problem in the first place. If the fire -- it turned out you can't have a zirc fire anywhere after the first three months, then this whole thing would have gone away, because the only problems that you are really going to have is if you have a zirc alloy, a zirconium fire. Given that we found that you couldn't dismiss the possibility of a zirconium fire in the first three to five years, when we did the risk assessment, well, are the numbers so low that we shouldn't be concerned? And that did turn out. And we said, well, about the off-site consequences? And that didn't turn out either. So

ANN RILEY & ASSOCIATE

that told us that we had to do more, and we had to look at it, and that is partly why we are coming forward today with our preliminary results.

As I had mentioned earlier, I have about three pages of assumptions on PRA that we have outlined that will be in the full report that should be out in August. And I wanted to come back to one thing that you said, Mike, that I think is a very important thing to think about. Doing a PRA for a decommissioned plant is not at all the same as doing a PRA for an operating plant. Just as doing a PRA for a plant that is in shutdown is not the same as doing a PRA for an operating plant. We would tend to look at things in a slightly different manner because the PRA itself provides us with a structure on which to perform a systematic assessment.

Now, just because when I am in an operating plant, I am performing a systematic assessment in one way, I will still have that same structure when I am doing a PRA at a shutdown plant or at a decommissioned plant, but I am going to be working under different types of assumptions. I am going to have different types of things that are of particular concern to me. And as I said here, you know, you would get no PRA results in a decommissioned plant if you only worried about things that happen in the first 24 hours.

So what we have had to do is we have had to really build something that is right at the state of the art. We have gotten expert opinions on some of these human factor error rates. We are not saying that these are the end-all and the perfect numbers. We are certainly interested in exploring that and having other technical experts take a look at what we have done and give us their comments and suggestions. But we do think that it is important to recognize that we are talking about very low human error rates. People have the ability both to do things very foolishly and also to make very smart and very quick thinking actions. Does this happen many times in the world today?

ANN RILEY & ASSOCIATE

So I think what we have done here is we have created a process whereby you can go and you can take a look the decommissioned plant, not the same as you would for an operating reactor, but with the same kind of structure that you use, the same where we have these same event tree, fault tree type process. We do look at operator errors, we look at the amount of time that is available, but we are in a situation where we are out beyond what you ordinary look at in an operating reactor, because this is a whole other arena that we are concerned with here. But that puts it in a little bit different perspective for you.

MR. MEISNER: Well, yeah, you know, but to be a little cynical about it, what you do is you make sure that you have something come up by extending the timeframes, for instance, in recovery so far that they make a difference when you add in human error. I doubt that there is anybody in this room that seriously thinks you are not going to be able to put water back into the spent fuel pool sometime in a week. You know, it is really like you indicated, a matter of procedure and you have though it out ahead of time. It is going to happen. Yet, you know, you don't see any of that kind of thinking in an operating reactor PRA.

MR. KELLY: Well, we did have a case where there was a foreign reactor that allowed its spent fuel pool level to drop significantly, about 16-18 feet before they did anything about it. And that is -- the operators had chosen to let that happen. They didn't think apparently it was probably a concern and then they went ahead and did makeup.

And so we realized that that is a possibility. I mean it is not something that happens very frequently, but it is something that did happen at an actual plant. So, because of that, we considered that it is something that is a credible type event. People make unusual decisions.

ANN RILEY & ASSOCIATE

MS. ORDAZ: As Glenn mentioned, the assumptions in more detail of our preliminary results will be in this report that we plan on issuing in August. And at that time we would like to obtain more information that you might have, more data, in order to refine our results.

MR. MEISNER: I understood this was a working meeting where we were going to give feedback and have an interchange. I don't want to wait till August to give you feedback.

MR. KELLY: That is why I am happy for your feedback now.

MR. MEISNER: We are all hoping that you will take this and do something with it before the report is issued.

MR. BRADLEY: Just as a general process question, there is a lot of expertise available in the industry to review the assumptions, sequences, data that went into this report and, given that you have been able to present preliminary conclusions today, why can't the report be made available now so that we can really have a real substantive interchange? I mean you are comfortable enough with it to present some conclusions, so, you know, it seems to fair to get the details out for review.

MS. ORDAZ: We are still in the process of completing our preliminary results, but we wanted to provide you with as much information as we could up to this point. And we are going through and finalizing our inputs and our conclusions, and that is our best schedule that we can meet, because we have had such a short, short period of time to do this work.

MR. BRADLEY: Oh, yeah, we understand it would be preliminary draft, but I guess I don't see what the harm is in providing the details out now so we get a two month, three month increase in our ability to do this.

MS. HENDRICKS: Or, in other words, why spend time

ANN RILEY & ASSOCIATE

finalizing something prior to getting input on your assumptions. They are going to underline the --

MR. RICHARDS: They are not talking about finalizing, you know, this is still a work in progress. They are just talking about trying to pull together their words so they have a product in draft that we can put out in public.

MS. ORDAZ: And it will be a draft product.

MR. RICHARDS: We are not going to pull together a bunch of notes and attach it to a document and put it out in the public right now.

MR. RONE: If I may, Art Rone, there is areas where the industry could provide some basic input. Although these probabilities seem low, and they are dominated by human error, you have made some very conservative assumptions about what those human errors are, like in the case of absence of having a procedure for recovering inventory in the pool out at 120 hours. I guess you have given 5 percent probability of that not happening?

MR. CHEOK: That is just a 5 percent probability of that not happening, that is recovery from off-site sources.

MR. RONE: Okay.

MR. CHEOK: I mean that is not counting the recovery from on-site sources using your fire pumps.

MR. RONE: Okay. But I think we can provide specific input on what the options are available to us to give you more credible information around which to base the assumptions, and maybe to wring some of the conservatism out of the human error rates that you have considered as part of your preliminary results.

MR. RICHARDS: We are headed there. We are looking not only for the industry's input but also the public. I think the only thing you are talking about is how fast can we package this thing so that we

ANN RILEY & ASSOCIATE

are comfortable making it available to everybody. And we are going to try and do that as quickly as we can. You know, I think they are targeting early August. If we can do better than that, fine. Believe me, they are working very hard and as soon as we can get something on to the street for everybody to look at, we will.

MS. ORDAZ: And it will be draft.

MR. RICHARDS: In coming up to this meeting today, we felt like, hey, we need to keep the dialogue going, so, hence, we are talking. And now I sense a little frustration because now you have had your appetite whetted, you know, why can't we give you everything? Well, we are just not there. The alternative would have been to cancel this meeting and wait until August, until we had a big fat packet to put on the table. We elected to continue the public process.

So for everybody who wants to see it, the industry and the public, you know, we will get it to you as quick as we can. But we do appreciate the dialogue. We are interested in hearing what you are saying.

MR. RONE: I guess in areas where uncertainty, where you don't know what the response would be, dominates your assumptions with respect to human error rates. The industry can provide that data and we would be willing to provide that data. We need to know what your assumptions are and what you are considering, like, for example, if you need specific information about outside of internal plant sources, how would you makeup to the pool?

We can provide a number of scenarios how we would bring in outside sources of water to makeup to the pool, what is available for our company resources as well as from local municipal resources. But we don't know that you need that information, we don't know that you are considering that. The sooner we know that, the better we can proactively help provide that input to you.

ANN RILEY & ASSOCIATE

MR. MEISNER: That three pages of assumptions you mentioned, that might be a good starting point, something we can work on and get you information back that may work to change some of those assumptions.

MR. RICHARDS: Well, we can't commit to do that, but let's take that suggestion internally and we will talk about it.

One thing I would like to point out, I'm sure you have already figured this out but they have done a PRA here on a plant that doesn't exist. We tried to, I think, and I hate to talk for the technical working group, but I think what we have done is we tried to make some fairly conservative assumptions. You know, we're not looking at Maine Yankee or Zion or any particular plant. We are looking at what can happen one year down the road. I think you guys assumed the spent fuel pool that is completely full, is that what I have heard before? And I don't think anybody has got one of those, so we are trying to do a bounding analysis here to see if we could dismiss these things relatively rapidly without a lot of dialogue, and what you have heard today is based on the very preliminary results. The answer is no, we need to talk about it, so that is where we are headed, and I want to keep reminding people we don't have results yet, and what we have is a work in progress, and when you start talking about the results or x, y, or z, the results are still being worked on.

MR. MEISNER: That's probably the best time to exchange information.

MR. RICHARDS: Right, it is, and hence our discussion today.

MR. MEISNER: To see if the assumptions are right.

MS. HENDRICKS: Even setting aside some of the specifics, if I could make a general comment on the approach, it seems like you are missing an important opportunity by not -- and we will argue if we say worst case -- but I did see a lot of bounding analyses.

It's seems like first of all you missed an opportunity for

ANN RILEY & ASSOCIATE

real insight by doing too much worst case bounding analyses. I mean that is not really how PRAs work best, and then --

MR. KELLY: Let me just explain that and I think that is important and I am glad you brought that up.

In the deterministic analysis that provided us with things such as how much time do we have available before we boil down the water, how long will it take before -- given that I have uncovered the fuel -- how long would it take for the fuel to heat up to the point that I get a zirconium fire? Those numbers, we did those on a more conservative basis. They weren't the most conservative but they were done in a more conservative manner to make sure that we were not being overly optimistic, and we wanted to see also, you know, from a deterministic standpoint whether this would -- the problem would go away, and when we looked at that we found that, no, it wasn't, it didn't go away.

So from the PRA standpoint what was conservative was our times, our recovery times perhaps could be a little better than what was assumed here but the PRA analysis that we performed was by and large a realistic analysis to the extent that we could.

When we talk about not wanting to drop the procedural -- the numbers for human error rates below 10 to the minus 4, that is the type of thing that we wouldn't want to do for a operating reactor either, because we don't think that that is the appropriate way to do it. That is not where we have conservatisms.

For example, the ideas about there not being procedures for some of these things, that is based on my going out to the plants and asking them what procedures they had and that was the answer that I had gotten, that the procedures were for very slow drain-down events types of things. It was not for the type of problems that we were considering here, and because of that I think most of the assumptions that we have

ANN RILEY & ASSOCIATE

made in the PRA aspect would not be considered bounding, which isn't to say we don't have something but I am just saying that primarily this is a -- to the extent that we can -- a realistic analysis.

MS. HENDRICKS: Well, the follow-on then to the second point is again I think in terms of coming up a pragmatic regulatory approach, I think you have missed the boat. I think you had an opportunity if you had concerns about procedures to go forward assuming some procedures and in the shorter term come up with a more practical regulatory basis that you could implement in the shorter time, versus, you know, you are studying something with precision and with numbers and quantitating it, where the qualitative -- the ability to disposition some of these things qualitatively seems to have been -- I mean seven days to put water back into a pool and assuming that that won't happen, I mean if there was a foreign reactor or something where there was absolutely no oversight, but why model with that assumption?

I mean you have the opportunity as the regulator to put in place an appropriate program. That is what this is all about, not --

MR. CHEOK: I think that's fair. We're trying to hear that. As Stu keeps saying, this is a work in progress. By putting this model in place, I don't think we have missed the opportunity. We have set ourselves up with a model that will point up to the right directions as to what is important.

As a matter of fact, I have a slew of sensitivity studies with me that tells me if I decrease certain things by a certain percent, what would the result be and I mentioned one of the studies to you.

If I had decreased that 5 percent to 1 percent, a one E minus 5 becomes a seven E minus 6. I have 30 or so cases like that. These kinds of studies would basically point us to what becomes important. I don't think we are missing the opportunity. We created a model that would point us in the right direction as to whether we should

ANN RILEY & ASSOCIATE

be headed, what we should be looking at, and, you know, this is a work in progress. We have just started and we now have a model in front of us where we can now look at the model and say what is important. In this case it could be procedures.

MR. RICHARDS: Without prejudicing the outcome on that, I mean we might end up down the road with a rule that says the licensee must demonstrate that they have some of these procedures we are talking about, maybe administrative controls on fuel movement for cask drops, something to address fire, maybe we'll have a rule that says, hey, if you address these things then that provides us with confidence that some of these events are in the realm low enough in probability that they are not a concern, so we are looking for a technical basis to put something down that is codified that everybody, the public and the industry, can say, yeah, that's what is expected and if you got this, then we can move on to the next step.

MS. HENDRICKS: I agree with you, but remember part of the problem that we are trying to remedy here is going on and on with no criteria. I mean there has been a lot of frustration. There's been a lot of what I think NRC would agree is unacceptable regulatory practice in this area, and that is what is trying to be remedied, and the Commission's expectation I think was that it could be done in a relatively reasonable timeframe, and I agree that a lot of study is great and it is interesting and I like it as much as the next person, but your method is going to I think put you off on a course where a study could overtake a more practical objective of coming up with some criteria in the short term that are in fact very risk-informed and very supportable.

MR. RICHARDS: Frankly, I am optimistic that we are going to get exactly what we hoped to get when we started out, and I think we are just talking about how long it is going to take to get there, and again

we will do what we can to move the process along, but quite frankly, the technical results are the technical results. You have got to do the science before you can do the process.

We have got to do the science right, and we promised this to be a public process and we are going to follow through on that. That includes your input and the public's input.

If we can get the thing out on the street and deal with the details in a short time, we will move that timeframe up.

MS. ORDAZ: And that is why we lengthened the timeframe, so we can make sure we included public stakeholders' comments and anything they may be able to provide us, instead of issuing the entire report in June.

MR. BRADLEY: I think this is more than just dealing with details. I think there are fundamental issues here. A bounding PRA is an unusual animal in my experience, and it is more than a detail issue how some of these numbers have evolved and the fact that you have got a frequency here that is about the same or greater than a release for an operating plant.

I mean that on its face seems to merit a lot more study.

MR. KELLY: We agree, but again I want to reiterate that this is not a bounding PRA.

MR. BRADLEY: Well, I mean I heard enough in just the brief snippet we heard on fire to question judgment. You know, 10 percent of the fires large enough to lose offsite power are pump -- you know, some of these initiating event frequencies, I would like to see how those were scaled from an operating plant to a decommissioned plant based on the number of sources you have.

MR. KELLY: You know, you have to realize there's a lot of -- for example, loss of offsite power is a very important point, but this is not necessarily a site that has three independent offsite power

ANN RIL EY & ASS OCI ATE

lines going into it anymore. This may be a site that has only one offsite power line going in.

All of the power going in to handle the spent fuel pool cooling systems comes off of the same bus, so now you are talking about a fire that would take out one bus -- it would take out everything. You don't have that in an operating plant.

MR. BRADLEY: I recognize there are differences. I guess the only point I am making, I think you can't have a real dialogue on this until we have the details, the sequences, the HRA assumptions, the database you use to derive your frequencies. All those things are key.

I mean otherwise we are just going to have a hollow discussion here until we have substance before us.

MR. KELLY: Right. I mean the key is that we have performed a lot of work in a very short period, and we have got event trees and fault trees and we have got the data and all these other things --

MR. BRADLEY: Right.

MR. KELLY: -- and the process of putting that all together and putting it in a package that is going to be understandable to people and along with the deterministic analyses and the things that were done there and the assumptions and how we laid that all out and what was done there, so that it makes a coherent story about what we looked at and what we came up with as a preliminary set of insights about what was going on.

As I say, we are going to make that available to you as quickly as we can.

MR. MEISNER: And I guess what you are hearing is why not share it right away? Why not get the feedback, and I think it will be pretty constructive feedback, that would make the --

MR. KELLY: I understand, but we are right now --

MR. MEISNER: -- initial draft better than what it is now.

ANN RILEY & ASSOCIATE

MR. KELLY: -- the reports, it's early. I mean we have just -- you know, we have only had this report together -- you know, we had 16 different technical experts providing input into this report. You get 16 different people writing things. It is a challenge now to put that all together and to make sense out of it, and to make it all work in a coherent manner.

MR. MEISNER: You have got some critical assumptions in there that really drive the results, and in our minds are probably inappropriate.

Why not get into that dialogue now and share that information?

MR. BARRETT: I think that a key point here, Mike, is that if we can document this thing well, so that it can be easily understood by yourself and by other stakeholders and it can form the basis for a productive dialogue that can, as Stu said earlier, that could converge on some sensible regulatory positions, if we put it out prematurely the problem might be that it would become a discredited piece of work, and it would not form the basis for that dialogue and might in fact cause a delay or force us to go back and run through the whole thing again.

I think that the month or so that we -- or two -- that we want to invest in making this into a credible and understandable first shot at the technical situation will be well worth it, but if we were able to do it sooner we'll certainly put it out sooner.

MR. MEISNER: We are talking about not putting out a full product for our review, but give us the set of assumptions, you know, the things that we have been discussing most of this morning. Why not get some consensus on that going in?

MR. BARRETT: Because we don't want to have a document that is discredited before it has an opportunity to lay out the entire story of what was analyzed. We recognize that there are places, particularly

ANN RILEY & ASSOCIATE

in the deterministic analysis, not in the PRA analysis but in the deterministic analysis where there are conservatisms. We want to have the opportunity to lay out the entire picture so that people can understand what the NRC was trying to accomplish by making these assumptions.

If we just put out fragments of information, it becomes vulnerable to being discredited as a piece of technical work which was not taken seriously, would not be taken seriously ever.

That is our biggest concern.

MS. ORDAZ: I would like to add that the technical working group is working at full capacity if not more in most cases and it does take a process that we have to go through as well, a concurrence process, through management and everybody, in order to get it out even in a draft form, so we are working to that and we are working very hard, and that will be in a forum for both NEI and the public as well.

MR. RICHARDS: We are going to take your comments, anybody else who makes a comment today and go back and mull it over and decide how we are going to do it. We are telling you what our intentions are today. But we are here for some dialogue and we are trying to keep an open mind.

MR. MEISNER: Okay. I assume the rest of these slow-acting events all get down to the same thing, whether you get 120 hours to recover.

MR. CHEOK: Most of these cases, that is true.

MR. MEISNER: Though with maybe the exception of the aircraft impact.

MR. CHEOK: We have the seismic, the cask drop, the tornado missile, and the aircraft, which are fast moving. The loss of coolant inventory, we actually have a small class of that initiator where we have a larger that small loss where we could have a loss of level to

ANN RILEY & ASSOCIATE

about four to five feet above the fuel level, in which case you have 30 hours for recovery, as opposed to your 120 hours. That is a small fraction of the --

MR. MEISNER: What is your thinking now on the seismic event?

MR. CHEOK: On the seismic event, basically, what -- the assumptions that was made for the seismic event is that we are assuming that the pool is built to resist -- the ruggedness of the pool is three times SSC, and looking at the Livermore curves and the EPRI curves, for a .4 to .5 g earthquake, we come up with an initiating event frequency of roughly 2 times 10 to the minus 5. Then assuming a typical fragility curve, we come up with 1 times 10 to the minus 6. Frequency of uncovery from the seismic event itself for failing the pool, we have another 1 times 10 to the minus 6 for failing cooling equipment, not the pool itself. Given the fact the pool is intact, we can fail the pumps or any makeup equipment, in which case then we have makeup from off-site sources.

MR. MEISNER: I guess I am not a PRA expert, but I guess -- what you are saying is you have really not changed your view on the frequency of a zirc fire associated with seismic.

MR. CHEOK: We basically, I mean -- the zirc fire, I mean the zirc part of it is --

MR. KELLY: Independent of whether it is seismic or not. What was -- I am not sure I understand you.

MR. CHEOK: All we are calculating is the frequency of --

MR. RICHARDS: I think what he is asking you is they brought some information to the table --

MR. MEISNER: My recollection is 2 times 10 to the minus 6 -- 1353.

MR. CHEOK: You brought some information to the table that

the seismic frequencies would be a lot lower if we had used the Livermore curves. We used the Livermore curves to determine the frequencies of seismic events that could be three times SSC, which is what we assumed to be the ruggedness of your pool.

MR. RICHARDS: So the information that was referenced by NEI in previous meetings --

MR. CHEOK: Is used by us, correct. Actually, we looked at --

MR. MEISNER: Here is my simplistic view of this, 1353 said a seismic hazard, what 2 times 10 to the minus 6th, if I remember correctly. You are saying now, after applying the Livermore curves, it has now cut that in half, to 1 times 10 to the minus 6. Am I interpreting that correctly?

MR. CHEOK: I am saying that for your typical plant, I am looking at the whole range of plants where a .4 to .5 g earthquake, a frequency for a .4 to .5 g earthquake would and it is occurring at about 2 times 10 to the minus 5 pu, that is my initiating event frequency for a seismic event that would be three times SSC, for your typical plant.

Given that, if you take, let's say, you take your definition for -- your 5 percent probability of failure, you multiply it by 05, for example, but you have 2 times 10 to the minus 5, you get your 10 to the minus 6. That is a very simple bounding type calculation. But your frequencies themselves come from your Livermore report, or your EPRI report.

MR. KELLY: Right. Now, to help you understand this, we don't have actual analyses of the spent fuel pools themselves. So what we did is we said that we assumed that the spent fuel pools would be capable of withstanding, without any significant damage, up to three times the SSC. We just assumed that once you got in excess of three times the SSC, you are going to cause significant damage to the pool, to

ANN RILEY & ASSOCIATE

the point that you get rapid loss of inventory in the pool.

Now, it may be that on a plant-specific basis, people, knowing the details of the structural -- the structural details of the pool and that, that they can say, oh, no, we are good for five times whatever their SSC. But the thing that -- where you run into this is that, you know, we have these numbers, and then when you look at the hazard curves, the hazard curves are pretty vertical at this point, which means that the return frequency for -- there is not much difference, you know, to go from one g level to a next g level. When you are out at the fairly high g levels, you are -- the change in frequency is not that great. Okay. And that is due in part to the uncertainty associated with these large earthquakes, and just how the seismic experts around the world go about determining what is the frequency for these return periods.

MR. MEISNER: I guess, like I said, I am not intimate with those calculations, but just my simplistic look at it says that with new information, you came out with the same result as 1353 had. You, however, did not take the same approach.

MR. KELLY: Well, we didn't start out to do that. Right. And what we did end up with was different, I think is that we also included the contribution from the failure of the cooling equipment. And I think that the 1353 only looked at failure of the spent fuel pool itself. And we also considered the possibility of failing the cooling equipment and then having off-site recovery not work for them.

MS. HENDRICKS: So that is an area that also includes an assumption that you would have a week and not be able to get water back.

MR. KELLY: Right. That is what brings it to the 10 to the minus 6, because we are assuming that you are going to lose the spent fuel pool cooling system at a lot lower frequency than -- you are not going to go to three times SSC to lose something that is sitting on a

ANN RIL EY & ASS OCI ATE

skid, it is going to fail at a lot lower level than that. So we were looking at a very low probability that you don't recover from off-site, but still it contributed half of that, 1 times 10 to the minus 6 came from losing the spent fuel pool cooling system and 1 times to the minus 6 comes from losing the pool itself.

MR. BRADLEY: Do you expect this result for this portion of the hazard to be any different for an operating plant? Does this comport with what you see for catastrophic earthquakes for operating plants, since the assumptions would be basically the same?

MR. KELLY: Well, at operating plants, at those levels you are going to be damaging the core, the internal structure of the core, and you are going to be having probably a core damage event if you are three times SSC.

MR. BRADLEY: Did you review some of the operating PRAs to see if this was -- I mean I don't know, but I am just curious if you did a check on that to see if this is --

MR. KELLY: Well, I know the fragility of cores and so that would be my expectation. You, Tom or Bob might want to talk about that.

MR. ROTH: I think -- this is Bob Roth. In past PRA, seismic PRAs, you start seeing core damage at about two times the SSC, and here they are talking about three.

Well, one thing I wanted to ask you, Glenn, I haven't reviewed this, but when you were doing your seismic, did you also consider the effects of the earthquakes? When you are doing the seismic analysis, the seismic portion of this, did you also consider the effect of the earthquakes on off-site power or just on the spent fuel pool itself?

MR. CHEOK: When you look at the loss of off-site power from events initiated by a severe accident, or severe weather, we assume that the loss of off-site power from seismic events is enveloped in that

ANN RIL EY & ASS OCI ATE

event, events initiated by severe weather where recovery of off-site is a lot less probable.

MR. ROTH: I think because you lose off-site power ground motions a lot lower than the SSC ground motion --

MR. KELLY: We have included that in the other area.

MR. ROTH: Okay. That is what I was wondering, had you considered that.

MR. KELLY: Yes.

MR. ROTH: Okay.

MR. RONE: In the area of cask drop, what is dominating that probability, is that the human error also?

MR. KELLY: Yes.

MR. RONE: Are you equally balanced with equipment failure?

MR. KELLY: The human error dominates that and that is based on Department of Energy studies at their fuel facilities and determining that that is human error. It tends not to be the equipment itself but the rigging or the operator just doing the wrong thing, having a bad day and doing something he is not supposed to do.

MR. RICHARDS: One of the things on the cask drop we talked about internally, and we haven't had a chance I think to develop it with the timeframe that they were doing, but, for instance, we just issued an amendment to Trojan to allow them to move fuel and to move casks. And I know in reading that amendment there were a lot of administrative controls and there were measures taken to preclude a cask drop from causing a problem. So, you know, it is that kind of information we need to factor into, you know, into the risk analysis to put it in perspective. So, you know, it is that kind of information we are seeking from you and from ourselves internally with what we know.

MR. RONE: That is exactly right. I know in the case of our own plant, when we are moving heavy loads, we would have a dedicated

ANN RIL EY & ASS OCI ATE

crew. That crew would receive special training. There would be additional engineering oversight of the rigging and lifting. And we do all of those things to squeeze out whatever the human error component is of failure. And it is not clear to me whether or not those kinds of special precautions and activities were considered when you looked at the human error rate's contribution to cask drop.

MR. KELLY: The numbers that we had were based on the experience from the Department of Energy and I don't know to what extent that reflects similar practices here to what you were just speaking about. It may be that, you know, as we get a better understanding of what the actual practices are -- I am not sure whether this is a voluntary thing that you are doing at your site or whether there is something that constrains you to do that on a regulatory basis to do that. But assuming that even on a voluntary basis that you are doing it, that would be important information for us to have and I know that some sites also have these -- in certain parts of their pool, they will have kind of like a cask catcher.

MR. RONE: A cask drop protection system.

MR. KELLY: Right. That acts to absorb the impact of any cask it might have on the pool and that is it. Another thing, if that is in place -- you know, we looked at it, we looked at the potential problems associated with dropping a cask on the edge on the pool or dropping it a gate or a weir or something like that, and what type of damage that could do. And these are things that we will want to explore further.

Again, we have -- you know, this has provided for us an indication that it is a potential problem. There may well be things that are happening out there that make this to be a lower number than what we see here. We have seen actual experience where people lift things too high, take it where it is not supposed to go, go through

ANN RILEY & ASSOCIATE

stops and things like that, don't necessarily follow the administrative procedures. So having administrative procedures is certainly important. It doesn't in and of itself though preclude you from doing something that you shouldn't be doing, because we see that happen in reality.

MR. RONE: It wouldn't preclude it but it would reduce the human error component.

MR. KELLY: That is correct. Although one of the conclusions that came out of the Department of Energy report was that procedures in and of themselves tend not to be enough because they were saying that it is -- the human error rates are things that, you know, people always seem to find a way to get around the procedure if it is possible and so, therefore, you can't just say that I have a procedure and I am going to check real carefully and not do that. Because you can reduce it, I mean you can do as much as you can, but are never going to make it go away.

MR. RONE: And I would agree that one thing by itself, just having a procedure may not be enough. And when you backed it up with other requirements such as dedicated crews, specialized training, engineering oversight, QA oversight, when you looked at what is the probability of all of that collectively failing and resulting in a human error that causes the cask drop, I think that is a very different picture than just simply saying, well, I have procedure and I follow the procedure.

MR. KELLY: Right. And as I said, as we get feedback about things like that, that are out there that are happening in real life, this will be important to help us adjust our values and to get a better perspective about the risk. You know, we have done the best we could in a short period to provide a very broad picture about where the potential risks are. You know, as you can help us to better understand what is really going on out there, we will improve the picture.

ANN RILEY & ASSOCIATE

MS. HENDRICKS: It kind of goes again to this issue not so much of specifics, but to your basis approach, the pragmatism, I would say, of your basis approach, because I recall when Gary Holahan laid his issues out, he clearly indicated at that point that credit would be given for good practice, it didn't have to be a regulatory requirement. So, in terms of your basic approach, I think, again, I don't want to be too negative, because I do appreciate that it is preliminary, but I think you are missing an opportunity to get more insight and more done sooner through a more pragmatic approach versus waiting. I mean --

MR. KELLY: Well, see, there is a difference. When we perform a PRA, we generally don't perform a PRA the way we think we would like the plant to be. We generally do it the way we think the plant is. And then we will modify it and look to see how it would improve or get worse if they did things differently, or the plant was built differently.

What we did here is, you know, again, this was a very quick turnaround risk assessment based on going to four sites and the information that I saw there and what I was able to able to gather in that week of going to plants. It is not a complete picture and I understand that there may be areas that could be improved by more information. And we are certainly willing to that, we are interested in doing that. But we based on our models on what we saw and not what we hoped to find. And, therefore, you know, it wasn't how we -- we thought, gee, if you went ahead and you did the following things, well, we can give you more credit. This is, you know, what we saw when we out there.

MS. HENDRICKS: That seems a little bit contradictory because hearing from Art and Mike and all the plants I know, they seem to have a lot of procedures on heavy loads, for example. And I know you have access to the dockets for the SRPs and the different things they

ANN RILEY & ASSOCIATE

have submitted to you in the context of tech specs and DSARs and all this other stuff. So I am little perplexed that on the one hand you are saying you are using what you saw and it doesn't seem to agree with, you know, procedures.

MR. MEISNER: A real simple example, we are not allowed to move casks. We don't have a tech spec for it.

MR. KELLY: Okay. And as I say, this does not represent any one plant. It represents a potential plant at a particular time with a particular configuration.

MR. MEISNER: But the point is, it is a tech spec controlled activity that has all the associated procedures, training and whatever goes along with it.

MR. KELLY: Right. And we would certainly -- and we would say that your risk would be very low if you don't move anything. And we would agree with that. And if everybody had that tech spec, then we wouldn't be concerned with cask drop, we don't see that.

MS. HENDRICKS: But it seems to represent a plant independent of any regulatory program. I mean when you gave your example of what had happened in, I guess, a foreign plant where somebody walked away for a week and didn't notice that the -- didn't take any action. I mean how does that comport with the statement that you are going to, you know, represent what is likely?

MR. RICHARDS: Well, that is all good feedback and we appreciate the comments and the criticism, but it is a preliminary product. We are bringing you something that is 60 days down the road. It is not in final. I think Gary's comment to you is probably correct, because we will get feedback from you and other interested parties and we will incorporate that into the product. We can't have it both ways. We can't sit here 60 days into it and give you, you know, a final product that has considered all the procedures. It couldn't have been

done in 60 days. So I guess our options were, you know, to wait six months and give you something that had gone through a lot more consideration before we ever talked to anybody, or to sit here and tell you where we are at today and seek yours and others' feedback. You can't have it both ways.

MS. HENDRICKS: It does go to your basic approach, I mean, and what I hear is that the basic approach is going to be carried out to the, you know, with sensitivity studies. And I'd like to see, I guess, some correction in the direction of the basic approach. That's the point I'm making.

MS. ORDAZ: It may change. It just depends on what we get through this independent review process. And that will be a work in process as it goes along as well, and at that time we'll be able to get some feedback from everybody on plant-specific initiatives or whether they're generic like Art was mentioning. But, you know, we have to gather our information that we do have, get it to you, and then go through that process so we can get all the data available that's out there.

MR. KELLY: Right. See, one of the things -- and I'm glad you brought up the question about things like what's going on with the casks and the movement of heavy loads and that, because I believe all the plants have committed to meeting the requirements, and I've forgotten the particular NUREG -- right, 612. But when a plant goes and becomes decommissioned, and this is -- there are things that a utility was formerly committed to doing something, but then in going into the DSAR and that they kind of decommit doing these things because they say they're no longer required and no longer necessary.

You know, we in the PRA gave you credit for all types of equipment, not just equipment that was safety-grade or just whatever. I mean, we looked at the instrumentation and whether it was good, bad, or

ANN RIL EY & ASS OCI ATE

indifferent instrumentation. We treated it as instrumentation. It was something that would provide the operator with information. It didn't have to be any type of particular quality or whatever for us to give you credit for it.

It wasn't clear to us whether or not in going into decommissioning whether a utility would retain its commitments to things like 612 or whether or not they've backed off from that and a lot of other things, and we're no longer going to have to follow those type of things, because we know that, for example, one of the things that utilities will do is they'll come in and ask to have their tech specs significantly modified to more adequate reflect what they want to do with the plan, and, you know, take out their RHR systems and the diesel generators and things like that. So because of that, and again because we had to do this so quickly, we went in not sure exactly what the status was at plants, and we didn't have time to do that research and we could only do so many things in parallel.

So we understand that we may have missed some things here, and we hope that you'll point out to us where there's something that maybe we have not understood what this industry practices or what the industry's committed to. But clearly, you know, we want to do our best to -- when we laid this PRA out -- to do the best to our understanding about how things might be working at the plant. And we know it's not perfect, but it was the best that we could do in a short period.

MR. RICHARDS: I don't think we should apologize for it. I mean --

MR. KELLY: No, I think it's a good piece of work.

MR. RICHARDS: What you've done is what you've done. It's a work in progress, and we're sharing it publicly for your feedback. So, you know, we're working through it.

MR. BARRETT: The other thing to consider too is that we

ANNRILEY & ASSOCIATE

know, as Glenn said, that a lot of what we saw at the plants is based on the historical experience with decommissioning. It's possible that in the future decommissioning will be a different kind of business than it has been in the past. Many of the plants that have decommissioned in the past have done so under circumstances which did not allow a great deal of free planning. It could very well be that in the future the amount of thinking that a utility does going into decommissioning could start years in advance of the process, and so that going into decommissioning on the very day that you start decommissioning, you could be in a very different regulatory configuration, you could be in a very different -- moving rapidly to a different plant configuration.

These are all possibilities that we kept in the back of our minds as we were doing this analysis. And so by laying out the what I'll call the technical landscape here and allowing us to have a dialogue on the full range of issues that are important, we can come to a conclusion that reflects the way the plants are today and the way the plants might be in the future.

MR. HUBBARD: One question that kind of follows in line with what Rich was saying is, you know, something we've been wrestling with, and I think it came out in the assumptions, is we looked at the plants the way Glenn found them, you know, at that -- you know, when he visited, and we realize, I think, every one of those plants is greater than two years old, is how quick do you get to the simplistic plant from the standpoint of I think most of the plants that are decommissioned now, it wasn't a planned thing.

And, you know, we're looking at, you know, Mike's plant from the standpoint that you're very simplistic in your cooling, and that took you some time to get there. They have one of the inputs that you can be thinking about, and maybe you've got some thoughts today is, you know, if you do preplanning or -- when do you start getting into that

position of getting the very simplistic is it early on or are we talking later, you know, because, you know, in our PRA we looked at, you know, one year you had a simplistic plant. Now is that realistic? I don't know. And --

MR. MEISNER: I think the general answer is it's a function of your deterministic analyses and heat-up and boil-down times in large measure.

MR. HUBBARD: Okay.

MR. MEISNER: And being able to put in a cooling system that can accommodate those heat capacities.

MR. RONE: In the case --

MR. MEISNER: And of course it's done under 50.59.

MR. RONE: In the case of Oyster Creek, and Oyster Creek is at least one of the early plants that does have a couple of years to do preplanning, we've speced out our alternate fuel pool cooling system to go into service one year after shutdown. So your assumption in that regard was fairly right.

MR. HUBBARD: Okay. So that was pretty accurate. Okay. And by that you would -- would that be a whole new cooling system, or --

MR. RONE: Yes, that would be a whole new cooling system. But just some of the things that are important to us is we're doing a failure modes and effects analysis on the system. It's already preliminarily designed. We're doing a full PRA on it to determine what is the probability of failure of that system. If there's a different safety goal that we have to have, for example, operator errors, make it more robust for operator errors, us knowing that earlier rather than later would help in our design of that system. So, you know, what you've done here is very much relevant to the planning that we're currently doing.

MR. HUBBARD: Okay. I guess the other question, since Mike

ANN RIL EY & ASS OCI ATE

brought it up, I know we've had several questions, and maybe you're going to talk to it this afternoon or whatever, you brought up the 50.59 question. And we've had several questions that have come to us regarding, okay, you're using 50.59, we understand that process, is not just say 50.59, what are some of your thoughts, you know, that you go through when you're eliminating these systems.

Now I guess Mike alluded to where you're looking at heat loads and this and that, but -- or if you're going to talk about it this afternoon more, the actual process for 50.59 rather than just saying we do 50.59 because we've had some questions as to well, what are you eliminating, you know, the, you know, there was surprise when Glenn came back that the systems were now so simplistic, and it was well, how do they do that? And our answer was of course 50.59, and it was well, how can they eliminate the spent-fuel-pool cooling, you know, and I was wondering if you had any comments in a little more detail than --

MR. MEISNER: I'll give you some general comments, just in general.

MR. RICHARDS: Could I just caveat his comment for the record here? When he says there was some surprise, obviously we have inspectors who are onsite, you know, we're dealing with these plants, so let's -- when you say we're surprised, we're talking about the technical working group, not --

MR. HUBBARD: Right.

MR. RICHARDS: The NRC as a whole here, oh, geez, what happened to that diesel.

[Laughter.]

MR. MEISNER: We had an onsite inspector through that whole process who went over the 50.59s in detail and sat in on all of our discussions. The general design approach was to have a self-contained cooling system, so we added the cooling system for the spent-fuel pool

ANN RILEY & ASSOCIATE

so that we could turn the rest of the plant what we call cold and dark. Wanted the decommissioning to proceed in such a way, the actual D&D work to proceed in such a way that it couldn't have any adverse impact on fuel management, which is something else I think you need to take into account when yo do these PRAs.

So we wanted to go to such a system, particularly since we've been shut down for a couple years, as soon as we could, so that we would minimize the impact of the decommissioning on our major safety function left, fuel management. You know, we did this under 50.59, and it's a straightforward process, because the systems that you're eliminating all serve no function anymore. They're replaced by a cooling system, and you're cutting all the ties, whether they're mechanical, electrical, water ties with the rest of the facility.

That's just big picture. I don't know if I answered your question.

MR. KELLY: I think probably more in detail we'd like to discuss a little bit about some of the understanding of like where before you had seismic makeup capability and that was part of your design basis where you had RHR as a backup, both as a cooling system and as a makeup source, and then you go from that to a 20 gpm makeup source that's not seismic category 1. To get an understanding of what was the basis for that, you know, in your minds as you laid that out.

And I understand part of that, because a lot of this has to do in 50.59 when -- talk about an unreviewed safety question with design basis accidents, and we're really not talking about design basis accidents here, we're talking about beyond design basis accidents, which is what EP is concerned with in your insurance. So if you could help us out, and maybe the answer will be that well, you weren't required to consider that and therefore, you know --

MR. MEISNER: In fact, most of the spent-fuel pool and

ANN RIL EY & ASS OCI ATE

associated systems, if you check our FSAR, are nonsafety-related but seismic. We put back into place voluntarily, not by requirement, a level of quality assurance, augmented QA I think, most plants use it to some degree or another, where you're kind of selective in the standards that you apply. And as far as seismic qualification, if you check our SAR I think you'll find that most of it is seismically qualified. And I'm fuzzy on the original design basis of Maine Yankee, but I believe some of the qualification was tied to RHR and its operating characteristics as opposed to simply spent-fuel management.

You mentioned RHR as a backup.

MR. KELLY: Right.

MR. MEISNER: The pedigree is different.

MR. KELLY: It depends on the plant.

MR. MEISNER: The pedigree is different depending on what its operating function was --

MR. KELLY: Right.

MR. MEISNER: Its decommissioning function.

MR. KELLY: Right.

MR. MEISNER: But like I said, we've had inspectors in there going over that up, down, and sideways. I'm a little surprised today that you would be surprised, and be happy to send you all our documents on it.

MR. KELLY: I appreciate that. It's just, you know, the PRA folks don't have that much time to read those inspection reports, and so we tend to -- it came as a surprise that so much equipment was gone from the plant --

MR. MEISNER: That's what we do in decommissioning.

MR. KELLY: Right.

MR. MEISNER: We tear it down.

MS. ORDAZ: And I think we're more interested in the time

ANN RILEY & ASSOCIATE

frame, you know, is it within the first three years, is it beyond -- or however many years is it beyond that.

MR. MEISNER: If you are trying to tie that to a beyond design basis event like zirc fire, that's inappropriate; 50.59 is for the license and design basis of the plant.

MR. KELLY: I understand. But the reason why we're performing our risk assessment here is because there was interest in potentially providing a more level playing field for granting exemptions or perhaps forming a rule dealing with beyond design basis events, because that's what EP deals with. And it's true that 50.59 only deals with design basis events, but what we're saying now is that we're looking to see how the industry's use of 50.59, which deals with design basis events, potentially affects the plant's ability to deal with beyond design basis events, because if it, you know, it's something that we have to look at and see the potential consequences.

MR. MEISNER: Sure. But I would suggest that 50.59 isn't the issue. A good understanding of how the plants are designed for decommissioning is the answer, and looking at the various makeup sources, procedures, and whatever that we have.

MR. KELLY: All right. But in part for us it's to help us understand historically what's been going on and to have us have an appreciation, because the time period is very important for us, because we realize that there are only windows of vulnerability for a plant for a zirconium fire. Past a certain date for every plant it doesn't matter what you do, you can't create a fire there with zirconium. There's just not enough decay heat in there to heat it up to that point.

So once you've passed by that, EP I would expect, and this is not the Commission's -- I'm not speaking for the Commission, just for myself from a PRA standpoint, you're not getting -- it doesn't provide you that benefit because there's not going to be any offsite releases

ANNRILEY & ASSOCIATE

without the zirconium fire.

MR. MEISNER: And as we talked about before the Commission, what that amounts to is a zero-risk mind set, and as long as we continue to think and talk in that way, we're never going to risk-inform decommissioning. If the bottom line backstop is always a "can't happen," then you all haven't done I don't think what the Commission has chartered you to do.

MR. KELLY: I agree. But it's also important for us to understand what that period is. If that period is a month, or three years or five years or ten years, it's a big difference. And what we --

MR. MEISNER: And from a risk-informed point of view, it's not.

MR. KELLY: Well, because the length of that period has an impact on how much risk there's going to be. If the period is very short, then -- and given that I have a -- assuming that it was a constant risk per unit time, then the total risk would be short. If it was a long period, at the same risk per unit time, I'd have a higher, potentially a much higher risk, depending on how long the period was. So we're interested in that from a deterministic standpoint as a matter of just telling us, you know, from a prudency to understand over what period do we have that vulnerability.

MR. MEISNER: This issue would be a whole lot easier if zirc fire never went away, from the point of view of resolving the problems that we have in risk-informing the area. It's the seductiveness of the possibility of that thing going away at some point that's been driving all the problems we've had for years in this area. I think we need to throw that notion away and get down to determining once and for all what is the real risk -- risk, not can a zirc fire happen, but probability times consequences.

MR. KELLY: Right. In looking at this, though, I think

ANN RILEY & ASSOCIATE

there's an important distinction between being risk-based and risk-informed. When we're risk-informed we also understand if you go to our new regs that we've written about licensing basis and how we want to go about if someone wants to look at making changes to the plant that affects risk.

We're saying that not only do we expect the increase in risk to be small, but we also want to make sure that we're maintaining a margin of safety, maintaining various levels of defense in depth, and so what we're trying to understand here also in looking at our risk assessment is how much margin of safety we have, what kind of defense-in-depth do we have that's still maintained there. And we're not basing our decision strictly on the bottom-line risk number. That's an adjunct to our deterministic evaluations, because risk-informed does not mean that we just look at the risk number, it means that we use that to help us make prudent use of everybody's resources -- ours and yours and the public's.

MR. BRADLEY: I don't disagree that you have a risk-informed approach here rather than risk-based, but there is I think a distinction between the documents you re referred to which are looking at changes to the current licensing basis and viewing them in the context of an existing safety goal for an operating plant.

Here you are trying, it seem in my mind, to establish -- I guess I am not clear. Are we looking at the same large early release frequency safety goal, and is it the absolute context that we are working with here, or is there an idea that there is a different ultimate measure of risk that you invoke once a plant is decommissioned?

MR. RICHARDS: Going back to where we started, a number of years ago a question came up should we consider a zirc fire for decommissioning plants and clearly we have been because we have been dealing with these exemptions on that basis, so the question came up, I

ANN RILEY & ASSOCIATE

think, whether that was the right event to be considering. Does it happen enough? Is the risk high enough to consider? So it drove us to have this group go off and rethink is zirc fire the right thing, and that is what we are trying to put in perspective. That is what you want us to do, right? Is that really a problem or not, and that is what we are trying to do.

MR. BARRETT: I think you are talking about a level of thinking that is beyond where we are right now.

As we pointed out earlier, as Mike said, risk is basically frequency times consequences. We looked at the three components that would be important to frequency times consequences here, and that is frequency of fuel uncovery, which we used as a surrogate for frequency of zirconium fire, the deterministic evaluation of whether or not a zirconium fire can happen or whether it can happen in a timeframe that would affect EP, and then the consequences in terms of doses from a zirc fire.

We looked at all three of those and none of those three in our preliminary analysis was sufficient to make the problem look like it could be dismissed.

The next level of thinking would be to say, okay, well, if you put all of this information together and you started asking yourself about criteria and how it related to safety goals, that is a ways away. We have started thinking about it, but we are not at a point where we can say, well here is where we are headed. We are just not at that level of sophistication right now.

MR. BRADLEY: Right. Maybe it's a large release frequency, since you are talking about EP and the difference in LERF and LRF -- is the overall context -- I guess you are just saying that that hasn't been established --

MR. MEISNER: Rich, why would it be any different than you

have always used? Why do we keep inventing new things for decommissioning?

MR. BARRETT: I don't think it's necessarily inventing new things. I think that it could very well be that we could use very similar criteria.

One of the things we think we might want to do as a starting point is to take the Regulatory Guide 1.174 and rather than using the criteria, step back one notch and say let's look at the safety principles, and the safety principles relate, as Glenn said, to defense-in-depth, margin of safety, probabilities or changes in probabilities and frequencies and risk, and putting systems in place to monitor performance and start there to develop criteria, because when you take a quick look at it, it's not exactly analogous. The cases are not exactly analogous, so we are just not far enough along in the thinking.

It could very well be -- we certainly don't want to reinvent the wheel. You are right, Mike.

MS. HENDRICKS: To kind of take it instead of from the bottom up, I guess from the top down it seems to me that if you would just say that something could happen in seven days then your ability to influence the risk by any of these added requirements is not there.

I mean do you realize that? It all hinges on that. If you can in seven days put water back into the pool, you have no ability no matter how broad the requirements, no matter how onerous they are, to have any effect whatsoever on the ultimate risk.

MR. BARRETT: Well, for some of the scenarios that is true. If you could establish --

MR. RICHARDS: For the great majority of them.

MS. HENDRICKS: Virtually all.

MR. RICHARDS: Outside of seismic and cask drop and I guess

you can talk some of the siphoning events but --

MS. HENDRICKS: The seismic and the cask drop both have that as a factor it would appear.

MR. RICHARDS: No, I think seismic and cask drop say you basically -- the assumption is you drain the pool instantaneously and you don't put water back in --

MS. HENDRICKS: But the risk of that is tiny.

MR. RICHARDS: We don't have seven days. You --

MR. BRADLEY: But we also heard that part or at least over half of the seismic risk was coming from the equipment and not the pool, so I mean there is a factor there too of long-term uncovery.

MR. RICHARDS: Yes, that's right. You are right. There is a portion of the seismic that falls into that category.

MS. HENDRICKS: And I presume the cask drop -- we didn't get all the way through the sequence but I presume not every aspect is catastrophic, if you will, for the cask drop, that you have other damage levels too, just like you would for seismic.

MR. BARRETT: I think it is very possible that when we get right down to it a lot of these scenarios will drop off the screen, when we get information back from you and from other stakeholders that give us a sense of where the plants are, how they actually operate and how they will operate in the future.

We weren't able to get there in two months. That is a level of detail that, as Stu said, we just -- we had to make a trade-off between level of detail and specificity versus getting something out in a reasonable amount of time that can begin a dialogue with you and with others, and we have made those choices, and as you know in the past the NRC would have taken a lot longer. We would have come to something that was much closer to a final result, and we probably would have been a little bit more set in the sand as to how much flexibility we had to

ANN RILEY & ASSOCIATE

move from there.

We are trying to do business differently now, and this is part of it, that you are going to see information that hasn't had the full kind of study that the NRC used to try to do, so we are very interested in seeing that feedback, but always in the background keep in mind these are very, very low numbers that we are calculating here -- 1.19 percent of 10 to the minus 5 is twice in a million years. That is pretty low.

MR. RICHARDS: Other comments or questions?

MR. DUDLEY: Ray, do you have any comments or questions?

MR. SHADIS: I was just in a stir here now. Would it be of help to the process if the working group had up-to-date design information on all the plants which are undergoing decommissioning? That's sort of rhetorical.

It is one of the criticisms that GAO levelled about the whole risk-informed process at NRC is that many plants do not have up-to-date design information available. Their FSARs are incomplete, whatever it may be, and it seems that the seven-day thing has almost a biblical tone to it -- recovery in seven days.

If you have an earthquake that is large enough to damage the spent fuel pool, I think we have to understand that the infrastructure in the host community is also likely to be severely damaged, that emergency equipment simply may not be available. If it is large enough in the case of Maine Yankee, for example, if it is large enough to damage the spent fuel pool, it will be large enough to collapse the spent fuel pool building, the end walls of which are not seismically qualified. They are masonry walls.

Then you may well have a curtain of masonry lying on top of the fuel. There's so many factors that play into this that relate directly to the siting of the plant and to its design, and I want to

ANN RILEY & ASSOCIATE

point out that the industry folks really should be contributing I think at this stage, but one of the things that you really to have in hand is that plant-specific design information so that there won't be surprises.

Mr. Kelly observed that you have a single bus handling this spent fuel system. That should have been on an application, on a piece of paper in front of you.

One of the problems that has brought us to this procedure is that plants undergoing decommissioning have to approach all of these issues piecemeal with applications for amendments and exemptions and so on. It seems like the right thing would be a single application, but it really should have all of this information to meet a standard set of criteria for a decommissioning plant.

You know, that is my observation to date. I would like to make a speech later on.

MR. RICHARDS: All right. Well, I think we agree with you that we hope to go to a process where plants can perhaps make a single application to go through decommissioning because we'll lay out rules that will say what is required instead of dealing with these changes on an exemption basis. It would be nice to have it all laid out ahead of time in 10 CFR and then licensees would know what they had to do exactly and simply implement those changes and be done.

That is part of why we are going through this process, Ray, is to try and get there.

As far as design basis goes I can't speak for the technical working group but I would think that for decommissioning plants that certainly design basis, the construction of the spent fuel pool and then the recent changes they have made are probably readily available. I mean you are talking about obtaining the design basis for a very small fraction of that total plant that was built, so on a plant by plant basis I don't imagine that is going to be a problem where we are dealing

ANN RILEY & ASSOCIATE

with plants individually.

What we are trying to do is craft a set of regulations that envelopes all the possible scenarios without having to go out and analyze each one, one at a time.

MR. SHADIS: Well, I know, but we heard some specifics here being tossed back and forth, issues about siphoning, for example. If you look in the ISAT, 1997 ISAT report on Maine Yankee, you will see that there was a temporary rig where there was not a lock to prevent siphoning on that pool, so you want to look back to that.

If you have issues of the configuration of the fuel being directly related to the number of days you have available for a zirc fire window, and I forget which NUREG number it was, but it mainly had to do with the size of the orifice of the cooling channel up to the center of the fuel, stretched it by a factor of two, I think, as you reduced the size of that orifice -- then you, to my mind you bring in foreign materials exclusion issues.

If you have a tarpaulin or plastic heating of something go into the spent fuel pool, maybe even by the same event whereby you have challenged the integrity of the pool, be it the transfer tunnel or whatever, and you have blockage on the bottom of one of those racks, then you have a column of steam and water bubbles, whatever it may be, coming off that rack. You have radiological problems. If I were a fireman, I wouldn't want to go near it with a fire hose, so, you know, I think a lot of those issues really need to be brought in, and a lot of them would surface I think if that design information were accurate and it were up-to-date, if those administrative procedures were all in one place.

I think in the future this really ought to be the shape of the PSDAR. It really should be more than the trivial outline that it is at this point.

ANN RILEY & ASSOCIATE

MS. ORDAZ: Thank you for the comment. We appreciate the comment and we will take that into consideration during independent review process.

MR. SHADIS: Thank you.

MR. DUDLEY: Are there any more public questions or comments? Yes, Mr. Atherton?

MR. ATHERTON: I have quite a list.

MR. DUDLEY: If the questions are regarding the presentations you have heard, we would love to have them now. If they are not regarding the presentations now, if you could reserve that to the public comments session at the end of the meeting.

MR. ATHERTON: My name is Peter James Atherton. I have a number of comments which include what has been discussed, but also covers what I haven't heard yet and I suspect that you might cover that.

MR. DUDLEY: Why don't you go ahead with the comments regarding what you have heard.

MR. ATHERTON: Well, I am here, I guess, I am one of the few people who has been involved with nuclear power plant sites, and I have represented the interests of the people in and around the nuclear power plants at a number of different locations.

It has come to my attention that, especially with some of the earlier plants which were built in the '50s and '60s and are now decommissioned or going through the process, that there was specific seismic requirement that I was able to locate in the safety analysis reports in the public document rooms locally which identified the basis for a seismic design of a spent fuel pool. And I, therefore, have a general basic question as to what is the design criteria that is being applied, generally speaking, across the board, not just seismic, to spent fuel pools.

The first operating reactor was proposed roughly in 1955 for

commercial generation of electricity, which is 44 years ago, and here we are 44 years later identifying problems which haven't been addressed or considered during this interim. I have some difficulty with that. Are we now just realizing that these have been problems that are, for all practical purposes, realized for the first time? Or is it only because more and more plants are being decommissioned that we have an inclination to look more rigidly at the way things exist today?

MR. RICHARDS: Peter, before you go on, if I could get a little clarification on those comments. Of course, has time has gone by -- you asked what is the criteria applied to the construction of spent fuel pools. That has evolved over time. You know, obviously, the standards that were applied to the construction of a plant in, you know, 1965 is not the same as that that was applied to a plant in 1985. As issues have come up, I think they have been addressed by and large. I can't speak exactly to what you are talking without more specifics. But, for instance, I know the agency undertook the SEP program, oh, probably a decade or more ago, the purpose of which was to go back and look at plants that had been built early on and to address the seismic issue.

For instance, San Onofre, Unit 1, was a fairly early plant, was looked at from the seismic perspective. I think the agency was expecting them to make some fairly significant seismic upgrades and, as a result, they elected to shut the plant down rather than make the investment.

So I will grant you that the criteria has changed. I don't know of any plants that have a problem today based on your comments. So unless you can give us specifics on the name of a plant you are concerned about, I don't think I can answer your question.

MR. ATHERTON: Let me rephrase it. Without getting into the naming of specific plants that perhaps I would have a concern with, what

ANN RILEY & ASSOCIATE

are the standards? It appears to me that you are -- if I could make a comment based upon what you said. It appears to me that you are in the process of developing standards at this time which to apply retroactively to spent fuel pools. Is that what you are attempting to do from an overall perspective?

MR. RICHARDS: No, I don't think so. If you are saying we have been making errors all along and now we are trying to correct them, that is not my perspective. What we have been doing is dealing with plants on a case by case basis. When they have gone into the decommissioning mode, we have asked plants to look at the potential for a zirc fire, to develop -- you know, most plants are seeking to truncate their emergency planning based on being able to say a zirc fire can occur regardless of how small the probability is. We are trying to get into a position where we don't have to deal with that on an individual plant by plant basis because it takes so much resources.

So the intent was to see if we could step back, identify in an integrated fashion the risks associated with decommissioning and put together a set of regulations that capture all plants who would enter decommissioning and streamline the process. I think it has been said a number of times today that they made a number of assumptions on a plant-specific basis may -- you know, utilize or would -- on a plant-specific basis you may come out with a more conservative answer. But for the purposes of us trying to envelope the entire industry, we had to assume something else.

So, do you understand where we are trying to head here, what the purpose of our effort is?

MR. ATHERTON: I have been trying. Let me -- perhaps I should continue with --

MR. RICHARDS: Well, I want to nail you down a little bit because I want to be responsive to your comments, but I can't do that if

ANN RILEY & ASSOCIATE

they are very -- very, very broad.

MR. KELLY: This is Glenn Kelly from the staff. I know of the four plants that I went out to, one of them did not have a seismic Category 1 spent fuel pool, but that fuel had also been in that pool for many, many, many, many years, to the point where they don't even need a heat exchanger to remove heat. It just -- losses to ambient are more than enough to keep the pool cool.

At that plant if you were to drain all the water out, the pool -- the fuel would almost care less. It is not going to heat up to the point that you are going to get a fire. And if you don't get any fire, you are not going to have any off-site consequences.

So whether or not a seismic event ever affected that pool, at that is point it would have no impact on public health and safety. I am not aware of --

MR. ATHERTON: Could I ask you a question?

MR. KELLY: Sure.

MR. ATHERTON: Are you considering only the possibility of a fire -- what is it, a zirc fire?

MR. KELLY: That's correct.

MR. ATHERTON: That would release sufficient radioactivity to adversely affect the public?

MR. KELLY: That's correct. And from my standpoint as a risk analyst, I am worried about something that would be -- I am not worried about a design basis, you know, 1 rem at the boundary, that is a "no, never mind" in risk space.

MR. ATHERTON: Well, what about the criticality problem?

MR. KELLY: Criticality, again, at this plant would not be a problem and, in general, when we have looked at the criticality, and we are not done looking at it, but it doesn't appear to be --

MR. ATHERTON: You haven't spoken to that. That is a new

issue, I didn't want to bring it up at this time.

MR. KELLY: Well, it is something that we have -- it is in our report and we are looking at that. It is does appear to be a real problem for us, but it is something that we are continuing to look at, to confirm that that is not a problem.

MR. ATHERTON: Then I assume you are going to talk about that later this afternoon?

MR. KELLY: From a risk standpoint, we don't consider it to be a problem. And the reason is -- and I will speak from my thinking about that, if you have -- if you were able to create a small critical mass within the pool, as long as it was coolable geometry, all you have to do is keep some water on it, and it is going to, at worst, just heat that water up and bubble it away.

MR. ATHERTON: Now, you are assuming the pool is covered, though, when this happens? You have water in the pool.

MR. RICHARDS: If there is water, there is no zirc fire, there is no change in the configuration.

MR. KELLY: Right. Well, I could get a change in configuration from a large seismic event that might -- potentially might affect the configuration and could cause me some criticality problems. I might be able to get -- there may be a range where I could get a point where I could shake the assemblies enough that I could knock out the burl and other things and knock the pellets loose and put them on the floor of the pool and maybe get something, go critical then.

MR. ATHERTON: What about a collapse of the racks that hold the spent fuel together, are you considering that possibility?

MR. KELLY: Right. I am saying it is possible that I might have a large enough earthquake, beyond design basis earthquake, that could create something like that.

MR. ATHERTON: But if there are a number of plants which do

not have seismic criteria for the spent fuel pools, how do you --

MR. KELLY: The racks are still seismic.

MR. BARRETT: If I could add a word about this, --

MR. KELLY: And the pool -- and you are not going to get a fire.

MR. ATHERTON: Say that again, please.

MR. KELLY: The racks are still seismic.

MR. ATHERTON: The racks are seismically attached or fastened to a non-seismic spent fuel pool, is that what you are telling me?

MR. KELLY: That is what Diane was just telling me, that the racks themselves were that way. But maybe George has some more details about that.

MR. HUBBARD: I will refer you to a couple of studies that -- I say recently done, actually, as I think about them, they are about three years ago. The staff undertook a --

MR. ATHERTON: Who am I speaking to?

MR. HUBBARD: George Hubbard with the Plant Systems Branch. In July 26 of 1996, I believe it was, the staff submitted to the Commission a report, it was the results of a task action plan that we did looking at spent fuel pools, looking at them from the cooling aspect. I believe we also looked at seismic. And as we identified some plants that had some concerns, we went back and looked at those plants and determined that we could not justify any additional -- any backfits on them.

As part of this, I am not aware of any plant that you are talking about being a non-seismic pool. I am not aware of any plants, the operating plants that have a non-seismic pool. Some of the cooling systems may be non-seismic, but the pools themselves, and I believe the racks also, have been considered for seismic design.

ANN RILEY & ASSOCIATE

MR. ATHERTON: Well, when you consider -- I go back to 1978, if I may go back that far, for one purpose. In 1978, at Maine Yankee, the staff, NRC staff, and this was after I left, the staff determined that a hydrogen explosion in the turbine building would collapse the turbine building. And the staff left that in the middle of the report and never elaborated upon it thereafter from what I have been able to find out.

Likewise, when you say the pool is seismically designed, Mr. Shadis raised the concern that what about the components surrounding the pool, the walls, the roof, and other equipment that might be in the general area, what effect is that going to have in the event of a seismic -- a significant seismic event?

MR. MEISNER: Well, since that has been raised twice, I am going to have to answer it. That has long since been analyzed, particularly what Ray discussed about the cinder block wall falling down on top of the pool, layering on top of the pool, that was analyzed from a cooling point of view, I think ten years ago as part of our license basis.

MS. JACKSON: From a generic standpoint, we are hoping to cover that in our deterministic analyses as well, try to make those bounding or near-bounding. And although it is unrealistic and we have been criticized for it, one of the calculations we did was based on adiabatic heatup. Now, even if you have the roof of your spent fuel building on top of your spent fuel pool, you will still have more cooling than an adiabatic heatup, so that is an overly conservative calculation we did to try and bound things and to give us a measure of how much time would you have to take protective measures if you didn't have off-site emergency preparedness. It is things like that we tried to capture, not in every case, because in a probabilistic arena it wouldn't be appropriate, but perhaps in the deterministic arena, we

would try and capture that.

As far as the criticality is concerned, if you have to lose your water -- if you have water in your spent fuel pool, especially the PWRs, there is soluble boron in them, so you have to loose all your water and refill it with raw water and have damage to your fuel or your rack to have a criticality problem. If you have some water left in, perhaps it is boil-off, you are getting a larger concentration of boron left, so if you add more clean water, you still have boron, you won't have a criticality problem. If you lose all your water and they are just exposed, you don't have a moderator to be able to go critical, so you wouldn't have a criticality problem.

MR. ATHERTON: You are assuming the fuel rods remain intact?

MS. JACKSON: Right. We are going to that. But, yes, so far, yes, remained intact. If we reflood with pure water after losing all of our water, but all pure water back in the fuel -- the fuel is intact, it still wouldn't because it is a criteria, the rack itself, to maintain K effective below 1. You would have to get some damage to your racks, to your fuel, and be in a configuration that you can say the boron that is existing in the plates themselves aren't there to help you with criticality dampening. We are still looking at that type of stuff.

MS. ORDAZ: Yes, we still have further work to do on the criticality portion before our report comes out in August.

MR. ATHERTON: Since we are in that subject, what techniques are you using? Are you using -- what computer codes are you using to determine your criticality problem?

MR. KOPP: I am Larry Kopp, NRR. We are not doing any calculations, we are looking at it just from a physics standpoint. You don't have criticality concerns if you don't have water in the pool, because your fuel is limited to 5 -- 8 percent enrichment and you cannot, even for an infinite mass, go critical without water at that

ANN RILEY & ASSOCIATE

enrichment or less.

If you destroy the fuel or somehow deform it and reflood with pure water, you may have some criticality concerns then.

MR. ATHERTON: Well, in operating reactors, we used to be concerned with fuel meltdown when it was exposed and there wasn't a cooling medium there.

MR. KOPP: That is a radiation problem, not --

MR. ATHERTON: How does this affect -- well, I am getting there. How does this affect the scenario that you described in the spent fuel pool?

MR. KOPP: Where you can get to the TMI type scenario, is that what you are talking about, where you can lose the pellets from the cladding somehow, and if you assume they form some type of critical configuration at the bottom of the pool, yes, there you can have a criticality concern then. The scenario is pretty far-fetched, though. For all the pellets to get out, first of all, to get out of the cladding and form on the bottom of the pool into a critical configuration, have enough moderation, it is --

MR. ATHERTON: Well, we are talking about worst case scenario, the collapse of a seismic event, the collapse of some --

MR. KOPP: Well, that is one of the scenarios that we are mentioning in the -- as far as being able to calculate it, we will have to --

MR. ATHERTON: Well, I just -- I am raising the concern as a member of the public because radiation release in a building that is not contained, that is, it does not have the equivalent of a reactor building or a reactor vessel's containment, has the potential for releasing this to the public should this worst case situation evolve somehow. And because you don't have the equivalent of the defense-in-depth that you had with reactor systems inside a containment

ANN RILEY & ASSOCIATE

within the spent fuel pool area, it would seem to me you would want to look into these in some greater detail because of the potential severity of the release to the environment.

MR. KOPP: Damaging the fuel and releasing the pellets outside the cladding would cause you a radiation concern right then and there without even considering a criticality event.

MR. ATHERTON: You are looking into this?

MS. ORDAZ: Yes, Mr. Atherton. We still have some work to do in criticality and we are looking at this -- or we will take your comment --

MR. ATHERTON: I didn't mean to divert to that before he had a chance to talk about it.

MS. JACKSON: Larry is doing the criticality part. What you are now talking of is dose consequences to radiation protection.

MR. ATHERTON: That is ultimately what I am concerned about for my constituents.

MS. JACKSON: And that would be the next step beyond the criticality question.

MR. ATHERTON: Okay -- and that is something you are going to look into though?

MS. ORDAZ: Yes.

MR. ATHERTON: I raised this issue at the last meeting, last month, concerning the aging and the equipment qualification. What effect has the fact that some of these spent fuel pools are quite ancient, and I know for a fact that at least one of them is leaking, what effect does this have upon the determination that the equipment was designed seismically, if such was the case, back in the design phase of the building, and then 20, 30, 40 years later we find out that it is failing in a manner in which we did not consider it would fail in, probably because we didn't anticipate the use of the spent fuel pool as

ANNRILEY & ASSOCIATE

a quasi-permanent storage center because of the lack of anyplace else to put it. That is phase one.

The second phase is there are a number --

MR. ZWOLINSKI: Well, Mr. Atherton, you have just said we have got a spent fuel pool out there that is leaking. Could you identify that to us so that we might be able to look into that matter? We take that issue very seriously. I am certainly not aware of pools leaking in this country.

MR. ATHERTON: The spent fuel pool that I know of has segments. It is divided into various segments in which it keeps its damaged fuel, its defective fuel, its spent fuel, et cetera, et cetera.

It has lowered the water level in order to minimize the leaks and then put some sort of a steel covering over it in order to minimize the radiation hazard to the people who have to go into the area.

I was surprised to hear about this, and I am even more surprised that you don't know about it. I am not intending to put any one plant on the spot here. I am trying to address problems generically and I am reluctant to --

MR. RICHARDS: Well, Mr. Atherton, we are aware that there are a couple of plants out there that have what we would consider to be relatively minor leaks, and there are various ways to get that beyond the spent fuel pool itself failing. I think that is the way you characterized it.

MR. ATHERTON: It went to the fact that the spent fuel pool had degraded to the point where at least in this one instance they weren't able to identify the leak as to where it was actually leaking from, and they were experimenting with the fuel pool level, water level, in order to try to minimize it.

However, in just about every design basis that I considered,

ANN RILEY & ASSOCIATE

the spent fuel pool was not intended to be designed so that it would leak.

MR. RICHARDS: Well, let me respond to your question if I could --

MR. ATHERTON: Let me finish. The pool was not designed to be a leaker, and some of them it appears have turned out to be leakers and therefore my concern would be what effect does aging have upon the qualification of the barriers in the spent fuel pool? That would be something that would affect I think deterministicly if not probabilisticly, how you would look at long-term fuel storage at this particular or any particular site.

MR. RICHARDS: All right. The leakers that I am familiar with appear to be that you get a leak in a weld along the liner. These pools are typically concrete and rebar for the most part, but you put a liner on the inside and then I know most plants have a leak detection system that goes along the welds of the liner so that if you do develop a pinhole leak in a weld that may not have been the quality you hoped for on the front-end, it shows up in the leak detection system, maybe not, but my understanding is that the leaks that have occurred have been very small, probably due to the liner. It does not affect the basic integrity of the steel or the concrete involved in maintaining the overall integrity of the pool, so in the bigger scheme of things as far as I know we don't have a problem out there.

If you are talking about having a pool that should not have leaked at some very, very small rate -- yes, that might be the case but I don't think that presents really a radiological hazard of any magnitude at all.

MR. ATHERTON: In the event of a large earthquake, what effect would the fact that you have a leak at this point and possible degradation of the liner and/or the concrete barriers, what effect would

that have upon your assumption that from a probabilistic perspective that it is rugged enough to withstand three times the safe shutdown earthquake criterion?

MR. RICHARDS: I don't think it would have any at all if it is just a weld defect -- as far as I know. I haven't heard of or I am not aware of any significant degradation in any spent fuel pool as far as the rebar, the concrete, and the basic liner goes.

MR. ATHERTON: Especially for operating plants.

MR. BAGCHI: Can I address that?

MR. RICHARDS: Sure.

MR. BAGCHI: My name is Goutam Bagchi. I am with the Division of Engineering.

The pool liner is anchored to the concrete itself. Leakages due to some defect in the weld or eventual expansion-contraction causing some cracking in the weld may cause some minor leak, but it does not affect the structural integrity and even in an earthquake, a very large earthquake, the structure is much more rugged than just the simple design would call for.

These structures have very large walls, very thick slabs as well, and there is no aging effect, determinable aging effect that could affect the fragility of the spent fuel pool structure itself to question the integrity.

MR. ATHERTON: Is this generally speaking or for particular instances that you have performed evaluations of or are you speaking from general knowledge and experience? On what basis are you --

MR. BAGCHI: This is generally-speaking based on the configuration and sizes of walls and slabs that we have reviewed.

I would like to emphasize that most of the operating plants have gone through several cycles of review of the structure itself with respect to upgrading their fuel pool racks, and these things have been

reviewed every time this comes up.

You addressed the question of aging and I would like to point out that as time goes on, concrete itself increases in progressive strength and aging up to 60 or 70 years is not a concern.

MR. ATHERTON: On what are you basing this? Is this as a result of mathematical calculation coupled with experience? An educated guess or what?

MR. BAGCHI: I have done many evaluations myself, having been a designer and also having been a reviewer based on actual evaluation. I think I have looked at the Maine Yankee evaluation myself.

MR. ATHERTON: The reason I am asking this, I used to work for the Nuclear Regulatory Commission in the 1970s --

MR. BAGCHI: I know you did.

MR. ATHERTON: One of the criteria that the design requirements considered was the fact that a reactor vessel for instance and its permanently installed internals were designed to last 40 years.

Now we have seen in both some PWRs at least around the control rod drives and in some BWRs around the core shroud area and the spray spargers and the rings, et cetera, we have seen some degradation to the point where they were concerned about failure and at least in some instances there were attempting to patch if not overseas replace some of these parts altogether --

MR. BAGCHI: Can I address the aging question? Those are active components. They are subject to flow-induced degradation and these are passive components. We are doing license renewal reviews. Industry has prepared a significant amount of information with respect to aging of passive structures. These were called industry reports and research information has been gathered on the behavior of passive components.

ANN RILEY & ASSOCIATE

We also have the maintenance rule and we have not found significant degradation of any sort in passive structures.

MR. ATHERTON: What about the racks in the spent fuel pool?

MR. BAGCHI: You were talking about the integrity of the spent fuel pool itself. Now you are talking about the racks. The racks have been evaluated for the seismic basis that they have to operate under and beyond design basis events there could be some failures, minor failures.

MR. ATHERTON: I am talking about the degradation --

MR. RICHARDS: Mr. Atherton?

MR. ATHERTON: Sir? Am I taking up too much time?

MR. RICHARDS: Well, we value your comments and we have a period this afternoon for public comment at 2:30 to 3:30. We are closing in on lunch.

If you have a specific question that we can cover quickly for the group, that would be fine, but I think we are getting into kind of a very general area here of the maintenance rule and degradation of plants.

In order to keep us on schedule here, I think we need to move on.

MR. BAGCHI: I just want to add one final point. The racks are made out of stainless steel and far less subject to degradation than anything else. These are passible.

MR. ATHERTON: The core shroud on a BWR is made of stainless steel also. I just wanted to raise the fact that I am concerned because I have encountered problems with both stainless steel and other components in operating plants and I am carrying it over to the spent fuel pool to see what you are doing in that arena.

MR. RICHARDS: Mr. Atherton, could I ask that you -- we'll cover your additional comments at 2:30 this afternoon, if that is all

ANN RILEY & ASSOCIATE

right, because I think it is time for us to take a lunch break.

MR. DUDLEY: Do you want to get Bill because Bill has a short talk?

MR. RICHARDS: Well, what is the consensus here? Do you guys want to do Bill Huffman's talk --

MR. MEISNER: Stu, we don't have a presentation.

MR. RICHARDS: Oh, you don't? All right.

MR. MEISNER: If you want to use that time. I think we will have some remarks but --

MR. ZWOLINSKI: Let Bill give it.

MR. RICHARDS: Yes, all right. Why don't we go ahead and do Bill Huffman's presentation and then we will see where we are at.

Mr. Atherton, we appreciate your comments, but we can continue the dialogue at 2:30. We appreciate that.

MR. ATHERTON: Thank you, sir.

MR. HUFFMAN: Almost good afternoon, everyone. My name is Bill Huffman, and I am in Decommissioning Projects. And we are concerned with implementation, the process side of this whole equation and our charter was -- What can we do to improve the decommissioning regulatory process?

As probably the industry is well aware of, there have been several rulemakings that have been struggling for a number of years, emergency planning, financial protection. And based on what we have seen so far in the staff's technical assessments, they will probably need to be changed again. And so we are saying to ourselves, there is a need to step back and do this whole thing in a holistic, integrated way, so we are not wasting manpower coming up with rulemakings that go through the process, go out for public comment, and then have to be changed again. So we want a finalized understanding of what the risks are and what we need to do to make this thing a streamlined process.

ANN RILEY & ASSOCIATE

So as was hinted at -- or, actually, more than hinted at, this was described in an earlier presentation, we are going to take emergency planning, financial protection, safeguards and operator staffing and training and hold off on those rulemakings until we have a good understanding of risks from a spent fuel pool, and integrate that understanding criteria that is developed into a single rulemaking package, and push that through with a fairly high priority once we have that understanding and we are pretty confident that it is not going to change.

But until that understanding is reached, I think it would be a mistake to go forward and try to second guess what the technical staff is going to arrive at. Just like we have been discussing today, it is still very early, very preliminary and we haven't reached the point where we are thinking about ultimate criteria.

Well, be that as it may, what else can we do to keep the process moving along? And we recognize there are some regulations that of great interest to the industry that we are probably going to be putting a hold on. But is there something else we can do that is big picture? And what our group has determined, and I pretty much went over this the last time we met, was that we would prefer to consolidate all the decommissioning regulations into its own dedicated part within CFR.

And several reasons why we think this is a worthwhile effort. Number 1, it will only contain regulations applicable to decommissioning, and so it will clearly segregate and be separate from any of the operating plant regulations that tend to get confused in this Part 50 license arena that remains even after the plant has ceased operation. It will eliminate uncertainties as to what rules no longer apply to decommissioning.

More importantly, I think the process of doing this will help identify decommissioning regulatory problems and policy issues, one

ANN RILEY & ASSOCIATE

that are there are in the background that maybe we haven't fully come to grips with yet, and it will also help us identify other regulations that are amenable to risk-informing. We have singled out four, but certainly there may be others as well.

And, lastly, but probably least, is that continuing the way we have been doing business, of amending rules in 10 CFR Part 50, is always a concern to operating plants, too, because of the way that we make those amendments and we tend to make exception to operating plant amendments, and this would be a much cleaner way of dealing with any future licensing amendments.

So what we have done is we have devised a plan, a phased approach, and the first phase would be performing a detailed review of 10 CFR, not just 10 CFR 50, but other parts, other 10 CFR regs as well, and bin them into the appropriate categories.

And this is going to be the meat and potatoes of this whole thing is to make sure we come to grips early on with what the basis for these regulations are, what is the intent, and where we lack definition in decommissioning space. Particularly Bins 3 and 4, regulations that have indeterminate applicability to decommissioning of nuclear power plants.

I can site where there seems to be some confusion and that would be 10 CFR 26 on fitness for duty. I know that we have staff position that has gone out, lower level staff position that said it doesn't apply. We have other Statements of Consideration in the 1996 rulemaking for decommissioning that says we will assume it does apply until further decisions are made. So we have to look at these and others and determine ultimately, are they or are they not applicable?

Bin 4 recognizes the state of regulations as they are now, that there are a lot of partially applicable rules, or rules that change with time, with decay heat loads, and these are some areas that are

ANN RIL EY & ASS OCI ATE

going to present a challenge when we write our decommissioning rules.

After we get through doing that first phase, then we will work on constructing a model, looking at something similar to what we did with license renewal. And then Phase 3 is where we get into the standard rulemaking process. We will put together what we have learned, the model we have got and submit a rulemaking plan to the Commission for approval. And we expect that this rulemaking plan will identify additional policy and regulatory problems and hopefully contain regulatory solutions.

And when we get to this point, we will have to have a pretty clear understanding of what the detailed resources and schedules are for completing this kind of thing. We don't anticipate it is going to be a minor effort if there is a lot of regulatory decisions that have to be made.

The final phase of this would be, in an effort to include the public and industry stakeholders early on, is we would, with the Commission's approval, put this out as an ANPR to make sure we do have buy-in from the public that this is the way to go. And even before the ANPR phase, as we are meeting today, we would continue to solicit and work with the industry and the public in terms of letting them know where we are and how we are progressing, what kind of problems we are encountering along the way.

But once we get into the normal rulemaking phase of this process, then it would proceed according to all of the rules NRC has for rulemaking.

So just to repeat some of the motherhood things, is that we think that this is important. There has been a lot of problems in decommissioning. We are thinking that this is the way to go, to start with a clean sheet and to reinvent decommissioning to enhance clarity, efficiency and effectiveness, while maintaining safety, and to improve

ANN RIL EY & ASS OCI ATE

public confidence.

Two things that we are looking at in particular is the integration of those four rulemaking areas, which will we will hold off on until we get a better picture on the technical side, and the consolidation effort, we look to move forward with, assuming we get management approval. That is about it.

MR. DUDLEY: Are there any questions for Mr. Huffman?

MR. RICHARDS: I would like to note that this is all preliminary thinking. We haven't got the NRR management chain of command's okay on this, much less the Commission, but this is our early thinking on it.

MR. DUDLEY: Oh, yes.

MR. LAGGART: My name is Mike Laggart from Oyster Creek and regulatory stability is what I am looking for in decommissioning in the next couple of years. And from what I am seeing in the areas of safeguard and training, and previous exemptions issued, I have no guidebook at all. No previous exemption requests are valid any longer, or any positions by the staff. You mentioned the fitness for duty rule, that is up in the air as well.

I can't wait three -- possibly three years when all the rules come out, all the regulations come out. I am in a quandary as to what the guidance is going to be, or how closely I can work with the staff in the next couple of years. And I am assuming other plants are going to be in that position, too. We have enough time for planning, but I am left in a position where I can't plan anything. I guess I am searching for the guidance in the short-term, the next couple of years, two to three years.

MR. RICHARDS: I think what we are going to do is we are going to continue to build on the experience we have got before. You should be looking at what has been approved in the past on a case by

ANN RILEY & ASSOCIATE

case basis, and unless there is something significantly new that has come along, we will probably be looking for the same kind of submittals from you.

MR. MEISNER: Just to follow up on that, Stu, I think one of the problems is there has never been any consistency in the past, that every new licensee that comes up has something new added. You know, we talk as if zirc fire has been applied to all decommissioning facilities. You know, the history of this, it has only been applied to the last few. And the ones before that, there were other criteria or inconsistent criteria.

I was as surprised to hear about Part 26, gee whiz, you had already put out a position on that. Are you going to take that now?

MR. RICHARDS: I don't think so, I think we will just group them together.

MR. MEISNER: Why would that be indeterminate?

MR. HUFFMAN: Well, my study has shown that when you say we put out a position, the staff, very -- fairly low level, issued a position on it, I agree. However, --

MR. MEISNER: Are you saying we can't count on that?

MR. HUFFMAN: Well, I have found contradictory information in the Statement of Considerations for the 1996 decommissioning rule.

MS. HENDRICKS: It was my understanding in the discussions we had with the Commission that they were looking as an objective to come up with an interim basis for some certainty and predictability.

MR. MEISNER: Right.

MS. HENDRICKS: Short of complete rulemaking. And I guess I hear that objective sort of being taken off the table. That was the question I had asked Mike before it was brought up by Mike.

MR. MEISNER: That is the fundamental problem with all this, the staff can't take and hold a position. I guess we can talk about it

more after lunch time, but, you know, every time a decision seems to be made in decommissioning, somebody pops up later and says we are going to change it.

MR. HUFFMAN: No, I am not sure that says we are going to change it, but if we find contradictory positions out there, I can't ignore them.

MR. MEISNER: Of course you can. Someone makes a decision because there is more than one possibility. Having made that decision, established that staff position, of course there was contradictory material before that, but you have established the position. Let's get on with life. You can't change it, that is why we have things like the backfit rule.

MR. RICHARDS: You know, we can have a discussion. I guess we are going to have to go to lunch if you want to start talking about the backfit rule.

MR. MEISNER: Yeah, it is probably the right time.

[Laughter.]

MR. RICHARDS: That is not on the agenda, we can put that on. But one way to take care of business, Mike, to try and nail it down, is to put it into a rule. Would you agree to that?

MR. MEISNER: Absolutely.

MR. RICHARDS: All right. So that is what we are trying to do. But in order to have a rule, we have to have a basis. We turn to the technical group for that basis. And that is the next step in the process, we would like to do that as expeditiously as we can. We will work with you to do that. And then when we have that basis, hopefully, we will codify and then you and everybody else will be able to point to it and say it is in the book, that's it. Right now we are not there.

Do you want to take a lunch break or do you want to plow on here?

ANN RILEY & ASSOCIATE

MR. MEISNER: I am ready for lunch.

MR. RICHARDS: All right.

MR. DUDLEY: Let's all reconvene at 1:00 p.m. And for those of you not knowledgeable with this building, there is a cafeteria on the first floor. Thank you. See you at 1:00.

[Whereupon, at 12:00 p.m., the meeting was recessed, to reconvene at 1:10 p.m., this same day.]

ANN
RIL
EY
&
ASS
OCI
ATE

A F T E R N O O N S E S S I O N

[1:10 p.m.]

MR. DUDLEY: Okay. If we could reconvene.

Next on the agenda is discussion by the Nuclear Energy Institute. Annette, will you lead that off, or Mike?

Mike Meisner.

MR. MEISNER: Okay. We didn't come prepared with a presentation. What we did come prepared to do was listen and then provide you with our feedback, and it's what we intend to do.

I'm going to talk fairly frankly, because it's really going to be difficult for me and the others to get across how disappointed we are in this process. I think there's been a real missed opportunity to do things right here.

When we look back at the Commission meeting that kicked all this off, in my mind the notion was the staff has done a lot of work already, and what we needed to do to risk-inform Part 50 is to bring some probabilistic insight to a lot of deterministic work that had already been done and package that together and send it to the Commission in June. I haven't asked yet, and we'll need to find out later, but I guess my impression is what goes to the Commission in June is largely a plan to work a plan, as opposed to any technical information.

I don't think that that's what the Commission is looking for. I think they were looking for a simple, straightforward way to risk-inform what we're doing here today. And instead I think you've developed a very elaborate process that is going to be years in the making. I don't really see any need for it, and I don't think the Commission will see any need for it, either.

I believe that it reflects a lack of discipline on the part of the staff in being able to go from A to B, to build on past

ANN RILEY & ASSOCIATE

information rather than do it all from scratch, and I think it has to do with something we've seen consistently in decommissioning. Every step of the way is an inability to hold a position. I mentioned earlier that every single decommissioning plant that's come up for exemptions in emergency planning or the like has faced a different staff position on what's necessary to get those exemptions approved -- every single one, save the last two, Maine Yankee and CY, who were kind of dealt with as a pair. But those of you who know the history of this, and some of you know it pretty intimately, know that there has never been a consistent staff position, and that it changes all the time.

We thought NUREG-1353 was a pretty good document. It seemed to address the range of issues and concerns associated with spent fuel pools. In fact, what we provided you in a previous meeting was an updated analysis, a la 1353, precisely because at the time that clearly seemed to be the central issue.

Now if I've understood it correctly today, that information has been put aside or that methodology has been put aside, and somehow using the Laurence Livermore data, you all have come up with a risk number that's about the same number as 1353. In other words, the Laurence Livermore data made absolutely no improvement. At best it cut it by half from 2 times 10 to the minus 6 to 1 times 10 to the minus 6.

The point is you again changed the process, you changed the methodology, if I understood it, because I know darn well, based on the work we did and provided to you, that seismic risk goes down nearly an order of magnitude with Laurence Livermore data, and even more if you use the EPRI hazard curves.

What we've heard this morning about how PRAs are done conflicts with our understanding of how PRAs have been done in the past. This 120 hours versus 24 hours thing is really mind-boggling. It seems like to us the intent for doing it the way you did is to have something

ANN RILEY & ASSOCIATE

to deal with, because otherwise there wouldn't be anything there. We see the same thing on the back end of this with NMSS and license termination plans. They want to do a PRA with an end state of 31 millirem. I mean, my goodness, why even bother.

The industry needs some stability. That's why we're very concerned with making it up as you go constantly, constantly changing staff positions. You heard earlier from Oyster Creek, that you can't -- they don't know how to plan. You know, the things they heard here today are different than they heard yesterday. We're even changing on the fly staff positions on Part 26. The industry needs to be able to rely on that in order to do decommissioning.

I guess to some degree we were disappointed about the site visits that were conducted. I was listening real carefully as to what input from the site visits went into the PRA model and which didn't, and if I did my tally correctly, every single negative thing went into the model, and not one positive thing did -- you know, credit for procedures or design changes -- none of that went into the model, ensuring that you've got a very, very conservative non-PRA model. That isn't how a PRA is supposed to be done.

At the same time it seems like the staff has ignored industry information -- like I mentioned, the seismic analyses that we did with the 1353 methodology. We've got a pile of docketed information, our FSARs, procedures from inspections, any number of reports that we've docketed unique to decommissioning that don't seem to have been touched. And when we talk about not having design information for decommissioning facilities, it sure seems to me that a lot of that information is there right on your desk. You want to know how the Maine Yankee pool is designed and operated, it's in the FSAR.

I think we mentioned last meeting, if I remember right, that Seabrook has done a PRA right on this issue. I haven't heard the staff

ANN RILEY & ASSOCIATE

mention that once. There they did it to the same end state I understand you're doing it in this fuel uncovery. I also understand that when you're going to take out the operating plant type of sequences that the number comes in at 5 times 10 to the minus 7. It would seem to be at least a worthwhile data point to use, but I haven't heard anything about that being used.

And the way the discussions have been going this morning, and we're practically begging you to get information, take information from us, and use it to inform the process, and it feels like you're resisting that, and I don't understand why. And overall I think the staff did a singularly poor job in ferreting out information from us in these plant visits associated with human error. Human error, if I understood what was said this morning, is the sole driver of these ungodly numbers that you're coming up with. And it's there because you're not cutting off a sequence.

I think it's important that we get realistic. What would happen if one of these facilities started draining down in the pool, it went on for a day, two days, three days? Do you think that would attract any attention? You know, we could look at TMI maybe as an example, and the incredible resources that were thrown into that plant right after the event.

Is the NRC going to sit here in Washington three days into a draindown and not show any interest? Do you really think that a plant would do the same? This is a simple operation out there. We can get water into that pool any number of ways, and to even consider that we have to worry about an event that's a week long, there's something wrong. We've lost touch with reality.

You've come up with numbers that show a risk comparable to an operating reactor, 10 to the minus 5, that really doesn't meet the straight-face test. These are very, very simple systems. Those of you

ANN RILEY & ASSOCIATE

who have been out there know how simple they are. And to come up with human error rates and failure rates enough to drive that number so high as to be the same as an operating facility, there's got to be something wrong, especially when you throw in the long recovery times available.

And one thing that is just a bit mind-boggling, if you look at 1353 and the numbers, the risk numbers that they came up with for seismic versus some of the other events like slow draindowns or airplane crashes or the like, what it appears you've done is you've lowered the seismic probability a little bit, and you've raised everything else an order to two orders of magnitude in risk. I don't see how you can be that far off from a study that was used to resolve safety issues in the past and on which the NRC relied.

One thing, I know that in our last meeting that Gary Holahan emphasized several times is that we can disposition issues qualitatively, but I've not seen any tendency to do that. This 120 hours should surely be one that can be resolved qualitatively with a realistic mind set. And there are others as well. Instead, it seems like you've retained every adverse item you can in the model and avoided making a decision on it.

There are several things we want to request of the staff. First of all, that you set a ground rule for these issues going forward to be consistent with the past. If a position's been taken in the past and adapted, if a methodology's been used in the past, then follow it. We don't need to reinvent the wheel from scratch here on every single thing. You've got assumptions that are of concern to us. We see no reason why you can't give us those assumptions tomorrow and start working constructively with the industry and take our input and use that in informing what you're doing. The assumptions seem to be critical to the results, and we need to get it right.

I think you also need to, in addition to the very

ANN RILEY & ASSOCIATE

conservative calculations you're doing, also run another set of numbers doing them like they should be done in PRA, best estimate. Make some assumptions like the licensee will recover within a week and put some water into the pool. Put those into your numbers. There's a broad range of those things that if you considered I think you at least need to calculate to show a comparison to the other numbers you're coming up with. And I think that's only fair, and it's the appropriate thing to do in PRA space. I know you're doing sensitivity studies, but why not take a best-estimate approach as well and do the whole calculation and see what it shows?

But most all we wish you would kind of get over this seven-day hangup you have, because if we end up with that as a technical basis for what you're doing, then it's not worth doing. It simply skews the results unrealistically, and makes no sense.

So in summary, we need stability. We think the staff is missing an opportunity here. We believe that the approach that's been taken is not consistent with what the Commission had in mind. I've recognized the need to be thorough and to cover all the bases, but there are any number of different ways to do that to show that you've taken certain things into account, and there are very many ways to qualitatively resolve issues that don't need a year's worth of calculation behind them.

So overall we don't agree with the staff's approach or position on the work that's been done to date, but we really want to provide whatever information you need to resolve the outstanding issues. And I think you'll find us very responsive quickly and with good-quality information, but what we have to know is what do you need. We'd like you to give us your assumptions.

MR. RONE: At the risk of repeating some of the points that Mike made, I would like to stress the theme of using extremely

ANN RILEY & ASSOCIATE

conservative assumptions on human error rate, and that is overall contribution to risk.

I don't think it is reasonable and appropriate in the absence of information about what operators would do or what the utility's resources might be under certain accidents to assume the worst. I think this underscores Mike's point about not assuming that in seven days we wouldn't be able to recover some makeup source for the pool.

Think about what was said. There is a five percent chance that in a week with the nation notified that we wouldn't be able to find some way of putting water into a fuel pool that is boiling. To me, that is beyond what is credible. Even one percent, at least to me, is beyond what is credible.

I think there is an absolute certainty that given a week that with national resources committed, as they were in the aftermath of the TMI accident you would find some way of adding water to the pool, and so I would ask you please to go back and look at those conservative assumptions. Let us help provide you input on what we would do under certain of the scenarios for which there is a high human error rate that is dominating the overall risk profile.

Having said all that, let me now talk about Oyster Creek specifically. As you know, we have been trying to do the first plant to do a good job prior to actually shutting down of preplanning for decommissioning. Part of what we have been dealing with is the regulatory uncertainty and we had looked to this initiative as a near-term solution to provide us some guidance that we could use for the basis of exemption requests and other submittals that we need to make.

As I sit here, it looks to me like everything is back on the table and I am not sure where we stand, what the interim Staff guidance is going to be to us, as we march through this rulemaking process.

ANN RILEY & ASSOCIATE

Our original schedule for our first round of exemption requests was June, and then we moved that to the late summer and now to the early fall. We are very quickly running out of margin in which to slip our submittal schedule while this process works its way through, and as we sit here, I don't know what we say, to be quite honest with you.

I think that if you extract out the human error component and use realistic assumptions, you would have the basis for concluding that zirc fire is not credible and doing that on the near-term basis rather than on a two-year basis.

MS. HENDRICKS: Just to summarize, I guess, remember what we are trying to remedy here is lack of criteria, and going to what Art was saying, over the years even without the latest upheaval, this has been an incredibly resource-intensive process for licensees to go through -- the uncertainty, the lack of stability. Review requests are not easy to process because the Staff has no criteria to use to process them. Things that could be in a rather routine approval process end up sitting around for quite a long time.

I do think there is an opportunity to come up with some interim criteria that could be very pragmatic, using assumptions that are reasonable, if necessary codifying the requirements or expectations to see certain things in procedures and controls.

I really honestly think that is doable and I think that is kind of what is really needed here, so I just hope that will be taken on as the challenge, and just one point. Mike had mentioned that we are seeing the same thing on the NMSS side. What he meant to say was dry cask -- he said license termination -- dry cask is where we are seeing a comparable what we view as an inability to do things like allow burnup credit for fear of fission accident and transport, and when you look at the numbers the risk of that accident really is just off the back of the

envelope calculation, 10 to the minus 13 to 10 to the minus 17, which again gets you to the same theme we are thinking of here where your ability to affect these risks with the additional requirements that you may envision may not be there.

I mean you could have the requirements. For example, they don't permit burnup credit. They have a fresh fuel assumption but in reality permitting the burnup credit if you look at what the real risk is of a criticality in an accident where you have to have a very severe accident, you have to flood the cask and you have to have misloadings, at least one or two and on and on.

You don't accomplish in the regulatory space what you believe you are. In fact, you are misdirecting resources away from areas where you could in fact have a real effect on safety, so that is what Mike was referring to. I didn't want that to get confused, especially since it is in the transcript.

We do very much appreciate the opportunity and we also appreciate that you were somewhat under duress in coming forward with what you did in the timeframe that you did it, and we hope you will take our comments as constructive and as Mike and Art have said, reach out and work with us and make the process hopefully a little more pragmatic.

MR. RICHARDS: We appreciate your constructive comments. Responding to Mr. Meisner, I guess in looking through the notes, and I tried to capture all your thoughts, one thing that has confused me -- I think we are all in agreement for what we are looking for for an end goal. You are looking for predictability. I think we agree that is what we are trying to get to.

We are looking to try and risk-inform a deterministic process. I think we have said that a number of times today. That is our goal. But repeatedly during our discussions this morning and certainly clearly right now, the one thing that comes out to me is that

ANN RILEY & ASSOCIATE

you are disappointed that we can't get there faster. That is what is confusing to me. I mean the end result of --

MR. MEISNER: Well, it's semantics --

MR. RICHARDS: Well, let me finish, Mike. The end result of where we go I can't prejudice, but certainly the goals you have laid out as far as risk-informing a deterministic process and clarifying the requirements, streamlining -- that is where we are attempting to get to.

You said you were disappointed with the approach and the position to date. Perhaps you felt that we should have arrived at final conclusions within the 60 days, and admittedly when we started out, I was hopeful. It didn't turn out that way but my hope was on the front end.

On the other hand, we have to have a technical basis for whatever we do and that is what we are trying to do here, and ultimately I think we are going to get there, so I am trying to understand your comments in that perspective.

Are you frustrated with where we are trying to go or are you frustrated that we can't get there faster?

MR. MEISNER: I am frustrated that you can't get there faster because you have adopted an approach that ensures a several-year process. You are not building on the past. You are doing everything from scratch, the best I can tell. Previous Staff positions are not being applied.

We are adding on extremely conservative assumptions in the technical work that you are doing that in my mind completely invalidates the technical work and makes it useless for regulatory decision-making.

MS. HENDRICKS: To state it differently, you made some choices where you did in a certain timeframe. You could have made a different choice, to use best estimate, which I personally think you would have gotten better insights that modelling for things like lack of

ANN RILEY & ASSOCIATE

reasonable procedures. We could have been further along, no final answer necessarily, and certainly rulemaking will be needed to codify the specifics, but I think you could have come much closer to some interim, practical, pragmatic positions that would have been acceptable and met everybody's expectations.

MR. RICHARDS: Well, I'll tell you my frustration. I mean we come to the table here with 60 days worth of work to share it with you. That is the intent was to share what we are doing as we go through it and also to share it with any other stakeholders we have, so we are doing that and now we are getting a lot of frustration back from you that we have come to the table with a product that you think, you know, is half-baked, I guess, or the wrong assumptions in your mind, the wrong approach.

Okay, we appreciate your opinion but I got to tell you, that doesn't sound like -- you know, those comments don't help. The comments that do help is we have these kind of systems. This is the way we do business. This is -- you know, let's talk about these kind of events.

I don't know. Some of these other things --

MR. MEISNER: I think the real problem here, Stu, is we should have been working together all along. We shouldn't go out and visit four plants in four days and then go back and erect a whole methodology. Why not include us in the process? Why does it have to be that way?

MR. RICHARDS: We are trying to include you in the process. We are sitting here today talking to you about what we are doing, soliciting your feedback repeatedly.

MR. MEISNER: What I am saying though is if we had a technical team working with your technical team all the way along, these issues would have been brought up, addressed, and resolved somehow by our meeting today.

You know, if you had a need for procedures, we would have provided the procedures. If you had a need for design information, we would have provided it. But what we heard today was a lot of gee, I don't know, so therefore I assume the worst case.

MR. RICHARDS: Well, you know, we are getting to that point again -- it's a matter of timing. You think we could have done that in the first week or two, I guess. We think we are doing pretty good to be 60 days down the road and gone this far, so if you are frustrated with the timing of what we are doing, so be it. I can just tell you that the group is working very hard.

I think our ultimate goal is common. We intend to get your comments and factor that in. We intend to get the comments of the public.

The other thing I would like to ask, Lynnette, you mentioned that you think or at least NEI thinks that we ought to establish some interim criteria while we work through this process. In what regulatory framework would we do that?

MS. HENDRICKS: I would think that since you have been making these decisions on an ad hoc basis it's not a big stretch to codify them in guidance that would have the assurance to say that maybe the approach used in the two previous guides would likely be used on the next guide, but again, I think you have the opportunity to use risk insights at that phase even.

MR. RICHARDS: Well, no, that is not the question. You said we should establish interim guidance that we would apply to everybody. That implies in my mind rulemaking.

MS. HENDRICKS: A Standard Review Plan, a Regulatory Guide --

MR. MEISNER: NMSS uses what they call ISGs, Interim Staff Guidance.

ANN RILEY & ASSOCIATE

MR. RICHARDS: All right, but certainly none of that is for discrete issues. I mean we can crank out a Reg Guide, I guess, that would additionally have to go through the public review process, through your review process. One thing I would like to make clear is that your comment on establishing interim guidance is not something that we could put out on the table overnight and say, well here it is, and in the meantime we will go through the rulemaking process. It is simply not that easy.

MS. HENDRICKS: Well, this was actually a concept that came from I guess your direct predecessor, Stu, who suggested a Standard Review Plan. In fact, he suggested our assistance in helping to draft it. I mean that was put forward to us by the NRC, and so maybe we are still sort of in that mode, but as Mike says, it is often used in other areas.

MR. BARRETT: Are you talking about this within the context of the exemption process? Is that what you are saying?

MS. HENDRICKS: I am saying you make these decisions every day and if you think that you don't, those case by case decisions aren't viewed as adding requirements anyway. They certainly are. Some of them have been challenged and --

MR. BARRETT: I recall a case that may be relevant here, and that was when we were in the final stages of putting in place the alternate Appendix J rule. There was interim guidance on how to do exemptions, how to interpret 50.12 -- the exemption rule for the specific case of exemptions to Appendix J, in the interim while we were waiting for the rule to go through the process, so there may be some experience there that would allow some form of interim guidance to be developed. You know, we would have to go look at it and see if it is applicable here.

You have to meet 50.12 to get an exemption. And of course

ANN RILEY & ASSOCIATE

the 50.12 has a set of criteria in it, but what I think maybe you're asking for is more specific guidance on how to meet those criteria in this specific case. Perhaps that's --

MR. RICHARDS: I'd like to make one more comment in responding to Oyster Creek. You know, it's not in a procedure or something like that, but one thing we have done internally is we have made a commitment to ourselves, I've made a commitment to my boss, to work fairly hard with plants entering decommissioning to try and make the process as smooth as possible. I believe we came out and supported you in a meeting. We're certainly ready and willing to talk with you. We've been talking with the Zion people. We recognize that in the past maybe there were some issues we could have dealt with on a more timely basis on an individual plant basis.

I think within the Agency the decommissioning area has gotten a higher priority so that the decommissioning section is in a better position to respond more promptly. We've tried to work through the Maine Yankee backfit issues to put those to rest. And on a plant-by-plant basis, while we're working through this, we intend to continue to put a lot of energy into resolving these issues case by case. We don't like doing that either. We'd like to have it all packaged, put together and taken care of in a rule. But it's going to take time to get there.

You know, I'd like to get there just as fast as you would, but we have to follow the process, we have to have a sound technical basis, and we have to have the public input. And we appreciate, you know, your contribution in the future to help us get there.

MR. ZWOLINSKI: Correct me if I haven't understood the staff, but it sounds as if we've got an issue boxed, that is, we could essentially stop our efforts today and say after three or four or five years or some period of time, there's no more issues with these spent

ANN RILEY & ASSOCIATE

fuel pools. And we could put that as our basis for all of our rulemaking and switch gears.

But my understanding is the work that these folks have under way is to take that three years and keep working it backwards to whatever the right number may or may not be, 2 years, 1 year, 45 days, and I don't know what we're going to get to over the next few months, and with your input get to a defensible figure. In other words, I think that number can become a smaller or tighter figure that might fall more in the realm of what you find as acceptable vice maybe three years which you don't find acceptable. But I think the staff is more on the outside working its way towards a figure that might be smaller. And with inputs, working with you folks, many of the examples.

We've worked our way through some of these ourselves, and we -- do we have to, in going forward with a rulemaking, speak with one voice that there would be certain things available for one year and whether it's monitors for a pool level or it's operators' four-hour walk or control of a crane or some of these administrative issues, we need to put all that stuff in a box and put that as part of our statement of considerations, and thus we can essentially move forward with a rule with the underlying basis being after one year we can -- you can essentially have relief for EP or any of the other rules, for example. So it's to me we're never -- I don't see us going to zero, but what's the happy medium?

These folks are, you know, we're not on solid ground yet. They're telling us it's going to take us a little bit more time to get to a point where they feel they can engage and say here's many, many different scenarios that were evaluated, anybody can look at those scenarios.

With real-life contribution coming back, many of those scenarios may essentially wash. They may not become a tall tree. And

ANN RILEY & ASSOCIATE

we may indeed find ourselves with a technical foundation now which says in so many words we can go with a period of time and thus become totally predictable. And I think that still is our mantle as to be on the course to develop a rule, set a rule in which it's just totally predictable, and get us out of the rule -- or get us out of the day in and day out let's review amendments, exemptions, what have you. Let's just get the rules written right once.

So I can understand it's a little disappointing, but yet our end state hasn't changed from what we said in so many words back on March 17 to the Commission. I think you have to have one set of rules and do it right. It's a little tough that maybe the basis didn't work out as obviously as maybe some of us projected, but I also didn't have a lot of this information in front of us, and I need to let these folks work forward.

Now, there may have been a missed opportunity, as you said, with working with you closer, but I will say we need to allow the team to come up to speed and take a lot of ownership to their work. Maybe we can reevaluate does it make some sense to engage now rather than wait a couple of months until the product is essentially a draft product ready for anybody to take a look at. But you work yourself through a couple pages of discussion and you'll have the staff coming up with okay, this event as it currently stands has some probability.

Next paragraph may be from a generic plant perspective, not an individual plant, and I heard the Seabrook comment, I don't know how well it fits generically, that next paragraph to me is going to be your generic plant comment. And with these kinds of administrative controls or changes or whatever, all of a sudden you're going to drop this by two orders of magnitude. All of a sudden that issue's no longer on the plate. I mean, that's where I think a lot of this is going to go. I think Stu alluded to that earlier in the discussion today. Rich,

ANN RILEY & ASSOCIATE

correct me if I'm overstating where it looks like this has the potential to go.

I mean, that's kind of the direction that we're headed. We don't know if it's going to be one year, six months, or a year and a half today, but with your help, that will help forge whatever's the right number that would be technically justified. And I think that's the collegiality of the entire process, including stakeholders and the entire staff yourselves. So --

MR. MEISNER: Yes. I agree, I think.

MR. ZWOLINSKI: We got into a lot of depth in a lot of areas that I think we're all over a little bit. Bob, do you really need to do that? But if you took a -- when I personally took a step backward and I said it sure looks like we're trying to cross all the t's, dot all the i's, and do it one time. And this is that one time, at least from my perspective, that our senior management's looking for that one shot at it.

Now, will it meet the Commission's expectations, or did we miss a little bit? I think our goal is to deliver a product that says there's the technical basis for whatever rulemaking we want to make in going forward, especially the EP safeguards, indemnification, things of that sort.

What I'm hearing, this may take another couple or three months, but peer reviews and ensuring, you know, will withstand scrutiny from anybody and it's a totally open process is the goal.

MR. MEISNER: I think, you know, we've always agreed on the end state.

MR. ZWOLINSKI: Okay.

MR. MEISNER: I think we're simply talking about how do you get there.

MR. ZWOLINSKI: Okay. And I hear your comment about

ANN RILEY & ASSOCIATE

willingness to continue to interact and maybe interact in a different way than we have in the past. At least you've got a sense of some of the different areas that we've been looking into. You all may want to think about would there be a way for it to be appropriate, interact. We'll do some checking ourselves as to does it make sense to release some material to everybody so they see what we're talking about.

I'm not sure just assumptions all by themselves are credible. In other words, there's no context to them, but we can certainly look at that and we can look at maybe there's another way, maybe we don't issue the entire report, maybe we do it in chapters or whatever or by area of review. We can at least attempt to see if we can't be creative about getting something out on the street. If it falls into ten chapters or do you wait until you've got one chapter at the very end, that's something I'll ask the technical staff to look into or consider. And if we can meet to discuss on those and, you know, some things I'm sure are much further along than others.

The issue about the 120 days, how we're going to dismiss that. Do you all have a view already? There might be a generic view that you can share that essentially allows that to be much better defined and roll it back to 24 hours or even something less than that.

MS. HENDRICKS: I think specifically in regards to that, just sort of a caution is I don't think that even if you can take three years back to let's say ten months, I don't think that you're going to -- it's realistic to expect either the industry or even the Commission for that matter to look at the approach outside the context of the approach in general agency policy for risk-informing things. I mean, if anything, when this was first presented to us at our last meeting, it was viewed as an opportunity. I think Holahan said maybe it would be the first time we'd be able to do a completely risk-based regulation.

So to a certain extent I think you're going to run into some

expectations of seeing things in the proper context, that the type of approaches to risk-informing that are used in operating plants will not be inexplicably very different in the decommissioning. I mean, that's something that we'll be looking for.

MR. RICHARDS: We still see this as an opportunity. You've said many times that we've missed it. We see this as a process that we just haven't finished yet. We're not done. So, you know, maybe we won't get there as fast as you think is appropriate, but you ought to wait until we have an outcome before you judge whether we've got a product you think is appropriate or not.

MR. BARRETT: We arrived at these numbers, these risk numbers, using the best assumptions and the best information we had available. We're not interested in showing high risk numbers. We would much rather see low risk numbers and have an explicit justification for those low risk numbers.

And I think that by having this last defined and saying here are the types of initiators that could get you there and here are the types of sequence analyses that you would have to go through to figure out how likely those things are, we can then come back and -- you can come back and say here are the safeguards, here are the barriers, here are the things that lead us to believe that these are very, very low in probability, lower than what you've calculated, NRC, or perhaps even incredible for some of the scenarios.

Then we would have the basis for concluding that we can approve whatever it is that, you know, falls out of that analysis. And any stakeholder, whether it's a public interest group or a member of the public or someone living near one of these plants, can pick up this report and say here are the concerns the NRC raised based on their preliminary analysis, and here's how they were dispositioned by real things at the plants, that apply to all the plants, for instance, or

ANN RILEY & ASSOCIATE

real things that apply to this plant, other real things that apply to this plant. So we can understand where we are and how we got there and what we can expect of each other.

So I think I can understand your frustration with this, and I know that going back a few months you felt that there was a technical basis for being farther along today than where we are. But frankly we didn't set out to do a conservative analysis here. We set out to do the best analysis we know how to do, and we've got some very good PRA analysts, and they did it by the book, and to the extent that we missed the mark, I think that that can be informed by better information about what you actually have at the plants and what you intend to have at the plants in the future.

MS. ORDAZ: I just wanted to add, in this short period of time we just came to certain assumptions and preliminary results in the past couple of weeks, so this really is the first opportunity to share a lot of this information with you, and we continue to do that.

MR. KELLY: I wanted to take a second just to -- there were two things that came up and I wanted to make sure it was clear from our standpoint where we stood on them. One of them was the discussion about NUREG-1353 and about its -- I believe the way it is kind of portrayed, it should have been used as a base for making a decision about the decommissioned plants and the risks associated with their spent fuel pools.

1353 was particular to operating plants, and the reason why seismic stuck out for 1353 was that, being operating plants, they had all of these additional makeup systems, levels of defense-in-depth, additional margins in that which are not available at decommissioned plants today. We went back and looked at 1353. It had some useful information for us for decommissioned plants, but it wasn't adequate analysis for decommissioned plants.

ANN RILEY & ASSOCIATE

We went and looked at event trees and fault trees that had been performed for decommissioned plants, and looking at spent fuel pools, some work that was done by LLNL for us. We built it on that work and on the information that I got from making the plant site visits, because 1353 in and of itself does not provide you with the appropriate information for making any kind of decision at a decommissioned plant.

The information that we modeled in the PRA was based on positive as well as negative information. There are a lot of things there that I realized could have been much worse, but, for example, I was very happy with the kind of operator oversight that I saw at the decommissioned plants. We are happy with the way that they are monitoring levels which could have a lot worse. But what we did is we basically modeled what was there. Not what we wanted to be there, or thought could be there -- we modeled what was there.

We modeled the procedures. When I asked people about the procedures, their emergency procedures, they showed me. And based on that, I made my decisions about what kind of information would be available for the operators. When we went to quantify these human error rates, we didn't make up something from the point of view of, you know, giving no credit for the operator when there are no procedures. We used the traditional method that you use when you perform a PRA, and this is for all kinds of PRAs, that there is are no procedures, you get less credit or it is assumed that there is a higher probability of operator error than if you have procedures, step by step procedures.

We went through all of these things when we were performing our PRA because we tried to use the methodology the way it is ordinarily used, but we had to change it somewhat because the decommissioned plants aren't identical in many ways to operating plants.

And there was one other point that I wanted to bring up.

MR. MEISNER: Before you go on, let me just say you missed

ANN RILEY & ASSOCIATE

the point. I understand that, that there are design differences between 1353 plants and decommissioning plants. I brought this up specifically with respect to the seismic methodology, where we took that methodology and overlaid it with the Lawrence Livermore and EPRI data. You seem to have done something entirely different.

And my point was you have got a methodology that the staff has used in the past, why not stick with it? Why continue to come up with something new? It wasn't with respect to the other sequences.

MR. KELLY: Okay. There is particular reasons why we didn't do that, and it had to do because we weren't satisfied with the fragility analysis that had been performed on the pool. There were two generic pools that were evaluated, those were not actually even specific fragility analyses to pools, they were kind of generic analyses that were performed and we felt, in looking at them, that we did not believe that, in doing for analysis here, that we could rely on those particular values in their fragility analysis.

MR. MEISNER: And that was my point, every single thing that comes up, we do it newly, even though that information and approach was relied upon to make regulatory decisions some years ago.

MR. KELLY: It was -- right. But we are talking about a different type of decision here. The decision that was made there was dealing with backfits and the need for backfitting plants, and from that standpoint there was a certain level of confidence that was adequate in order to determine -- because if you are off by a factor of 2 or 4 or 5 or 10 on it, from the dollar amounts that you are going to have, it didn't make any difference. There still wasn't going to be enough money to make a backfit available. Therefore, it didn't -- wasn't important to you whether or not you got the number that close.

We are not in the same situation here. And because of that, we had to come up with an evaluation that we felt we are a little bit

ANN RILEY & ASSOCIATE

more comfortable with in determining, you know, what were the potential risks associated with a seismic and the spent fuel pools.

MR. MEISNER: But I disagree, we are in the same situation here. In my mind, it is still an open backfit issue that hasn't been resolved.

MR. KELLY: Well, when you come in for an exemption, that is not a backfit. There is a big difference between an exemption and a backfit.

MR. MEISNER: Well, that is something I know something about and we still have an appeal pending before the EDO. I don't think that is a closed issue at all.

MR. KELLY: Just one other point, someone else had made a point about saying that we are not giving any credit for operator action or that there is very little credit, or it sounds like, you know, that the operators are not doing anything in this one week period, 120 hours.

What we are saying is that 9,999 times out of 10,000, the operator is doing exactly what he should be doing, that they are mitigating this and they are taking care of all the things. We are saying that that one time out of 10,000, the operators don't do what needs to be done.

Now, you may quibble that that is not the right number. We don't think that that is an unreasonable number to take for a human error rate, and we understand the 120 hours, none of this is proceduralized. The plants don't have procedures for dealing with these kinds of problems. There are no action levels to tell them, when the water level gets to here, I do something. When this happens over here, I have got to something. There is none of that that is available. So it is basically the operators making ad hoc decisions, and it may be a great decision most of time. Maybe there are great decisions 9,999 out of 10,000. But that was the number that we came up with using the best

ANN RIL EY & ASS OCI ATE

information that we could come up with and some really good human reliability experts gave us those numbers, and gave us a good feeling about what was appropriate there.

So it is not like we are not giving any credit for the operators. We are assuming that these operators do it the vast, vast, vast majority of the time. Numerically, it still comes out several times 10 to the minus 6, and we feel that that this at this time, you know, absent additional information, that is an appropriate number.

MR. MEISNER: Understood.

MR. DUDLEY: Other comments?

MR. BAGCHI: Can I just update something on the seismic issue? In the NUREG, there was specific information about the 50 percentile value and the HCLI value, and we did not deviate from the NUREG. We did not neglect information that was presented in the last meeting. We went ahead and used pretty much what the seismic capacity was determined to be, or, in other words, it was about three to three-and-a-half times the SSC. In case of PWRs, it is a little higher; for BWRs, it is a little lower. But that is in the order of magnitude that the NUREG had determined.

We took that value, took that capacity to be around three times SSC and then we went to the same source of information, or, in other words, the Lawrence Livermore latest seismic frequency and used that number, and that was 2 times 10 to the minus 5 and then since it was a HCLI value, a very simple information was that it would be multiplied by .05, so it was 1 times 10 to the minus 6. We used the same kind of information.

We believe that if we do develop any kind of a guidance, we are going to say that before you come in for your amendment, make sure that your seismic capacity of the pool is of the order of three times SSC. That should be eminently feasible for most plants.

ANN RIL EY & ASS OCI ATE

MR. MEISNER: Again, the point is not did you use the same information, but did you use a new methodology that hadn't been used in 1353? And I think what we heard is yes.

MR. KELLY: And we have absolutely no problem with doing that, because we have -- there are many different ways that you can perform a PRA analysis, and depending on what it is that you are trying to do, or the level of sophistication, or the details of the number or the accuracy of the number, you are going to do different types of evaluations. A margins method versus a detailed seismic PRA, both can give you adequate information, or may not give you adequate information, depending on what the bottom line is that you are looking for.

In this case we felt that the particular methodology that we used gave us the type of information that we needed. If we had had detailed fragilities of spent fuel pools, we would have done a convolution with the hazard curves to come up with detailed risk numbers. We didn't have that information available, we didn't feel that we could get it in any type of reasonable timeframe, so we went ahead with the best information that we had, and with that information we weren't able to use the identical methodology that was in 1353. So we went with the best process that we could and that is where we ended up.

MR. MEISNER: But you understand the point, right?

MR. KELLY: I understand.

MR. MEISNER: If you are continually changing methodology, and you can never compare apples to apples, then --

MR. KELLY: But we don't see any reasons to compare it to 1353 because that was for operating reactors, it was providing us with something else. We were asked to provide --

MR. MEISNER: Not in the seismic area.

MR. KELLY: We were asked to provide a technical basis for making decisions about, in essence, what was the risk associated with

ANN RILEY & ASSOCIATE

spent fuel pool. And I might have chosen any one of a number of methodologies, all of which would provide me with a pretty accurate number, and I can use that for determining what kind of risk I am getting from seismic or something like that. We chose the one that we did because it worked best with the information that we had available. If we had different information, we might have chosen a different methodology.

MR. MEISNER: I mean we can go around and around about this, but the fact remains that the staff does not maintain consistency from one week to the next in just about any technical issue associated with decommissioning. And it gives the industry absolutely no stability.

I am going to give you an example. Doing these zirc fire analyses, you know, for a while the staff was pushing -- do your own, use the SHARP Code. I understand now you won't even accept the SHARP Code. You can't keep changing things. You have to have some consistency from day to day, else there is no stability in the industry. And when you keep doing it newly from scratch every single time, we get into these situations like we are where, rather than having a three to six month effort, you are talking about a two to three year effort.

It is unwarranted, particularly when up to this point, until you started doing it from scratch again, the only issue of concern was zirc fire. We could have simply disposed of that and moved on. Instead we have sequences that have been examined in the past and found acceptable overlaid with uncertainty as to what are the procedures or what is the design. So we are doing it all over again.

MR. KELLY: Well, we would have no problems if the decommissioned plants looked identical to the operating plants and had all of the equipment, the RHR system, emergency diesel generators and all of the other things that were there in 1353, but they are not there. And when we model it, we are not going to model it as if all of this

equipment is there. It is simply not there.

MR. MEISNER: All right. I understand that. But what you can do is model --

MR. KELLY: I don't understand why you keep saying to use 1353 when 1353 has nothing to do with decommissioned plants.

MR. MEISNER: You are missing the point. It has to do with seismic. Seismic was the issue if you go back a few months.

MR. KELLY: Right. It was the issue because the other plants are operating plants. These are not operating plants. Seismic is only a little minor contributor here because there are other things, because you have an entire -- it is like I have this plant over here that is designed this way and have this plant that is designed over there this way. You want to take this plant and say do this analysis and just do that, and only look at the problems over here, forget about how this plant is designed. Well, this plant is designed entirely differently. You have to look at how this plant is designed, do a risk assessment for this plant. This plant is not applicable to this plant over here.

MR. MEISNER: Got it. But it is for seismic.

MR. RONE: I think what you are hearing is an awful lot of frustration on our part on this.

MR. MEISNER: We can't ever pin the NRC down, that is the problem. You know, you can come up with a new analysis tomorrow, done a different way, and say, oh, this is better than that. You have to at some point say, I am going to stick with my previous staff decisions.

MR. RICHARDS: And when we get it codified, Mike, we will have to do that. That is why we are trying to get it all packaged, put into a rule. And you will admit, I think, that once it is in a rule, then we have to apply the backfit process in order to go against whatever is in the rule, right?

ANN RILEY & ASSOCIATE

MR. MEISNER: Right. But the way I read the regulations, Stu, is you have to do that now anyway for any staff position. You can't willy-nilly change them as you go along because you prefer not to do -- prefer to do something different. Whether it is rulemaking or not, the standard is, have you changed the staff position? It is not, are you going to rulemaking?

MR. RICHARDS: All right. But you are taking us to the backfit argument about how do we deal with exemptions. And, like you said, that is still before the EDO, so I don't think we need to get into that.

MR. RONE: I don't think we disagree with going to rulemaking on this. In fact, we would say that that is the right direction to go, is to go to rulemaking on this. But I think we are coming at it from two different perspectives. In order for us to set the framework for what the rule should be, you have to agree upon what is the credible accidents, what do you need to deal with in the decommissioning environment. And that is where the disagreement is.

You know, the utilities, at least the ones in the decommissioning working group, believe that zirc fire and spending money, not a few bucks, but literally millions of dollars a year to maintain a security plan, insurance indemnification, security, all those issues associated with zirc fire that you have to deal with, is a poor choice of where to spend money in a decommissioning environment.

We believe the probability is sufficiently low that we need not consider it. Okay. So, you know, that is kind of the difference. The staff was of a position that, yes, zirc fire is credible and you need to consider it. The industry was, no, that it is not.

We start looking at -- well, okay, how can we do this on a plant-specific basis? We pick an analytical tool, at your recommendation, the SHARP Code. We do the analysis and it says zirc

fire window for Oyster Creek is three-and-a-half months. Okay. Well, can I live with three-and-a-half months? Yeah, I can live with three-and-a-half months.

When it comes down to specifics, we hear that the SHARP Code is no longer accepted by NRC. And, in fact, there is no suitable analytical tool which is available to us to do a plant-specific analysis. So now we are dropping back to using, you know, kind of deterministic approaches. And I would presume that some of this kind of thinking went into your coming up with the two years for boiler and two-and-a-half years for pressurized water reactor, adding additional conservatisms to account for uncertainties that are in the code.

So what that does is that stretches out the zirc fire window. It stretches out the period of time we need emergency preparedness, higher levels of insurance indemnification, and so on. And what was a few million is now $5 or $10 million, and it is all based upon something that we don't believe is credible in the first place. And what you are hearing from us is a lot of frustration around this. We are going to spend a lot of money and a lot of time dealing with things that we don't think are credible. And not only do we think that they are not credible, we think they are not credible by inspection, that there is enough already on the docket in order for the staff to conclude that zirc fire is of such a low magnitude of probability that it need not be considered.

Those are two different opinions. I mean your job is to thoroughly research this thing, to do your own independent assessment, which is what you are doing, and we would applaud you in doing that. In fact, I think it is terrific what you have done with the technical working group and the focus and the emphasis that this has gotten so far.

And the specific points that we have brought out, I think we

ANN RILEY & ASSOCIATE

would offer again the opportunity to work with the staff in providing answers, in providing insight, in providing more detail in the areas where you have insufficient information to have a conclusion around human error rates, for example.

I would again extend the offer for us to help in this, and appreciate that we're going through a process and that there are different opinions and different points of view, and at this point it's difficult to say which is the right one.

MR. RICHARDS: All right. Well said.

Anything else?

MR. DUDLEY: Okay. I guess we're to the public comment and question period. Mr. Atherton, you've signed up -- and Mr. Shadis.

Okay, Ray, I'll let you go first, and then Peter will follow up.

MR. SHADIS: Thank you. Ray Shadis.

I'll try to make this brief. I appreciate the difficulty of trying to resolve two points of view here. I've heard that the probabilities really don't matter because if you look at the consequences, the consequences are inconsequential, that there's no way you can have a release to trigger EPA action levels off-site. That's what I heard from this side of the table very early on this morning.

The question is in terms of precautions, in terms of those things which are in the regulations, a lot of these probabilities can get kicked around an order of magnitude or more without changing the requirements for vigilance. If there are consequences off-site that have to be dealt with, then from the public perspective, whether the risk is 10 to the minus 6 or 10 to the minus 7 really doesn't matter a heck of a lot. And I think we have some reservations too. Although it's laudable to get the input that you can get from the industry, we do have reservations about how closely NEI engages NRC staff in working on

ANN RILEY & ASSOCIATE

joint projects, if that's what it's to become.

I personally have worked on enough joint projects to know that it never really comes out the way I intended it to from the beginning. So from the public perspective and especially from the activist perspective, we're very leery of seeing a, if you will, just a joint project go forward without having the public there to be looking over everyone's shoulder.

One thing that was missing --

MR. ZWOLINSKI: Now you understand, Mr. Shadis, that the NEI position doesn't conflict with the NRC position other than the amount of time. In other words, we're not -- we can't agree with the NEI position today. We would say it's much more topping that you need before the pool becomes essentially benign.

MR. SHADIS: Well, you're talking about is there a fire window or something?

MR. ZWOLINSKI: Right.

MR. SHADIS: I understand that difference, but I --

MR. ZWOLINSKI: And that's what we were wrestling across most of the discussion.

MR. SHADIS: Yes, sir. It was one of those things.

MR. ZWOLINSKI: Okay.

MR. SHADIS: One of those things. But only one. And, you know, and if we're talking about issues involving personnel and whether they're going to quickly take action or whatever, I don't know how many of you recall an incident at Indian Point where the containment was flooded. I don't remember the exact numbers, but I'm thinking it was two or three days before it was discovered that it was filling, and we had like 12 feet of water in there, something like that. That was in the early to mid-eighties.

That's a scene where you would say where was everybody, you

ANNRILEY & ASSOCIATE

know. Where were the auxiliary operators? Didn't anybody look? Weren't there -- you know, wasn't there any indicator? And, no, there wasn't, and the scene went on. So from a layman's perspective, from a public perspective, we see some of these scenarios as they stretch out, and the inability of operators and licensees to take action as credible and important.

One thing that I have been missing in all of these discussions is any discussion regarding radiological sabotage or however you term it safeguards wherever it may come. And I understand that particulars can't necessarily be discussed in a public forum. But certainly if you're trying to risk-inform something, there needs to be some way that that has to come across more than just a heading in an outline. I think from a public perspective we would like to be reassured that this is being considered and being adequately considered.

MR. KELLY: Can I say something?

MR. SHADIS: Sure.

MR. KELLY: From a risk perspective, it's not a simple matter to try to determine what's the chance of having an act of sabotage in a nuclear powerplant. That type of work has been done for military facilities. We don't traditionally do that for the nuclear powerplants themselves.

What we have thought about and what we're considering doing is preparing a list of equipment that we feel is the most significant equipment and provide that information to the safeguards people so that they can in turn make a determination about how they feel that equipment should be guarded. So we'll make them aware of the equipment that we felt was most important, and in turn they can decide, you know, what measures they feel are appropriate for it.

MR. RICHARDS: Mr. Shadis, I'd just like to tell you that the security people, I don't think they're represented here today, but

ANN RILEY & ASSOCIATE

they are engaged in the issue, and it does involve, as you said, safeguards information.

MR. SHADIS: Well, you know, I wanted to make the point that from our perspective that that particular threat, if you will, needs to be more directly focused on, so that we can hear and see something of it.

This is going to Mr. Huffman's outline, but the notion of bundling -- and it goes just beyond the three items that we have on the table -- but the notion of bundling these regulations we spoke about before and heartily approve of that, bringing all the decommissioning regulations together in one place where they can be found, seen, worked with. But it also opens the way, I think, to consideration of bundling the applications, if you will, rather than having a licensee come in and hand you a stack of requests for exemptions or whatever they may be.

There really ought to be an application that says we're in phase 1 of decommissioning and here are all the technical details related to our operation, here is a detailed plan of how we intend to use our resources, and that that form part of an application. We'd also like to see that worked into the public process so that, you know, there is an accountability there to the public to see that all of the issues in those bundled regulations are addressed. An opportunity to intervene would not hurt at that point.

It would be good to see that process formalized. Right now you have this PSDAR, which I don't know if it tells the NRC anything, but it doesn't tell the public anything. And it may be a general game plan for the licensee, but that particular little application could be expanded to include Phase 1 of decommissioning and could address most of these issues, should and could be addressed in that initial application. But, you know, and then I say this at the risk of having that be something that can fly past us. I do think it needs to be formal, and I

ANN RILEY & ASSOCIATE

do think it needs to provide the opportunity for intervention, so that the licensee's representations in that application can undergo the tests of truth in the public arena.

MR. ZWOLINSKI: I'm not sure how the ultimate packaging will take place in that final regard, but as we go through with the advance notice of proposed rulemaking, that would be an excellent area or opportunity window to craft a comment along the lines of what you've just suggested, and perhaps the PSDAR should have additional milestones as to when licensees would take advantage of certain rules that they essentially would not be required to adhere to any longer.

If, for example, the rule that we promulgated was to give licensees relief of EP after let's say hypothetically one year, if they want to take advantage of that, they might say so in the PSDAR. That would be -- the NPR would be a good place to talk about that.

MR. SHADIS: Okay. I think that's all I have at this point.

MR. ZWOLINSKI: But if you have any additional thoughts on the process and packaging and its own part, and what we're trying to do is work through all the appropriate rules and regs so we really are clear on what belongs in decommissioning. We think that allows everyone to know the ground rules, predictable to the industry. I trust the public would feel much more informed and knowledgeable. Here's what applies and what does not apply. And there's some gray areas that we have identified that we want to work our way through.

MR. SHADIS: I think that we've all seen the difficulty in transition from operating status to decommissioning status.

MR. ZWOLINSKI: Yes.

MR. SHADIS: And, you know, and if public confidence is indeed a goal, then the series of episodes that we had, for example, at Connecticut Yankee, which are fairly well documented, everybody's pretty much familiar with what happened down there.

ANN RIL EY & ASS OCI ATE

MR. ZWOLINSKI: Yes, sir.

MR. SHADIS: You know, that may well have been avoided. If there was a hurry-up/slow kind of process where that company was required to step back, formulate a detailed plan for what they were going to do, provide all the specifics, go through some sort of permitting, if you will, if not licensing process, a permitting process of some kind, permitting -- allowing the public, really, to have input and scrutiny of it, we might not have had that series of incidents.

MR. ZWOLINSKI: Hindsight's 20/20.

MR. SHADIS: There it is.

MR. ZWOLINSKI: No, and that's the challenge for the staff in going forward, working with all of our stakeholders. This stuff has to make sense, and we have to be able to defend what we're doing, what our rules are, and I trust the public needs to be able to understand what they're --

MR. SHADIS: Well, and as much as I sympathize with the NEI's stated position that they would like to have some security in this, they'd like to have some consistency and so on, but let me tell you that from a public advocate's point of view, it's even a little more weird to try to deal through a constantly shifting regulatory scene.

MR. ZWOLINSKI: Thank you for your comments.

MR. DUDLEY: Mr. Atherton, you had additional comments.

MR. ATHERTON: Okay. My name is Peter James Atherton again. I would like to start by asking was there -- they had a second meeting that I was knowledgeable of last month in May, May 5th, and this was held on the eighth floor of the other building, if I recall correctly.

MR. DUDLEY: Yes.

MR. ATHERTON: And was there a transcript or was there a summary?

MR. DUDLEY: There was not a transcript but there was a

meeting summary that was issued.

MR. ATHERTON: Okay, I wasn't privy to that. I don't have a copy of it, so --

MR. DUDLEY: Okay. I believe I have your address. You use a post office box?

MR. ATHERTON: Yes.

MR. DUDLEY: Okay, I'll make sure a copy of that meeting summary is sent to you.

MR. ATHERTON: Well, part of the meeting summary or the brunt of the meeting summary had to do with Mr. Holahan discussing the technical working group's mission and he provided a technical basis outline which seemed to effectively bound all the problems that they anticipated encountering.

MR. RICHARDS: You are talking about the list of scenarios that were going to be reviewed?

MR. DUDLEY: That was at the May 5th meeting.

MR. ATHERTON: This was the May 5th meeting. The title of this is the Technical Working Group Mission Statement, followed by a three-page outline called Working Group Technical Basis Outline.

MR. DUDLEY: Okay.

MR. ATHERTON: What I haven't seen, and that may be because you haven't gotten to it, is somebody following this outline and making a presentation today concerning where it is you are and what it is you are doing, for the most part.

MS. ORDAZ: That is a work-in-progress document that Mr. Holahan went through at the meeting and a lot of those items will be covered in the report that we issue in August that will be out for comment for everybody to take a look at and give us feedback on.

What we were doing today is giving you some highlights on our very preliminary results instead of going through all the level of

ANN RILEY & ASSOCIATE

detail in the outline.

MR. ATHERTON: Okay. I was just -- I could not follow the presentation from the outline. In other words, there were areas that were not effectively addressed there like the criticality issue, which -- I am representing this from the perspective of someone out in the public near a nuclear power plant, and he primary concern is going to be not how the plant is being taken care of, not how strong the walls are, but whether or not there is any possibility that he might get zapped with some radiation, so I start from whether he can zapped with radiation and go back into the spent fuel pool arena and ask what are the possible scenarios that would release radiation to the environment.

The criticality issue, from my point of view, was addressed somewhat superficially and in my opinion very patronizingly, and not in any technical depth at all.

There was no organized method of how they were going to approach the potential for criticality and the potential for release of radiation. This does not appear to have been taken into account in any serious manner, from my point of view, and I look at this and if somebody in or around the nuclear power plant asked me what is the possibility of us getting zapped from any kind of an incident at a spent fuel pool, and I can't tell them that they have taken into account everything that I figure should be accounted for.

The criticality issue, in my mind, needs to be addressed.

MR. RICHARDS: Mr. Atherton? We have heard that comment I think going all the way back to the first of the three meetings. The technical working group has that on their list. Rather than try and --

MR. ATHERTON: Okay.

MR. RICHARDS: -- do that on an ad hoc basis here today, which I think you are alluding to from this morning, I would ask that you wait until we issue the draft report and see if you could comment on

ANN RILEY & ASSOCIATE

it at that time, because it should be addressed then. In that way it won't be an off-the-cuff presentation to you.

MR. ATHERTON: Okay. I will move on then.

There has been talk about offsite power loss as a possibility. There has been talk about electric power buses not meeting operating redundancy requirements and possibly qualification requirements. I was wondering is there anybody in the instrumentation electrical power arena who is involved in this to present some information concerning why we don't have simply redundancy, why equipment qualification isn't important, and why we appear to be relying upon operator action.

I am saying this from the perspective of an operating nuclear power plant where there are a lot of automated systems which automatically take place under certain scenarios that are postulated. That is what I am used to, and I am not seeing this in the spent fuel pool arena.

MR. RICHARDS: All right. Why don't we take that comment, too, on the record and we will see if we can respond to you at the draft report.

MR. ATHERTON: The seismic issue, for instance from the operating side of the fence, general design criterion two of 10 CFR 50, Appendix A, which is the general design criteria for nuclear power plants, permits a single failure coupled with an event, and everything that is not qualified or not designed to function involving those two systems, those two incidents simultaneously occurring would not be functional in the deterministic approach to the design of nuclear power plants from a safety perspective.

Looking at it from that point of view in the spent fuel pool arena, taking a seismic event coupled with a single failure, we don't have electric power, we don't have probably pump operations. We don't

ANN RILEY & ASSOCIATE

have a lot of things that we would like to have in this sort of a scenario and I haven't seen any criteria which would specify, maybe with the exception of an occasional tech spec, which would specify why automated operation or equipment qualification of at least one item of equipment would not be functional either to be operated manually or automatically in the event of some design basis situation that you can come up with.

I haven't heard anything in the last three sessions, included today, that I have been to over the last three months, that addressed this scenario and I was curious as to what the criteria involving the spent fuel pool would be in this particular arena. I say this in view of the fact that in the operating side of the fence we have a containment -- I have said this before -- we have a reactor coolant system which is designed not to fail. In the event that it fails, we have engineered safety features to help mitigate the consequences of the accident.

As a last resort in this defense-in-depth concept we have a containment building capable of holding everything that does escape into the environment within the containment within I presume certain leakage rate design requirements. We don't have the equivalent of that around the spent fuel pool and is there a philosophical approach which says, hey, we might start thinking about a containment structure around the spent fuel pool? If not, why not? Are you looking into these types of possibilities?

MR. ZWOLINSKI: Well, you took your thought just one step too far. You were right on the mark until you started getting into modifications of the plant. The question on the table that the Staff is challenged with working with the industry is how long can the industry operate their facility in the decommissioning mode with redundant equipment in place, redundant electrical, fluid systems, whatever, and

ANN RIL EY & ASS OCI ATE

then at what period in time -- six months, eight months, a year, can the licensee begin to take equipment out of service and remove it from the facility -- In other word remove diesel generators, remove large cooling pumps, remove piping systems, so it is that -- I see that as an issue.

When those systems are there, it changes our probabilistic analysis numbers considerably It's when we went out and took a look at some plants and found a lot of that equipment was gone, we double-checked and found that these pools were in fact quite old and were not going to be a risk to the general health and safety of the public, but in the near term when they have the potential to be a risk, Zion, Millstone 1, other plants that have recently shut down prematurely have redundant equipment available and their pools get cooler and cooler as days go by. Of course the iodine is gone.

MR. RICHARDS: In any event, as I think you have probably heard several times today, zircalloy fire in the spent fuel pool is outside the design basis of the original plant and in any case, you know, by any argument I think is a relatively low probability event.

You are asking I think the same question the industry is -- what is the criteria here to go forward. We're trying to put this into a risk perspective, hopefully for the final time, to go forward.

MR. ATHERTON: If I could produce some insight, in the 1970s when I worked with the Nuclear Regulatory Commission a spent fuel pool was not considered as part of this overall operation as I understood it, because the fuel would not be there very long. It was going into a recycling program.

Now after I left, the recycling program was killed and you had to look at the spent fuel pool from a different point of view, and the question I have is what point of view are you looking at it from, you know, from an overall perspective.

What occurred in the '70s for most of the nuclear power

ANN RILEY & ASSOCIATE

plants that are on-line today is the design requirements there changed once the recycling program was terminated -- fuel recycling program.

MR. ZWOLINSKI: I am not aware of that K-effective change.

MR. ATHERTON: I didn't say K-effective.

MR. ZWOLINSKI: It was in our standard review plan. It was issued in '74. The seismic design of these pools were in the standard review plan of '74.

Now one of the things that occurred was with the national policy evolving, there was the change that more fuel ended up being stored in these spent fuel pits -- the reracking issue -- and thus far more fuel has been stored in these pools than originally anticipated, but each one of those license amendments has gone through independent analysis and very close scrutiny by the Staff prior to approval.

I think the first one that I recall, Big Rock, in '84 went to hearing and thus has this whole matter of expansion of the spent fuel pit through a reracking methodology has become a very common undertaking for the industry, and I am not aware of any new or different safety issues at all that have not been thoroughly evaluated by the Staff over the last 15 years of examining reracks.

MR. ATHERTON: You just admitted then that there was a design change requirement as a result of the fact that the spent fuel pool had to store more fuel than it was probably originally designed --

MR. ZWOLINSKI: In some cases spent fuel pool cooling systems were modified slightly, racks were changed, but ultimately seismic criteria, design criteria were all in line with the licensing basis of the plant. The Staff was able to make an independent finding from the licensee that it was safe to operate with the additional fuel pit.

Those licensees that are operating today have all been reviewed and approved.

ANN RILEY & ASSOCIATE

MR. ATHERTON: This takes into account the problems we are talking about today. I guess the only real one we have talked about is the zirc fire.

MR. ZWOLINSKI: The Staff prefaced the comments at the beginning of the meeting that we are not talking about operating reactors. We are talking about facilities in a shutdown condition, essentially de-fueled and in a decommissioned state.

MR. ATHERTON: The question I had was when they considered the reracking to accommodate more spent fuel --

MR. ZWOLINSKI: Yes.

MR. ATHERTON: -- did they consider the problems that we are now looking into as possible causes of a radiation release. When did zirc fire become an issue?

MR. ZWOLINSKI: It's always been K-effective but --

MR. KELLY: The reracks primarily looking, assuring that you had adequate K-effective and assuring that the spent fuel pool cooling systems were capable of handling the increased heat loads.

MR. ATHERTON: But that meant as I understand it, for the most part, bringing fuel closer together with some kind of -- what is it, a boral? -- or some sort of a neutron blanket --

MR. KELLY: Right.

MR. ATHERTON: -- between them.

MR. KELLY: Right.

MR. ATHERTON: It could be the additional density.

MR. RICHARDS: Mr. Atherton, do you have a copy of NUREG-1353?

MR. ATHERTON: I sure don't, not with me..

MR. RICHARDS: Perhaps we can send you a copy of that. There was a generic safety issue that had to do with operating reactors and the risk that the spent fuel pool posed to operating reactors. The

ANN RILEY & ASSOCIATE

NUREG is the disposition that has been alluded to quite a bit here today. Maybe we can answer your question by providing you with a copy of that, and then if you would like to call us and talk about it, we can do that.

MR. ZWOLINSKI: That also introduces the zircalloy fire phenomena --

MR. RICHARDS: Yes.

MR. ZWOLINSKI: That is the primary topic of that. It was resolved in that generic issue.

MR. DUDLEY: For operating plants.

MR. ATHERTON: What I am suggesting is that designing or redesigning something after something is built did not take into account the problems that might be encountered should you have taken that same situation back during the design phases and made a different perspective of it.

For instance, the potential for radiation release, ultimately, just what I am trying to represent at this point in time.

MR. RICHARDS: We hear your comment, but I disagree with your conclusion. I think it was analyzed, and I think Mr. Zwolinski indicated that as part of the reracking, there was a lot of engineering work done. And, furthermore, this beyond design basis event was reviewed in this NUREG that we will send you that describes what the potential for releases basically amounted to.

MR. ATHERTON: Okay. And I will continue down the list here. In this reracking, the qualification of the new racks were designed to meet -- to last how long?

MR. RICHARDS: Mr. Atherton, we don't want to go into a dialogue of reracking. This is really a dialogue on decommissioning. You know, we would certainly welcome your comments if you want to provide that to us offline. But that is not the issue today.

ANN RILEY & ASSOCIATE

MR. ATHERTON: It had to do with, say, the qualification of the structure itself.

MR. RICHARDS: Without getting into a lot of detail, we have already told you that the reracking of spent fuel pools was a seismic undertaking. So unless you have a specific concern, we can talk about it separately as far as reracking not meeting some criteria.

MR. ATHERTON: What about its qualification --

MR. RICHARDS: I think we need to move on in the decommissioning area.

MR. ATHERTON: What about its qualification to last in the spent fuel pool over a certain period of time?

MR. RICHARDS: Well, again, you know, we have had people get up and talk about the fact that our general experience is that this equipment does not degrade, there are surveillance requirements with the spent fuel pool racks. Unless you have a specific technical issue to ask us, generally, what about aging of the equipment, that is difficult for us to deal with. Do you have a question related to the discussion on decommissioning that we are talking about today?

MR. ATHERTON: Well, I would like to make a constructive suggestion. Lynnette, I guess it was, had suggested some sort of interim standard from NRC concerning how industry should approach their decommissioning. The techniques used back in the 1970s with the establishment, beginning at the branch level, of branch technical positions, before they were ever made into Reg. Guides, and it was, you know, well digested within the branch before the position was taken, and then the branch took that position and industry knew about it. And this, again, was before a Reg. Guide was issued or before it went even further beyond that. And I am wondering, have things changed in some 20-25 years such that these types of things don't exist anymore? Is a branch capable of coming forth with a branch technical position on an

interim basis?

MR. BARRETT: What was changed in the last 25 years I think -- branches are still capable of coming forward with branch technical positions. But the agency has evolved into more of a position wherein any time we change a position or establish a position, we try to make it a more open process now, so that it becomes more difficult and more time-consuming to develop a technical position. You can still do it, and I am sure there is a threshold for that sort of thing, but for anything of substance, anything that has substantive impact potentially on public health and safety, it tends to be a more open process.

MR. ATHERTON: Okay.

MS. ORDAZ: And that would include the ACRS and possibly the CRGR, so that is more of a lengthy process than a near-term.

MR. BARRETT: That is not to say it can't be done, but it is not as -- it is more open now and more difficult.

MR. ATHERTON: For instance, I would have a question concerning the assumptions made for -- was it the PRAs, a three page list of assumptions that you said would be available in August? If the assumptions are being used today, why not make at least that available without, you know, the end result before August.

MR. BARRETT: Those assumptions were used in this preliminary analysis, which is not being used today. We specifically do not plan to use this analysis in any regulatory decisions until we have had the benefit of independent technical review and stakeholder interactions.

MR. RICHARDS: Mr. Atherton, could I ask how long a list you have? You have had about -- I think between this morning and this afternoon, about an hour of our time.

MR. ATHERTON: I have one other question then.

MR. RICHARDS: Okay.

ANN RILEY & ASSOCIATE

MR. ATHERTON: I will move on. Several utilities have sued the federal government, I think it is primarily the Department of Energy, concerning the Department of Energy's not complying timely with removing spent fuel from their spent fuel pools. To the extent that this impacts NRC's obligations in regulating decommissioning, to what degree does NRC find itself legally in a conflict of interest situation? Being the federal government regulating spent fuel pools, utilities have no place to put their spent fuel except in their spent fuel pools, not at some permanent or even temporary waste storage site. How is NRC impacted legally by these extracurricular happenings?

MR. RICHARDS: I can't answer that question, we don't have anybody from our Office of General Counsel here today. If you want to talk offline, we can see about getting you an answer. Anything else today, Mr. Atherton?

MR. ATHERTON: Well, if I could go one more step, Lynnette, or I guess NEI --

MR. RICHARDS: Is this your last question then today?

MR. ATHERTON: This is my last.

MR. RICHARDS: Other than this, I would like to talk to you separately, and we will get your concerns.

MR. ATHERTON: Okay. NEI had pushed for a reasonable approach to the accident scenario, I guess for PRA purposes, versus contemplating the worst case situation. In design of nuclear power plants, we always used the worst case, found out what that was like and then moderated it if we felt that it was appropriate to do so. How does NRC feel about this approach to resolving the decommissioning problem?

MR. BARRETT: What we do, Mr. Atherton, is we still use that approach for defining the design basis of equipment, for the so-called design basis accidents, design basis events. That is not the way we approach probabilistic risk assessment, though. What we do in

probabilistic risk assessment is we look at a whole spectrum of accidents from ones that are the most limiting, and presumably less likely, to those that are less limiting, and presumably more likely, and we try to examine the frequencies with that whole spectrum of accidents happen, and the consequences. And then it is that combination of frequency and consequences that tells us ultimately what types of accidents are the ones that are the biggest contributors to risk.

Now, we have got 25 years of experience in analyzing the kinds of accidents that are most -- that are the biggest contributors to the risk of operating a nuclear power reactor, either a BWR or a PWR. But we are in a little bit of unfamiliar territory here in analyzing what types of accidents and initiators are the most important contributors to this particular phenomenon for a decommissioned nuclear power plant. But we look at the spectrum, and for the spectrum of possibilities, we look at their frequencies and their consequences, and it is the product of those two figures that give us the figure of merit we are interested in, which we call risk. That is how we define risk.

MR. ZWOLINSKI: Going back 25 years ago, if you want to use the vernacular, the agency has always used the reasonable assurance standard, not the absolute assurance standard. And we continue to use, in this case, a risk-informed reasonableness test, not an absolute test.

MR. BARRETT: If I could use an example, I don't know when you left the agency, but I am sure you know that large break double-ended guillotine LOCA is the limiting LOCA for a lot of purposes. When we do PRAs, we find out, yes, indeed, it is a limiting accident, but it is not the dominant risk accident because of the low frequency of it, and because of all the mitigating systems that have been put into the plant to deal with it. Other accidents which are much less limiting turn out to be the ones that dominate risk.

MR. ATHERTON: However, the industry was required to design

ANN RILEY & ASSOCIATE

their safety systems on the basis of this.

MR. BARRETT: That's right. And we still have this duality.

MR. ATHERTON: But we have, you know, --

MR. BARRETT: We have this duality, we design equipment in accordance with these more limiting accidents. We analyze risk in terms more of realistic accidents.

I am sorry, maybe I am not addressing your question.

MR. RICHARDS: Mr. Atherton, in the interest of time, can we talk separately offline then?

MR. ATHERTON: Okay.

MR. RICHARDS: For the rest of your comments. We would appreciate that.

MR. ATHERTON: I thank you very much for letting me speak.

MR. RICHARDS: Thank you.

NEI have any closing comments?

MR. MEISNER: I would like to go back to a question we asked earlier, and that is, what do you see this SECY or document, June 18th, to consist of?

MR. RICHARDS: We see it as being basically an update to the Commission as to what we have accomplished to date, laying out the schedules for what we intend to do in the future.

MR. MEISNER: Would you characterize it more as a plan as opposed to technical information?

MR. RICHARDS: Yes.

MR. ZWOLINSKI: Hadn't we considered approaching the Commission with the phased approach and suggesting or possibly recommending a section that should have the decommissioning all put into one? I think some of the process issues that you heard Bill Huffman go through, much of that we were going to try to put in as process, and to the technical working group, that was going to be far more succinct, to

ANN RILEY & ASSOCIATE

be more of a status overview of here is what is going on.

MR. MEISNER: Yeah, I guess I was most concerned with the Commission won't see any of these assumptions, for instance.

MR. RICHARDS: We don't think it is appropriate to bring the product to the Commission because it is not a done product. Like John said, on the process side, we feel more comfortable sending a proposal up to the Commission asking -- or seeking their approval to go forward. So, no, we don't anticipate giving the Commission a lot of detail on what has been done today on the technical working group.

Other comments or questions? John?

MR. ZWOLINSKI: Thanks, but I think the long hand on the wall is starting to press us for time.

Thank you very much for your attendance today. I think it is important that we continue to meet and we will back in touch as to what would be appropriate as to the next meeting and just go from there.

MR. DUDLEY: Okay. With that, we will adjourn the meeting.

[Whereupon, at 2:58 p.m., the meeting was concluded.]

ANN
RIL
EY
&
ASS
OCI
ATE