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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

483RD MEETING

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JUNE 8, 2001

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ROCKVILLE, MARYLAND

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The Committee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B3, 11545 Rockville Pike, at 9:00 a.m., Mario V. Bonaca, Vice Chairman, presiding.

COMMITTEE MEMBERS PRESENT:

MARIO V. BONACA	Vice Chairman
F. PETER FORD	Member
THOMAS S. KRESS	Member
GRAHAM M. LEITCH	Member
DANA A. POWERS	Member
WILLIAM J. SHACK	Member
JOHN D. SIEBER	Member
ROBERT. E. UHRIG	Member
GRAHAM B. WALLIS	Member

COMMISSIONER PRESENT:

GRETA J. DICUS

ACRS STAFF PRESENT:

SAM DURAISWAMY

ROBERT ELLIOT

CAROL A. HARRIS

JOHN T. LARKINS

HOWARD J. LARSON

JAMES E. LYONS

I N D E X

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

(8:55 a.m.)

VICE CHAIRMAN BONACA: It is a great pleasure to welcome Commissioner Dicus who is here today to discuss some items of mutual interest. We understand that first you have some remarks to make and then after that we will open the floor for discussion. So without much ado, I will turn the meeting to you.

MEMBER KRESS: George wanted me to remind you that he's really sorry he couldn't be here.

COMMISSIONER DICUS: I spoke to him yesterday. His daughter is graduating today.

MEMBER KRESS: That takes priority over anything.

COMMISSIONER DICUS: That absolutely takes priority over everything.

I really don't have any prepared opening comments other than I do very much appreciate the opportunity to come down and discuss whatever items that you have on your mind that you first -- well, hello.

MEMBER POWERS: Hi.

COMMISSIONER DICUS: I didn't think you would make it.

MEMBER POWERS: We were in discussing plans to handle the steam generator tube probe problem in the future and we snuck in a quick briefing here.

COMMISSIONER DICUS: Very good. You had prepared and I had met with Dr. Apostalakis earlier and did you have something in particular in mind you wanted to talk about, what was the particular interest that the Advisory Committee had and he brought in an outline of some topics to go over, so those are the topics that I think we might be interested in discussing.

If you had a particular priority on those, I sort of have my own priority, but obviously it would start out with the health physics issues that you identified particularly, any needs in research with regard to actinides, toxicity, metabolism in the body and then what are we ever going to do with the LNT. I can start with those items and then we can go on to some of the technical issues.

MEMBER POWERS: Yes, I think we've got some specific -- we need some specific guidance in connection with the actinides and the toxicity issue because we have this MOX facilities staring us in the face here and some of that stuff takes some lead time to do.

COMMISSIONER DICUS: Right. Let me start with that. With regard to plutonium oxide and uranium oxide issues, there currently is no research that I'm aware of at least being done. Quite a bit of research has been done in the past. The only thing that is on-going is some epidemiological work with the Joint Coordinating Committee of the Radiation Effects Research, the JCCRER work that I'm involved with in the bilateral with Russia. The Russian workers did have significant uptakes of plutonium in the early days of their activities there and we are looking at it from an epidemiological point of view.

The Russians have identified what they characterize as plutonium pneumoschlerosis which is an interstitial lung disease that leads to lung deficiency in capacity. The x-rays show basically fibroschlerotic lesions in the lung of the Russian workers.

It doesn't take very much. Basically, the uptakes are almost in micro curie quantities, so you're not talking about a great deal of uptake, but the doses range anywhere from 500 to 3700 rem dose equivalent for these workers.

This contrasts with the American workers in the Manhattan Project that had uptakes, those that

did have uptakes, had uptakes in the nanocurie range, very, very small uptakes and the doses, effective dose equivalents were somewhere between 10 and 720 rem and we have not identified this issue of plutonium pneumoschlerosis that the Russians have identified, but we're talking about a lot higher doses in the Russian workers.

The work that was done with beagles you're probably aware some years ago a tremendous amount of work was done with beagles and at doses of around 800 rad. They did identify what they called radiation pneumonitis in the beagles, but again, we haven't identified that in any of our workers, but again, we have relatively low doses of the workers in the Manhattan Project.

Our annual limits of intake of plutonium oxide and uranium oxide is taken from ICRP document number 48 and the modeling from ICRP document number 30 and we use those documents. Those numbers continue to stand. I don't know, to my knowledge, the ICRP has not determined that they need to go back and re-look at these numbers. Not that it might happen at some point in the future, but it has not happened yet for the plutonium uranium.

I have in front of me a memorandum that's

dated October 6, 2000, an NRC memorandum. It is from Eric Leeds who is the Acting Chief of the Special Projects Branch, the Division of Fuel Cycle Safety and Safeguards in NMSS and Cheryl Trottier who is the Chief of Radiation Projection, Environmental Risk and Waste Management in risk analysis and applications, a branch of research and the conclusion from this memorandum is that the NMSS staff concludes that the annual limits of intakes published by the NRC in Part 20 and other available information on plutonium oxide and plutonium oxide, uranium oxide radiobiology would yield conservative dose estimates were they to be used to prepare license application for MOX fuel fabrication using weapons grade plutonium.

For this reason, NMSS staff does not recommend that the proposed research proposed -- and there was a proposal for research -- necessary for NRC to reach a safety conclusion on the construction and operation of a MOX fuel fabrication facility. So the staff has concluded research is not necessary.

MEMBER POWERS: The contention that's come to that particular memorandum, it seems to me, to revolve around the issue of in vivo dissolution of this plutonium uranium dioxide mechanical mixture and whether that, in fact, you get a conservative estimate

from those because the biological uptake might be different and different not only for the plutonium, but because of the americium decay in the plutonium and what not.

And in my looking at it, it really came down to how confident this Commission thinks we ought to be when we go about attacking this, the challenge of licensing this MOX facility.

What we have basically is a plausibility argument in the memorandum that we're going to be conservative and not a proof and so it's one of these subjective decisions. I have to admit I haven't looked at the length and the breadth of it, but it really basically is how confident do we want to be that we are, in fact, reaching a conservative decision here because of the biological uptake problem. It looks, I mean it seems pretty plausible that you would get a different biological uptake with a mechanical mixture than what we have based on the sought solution.

COMMISSIONER DICUS: Now when you say uptake, well, let's back up. The memorandum also, as well as other information that I have read, discusses the issue of transportability. Once the radionuclide is in the body, all the research that we know can to

take on what we have in front of us states, indicates that the uptake, the organs of concern, obviously the lung through inhalation, that's going to be the pathway and the thoracic nodes.

The data so far indicate the transportability irregardless of form to other organs in the body is essentially nil.

MEMBER POWERS: Nil.

COMMISSIONER DICUS: That it does stay in the lung and the thoracic nodes and there is where the dose is going to be received. Transportability other ways whatever class is used and they looked at Class W transport and Class Y model parameters and still the transportability doesn't -- so I think that's conservative.

MEMBER POWERS: If you're not going to get any transportability, then I don't care whether -- what the dissolution rates and what not are because they're negligible.

COMMISSIONER DICUS: Right. Any other questions? I think we always have to keep our minds open and be sure some new piece of data -- we're always finding new things, that we have the possibility that at some time it would have to be relooked at, but I'm comfortable because I really

believe the transportability, the studies on transportability --

MEMBER KRESS: Aren't these transportability rates and the solubility though --

COMMISSIONER DICUS: Say again?

MEMBER KRESS: Aren't they dependent on each other? They're not independent variables?

COMMISSIONER DICUS: Yes.

MEMBER KRESS: So it's hard for me to separate the two.

MEMBER POWERS: I think it's dribbling down to a plausibility argument that you've got to inhale first. And then it's got to dissolve from the sites that it deposits and go into blood stream or something like that in order to move on.

MEMBER KRESS: Which means it has to transport across the blood vessels.

MEMBER POWERS: Yes.

MEMBER KRESS: But that's the function of solubility, to me.

MEMBER POWERS: Right.

MEMBER KRESS: Once it's soluble, so I have trouble separating the transportability out from the solubility. If it's not soluble, it's not going to be transportable. But if it is highly soluble, it

ought to be transportable.

COMMISSIONER DICUS: I think it's more -- I think the solubility is not that good.

MEMBER POWERS: It's low solubility.

MEMBER KRESS: I would think it's very bad, yeah, and that's the saving --

MEMBER POWERS: The americium is going to be a little more soluble than the plutonium which is a little more soluble than the uranium. The uranium is bottom of the list here.

MEMBER KRESS: It seems to me like if we know that, then their conclusion that you're conservative and don't need any more research is fairly sound.

MEMBER UHRIG: Are these studies independent of the isotope involved, whether it's 241 plutonium isotope?

COMMISSIONER DICUS: I don't know the answer to that question.

MEMBER POWERS: Most of the --

COMMISSIONER DICUS: They did look at the americium, etcetera. They looked at others, but what isotope of plutonium, it was 239 to my knowledge --

MEMBER UHRIG: 239 would probably be the logical one.

COMMISSIONER DICUS: Right.

MEMBER UHRIG: But when you get into things like isotopic generators you get into 238 which at least my impression is that it's more of a problem.

COMMISSIONER DICUS: I don't know the answer to that.

MEMBER POWERS: It has a much more rapid decay rate. For the facility itself, the facility of interest here, it's only the 239 and it depends on what -- where the database was generated. In the United States, most of our data comes from the 239. That's a small amount of the data. The European data actually comes from the 240, 241s.

MEMBER SHACK: You were quoting data from the Manhattan Project, but we must have vast amounts of data on people working with plutonium since those days in terms of the weapons -- are the limits --

COMMISSIONER DICUS: I don't have that data.

MEMBER SHACK: Does DOE have that data?

COMMISSIONER DICUS: I hope they do. I have my fingers crossed. I could find out that for you.

MEMBER SHACK: I just wondered how these limits, whether they were consistent with --

COMMISSIONER DICUS: Why I used the Manhattan Project is I was relating it to the Russian workers shortly after that. That's why I use the Manhattan data. Modern data certainly exists.

VICE CHAIRMAN BONACA: Any other questions on this? If not, I would like to start with one issue that clearly is interesting to us which is the impact of national energy policy on the Agency and the country. Last Monday and Tuesday we had a workshop, as you know, that was reviewing new reactor designs and clearly, there is a stirring of interest on the part of this committee and the whole community regarding this issue and the ties to this on national energy policy. I wonder if you could give us your insights?

COMMISSIONER DICUS: Sure. I'd be happy to. Of course, the new energy policy, we're still in the process of reviewing of what the real impact might be on this Agency, but the obvious impact is new energy policy underscores the need for additional power plants to provide additional energy and that nuclear will remain a viable part of the energy mix.

Given that information, coming out of the energy policy and if that policy does finally see the light of day for Congress and becomes the national

policy, I do anticipate that the Agency will be impacted through additional renewal applications, by possibly most of the plants, not all the plants, coming in for renewal applications, hopefully not all at one time. I hope they will pace themselves accordingly.

But we do anticipate a strong potential that we will get an application or a new reactor perhaps in the next two or three years. Whether it's going to be the pebble bed or not, who knows? That is the decision for industry to make and decide what kind of reactor, decide if they want to build a new reactor and then what kind of reactor they want to build.

The challenge to the Agency, the challenges to the Agency is if it's a pebble bed to have the technical expertise to be able to do it and be in front of the curve on that and I have a confidence at this point that the staff is acutely aware of this and I know staff has been to South Africa following the activities there, getting up to speed on the pebble bed.

There's going to be a challenge to the Commission. We're going to have to address some very interesting policy issues of the pebble bed reactor. For example, containment. What are we going to

consider with regard to containment? I mean it doesn't have one. It's a new breed of reactor. Defense-in-depth is another issue that we're going to have to come up and look at our policies on defense-in-depth. Emergency planning becomes a policy issue that we're going to have to look at because the industry came in to talk to us about the pebble bed and indicated, for example, a 2 mile EPZ, that is the 10 mile EPZ we are accustomed to. That's just off the top of my head. Those are three major policy issues for the Commission to deal with, so we have policy. We have issues.

MEMBER KRESS: They outline several other policy issues at our workshop. For example, how do you deal with multiple modules on a given site. Is that treated as one facility or several? And then they had the whole list of financial kind of things that I don't know whether it's in the purview of NRC or not, things like the Price Anderson Act and --

COMMISSIONER DICUS: Yes. How much Price Anderson money do you put aside for how many modules you have?

MEMBER KRESS: But then there's the question of the fees also, how do you --

MEMBER SHACK: That particular question,

is that an NRC question or is that a congressional question?

MEMBER KRESS: I think that's congressional, the Price Anderson.

COMMISSIONER DICUS: The Price Anderson is congressional, but the fees --

MEMBER KRESS: The fees I think you can deal with.

COMMISSIONER DICUS: Fees, we can deal with, but the Price Anderson consideration would be congressional.

I think one thing, in some ways, I think the Commission is a little bit disappointed that talk isn't about coming in with one of the designs that we've already approved. We get all this work and these things are sitting on the shelf collecting dust and come on, people, it's not one of those off the shelf. All that hard work we did, was it worth the time and effort that we put into it.

MEMBER KRESS: That occurred to us.

COMMISSIONER DICUS: It could be very much an application, an interest is growing in the AP1000 nuclear plant and so --

MEMBER POWERS: We haven't certified that one yet. Look at the System 80.

(Laughter.)

COMMISSIONER DICUS: We haven't certified the AP1000. At any rate, it creates for us some very interesting things. One of them is the resource impact. If we got one or more applications and that's one of the things on your list, can we deal with more than one application and it's a resource call, with all the other things that are on our plate and we have to convince Congress that we've got to be in front of the curve. We can't wait to have the application on our desk and then start trying to hire the people. We need the people a year in advance or so.

We have a little bit of leeway in our FTE space that we could do a little bit of advanced hiring. We're talking about this in terms of human capital now at the Commission level. How do we prepare ourselves for a variety of situations, including the fact that approximately 40 percent of our staff could retire don us and walk out the door tomorrow. What are we going to do about that? How are we going to replace these people from the pool out there? It's not that big to find people.

MEMBER WALLIS: Well, maybe working on the new reactor might encourage some younger people to apply. It might be more exciting than the old stuff.

VICE CHAIRMAN BONACA: One concern that I thought about is the thought that NRC has a lot of talent and vendors will need talent to design and implement these new reactors. That may be an attraction for personnel, so there's also an issue of totally retaining knowledgeable staff.

COMMISSIONER DICUS: That's one of the human capital issues that we're addressing and some of the fixes that may be possible will require some legislative action to be able to do. We have the issue that if there is, indeed, an upswing in the nuclear industry and if the industry is going to be competing for these people --

VICE CHAIRMAN BONACA: Absolutely.

COMMISSIONER DICUS: It's going to be a very attractive situation, so we're very concerned about that. There is perhaps a little bit of an upswing. Students are beginning to show an interest in nuclear engineering and associated fields. Texas A & M University, their freshman class almost doubled.

MEMBER WALLIS: I wonder how many of those are actually studying phenomena relevant to new reactor design, whether the professors are stimulating them to do that, whether the professors are still teaching the old stuff?

MEMBER KRESS: With respect to the technology related to the pebble bed reactor, it's my view, you can become up to speed in a hurry on that one, so you've got enough bright people that with a little homework, I think you could cover that one. Some of the other concepts may be a little more difficult. I hope I'm still on the ACRS when you have to wrestle with this problem of the defense-in-depth and the need for containment because I'm really looking --

COMMISSIONER DICUS: You can tell which ones are on my mind. That comes around a lot. The financial issues are there, as well. Those are all -- they're different. When we start talking about defense-in-depth, containment and things like that from a policy perspective --

MEMBER POWERS: It's real simple. Just tell them they have to have a containment.

(Laughter.)

MEMBER WALLIS: Dr. Kress said with a little homework they could come up to speed. Maybe the ACRS could write some of those homework problems.

MEMBER KRESS: That's a thought.

COMMISSIONER DICUS: That's a thought.

MEMBER POWERS: It is remarkable to me

that given all the troubles that the industry has that they would want to engage in a battle over either containments or EPZs. It seems to me that those are -- they're guaranteed to be provocative and their low level fights compared to other things that the industry has to contend with. And they bragged about how good their existing plants are. Just look at TMI. Nothing occurred because of a good solid containment. Look how terrible the Russians are because they had a lousy containment unlike ours and then they said we're going to get rid of it. It's a very peculiar battle.

COMMISSIONER DICUS: The arguments will be made.

MEMBER POWERS: I think it's peculiar economics on their part too because when I have looked at containment costs as a fraction of plant costs, you're talking about a 7 percent effect. And so if you get rid of it totally, you change the cost by 7 percent. This doesn't look like a big change.

COMMISSIONER DICUS: Well, with the Emergency Planning Zone it's likely, in my view, that the first one or two to whatever design, if it's a pebble bed, probably be constructed near or at a distant site. Shrink it down.

MEMBER WALLIS: Well, you may plan for a

small zone, but if there's an accident, the population in a bigger zone may think that there's an emergency for them too.

COMMISSIONER DICUS: Right. That's true. We do expect to get some applications in this year for early site permits.

MEMBER POWERS: Are those new sites or are they locating plants on existing sites?

COMMISSIONER DICUS: I don't know.

MEMBER POWERS: Okay.

VICE CHAIRMAN BONACA: During the presentation from NEI, there was an interesting vu-graph where they were showing that they expect to have over 10,000 megawatts of electric coming from uprates and of course we are involved now in reviewing uprates as well as reviewing life extension.

I would like to have your thoughts about -- clearly, there's going to be a challenge with not only licensing new plants, but maintaining current plants operating at a higher rating and for longer periods of times and working safely and efficiently. So I don't know if you had any thoughts on this issue?

MEMBER KRESS: To get that kind of power, it's going to take substantial uprates to 20 and 30 percent type levels.

COMMISSIONER DICUS: I think we'll have to look at that. We are uprating. Some plants are going already, I can't remember offhand which ones for fairly high. I think Palo Verde may be going for a fairly high uprate, but doing it in steps and that might be maybe the way to go. That gives us a chance to look at what the issues really are. I'm not up to speed technically on what those issues are going to be for uprates and some of the --

MEMBER WALLIS: Well, the manufacturers assure us that there are very few issues.

MEMBER POWERS: I mean the argument that gets advanced is that the FSARs for the plants were originally for a much higher power than what they have been operating at and I happen to know it's because of some recommendations made by this Committee, these many years ago that they operated at the lower power, but they seem to not recognize that there have been some changes in the way things are done at boiling water reactor modes -- the big power uprates are all boiling water reactors, that weren't recognized in the early FSARs. And I think of things like outwash recovery actions. We're going to drop the level of a coolant down, introduce SLIC and then we're going to bring it up.

Now tell me about the lateral forces on cool rods that you've operated at high burnups so that they're nicely embrittled and the fact that the time that you have to do this has decreased now because you've been operating at a higher power. Those are kinds of technical questions that I have not seen addressed for these big power uprates and they're just not incorporated in the FSARs because these things have occurred since the original FSAR was written.

COMMISSIONER DICUS: Actually, I think one of the things that you might consider doing is really listing the issues that you see with these power uprates. That would be useful to the staff in getting that information because I hadn't heard that 10,000. that's a lot.

I hadn't heard that figure. That gives me a little bit of cause for concern that we're not just beginning to run amok.

MEMBER POWERS: We have over a unit's worth, over a thousand megawatt electrical on our agenda right now, so 10,000 doesn't sound out of the --

COMMISSIONER DICUS: No, it doesn't, but still, you know --

MEMBER POWERS: It's a bunch of plants.

COMMISSIONER DICUS: It's one thing when if we get this change in the future of nuclear power is to be able to pace that change so that doesn't run amok, say that we just suddenly there's a snowball effect that -- then we have an error. We don't need the error. That won't work for anybody. It won't work for the American people. We're going to need the energy. So I want us to be trying to look as far ahead as we possibly can, pace this change. I think the Committee -- it would be very, very helpful to the Commission in thinking along those terms and trying to identify the issues as you see them and keep this process very mature and very capable of dealing with change that may occur.

MEMBER POWERS: One of the things that's snowballing, not a fair term, one of the things that's moving along expeditiously nowadays is license renewal and we're seeing increasing public concern, it seems to me when they see on the one hand license renewals being granted and on the other hand, numerous reports of phenomena and processes occurring to the plant that at least in their mind look like aging phenomena, cracks in pressure vessel heads, cracks in nozzles, that sort of thing. And they don't draw the distinction between active components and nonactive

components.

The question comes about is do we have a public relations problem here or do we have rule problem?

COMMISSIONER DICUS: I think we have a public information problem. This is a perennial problem. It's one of the things the Commission is looking at as both our external and internal communications has been tasked with dealing with this issue, public relations, public information, public communication concept.

We don't say and this is what we're not getting this information out. I think when we go to the sites and we have our public meetings and not getting the information out, that we're not saying that there will be no aging issues. Of course, there's going to be aging issues. What we do in license renewal is very carefully look at what the licensee's program is to identify and deal with aging issues, but there will be aging issues. If you've got a vintage car, you work on it to keep it running because it's going to have thing go awry.

I don't think, I don't know that the public is getting that message that yes, there are some issues. We have steam generator tube issues.

We've got the cracking issues. We may probably are going to identify some other issues, but the point is being we can't identify them and the licensees have this aging management program in place and the wherewithal to deal with it. I think we have a public communication issue.

MEMBER POWERS: I think the licensees may not serve their best interests when they get surprised by an event and then say oh yeah, but we can run six more cycles with cracks and things. Somebody who is not intimately involved, it's not obvious that you ought to run six cycles with cracks in your cylinder heads.

COMMISSIONER DICUS: Right. I'm a little concerned about that.

VICE CHAIRMAN BONACA: And I think it's kind of difficult to reverse that perception in part because for so long we have licensed plants for 40 years. I mean we have a built-in perception that after 40 years these plants must be retired, otherwise why with only 40 years. And to reverse the perception is going to be very hard.

COMMISSIONER DICUS: Yeah, because the 40 years was picked out of the sky.

VICE CHAIRMAN BONACA: Exactly.

COMMISSIONER DICUS: It was a financial decision.

VICE CHAIRMAN BONACA: Absolutely.

COMMISSIONER DICUS: Well, in 40 years they'll have it paid for, so we'll just license them for 40 years. It had nothing to do with plant viability.

VICE CHAIRMAN BONACA: That's right.

COMMISSIONER DICUS: And we didn't that message out either.

VICE CHAIRMAN BONACA: That's right.

MEMBER WALLIS: While we're talking about public perception, this Committee has discussed there are various kinds of public. One tends to perhaps think of the public as being John Q. Public, but there are actually some quite sophisticated technical people out there and they need to see some technical evidence in the form of reports or something that the NRC is on top of these subjects technically.

COMMISSIONER DICUS: In January, I was at a conference. It was sponsored by NEA in Switzerland and it was public perceptions of risk and public communications and so forth and so on and that was one of the themes that came out of that conference. It was an excellent conference. It was by invitation.

I think there were about 70 of us there from around the world, mostly Europe. And there are many different kinds of public and you've got to talk to those many different kinds of public stakeholders, including the ones, the technical people, the nontechnical people. It was a really good conference.

MEMBER SHACK: One of the last times we had a meeting with the Commission you asked me whether I thought we were still making sufficient progress towards risk-informed regulation.

COMMISSIONER DICUS: Right.

MEMBER SHACK: I just wondered, what your perception is?

(Laughter.)

COMMISSIONER DICUS: Turnabout is fair play.

MEMBER SHACK: When you first came here, we were talking about low hanging fruit.

COMMISSIONER DICUS: Right.

MEMBER SHACK: We're still picking that low hanging fruit which just doesn't --

COMMISSIONER DICUS: It may have fallen off the tree.

I think we're moving. It's slow. Progress is very slow in risk informing. I don't know

if it's the proper speed or not, whether we could move a little faster or maybe we're moving at the right speed because we're trickling over into such a new arena for everyone, for us and for the industry itself and whether or not the industry is actually going to be able to use the risk-informed regulation.

We've stumbled over 5046. We hope to get a paper some time, but we're not sure exactly -- the staff is struggling with it, on how to do it and what to do with it.

So we are dedicated to the concept we are going forward. We do have issues. The industry has issues with us. Sometimes we get criticism because we're moving too slowly. Every once in a while I hear someone say we're not sure we're ready to do, to go to a risk-informed regulation. But I think we have to leap out there, it may be a leap of faith, carefully trying not to step in too many potholes as we go forward.

It's going to be interesting when we get some really good and working risk-informed regulations out and see licensees make their decision if they're going to use the risk-informed regulation or stick with the old regulation because we will have two sets of regulations which is going to be interesting, I

think, from the Commission's point of view and how the staff is going to deal with that.

But one of the things that we talk about, talked about -- my staff talked about it with Dr. Apostalakis is the quality and value of the PRAs that we have and how that's going to interact with the risk-informed regulation. It doesn't keep us from risk informing our regulations, but it may keep licensees from being able to use it because if they don't have a very good PRA, they're not going to be able to use a risk-informed regulation and hopefully before too long we will have a standard and then we're going to have take a look at those PRAs that don't meet the standard and the licensees are going to have to start making some decisions, so I would -- I get a little bit concerned that we get on, get busy with getting our regulations risk informed and deal with these two sets of regulations that we're going to have for each one of the issues and then very few licensees go risk informed, be sort of like all the work we did on certifying designs and no one seems to want to use them.

I hope that doesn't happen.

MEMBER POWERS: It seems to me that the regulations that we've considered risk informing up

until now, that includes to some extent the fire protection regulation with NFPA who insists that's not risk informed. The regulation is some hybrid, but put it in that category and now 5046, I don't think you're going to see licensees jumping at this. Where you're going to see continued licensee use is Reg Guide 1.174 for plant changes.

COMMISSIONER DICUS: Right.

MEMBER POWERS: That is already proving its use. And already we are -- we keep running into the problem that the PRA quality may be an issue, but the scope is even a bigger issue and I think with the emergence of the results coming out of the IPEEE, I don't know whether you've had a chance to look at those or not, but those are illuminating to me that risk from the so-called external events which includes internal fires which is a historical thing that adds to challenges I think the public has in understanding PRA are really quite commensurate with normal operational risks and until we have people coming in with PRAs that say yes, I take into account all of the risks, not just the operational risks during -- when the plant has power, but also these things in fire which is a risk that people have a very intuitive sense about, that you're going to have two kinds of

difficulties, one, challenges from public and challenges in using 1.174 to its full potential.

Getting back to the actual regulations, you're not going to see people sweeping to those until there's a much fuller set. One at a time, you're going to have the out person do it.

COMMISSIONER DICUS: You are going to have the out person do it and it may be that one of the things, those regulations that tend to have a generic approach or a generic basis may be -- if we can get those out, then I think we can get wider use and I think once a few plants or a few licensees really leap off, take that leap of faith to get fully involved in utilizing a risk-informed regulation, it will be like license renewal. Once Calvert Cliff got the courage up to take that leap of faith and thus tried to do this, and it went well and Oconee went well, now the flood gate is open. And I think the same thing will happen, but it will take a while.

MEMBER POWERS: I think you will see 1.174 still being used a lot. It's proving to be an attractive vehicle for making changes in plants.

MEMBER WALLIS: Can I make a connection between the last two subjects, the public perception and risk informed? We have a couple members of the

public here and they seem to be suspicious that risk-informed regulation is a way to reduce the burden on industry, whereas it seems to me that the drive for risk-informed regulation really should come from the public because this is where you actually face up to the question of what is the risk and what's being done about it and that's far better than some rather arbitrary prescription. It's surprising that the public can't sort of be better aware of the fact that this is in their interest and perhaps they should be more the driving force behind it.

COMMISSIONER DICUS: This is just another example of whoever has the responsibility. In my RIC speech, I'd put a burden on the industry. You people should be out there talking about what you're doing in the realm of safety. It's your responsibility to talk about your safety records. It's not our responsibility. It's our responsibility to ensure that you are doing that, but you're the ones that have to do it. The plant is your responsibility. And I think what -- the words you just used, reduce burden on the licensee, they hear burden, reduce burden. They don't hear reduce unnecessary regulatory burden. And the whole issue is that when we make essentially everything the same importance, even if it's whether

or not how they signed off on a particular piece of paper which literally has nothing to do with safety, when we make that just as important as how well they're taking care of their pipes and pumps and everything else, then the same emphasis, they can't put the emphasis and this is a message we're not getting out to the public. They can put the emphasis they should on those systems, structures and components that are absolutely vital to safety because they're having to spend time on something that is not vital or even important to safety and what we're doing is taking these things and putting them down here, got to be done, but it's not as important as these things, now you can put attention on here. We're not getting that message out to the public. And the industry is not getting that message out to the public. I don't have an answer for that. But any time I can, when I'm talking to the public, you know, and this question comes up, you explain it, and then they do understand. You don't discount the public that can't understand these things. They understand them very well. If they get the right information.

So it's a communication issue that we all need to work a little bit better at.

VICE CHAIRMAN BONACA: The unfortunate

thing is that, for example in the case of South Texas, there are a number of exemptions resulting from risk information and but if initial exemption means that you're going to have to do any more or something that you had to do before, and if you are ill-disposed, I guess the technology, you jump to the conclusion very easily and this can be so easily instrumentalized and that's one of the issues that of course, whenever you remove burden, the word unnecessary doesn't come to mind in that case.

COMMISSIONER DICUS: Does not come in.

MEMBER LEITCH: Further on this area of public perception, since joining the ACRS I've taken to reading the daily event reports and I'm struck by the number of medical administration issues, industrial problems, radiography problems, misuse, loss of radio isotopes. I don't really have a historical perspective on that whole area. Did an increase in these kind of incidents over the years are at least stable --

COMMISSIONER DICUS: I think it's fairly stable. It may, in fact, have gone down just a little bit, but medical administrations probably running pretty well what they normally run. I don't have stats in front of me. There might be hills and

valleys along, but there hadn't been what I would consider a steady increase or a steady increase. They're running about the same.

Lost or stolen sources, about the same. One thing, I think we're going to see in the offering source issue, I think we're going to see a real improvement in the offering source issue because of our registration program that we're going to put in for general licensees.

That's going to make people start having to really go out and find sources. In some cases, they didn't even know they had a gauge in their plants. It's sold two or three times and they're going to be surprised when they get our letter saying we have a record that shows you've got XYZ and they say we didn't know we had this. And then they start looking for them. But I think in two or three years with that kind of accountability that we're going to put in place, I think we will see a decline in some of these gauges, etcetera, winding up in the public domain.

So that part should improve. I think the others run about the same. It was, I think, my first speech that I gave at the RIC, first or second, at the RIC. I talked about the fact that where we are

unnecessarily irradiating workers and members of the public is through the radioactive materials side of the house and not in the reactor side of the house. And that's where -- that's not recognized that much. We just had the issue in Panama. That's not a U.S. issue, but several patients have died as a result, who were having radiation therapy because of still trying to ferret it out, but they received more radiation than they should have. And reasons for that still not real clear, other than their own parameters were put in. But why it's still unclear.

It is, and we continue to have medical administrations with our best efforts to prevent it.

MEMBER SHACK: One thing that comes out of the new reactors as we look at them, they appear to be much safer than our existing --

COMMISSIONER DICUS: They have the passive safety systems, yeah.

MEMBER SHACK: Right. Do you think that would increase pressure to rethink our notion of how safe is safe enough? That would be out in the future that -- would our safety goal be something that people would actually have to achieve, rather than aspire to?

COMMISSIONER DICUS: I don't know. But it's a possibility.

Right now we're wrestling with safety goal policy statements.

VICE CHAIRMAN BONACA: I imagine if the number of new applications were many and the number of reactors would be large numbers, then there would have to be some important consideration.

COMMISSIONER DICUS: I think at some point we would really have to relook at that and I think that's the issue why there's some hesitation now on the Commission's part to go further or at this point, to add to a revised safety goal policy statement, waiting to see more regulation is risk informed, seeing what does, in fact, happen, whatever the economics are that the nuclear power industry makes decisions accordingly, and maybe at that point in time we do need to take another look at the safety goal policy statements, what we plan to do with them.

MEMBER POWERS: If the staff really runs into a long-term hurdle in 5046, do you think they ought to rethink their option paper to you?

COMMISSIONER DICUS: Yes.

MEMBER POWERS: I think so too. I mean --

COMMISSIONER DICUS: I think that's in the works.

MEMBER POWERS: Is it?

COMMISSIONER DICUS: As far as I know.

VICE CHAIRMAN BONACA: Just thinking about these new reactors. We had presentations that speak about the system and again I was thinking about the comments from Dr. Powers regarding fire, external events. I think it will be important for us as a Committee to really pay attention to those external events which really create comment mode failure and because the focus has always been so much on the plant, specifically, and those external events are truly the challenge that is not fully appreciated in the existing plants.

In fact, the IPEEE were going to review them now, the results of it, but there isn't such an understanding of their impact, really, on the safety as there is for internal events.

MEMBER POWERS: And you get these remarkable things. As we move toward more risk-informed regulation in a different reactor oversight program and we look at corrective action programs you always find that. The oldest things on the corrective program are the fire protection stuff. They don't produce kilowatts so they come up bottom on the list.

And they're producing risks that are comparable to the normal operations. This is real

risk information here that's just not being used, but a licensee --

VICE CHAIRMAN BONACA: The reason why I bring it up is that their own paper, they can really design something which is for internal events, significantly and clearly safer than current plants, but if you don't pay attention to the external events, in the siting, for example, and other issues that may affect the plant, still you have this component which is not fully appreciated which is really the driver of common cause. If you have -- and we will have to be very sensitive to those kind of issues, otherwise, we'll have a perception of much better plants, much safer and maybe the perception is not correct.

COMMISSIONER DICUS: And because of the perception that may cause a lax attitude on things that ought to be, as you said, given a great deal of attention because they can create the unsafe situation in this safe plant.

VICE CHAIRMAN BONACA: That's right.

MEMBER KRESS: At the risk of being a dead horse with a red herring --

COMMISSIONER DICUS: Just got back from there.

(Laughter.)

MEMBER KRESS: How do you feel about the need for a substantial improvement in the risk assessment capability with respect to shut down risk?

COMMISSIONER DICUS: Well, everything that I read, well, indicates to me that there are some significant risks in low power and shut down from the point of view that you may have some systems very necessary for safety that are down. They're not available to you, so if you have some event, external or internal, that occurs that you need that system or component, whatever, and it's not available to you, then I think you have some element of risk. You don't have the reactor running, okay, fine, but you can still have something occur. That's what I read, that's my understanding. Obviously, this isn't my field and I'm very dependent upon what I learn externally to understand these sort of things.

Now on the Commission, there are feelings on both sides of the fence. There are strong feelings that basically there are very few risks at low power shutdown and it's just because the reactor is not running. Everything can be handled because you have time. Time is on your side. And that's true too, probably. I just think -- I guess to make me have a greater comfort level, I need it to be looked at and

if I'm sure that the answer is no, there really isn't a great deal of concern here at low power shut down situations because it can be handled and I've got little bullet items to tell me how that's going to be done and I will have a comfort level. Right now, I just don't quite have that comfort level.

MEMBER POWERS: It's examining what's necessary because you're right, time is on your side here. But if you look at what we have to go on right now --

COMMISSIONER DICUS: We don't have much.

MEMBER POWERS: Well, that time has not been factored in in any kind of realistic way, so we're stuck right now with actually -- those people that think everything is okay, don't understand. We're making decisions based on information that says things aren't okay because the original studies were all very conservative. Examination of it is exactly what needs to be done.

COMMISSIONER DICUS: Maybe we can put it to rest one way or the other.

MEMBER POWERS: And you can and you have to recognize there's a difference between scheduled and unscheduled shut downs, that a scheduled shutdown, I think the industry is doing a marvelous job with

scheduled shutdowns. And when we visited the plants, it's only reinforced my view on how well they're doing because they're very clever individuals.

The unscheduled shutdowns, however --

COMMISSIONER DICUS: That's different.

MEMBER POWERS: Don't have that kind of planning. So it's really examining it. It's not because you think that there's any imminent things that have to be done, new regulations written. It's finding out what the status is. It's really causing a problem right now.

MEMBER FORD: As the newest and maybe most gauche Member of this Committee, I'd be interested to know what your views are for the longer term future, for instance, right now we're proactively implementing risk-informed policies. But what do you see happening in five years? Ten years out, as far as what you'd like this Committee to be focusing in, on that sort of time scale?

COMMISSIONER DICUS: I think a couple of things immediately came to mind. Say 5 to 10 years from now, hopefully, we do have a full range or almost full range, certainly in 10 years, of better risk-informed regulations.

I think it's going to be incumbent on all

of us and especially this Committee to be sure that we're catching everything we need to catch, that the risk-informed regulation is indeed being focused on what is really important to safety and we haven't dropped something or we have something that we've declared important to safety that may not be that keeping in mind that this is going to be a living document, quite frankly, a living process. And we -- five years, I'd like to see us begin in five years and then in the 5 to 10 year range refine it. And fix any little problems that we see.

The other thing, of course, we really will be getting well into control of aging issues. Some of these plants will in 10 years beginning to start their second 20 years or their new life and I think this Committee would serve the Commission very well that you are really looking out there, 5 to 10 years on what might happen next, so there aren't any surprises. And we can give a heads up to the licensees that we think you better watch this, this could become a problem. So that is where I think I would like to see you put a lot of your effort.

MEMBER FORD: Bearing in mind the public perception acceptance is an important part of your cornerstones. What role do you think we should be

playing in ensuring that there's not a problem overseas?

If there's another major problem offshore, that's going to impact the public perception in this country. Should we be, we the NRC, be actively involved in helping regulation? I say that advisedly, obviously, you're not going to politically, from a technical point of view situation in Japan or Russia or --

COMMISSIONER DICUS: I'd like to give that some thought. Now we are involved with several countries through a variety of mechanisms to with regulations, with exchange of information of maybe from time to time we lend people to the IEEA on OSARs and other kinds of reviews, regulatory reviews, so we are involved. To what extent the ACRS has an involvement, I don't know, other than clearly -- I was surprised actually that the Tokamura accident didn't get very much press in this country. The Panama misadministration event, very little press in this country. Something like Chernobyl, obviously, it affected the world and it had an impact here in the U.S. as well. That's going to get a lot of press and a lot of attention.

We, through a variety of mechanisms,

mostly IEEE and NEA, like to see some of the unsafe reactors that are in the former Soviet Union countries not operate because we do feel that they have some issues with them that the safety level is not what we demand in this country and in other areas, but I mean if you identified something that you think the Commission must be aware of some place else, offshore, as you mentioned, I think it would be incumbent among you to let us know about that and then to what extent we have an opportunity through the avenues that we currently have in place to deal with that and I think that would be valuable information and I would see it from that point of view.

MEMBER UHRIG: There were a couple of trends that were discussed in the advanced reactors meeting we had this week. One of them is long-term operation without shutdown, either through continuous refueling like the pebble bed or in the case of the IRIS, they're looking at an AE or fuel cycle, something of this sort. And the other thing that was discussed is automated operation for a minimum number of operators involved where you have perhaps 10 modules, but only in the case of the South African concept about three operators to handle all 10 of those.

I wonder if you could give us your thoughts on this type of thing for do we need additional layers of assured safety associated with this type of operation or is the present regime of regulation adequate?

COMMISSIONER DICUS: For the refueling on line for both instances that you talked about, longer runs or in some cases being able to refuel while the reactors at some level of power and then other is the pebble bed and --

MEMBER UHRIG: Pebble bed is the continuous.

COMMISSIONER DICUS: But less operators with the pebble bed with more modules.

MEMBER UHRIG: Yes.

COMMISSIONER DICUS: So you want me to address what I think our regulatory structure --

MEMBER UHRIG: There are two separate issues here. One is manpower associated with the operation and automated operation and the second one has to do with long --

COMMISSIONER DICUS: I think we got into -- I don't know if we need regulatory changes or not. You get into reduced manpower and automated operation might well be. Certainly, we're going to have to

address it from the safety point of view and the risk point of view, so whether that would lead to a regulatory change I think the study of looking at it will tell us whether we need regulatory changes, might well do with that.

As far as being, of course, the pebble bed, putting that side as far as short -- longer runs and being able to refuel, without total shutdown, that is probably going to be a regulatory, something that has to be done from that point of view. I don't know.

MEMBER UHRIG: The IRIS concept had an 8 year core.

COMMISSIONER DICUS: Uh-huh.

MEMBER UHRIG: And they would propose to continue operation for 8 years before shutting down to refuel. And this is unprecedented in any operation that we've had in --

COMMISSIONER DICUS: I don't know. I would have to get information on that. I just can't answer the question at this point.

MEMBER UHRIG: Pebble bed was proposing, I believe it was 7 years before they shut down for a major overhaul, 7 or 8, something of this sort, so in both cases, it was the order of 8 years.

MEMBER KRESS: It seems like it would

impact your ability to monitor and inspect and find out if anything is working its way towards disaster. Might call for more instrumentation, at least.

COMMISSIONER DICUS: That will just be part of our learning curve and some of the things we ought to consider as we get into that sort, get into those kinds of reactors and our staff will have to come back, look to you for a lot of information on it as well.

Anything else?

VICE CHAIRMAN BONACA: It seems as if we are out of questions.

MEMBER POWERS: I am running out of ability to take notes here.

(Laughter.)

COMMISSIONER DICUS: You've been taking notes?

MEMBER POWERS: I'm hanging on every word here.

VICE CHAIRMAN BONACA: We seem to have run out of questions. Certainly, it has been a wonderful exchange and very informative. We thank you for coming and spending some time with us.

COMMISSIONER DICUS: Thank you. I appreciate it. I know some of the issues because

they're really technical, out of my field. I'm not quite up on the concepts and the policies and things of that nature. I've enjoyed talking about them with you. You've got your work cut out for you, I think, in your next 5 or 10 years. There's a lot coming down the pike and we're going to look to you for a lot of advice being an advisory committee.

Thank you.

(Whereupon, at 10:03 a.m., the meeting was concluded.)

CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of:

Name of Proceeding: 483rd ACRS Meeting

Docket Number: (Not Applicable)

Location: Rockville, Maryland

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

Jonathan Zilinski
Official Reporter
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