UNITED STATES NUCLEAR REGULATORY COMMISSION

MEETING WITH THE ADVISORY COMMITTEE ON NUCLEAR WASTE AND MATERIALS (ACNW&M)

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WEDNESDAY

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The Commission convened at 9:30 a.m., Dale E. Klein, Chairman presiding.

NUCLEAR REGULATORY COMMISSION

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GREGORY B. JACZKO, COMMISSIONER

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DR. RUTH WEINER, Member

DR. JAMES CLARK, Member

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

CHAIRMAN KLEIN: Well, good morning. We're looking forward to the update today. Obviously, your contributions give us a lot of technical advice and support, so we're looking forward to your review. I should note that I think this is Bill's last meeting as an official member of the advisory committee. I think you were a charter member in 1989.

DR. HINZE: Something like that.

CHAIRMAN KLEIN: So, I think from 1989 through 1997 you were full member while being an active faculty member and then when you became an emeritus you came back in 2004. So, I think in December, the good news is you've agreed to stay on as an advisor. So, on behalf of my fellow Commissioners, I'd like to thank you for your service and your continued service.

DR. HINZE: Thank you. That's very kind.

CHAIRMAN KLEIN: Any comments before we start?

COMMISSIONER LYONS: I would just want to second that. I want to make that same comment. We really appreciate what you've done.

DR. HINZE: I appreciate it. Thanks very much.

CHAIRMAN KLEIN: Thank you very much. Mike?

DR. RYAN: Thank you, Mr. Chairman. Again, I would add on behalf --

COMMISSIONER LYONS: This may sound silly, but I'm going to fall out of this chair with some adjustment. I'm going to get another chair. I'm not sure what's happening with this chair. It's tilted at an interesting angle.

CHAIRMAN KLEIN: That's probably the Rickover chair.

DR. RYAN: Well, Bill, let me add on behalf of the Committee that your contributions have been significant and sustained and without your guidance and talent and contribution we would not have the work products that we have. So thank you very much and thanks to your wife for letting you disappear for a week a month and we appreciate all that you've done for the Committee over many decades. Thank you very much.

Good morning, Mr. Chairman and Commissioners' Lyons and Jaczko. It's a pleasure for the Committee to visit with you again and it's a pleasure for us to report on activities of the Advisory Committee on Nuclear Waste and Materials. As we did in our last briefing with you, we will focus our remarks on key items and findings and leave more time for questions and dialogue with you. Next slide, please.

Since our last briefing, the Committee has reported to you with 17 letters on a variety of topics consistent with the scope of our charter and action plan.

Additionally, we have provided two White Papers including a Low-Level Waste White Paper documenting the history of low-level waste regulations in the United States since the Ocean Dumping Act of 1962.

The Igneous Activity White Paper that will be covered by Professor Hinze is an important effort to bring the range of scientific views on this topic to the Commission to better inform its future decision-making. Recently completed is the third Reprocessing White Paper has brought together information necessary for the Committee to be well-prepared if and when recycling of nuclear fuel becomes a reality and moves to the forefront as part of the strategy for the country. Next slide, please.

Two additional White Papers are in progress. The next White Paper is on Seismic Issues Related to Yucca Mountain. The Committee finished a working group meeting last month on that topic and we're preparing that report now. Another White Paper on Decommissioning Lessons Learned is in development and will bring together the information the Committee has collected and analyzed over the last year or so and we'll be preparing that report in the next couple months. Next slide, please.

The Committee appreciates the opportunity afforded by the Commission to expand its charter to include radioactive materials other than waste. We believe this is an important addition that's complementary to the Committee's

waste charter and we believe by carefully thinking about not only waste materials, but also thinking about the types of facilities that generate them that risk informed decision-making can be systematically improved.

The Committee will continue closely to look at in-situ leach mining, enrichment facilities and processing, transportation, storage and disposal facilities, and waste determinations as part of our expanded materials charter. Next slide, please.

The Committee will also continue to evaluate issues on other topics including radiation health effects, decommissioning, materials safety, applications of risk informed performance based regulatory approaches. I will talk about the Committee's activities in a few of these topics in just a minute. Next slide, please.

The Committee is also collaborating with the Advisory Committee on Reactor Safeguards. We are considering environmental issues related for new power plant reactor applications and waste issues related to the MOX facility in South Carolina. We've participated in a couple of joint subcommittees and additionally the Committee is reviewing regulatory guides and Standard Review Plan chapters where the ACNW&M can offer particular and appropriate expertise, such as in the area of recycled nuclear fuels and other topics that may arise from shared interests with the ACRS. Next slide, please.

The Committee is planning several working groups. The first working group will be on low activity radioactive waste as part of the Committee's ongoing look at radioactive waste disposal issues. This working group is scheduled for next month.

The next working group will examine facility performance regarding landscape evolution regarding erosion and other facilities and how these issues can be evaluated in a risk informed way within performance assessments to further assess long-term performance of disposal facilities.

The Committee's final planned working group will be an examination of low dose radiation effects. The goals of this working group will be to explore the current scientific understanding of the effects of ionizing radiation; what we do know and what we do not know about health effects of radiation doses, particularly at 10 rem and below.

Additionally, we will look at scientific uncertainties and low dose risk estimates to identify strategies for future research to reduce these uncertainties. And finally, to clarify the dimension of policy issues and implications of the underlying science in support of risk informed policy and regulatory decision-making. Next slide, please.

I'd like to turn your attention to the Committee's work regarding the recent draft recommendations of the International Commission on Radiological

Protection. The Committee has written three letters on various drafts of the ICRP's guidance. Additionally, we have written a letter summarizing the state of knowledge reported at DOEs low dose workshop and an additional letter on the French Academy of Sciences report on low dose radiation affects and estimating the carcinogenic effects of low dose ionizing radiation. Next slide, please.

The Committee concurs with the NRC staff that there is no compelling public health and safety argument to change NRC regulations at this time. We eagerly await the final publication of ICRP Publication 103, which hopefully will embody and address some of the comments made by us and others in their final recommendations. It's scheduled on the website -- their website as forthcoming. We hope to see that very soon. Next slide, please.

I'd like to close on the topic of low-level radioactive waste. Next slide. All indications are that the Barnwell South Carolina low-level waste facility is moving toward closure to out of compact generates. The Barnwell site will continue to serve the compact states of South Carolina, New Jersey and Connecticut.

The Northwest and Rocky Mountain compacts will remain unchanged as we understand it. The Energy Solutions facility in Clive, Utah will continue to receive Class A waste. This seems to indicate that storage of low-level radioactive waste is likely to increase. The Committee is also working on issues related to longer term storage of Class B and C waste, particularly at nuclear

power plant sites and materials licensee's sites.

The Committee in a recent briefing learned about the Nuclear Energy Institute's efforts and plans to store Class B and C waste safely and securely at nuclear power plants, to consider operational changes of nuclear power plans to reduce Class B and C waste generation, and the NEI Executive Committee's initiatives to evaluate strategies for long-term improvements in the management of commercial low-level wastes.

This concludes my initial presentation and I'd like to now turn to Professor Hinze for his presentation on the Igneous Activity White Paper. Thank you. Professor Hinze?

DR. HINZE: Thanks very much, Dr. Ryan and good morning again, gentlemen. Next slide, please.

I will be reporting on the results of recent activities of the Committee with regard to igneous activity at the Yucca Mountain repository. Much of our work has centered on the preparation of the White Paper that Dr. Ryan mentioned in his opening remarks. I drafted this White Paper which was prepared at the end of last year and distributed to stakeholders and cognizant experts seeking their review and comments on the White Paper.

Subsequently, we held a working group meeting in which they had a chance to discuss this fully among themselves and with the Committee. Based

upon the results of that working group, we revised the working group White Paper and we published it and submitted it to you in June.

In addition to that, we have continued in this area to review the NRC staff's reports on the issue as well as review and monitor the DOE's activities with regard to the expert elicitation on the probability of volcanism at Yucca Mountain. If I may have the next slide, please.

In the White Paper entitled "Igneous Activity at Yucca Mountain: Technical Basis for Decision Making" which has been prepared at your request, we have focused on a review and analysis of the full range of views regarding the risk triplet as it applies to igneous activity. That is, what could happen, how likely is it to happen, and what are the potential consequences?

This has involved evaluation of both possible, but not mutually exclusive igneous activity scenarios, the extrusive and intrusive scenarios. Next slide, please.

The extrusive scenario involves inhalation of dispersed contaminated respirable sized ash, which is ejected into the atmosphere by molten rock erupting through the repository. The maximum effect from this scenario is calculated to be during the first thousand years after the close of the repository when the waste has its highest activity.

A current analysis, which of course is not final, suggests that the risk from

this scenario will be only a small fraction, less than 10% of the proposed EPA standard for the repository. But this is more significant than the intrusive scenario. If I may have the next slide, please.

The intrusive scenario in contrast to the extrusive involves the release of high level waste to nearby aquifers by ground water movement from the waste packages destroyed by molten rock as it intrudes into the drifts of the repository during its assent to the surface. The maximum effect from this scenario is not anticipated for tens of thousands of years due to the slow movement of ground water to the compliance location.

And as in the case of extrusive scenario, the current analysis of the intrusive scenario suggests that the risk is a small fraction -- even a small fraction of the extrusive scenario of the proposed EPA standard for the repository. If I could have the next slide, please.

In the evaluation of these scenarios, we have considered the risk triplet: nature, likelihood and consequences for the waste release. I don't need to tell you that these are complicated issues leading to credible alternative views among professionals in the area reflecting the uncertainties in the processes that are likely to occur in the future and as well as the interaction of these processes. Next slide.

Referring to the first of the risk triplet questions; that is, what is the nature

of possible igneous events? Future igneous events are anticipated to be similar in power, duration, volume, and importantly type of eruptive products to those of the 80,000 year old basaltic Lathrop Wells volcano, the most recent of the igneous events at the Yucca Mountain region and similarly to igneous events that have occurred over the last few million years in the Yucca Mountain region.

There is general agreement that the igneous activity then will involve a single episode of small volume; less than a tenth of a cubic kilometer that disperses ash over the surrounding region in response to the prevailing winds. If I may have the next slide, please.

Considering the likelihood of igneous events, there are no current indicators suggesting the occurrence of a possible igneous event in the future; no precursors. As a result, the likelihood of igneous activity is based upon previous events which are identified in geology and geophysics, their spatial and temporal pattern, primarily over the last 5 million years, although that's a subject of controversy, and extrapolating these previous events then into the future, a significant problem.

Previous igneous events suggests that the volcanism is waning, although seriously there is no universal agreement on this, but clearly the volume and the extrusive rate of the volcanism is declining dramatically over the past few million years.

COMMISSIONER JACZKO: Is that true globally or locally?

DR. HINZE: Yes, sir. I'm speaking about just in our realm in the very near Yucca Mountain region.

COMMISSIONER JACZKO: So, just in that area?

DR. HINZE: Yes, right. There is a range of roughly one chance in a billion to one chance in 10 million per year of an event intersecting the repository. Thus, the igneous activity cannot be screened out as a very unlikely event. I might say that there are ranges that go beyond that, but in general agreement.

The ongoing expert elicitation by the DOE will update the igneous event probability estimate in 2008 and this will be a useful estimate because it incorporates the most recent data and findings. Next slide, please.

An important and critical part of evaluating the consequences of an igneous event is consideration of the source term in both the extrusive and intrusive scenarios. The source term resulting from the extrusive scenario must consider the number of waste packages that are involved in the conduit, the throat of the volcano; the quantity of radioactive material that is released from those canisters; and a fraction of that waste that is released as respirable material. And there is a range of views on this source, from essentially zero to all of the waste in the waste containers that are in the conduit, the throat of the

volcano. Next slide, please.

Evaluation of the consequences of an extrusive event are based on relatively mature models. I think we all would have to agree on that, but there is a need for evolving consideration of the range of waste particle size in the ash, the fraction of the waste that is in the ash versus that which is in the lava because only the waste in the ash will be available for emulation and the preferable remobilization by water and wind that may carry the respirable ash beyond the compliance location. Next slide, please.

The consequences of an intrusive event in contrast to those of extrusive event are less well understood and no natural analogs are available for this scenario that can serve as a benchmark for evaluations. This has led to considerable differences in the intrusive consequence views on the interaction of the molten rock with the waste packages leading to their damage and destruction; the governing properties of the molten rock, their mobility, their temperature, the differential pressure which is driving the magma into the drifts; and as a result, the number of waste packages affected and the potential for secondary vents from the repository which could erupt as molten rock, lava, or as ash. Next slide, please.

In summary, we anticipate that continued analysis will decrease the uncertainties in the igneous activity processes, but there is no doubt in our minds

that credible alternative views are likely to remain, especially with regard to the source term and extrusive scenario as I just explained and the interaction of the molten rock waste packages in the repository in the intrusive scenario, which also is at the source term, of course.

But as I stated previously, the current analysis of igneous events indicates that the risk from both of these is a small fraction of the proposed EPA standard. Our path forward on this will be that we will be holding continuing discussions of evolving views on igneous activity with all of the stakeholders and also we will be reviewing the NRC's treatment of igneous activity in the recently released TPA, total performance assessment.

In addition to that, we are having continuing discussions on this full range of alternate views and their technical basis with the cognizant scientific and technical groups. This is to lead to exchange of ideas which will lead to better understanding and we hope a decrease in the uncertainties.

That concludes my presentation and I'll pass the baton to Dr. Weiner who will be discussing transportation of high level waste and in-situ leach uranium recovery activities.

COMMISSIONER JACZKO: Mr. Chairman, could I just ask a quick, clarifying question? You said the recently released TPA. What were you referring to?

DR. HINZE: 5.1.

COMMISSIONER JACZKO: 5.1. That's from DOE?

DR. HINZE: No, sir. That's from NRC.

COMMISSIONER JACZKO: From the NRC staff. Okay.

DR. HINZE: I apologize.

COMMISSIONER JACZKO: That's what I wanted you to clarify.

DR. WEINER: Thank you, Professor Hinze. I'm going to discuss two issues related to transportation of spent nuclear fuel: moderator exclusion and burnup credit. Could I have the next slide, please?

The Committee has met with staff and stakeholders to discuss both moderator exclusion and burnup credit. Moderator exclusion applies to both DOE and commercial spent nuclear fuel. Burnup credit applies primarily to commercial spent nuclear fuel. Although there are differences in the risk aspects of these two, the two issues are related in that both involve potential exceptions to 10 CFR 71.43. Next slide, please.

Burnup credit for transport of spent nuclear fuel is credit for the decrease in the probability of a criticality during transportation. Allowing burnup credit would allow more spent fuel in a single shipment and would decrease the number of shipments in a shipping campaign. The Nuclear Regulatory Commission has approved one application for actinide burnup credit and partial

credit for poisoning of the criticality reaction by fission products. Next slide, please.

Moderator exclusion is currently regulated by Part 71 and by staff guidance. It requires a showing that water cannot enter the interior of the cask during transportation under any circumstances in sufficient quantity to moderate a fission reaction. Regulations currently require spent nuclear fuel be transported in a configuration such that a criticality could not occur even if water partly or completely fills the package.

The NRC has not yet approved shipments that rely on moderator exclusion, but applications for this are expected. Could I have the next slide, please?

10 CFR 71.55 Subpart C provides the basis for moderator exclusion and Subpart E and Interim Staff Guidance 19 provide for moderator exclusion under accident conditions. Could I have the next slide, please?

The Committee has made some recommendations in this area and recommends using existing regulations for moderator exclusion and that the regulatory guidance on both burnup credit and moderator exclusion be better risk informed. The Committee does continue to study these two transportation issues and we expect to report on progress in future meetings. Next slide, please.

I'd like to now turn to a discussion of In-Situ Leach Uranium Recovery

Activities. Could I have the next slide, please?

The Committee has been asked to advise the Commission on potential rulemaking on the environmental protection issues associated with uranium recovery by in-situ leach mining; in particular, with the resolution of concerns about ground water contamination. The guidance for licensing in-situ leach facilities is currently provided in NUREG 1569, the Standard Review Plan for license application for uranium extraction facilities.

A rulemaking is currently being developed to codify these regulations primarily to protect groundwater at in-situ leach sites. Next slide, please.

The Committee recommends that the staff proceed with the proposed rule. The rule should provide the following specific guidance: guidance on location of the point of compliance with regulation; guidance on ground water monitoring requirements; on the methods of demonstrating compliance; and on financial surety. Could I have the next slide?

The rule should also provide measures to reduce the likelihood of contaminant release, the guidance on groundwater remediation, and on whether or not to establish the pre-mining background or baseline ground water quality and where this needs to be established. Could I have the next slide, please?

Finally, the rule needs to consider groundwater use in the area that surrounds the in-situ leach sites. It also needs to consider offsite effluent

disposal and the requirements for decommissioning and license termination. Could I have the next slide, please?

The Committee will continue to review progress of the rulemaking and to monitor the resolution of public comments on the draft rule. The Committee will also continue to monitor progress in resolving issues associated with in-situ leach mining like the multiplicity of regulations that apply to this activity. This concludes my presentation and I'll turn this over back to Dr. Ryan.

DR. RYAN: Mr. Chairman, I think with that presentation we'd be pleased to answer your questions and have dialogue with you and the other Commissioners.

CHAIRMAN KLEIN: Thank you very much for those helpful presentations. I guess I'll start out first with a question for you, Mike. In terms of your joint meetings with ACRS, you talked about the MOX and then some recycle. Do you have plans for future topics that you'll be going over?

DR. RYAN: Yes. I think there's two areas in particular with regard to reactors that we're certainly open and interested in how to get engaged on, one is environmental releases and their analysis and certainly any waste management questions that come up as part of new reactor licensing. So those are two specific to reactors that are also on our agenda, but we haven't yet engaged on those.

CHAIRMAN KLEIN: Thanks. The ICRP certainly has been interesting, to say the least. Where do you see that going, particularly in the international arena?

DR. RYAN: If the guidance that comes out stays as it has in these last drafts without any major changes, again, I think we'd be of the opinion that adopting them really doesn't add any net value to radiation protection practice in the United States. It's interesting in that the terminology is different, some of the structure is different and it would be a very complicated and expensive task to implement that in the United States regulatory process and for all the licensees. I'm not sure that we'd accomplish any additional radiation protection.

So, the benefit would be minimal and the cost and implementation programs would be significant. So, I don't see that. Other countries, for the most part, do adopt ICRP and have through many of its variations. So, we'd be different, but I don't think we'd be any worse off.

CHAIRMAN KLEIN: Okay, thanks. In terms of the low-level waste issue, that's going to be challenging for the whole nation as we look forward to the years ahead. In terms of space, utilities tend to have more areas for which they could store their generated waste, but other generators don't; hospitals, universities. Has there been much discussion among those communities of what their solutions may be?

DR. RYAN: I think with the availability of A Waste, a lot of the generators who are in the non-reactor category tend to generate A Waste. So, many of them still have access to disposal. The hospital and university community, from previous interruptions of disposal capacity, have also focused their activities on storage of short-lived materials for decay, which again is allowed, of course under our regulations, and then disposal of those materials with regard to their other characteristics, but not the radioactive material. There are segments of the regulated community that are okay.

I think there will be some increase in storage simply because some folks will have waste where they can't find a home. Whether other sites come along, or for example, the licensing effort in Texas; if that moves forward and somehow that becomes available to States other than its own compact States at the moment, there might be doors opening for that, but it is something certainly to be mindful of.

I agree with you that reactors tend to have firm and robust plans for on-site storage of waste. They've had to develop them; again, for past interruptions in waste disposal, but the longer it goes on, the more attention should be paid to are there any risks developing out there that need attention.

CHAIRMAN KLEIN: I think just from a national perspective, as you have more and more sites that store the material then you're more likely to have

a building catch on fire, tornadoes come through or something like that that could cause an impact.

DR. RYAN: I think that's correct and I think my view after being in that business for 25 or 30 years is the best thing to do with waste is properly dispose of it in a permanent location.

CHAIRMAN KLEIN: Well, it will be interesting to see how that one moves forward.

DR. RYAN: Indeed.

CHAIRMAN KLEIN: On the igneous activities, Bill, not being very knowledgeable on volcanoes, but I did read an article recently in that technical journal of the *Washington Post*. They were talking about the Yellowstone area as being more dynamic with rising and so forth. In terms of if there is likely to be a volcano, do you typically see an advanced ground movement?

DR. HINZE: Well, precursors are the subject of a lot of study and in the kind of activity that we have at Yellowstone, this is a much more major volcanic area than the type of volcanism, the basaltic volcanism that we see at Yucca Mountain.

Generally speaking, we would not expect to see the kind of inflation that we see at Yellowstone around a very small volcano. They come up rather rapidly from 100, 150 kilometers within the earth, what we might expect to see is some

seismic activity associated with hydrofracking of the rock pushing its way toward the surface. And that's one of our best precursors, but as I stated in my presentation, at the current time we have no evidence from precursors and we have no means of predicting thousands of years into the future.

There's been many attempts made to look for hot areas studying the velocity of the rocks at depth to see their effect upon the melting of the rocks at depth and that's still very questionable. We've covered that in the White Paper. There's still are a lot of questions regarding it and there's no definitive evidence of a hot area there, although there are people that see it. I think the consensus viewpoint is that it's not there.

CHAIRMAN KLEIN: Thanks. Ruth, obviously there's a lot of activity with in-situ mining these days as the price of uranium has gone up. What's your view of the current technical expertise of how that's done and what kind of innovative techniques might be changing over the next say five to 10 years?

DR. WEINER: We, a subcommittee of the Committee, has visited a couple of uranium leach sites and talked to a number of people who are engaged in the process. It's a well developed technology the way it is done now. I think the challenge is in remediation. Right now what appears to be done is that water is run, oxygenated water is run through the site until -- after it is no longer economic to recover uranium from it.

Hopefully, until they get back to background, but when that doesn't appear to be feasible in all cases whether that infeasibility is an economic judgment or an actual technical judgment is a question of the actual site and the operator. But from what we've seen and what we've talked about, the extraction of uranium is quite well developed, very well understood and very well done, I might add. But the remediation remains the major problem.

CHAIRMAN KLEIN: I was surprised when I had some briefings by our staff on that, how localized it is. Obviously, the curiosity was if you have one property owner next to another property owner, whose uranium are you getting. As they were describing it, it was fairly accurate.

DR. WEINER: Yes. It seems to me. I'm not a miner, but there are quite distinct paths through the ore bodies and it's also possible we've learned from some of the work done at the University of Northern Arizona that you can avoid drinking water aquifers very successfully. You don't always have communication between aquifers. It appears to be quite possible to determine where those communication channels are and thereby avoid them.

CHAIRMAN KLEIN: Great. Thank you. Commissioner Jaczko?

COMMISSIONER JACZKO: I guess I want to start with a follow-up question on a question the Chairman raised on the issue of low-level waste disposal. One of the things I know the Committee has taken a look at and I

thought maybe I'd ask some specific questions about is the use of RCRA Subtitle C facilities, in particular for some low activity waste. I know this is something on a periodic basis, the staff will use exemptions in our regulations to look at alternative disposal sites and this is one of the most natural disposal sites to think about other then, of course, an NRC or Agreement State licensed facility.

I'm wondering if anyone has specifically looked at the technical -- certainly, the technical requirements that exist under our RCRA and how they compare with the technical or performance requirements in Part 61 to see if there is -- certainly if we could show that in one case one would be bounding over another, in particular the RCRA Subtitle C facilities might be bounding in particular for low activity A Waste.

I'm wondering if that's something anyone has done or looked at or looked at some of these facilities and compared them; how they would fare under Part 61 analysis or RCRA Subtitle C.

DR. RYAN: Let me start with a general answer, if I may. I think we're going to address those and many related questions in our working group coming up in December and we're planning on a lengthy letter or White Paper that will hopefully gather all of this information together in one place so you can see a coherent picture. The short answer to your question is the answer is "yes".

The Envirocare site in Utah is an example where they have both kind of

permits. So, they actually have a RCRA Subtitle C permit, I believe it is, as well as a low-level waste, so they've actually merged the regulatory issues into combined permits so they can deal with it there.

COMMISSIONER JACZKO: Has anyone gone the other way where they've taken a RCRA Subtitles C and then they've licensed it under Part 61?

DR. RYAN: I think there are cases -- the U.S. Ecology site in Idaho which as a subcommittee where one of the staff folks visited just last week does have the capability for certain unimportant quantities of radioactive material. So, the answer is yes. They started with a RCRA facility and then added the radioactive material part.

One of the significant goals that we believe is significant for our White Paper is to pull together all the examples we can find where these kind of combined activities have been performed, whether it's an ad hoc short-term campaign for a particular project or it's an ongoing enterprise. We're working very hard to gather that information from across the country and all venues to see if we can learn a pattern or learn what's going on and maybe that study will give us, well, if we do these five things we've addressed the combined regulation of issues or try and give that some shape as we study.

We're very much actively engaged in that as we speak and we hope in a couple of short months after our working group put all that information together in

a report and White Paper to the Commission.

COMMISSIONER JACZKO: Well, I'd certainly encourage you to take a look at really trying to look from a technical standpoint of how these two statutory constructions compare and if there's kind of an overlap between them. I think that there - I don't want to say it's for sure because I'm not positive - but there might be certainly one Subtitle C facility that may have received an Agreement State license, maybe in Colorado, I think.

DR. RYAN: Yes, just recently.

COMMISSIONER JACZKO: Just recently.

DR. RYAN: I think its Clean Harbor. Is that correct?

COMMISSIONER JACZKO: I think that was the Deer Trail site or something.

DR. RYAN: Deer Trail. That's right.

COMMISSIONER JACZKO: That certainly may be another site that could be useful to take a look at how, again, how those various regulatory jurisdictions overlap.

DR. RYAN: Just one other example. In Lake Charles, Louisiana, there's a chemical waste management facility that has a NORM provision and that's in many of the oil and gas states have dealt with the NORM provisions as well. So, even though it's kind of a different area of radioactive material

regulation, it's nonetheless radioactive material.

The one interesting part is in performance assessment. Typically the EPA is a concentration-based system of regulation limitation when we go to a performance assessment and how does it behave over time. That's not irresolvable, but that's just the fundamental difference in how things are demonstrated for compliance. We have to think through that carefully. But as you say, there are many examples and we hope to pull that all together in a coherent halt.

COMMISSIONER JACZKO: I look forward to that. I think it will be very interesting. Turning to another issue, Bill, you talked a little bit about this upcoming expert elicitation coming up in 2008 on the igneous activity in the, I guess, the revaluating, the probability or the frequency of volcanic activity. I'm wondering, we've had some experience with the expert elicitation, or certainly I have in the revisions of Part 46 rulemaking for large break LOCA.

I'm wondering in the context of these kind of volcanic activities, what is the meaning when we talk about the probability and talk about the frequency? What exactly are we expecting this expert elicitation to come up with? Is it expected to be a time-base frequency or what is the meaning of that probability or some sense of an uncertainty analysis? What does that mean in that kind of context?

DR. HINZE: Well, as we both know, expert elicitation also gets at

the uncertainties as well as the answers. I, too, have participated in an expert elicitation and there are good things about it and bad things about it. I think generally it's a very excellent technique of trying to bring together, to synthesize, to aggregate, if you will the combined view of experts when one does not have the definitive processes and parameters to make it clear what the answer is. So what one does is come up with a range of views. These views give the medium value or a mean value.

COMMISSIONER JACZKO: But a mean value for what?

DR. HINZE: It's a mean value of the potential of igneous activity per a time period, per year for example. The previous expert elicitation of 1996 had a value of about 2 times 10 to the minus 8 per year as an evaluation. Actually, that's the measure of --

COMMISSIONER JACZKO: I raise this because I think -- again, I'm somewhat of an amateur at some of this risk stuff, but it's a function of this job, so you get to, I guess, be a paid amateur pretty quickly. This came up initially for me some of these ideas about what we're talking about what these numbers when I asked the question about Alpha-mode failure in reactors. It was told this was very low probability event and I probed and asked what does that mean for it to be low probability event.

I was eventually pointed to one of the, I think it's a NUREG now that was

done. It was a panel that was convened to take a look at Alpha-mode failure and the probability of that happening. It was interesting just to see what the various authors said or the participants in that panel about what the probability meant. I remember one of them had a very large number for the probabilities. It said it probably on the order 10 to the minus 2 or something like that. And went very clearly to explain what that probability meant.

To some extent, that was a measure of uncertainty in the mind of that individual about the possibility of this happening. While others produce much lower probability numbers, their numbers meant something very different. So I always find it interesting when we're talking about probabilities in these kind of contacts because, of course, we're not talking about probability in the normal sense of repeatable experiments with frequencies for occurrence that are measurable and predictable in some way, but that these are low likelihood events and these numbers are somehow a measure of the fact that this is a low likelihood event.

I guess that's not necessarily a question there, but I think it's something that we as practitioners and in using these numbers we have to be very careful about what we do with them. I don't think they're necessarily intended to be used in a strict mathematical sense of providing a frequency for occurrence.

DR. HINZE: Well, I was part of the expert elicitation on the eastern

seismic hazard study back in mid ‘80s; a long time ago. I think that was really the first one that was done. It's very interesting to watch your colleagues that you have a great deal of respect for, but you know better than they do, of course.

COMMISSIONER JACZKO: I understand that feeling.

DR. HINZE: And to see the uncertainties they put on it. There are those that are humbled and put a broad uncertainty with their findings and others that are -- you can almost tell by the personality. They are right in the uncertainties. And so, it really takes a distribution of kinds of personalities and kinds of interest.

I know I felt, we’re off igneous activity a little bit, but I felt that I was being pushed to make an uncertainty at times when I was really incapable of making that decision because as a scientist, you like to have the nuts and bolts there that you can tie together and oftentimes we don't have that. And that's exactly why we have expert elicitation to get this range of views.

To me, that's one aspect of it, but it's also an aggregation of the results and how that is aggregated. That is very critical to the achievement of meaningful results from the expert elicitation. The chap that is directing the expert elicitation for the DOE at this time was the same person that was running this for us back in the mid '80s. He's a high quality person and an honest person and I really have great respect that they are doing their best to aggregate this in

an unbiased manner. That's critical; to have an unbiased, you can't have an agenda.

COMMISSIONER JACZKO: I appreciate that and as I said, I think it's an interesting process and seems to be one that we're encountering more and more as we get into these areas where it is very difficult to come up with probabilities and frequencies.

DR. HINZE: I really think it's helpful to have people who have gone through this process because it's a very mind-bending process. I think you appreciate it more if you've gone through it.

COMMISSIONER JACZKO: Thank you. I have some other questions. Maybe I'll wait until a quick second round.

CHAIRMAN KLEIN: Commissioner Lyons?

COMMISSIONER LYONS: Well, first, thanks Mike to you and the presenters; very clear, very good presentation. As always, I greatly appreciated them. The timeliness and the clarity of your written reports is also something I very much appreciate. And just in general, I think the level of communication between the Committee and the Commission is excellent. I appreciate your focus on a subset of activities that we've all agreed are of significant priority. You'll have many compliments from me.

DR. RYAN: I might quickly add, if I may Commissioner, that the

Committee sure appreciates your vote of confidence, but I'd be remiss if I didn't mention the staff that supports us because without their hard work the three weeks that we're not here every month, we wouldn't be as successful as we are. So I want you to know they are as much a part of our team as the five folks sitting here. So, thank you.

COMMISSIONER LYONS: Thanks for noting that. As you know, an area of particular interest for me is low dose radiation affects. I appreciated your comments on that. I appreciate and I will very much look forward as you continue to follow evolution of research in that area and further White Papers in that area. I view that as a truly very, very significant area for Commission focus and to better guide the standards that we use.

One particular question on that with regard to ICRP; it happens to be on your slide 11. You changed one word as you went through slide 11 and the word you changed is "maybe" to "is". The staff view was that this is with reference to ICRP. You're quoting on 11 that "there may be no compelling public health and safety argument to change NRC regs". You, in your comments, said "there is no" and I just wanted to be sure that I'm understanding that that is the Committee's view, that "there is no", not that "there may be no".

DR. RYAN: I think there's a fine line. I think the Committee would view that there really is no compelling reason that we would have told you what

those reasons were. I mean, it is a system of radiation protection. I think we have a very robust system. In our previous letters to you we've talked about the various elements of the robust system that exists under NRC and Agreement State licensing. The record of performance is excellent.

If you look at, for example, power plants you see decreasing dose per year, a decrease in average doses and total doses and very effective management by using our dose limits as well as ALARA. It's a very active and productive program.

So, changing to a different structure and a different terminology and lexicon for radiation protection and let me not leave out changing to different units from rem and rad to sieverts and grays and becquerels. That's a promethean effort to tell the United States. At the end of a 20-year break-in it might be okay, but you've got to ask yourself is that where we want to put our resources at the present time and I think the answer is at this point we didn't see any real net benefit.

I do want to also add that I think the staff who works in this area, Dr. Cool and Dr. Holahan and others are very much in tune with the ICRP and its Committees. They certainly are aware of technical details. Now, there are things we do implement. We do look carefully at metabolic models that are put out by the ICRP and implement those as quickly as they're vetted and recognize to be a

better model for a particular element or radionuclide.

So, there are elements of it that we do pick up and use and should continue to evaluate not only from the ICRP, but from the IAEA and other international organizations where the staff participates. I'm not preaching isolationism, but being a little bit selective on the menu of things to integrate and incorporate.

So, the basic standard recommendations we have incorporated some concepts and have some of the concepts just with different words, but to take a wholesale view and just say let's go ahead and adopt publication 103, I don't think that's something that would improve our practice at all.

COMMISSIONER LYONS: I appreciate that. I just wanted to be sure that I understood the degree of definition of the Committee's reasoning. Ruth, I appreciated your comments on ISL, a subject that I've been very, very interested in. You mentioned some of the challenges associated with remediation and this may be a silly question and you can tell me if it is, but as you look at uranium ISL, are there analogs from other types of ISL mining? I don't even know if there are other materials that are routinely explored with ISL techniques that could provide analogs that would be useful in guiding our understanding of the types of remediation efforts that come up in uranium ISL.

DR. WEINER: I don't believe there are other mining techniques.

Uranium chemistry is very interesting in that you can actually do this. You can dissolve the uranium because uranium carbonate, which is the form that it comes out in, has a very significant pH dependence and you can adjust the pH very carefully to get maximum solubility and take it out. It's almost a parabolic pH dependency curve.

As I said, I'm not a miner, so I don't know. But there would be analogs in removing contaminants from the subsurface. We do remove a number of contaminants. Hanford right now has a large program in the pump and treat program in removing contaminants that have adhered to the soil. There are, of course, a number of areas where natural contamination occurs where you have a metal that naturally contaminates some water body.

We have that problem in Albuquerque. We have arsenic in the water that exceeds the EPA drinking water standards. And I think your point is very well taken. We could look at some of these processes; both the processes to remove contaminants and the process by which you would get a natural contaminant that is basically leached out of the rock. I know in the Northwest, the natural waters, natural ground waters, tend to be somewhat acidic and that's another place where you get a certain amount of arsenic leaching into the ground waters. That's an excellent suggestion.

COMMISSIONER LYONS: You broadened my suggestion to

natural analogs and I was asking about mining analogs, but just in general to the extent that there are analogs that could perhaps shed additional light on those remediation questions, I think it could be very interesting for the Committee to perhaps explore and see if there is some possible further definition there.

DR. WEINER: I think that's a very good idea. It got me to thinking. One of the things that's done now is that the leaching solution continues to be pumped through the ore body and until all of the soluble uranium is gone and until it's back to what is perceived to be background, I don't know of a case where there is an attempt to chemically alter that lixiviant solution so that you can reach background more quickly.

Right now the lixiviant -- it's basically oxygenated water and uses the carbonate in the rock. But that seems to me might be an area to explore, whether there's something you can add when you finished removing what is economically possible to remove to simply make the remediation go more quickly or more thoroughly or both.

COMMISSIONER LYONS: Well, given the extent of the probable extent of ISL in this country and probably elsewhere, I think it's probably well worth looking at. A question for you, Bill. As you talked about the intrusive events. I'm actually looking at your slide 24. On that slide and as you talked about it and this was in the context of the intrusive events. You talked about the

possibility of vents forming in conjunction with the intrusive event.

What was going through my mind was it sounded as though that was almost the worst of both the extrusive and the intrusive in the sense that it was an extrusive addition or potentially an extrusive addition to an intrusive scenario.

DR. HINZE: That's correct.

COMMISSIONER LYONS: I just wondered if even that situation would still fall within your statement that probabilities seem, with current studies, to be within acceptable limits.

DR. HINZE: Part of it relates to how mobile the magma is and whether it will extend down the drifts and have cause to erupt out into the surface at the end of a drift or at the end of a series of drifts. There is a great deal of difference about the views. There are a great deal of differences in views on the mobility of the magma and how much pressure it will have as it progresses down a drift. These are questions which we are not going to resolve, but we're going to have to consider all of them in the license application.

COMMISSIONER LYONS: Okay.

DR. HINZE: This goes back to the dogleg scenario. This is a scenario that was proposed by the staff and the Center in a publication, which I think has been pretty well discredited by everyone and it is treated rather thoroughly, I think extensively, in the White Paper.

I think the general consensus is that the dogleg scenario where the igneous event would come up, run along the drift and then rise to the surface because of the extreme overpressures has been pretty well modified to the point where -- or accepted that it just will not work.

COMMISSIONER LYONS: Thanks for the comments. I, too, will have a few more if we do a second round.

CHAIRMAN KLEIN: Just a quick question for Ruth on transportation. If you look at transporting radioactive materials, it seems there's a disconnect in our educational activities between what we normally ship; gasoline, chlorine and other things in less robust containers and then the containers that we ship radioactive materials.

Do you have any recommendations on what we should do as an agency to better educate on the transportation of radioactive materials?

DR. WEINER: I'm really glad you asked that question, Mr. Chairman. Please stop me if I go on and on too long. I recently attended the Tri-Annual International Meeting on Packaging and Transportation of Radioactive Materials. This question came up repeatedly: How do we make transportation more acceptable to the public?

Historically, the agency along with everybody else who transports radioactive material has gotten itself into a kind of dichotomous state. NUREG

0170, which was the NRC's environmental impact statement on transporting radioactive materials, devised a program which we still use today which calculates doses to a variety of receptors when absolutely nothing happens during routine transportation. And of course, the dose is calculated very small. You can calculate doses to residents by the side of the road, to people in vehicles sharing the route and so on.

The current practice of translating these doses into latent cancer fatalities by simply multiplying by a number and the number now used in the most recent environmental impact statement for Yucca Mountain is 6 times 10 to the minus 4, sends the wrong message because people here on the one hand that transportation is safe and it is. There have been no incidents at all of anyone suffering anything from radioactive releases or from the external doses during transportation.

So, on the one hand, we say it's safe. It is safe. And on the other hand, what people hear, what a member of the public tends to hear when you say, well, you got this very small dose and we multiply it by a number and that may result, that gives you a risk of cancer. All people hear is "cancer".

So, on the one hand we're telling people it's safe. On the other hand, we're telling them a truck goes by and you could get cancer from that. That's the wrong message. I think that the way to alleviate the impression that that has

given is to risk inform our risk assessments of transportation. And currently, we tend to -- in the regulatory framework this is always done -- we tend to make very conservative estimates. And it is of the doses to people both from routine transportation and transportation accidents.

The other message that I think needs to be emphasized is the Nuclear Regulatory Commission guarantees that the packaging of very radioactive materials for transportation recognizes that these vehicles will be in accidents and packages them appropriately. And this speaks exactly to the point you just made, Mr. Chairman, that we package radioactive materials because we know they're going to be in accidents and we package them to withstand accidents.

That is not uniformly done for other hazardous materials. We package radioactive materials much better, but I think the point is that the packaging is such that we can depend on it to protect the public in the event of an accident. That message I don't think gets across either.

CHAIRMAN KLEIN: Well, I would look forward to specific recommendations that you might want to pass through your Chairman as to how we might better educate and promote a better understanding so that we can reduce unnecessary fears and so the public better understands what we do and what's been done in that transportation area.

DR. RYAN: We would be pleased to take up that question. I think

on Ruth's first point of the fatal cancer risk estimates, that deserves broader attention because that's been misused in a number of areas. As the expression goes, micro doses to mega people and you come up with big numbers of cancer and in fact doing that is just technically wrong. And we need to stop doing that not only for transportation risk assessments, but in a variety of others. So, we'll be happy to be specific about transportation, but maybe take a broader view of that risk metric and see if we can help suggest ways to improve that.

CHAIRMAN KLEIN: I think that would be helpful.

DR. WEINER: There's another area that I think we can improve communication and that is when we do risk assessments of transportation, we tend to use, in fact we do use, the regulatory maximum for everything. In other words, we say that you can transport packages with an external radiation dose of 10 millirem per hour at 2 meters from the cask. Point of fact, most of them are zero dose at 2 meters from the cask. But use the regulatory maximum because that's the number you have.

That doesn't recognize that any regulation has to be conservative and that maximum is probably more than most packages will have.

CHAIRMAN KLEIN: Thank you. Commissioner Jaczko?

COMMISSIONER JACZKO: Well, I want to follow up a little bit on this and I think that there is a lot of important things you're saying Ruth and one

of the things that we need to keep in mind are the difference between what you have to do from a regulatory analysis, which often requires us to have significant margin because that's what regulators do, I guess, and an analysis to make a determination about what the effect and impact will be that's done in an extra regulatory context.

It gets to some extent to the point about the use of collective dose. I think certainly I have had concerns about the idea of collective dose. It's not something that conceptually really makes sense and it's something that's used quite a bit and part of it goes to the challenges of how we describe the effects of low dose -- cumulative low dose radiation effects. Right now, the science, as best as I can tell is murky and it's not clear -- is there a threshold, no threshold?

Again, the point I'm trying to make is that at some point, however, we have to make a regulatory decisions and right now our regulatory decisions are built upon a linear, no threshold framework. I think I'd certainly be interested in understanding how we can better make those decisions using linear no threshold from a regulatory context and then, of course, there's a separate question of extra regulatory analysis and how they use that information. I think there's a difference here in those two approaches.

I do want to touch on some of these transportation issues since we're on them. Ruth, you did make some comments about the use of moderator

exclusion, the Commission has a paper in front of us right now to do this. I think this is an area where -- it's probably going to be more of a statement than a question, but I think certainly as I look at the issue of moderator exclusion, this again gets into one of these areas where we're dealing with events that are unlikely, but yet it's very difficult to assign probabilities to them and really to do risk analysis. It's a very challenging area when we're dealing with these low probability events and really events that have never happened ultimately.

As I look at that and I think that particular issue, I'm certainly much more reluctant to make a change in the assumptions we've made about moderator exclusion. I think that a margin that we've built in that's been a very valid assumption and I think it provides good margin. It provides a good basis from which to make analysis.

I think as the staff said in their paper so that we're able to say that criticality from a moderator intrusion will not happen in an accident scenario, regardless of integrity of the cask, which generally we know should be pretty good.

I certainly was encouraged to hear your comments that this is tied very closely to the issue burnup credit. I think when I look at this issue that to me is the area where we should explore this because if the goal is to try and reduce shipments and provide a better analysis of what's happening from a criticality

perspective, looking at what fuel composition really is seems to me a much better approach where you're really dealing with actual data.

You've got fuel elements that you can look at. Various people have done experiments and have looked at this, so I certainly think that these are very closely related. Certainly from my perspective right now, the one that I would see us exploring most quickly is really the issue of --not quickly, but first, is the issue of burnup credit. Because as I said there we're talking about the physical realities of the fuel rather than an assumption we've made previously that does certainly provide margin, but nonetheless is easily quantifiable in a way that we can demonstrate that there may be improvements in criticality or performance from the fuel.

So, I think there's a lot of areas with the issue of transportation and certainly in my mind taking away the moderator, the assumptions about the moderator, is really one that is probably not necessary at this point.

If I could turn and just get in a question here just briefly. Back on an issue we touched on quite a bit, low -- disposal of low activity material and low level waste disposal. I can't help whenever we talk about that one issue talking about another issue which I think is intimately connected with is issues of decommissioning.

I know you've taken a look at some of these issues and the staff has given

us a paper looking at ways to minimize contamination and improve financial assurance for decommissioning. I'm just wonder if you all have any thoughts on that and would want to talk about that particular issue and any thoughts you have on that paper and the approach that the staff has laid down and things we should know as we're reviewing that paper.

DR. RYAN: I think we just finished a letter this week on this topic. If I may turn to Professor Clark and ask him to respond. He's the lead member in that area.

MR. CLARK: Thank you. Yesterday -- I think back to our conversation at the last briefing about decommissioning of large facilities and only having a few places to take waste that is in many cases very low contamination. From the standpoint of preventing legacy sites, trying to ensure we don't get to that point where we need a lot of money to do the decommissioning, the financial assurance of course is a piece of that and the staff has reviewed ways of doing that and we commend them for the proposal of what is a robust financial vehicle versus what might not be. It's very good.

From the other side of it, which is looking at it from the standpoint of let's try not to get to a point where we need a robust financial vehicle. We see it as having three pieces. Prevention release obviously is ideal. If you can't do that, then early detection release, and if you have a release, we think early

remediation is a piece as well.

COMMISSIONER JACZKO: I think that as I reviewed the paper the staff provided, that's perhaps the area where there's most uncertainty about our ability to impose requirements in that area. But from the Committee's standpoint, I would understand what you're saying is that that's something that can have a real benefit in terms of ultimate decommissioning is to do that early remediation of spills as soon as they happen or as close as they happen as possible.

MR. CLARK: Yes, releases to the subsurface do not get better with time.

DR. RYAN: I think we had a very good -- Jim and I had a very good dialogue with the staff on this topic and recognize that we have a different opinion. I understand their view of the regulation itself. If you protect workers at five rem per year and the boundary at 100 millirem per year and recorded your spills according to the rules of documenting those kind of events under a license, you're done.

Well, that to us just doesn't get us to where we need to be. We took counsel from the tritium task force report where very small quantities of radioactive material became very big issues very quickly. So, a compliance issue that meets a dose standards with regard to workers or a boundary fence line limit may not be good enough. I think just practical health physics thinking

says if you spill something, clean it up as soon as you can because it's no longer a problem. That's just so fundamentally sound that we have to say that to you, that that's what ought to happen.

COMMISSIONER JACZKO: I remember one of the very first Commission briefings I think I was at was a decommissioning briefing and we had the decommissioning manager from Big Rock Point and I want to almost quote him exactly, but I think he basically said the best thing you can do for long-term decommissioning is to clean up spills when they happen. That is financially the right way to go and it's also the right way to go certainly from a public health and safety standpoint, but even financially which ultimately is what draws a lot of this.

If a spill happens, plumes migrate, and more and more area may require remediation and that just becomes more and more expensive. Well, I appreciate that. I have not seen the letter.

DR. RYAN: It's just fresh off the press today. It will be up soon.

MR. CLARK: If I could amend my answer a bit, obviously decay is a factor. What we've seen in the chemical arena on Super Fund sites. I think this has bearing on the question about in-situ leach remediation as well. Is that there are mass transport processes on the subsurface in a complex heterogeneous subsurface, primarily diffusion will take the materials into areas where it takes a

long time to get them back. That's what I meant by --

COMMISSIONER JACZKO: Thank you. I appreciate that.

CHAIRMAN KLEIN: Commissioner Lyons?

COMMISSIONER LYONS: Commissioner Jaczko addressed moderator exclusion a fair bit and that was an area that I also wanted to address. I think I agree with pretty much every point, Greg that you made. I, too, am concerned with any attempt to focus on moderator exclusion as opposed to -- I think as you said getting at the more fundamental data of the burnup of the actual burnup credit and the burnup data.

I was just curious if you know where we stand on finally getting that data, which I gather is French data which DOE is supposedly getting and we keep hearing the data is coming or that DOE may buy it. Do you know where that stands?

DR. WEINER: We have not had anything beyond what you just mentioned. It's coming and DOE is intending to buy it. I would like to make a comment, though. I quite agree from a personal point of view with the points that both of you have made about burnup credit. Burnup credit is something that you can calculate. You can calculate it fairly accurately -- quite accurately and we owe that to Mr. Croff, the author of origin. Whereas moderator exclusion will always involve a degree of uncertainty.

COMMISSIONER LYONS: Or an act of faith.

DR. WEINER: Or an act of faith. You cannot guarantee the moderator exclusion, but you can pretty well guarantee -- you know much more about fuel burnup. Even in the absence of the French data, I think we can move ahead with that consideration.

COMMISSIONER LYONS: Has that Committee evaluated whether they agree that the only source of that data is this mythical French data? I find it hard to believe that there aren't other ways of getting at even fairly credible estimates of what those cross sections should be.

DR. WEINER: We haven't reached any kind of agreement that that is the only source.

DR. RYAN: It sounds like a great question for the author of origin.

DR. WEINER: I would push that to Allen.

MR. CROFF: Ruth was getting into the answer, but we haven't looked into it as to whether there are other sources.

COMMISSIONER JACZKO: Do you know what it would take to reproduce that? Is it something we could do domestically?

DR. RYAN: Well, taking it away is a homework problem. I think it's a good question. I'd like to ask your permission to maybe study a bit and come back with a more thoughtful answer. I think in general, the fact is that fuel burnup

is a very carefully tracked matter in power production. They want to get every watt out of that fuel that they can because it's expensive and they want to do it efficiently and effectively for lots of reasons.

I can't imagine that if you're burning the fuel up that you don't understand all the details of burnup including fission product poisoning and all the other issues that are attendant to it. I think what I'd like to ask is that we work collectively and take that question as an assignment.

COMMISSIONER LYONS: Mike, the way you said that is exactly what's bothering me, too. I can't understand why it is so all fire difficult to come up with this information because it is fundamental in the economics of the operation.

CHAIRMAN KLEIN: The data that I'd heard early on some of the quotes was that the mythical French data to duplicate that, whatever the mythical data may be, was expensive. But I have no idea what the tests were or what the data may be.

DR. WEINER: There's also a database at Idaho, at INEL, which tracks the condition of the fuel of a number of different fuels that are stored there and that's a database that is maintained and that is available. I think we just haven't looked at it from this point of view.

COMMISSIONER LYONS: I guess my question was just meant to

encourage that if any members of the Committee see alternative ways of getting at the same fundamental parameters, I'd certainly be very, very interested. Be nice to get the French data, but I've been here almost three years and I keep hearing about the French data that's going to come.

The only other comment I was going to make to switch gears completely is just that as we get into the next year, potentially certainly into the elections and new Congress, I would hope that the same effort that you've put into tracking current implications of GNEP and through its evolutions, I'm sure there will be further evolutions of GNEP, and I would very much encourage that the Committee continue to track whatever GNEP becomes and continue to provide advice from a regulatory perspective on future GNEPs, whatever they are called.

DR. RYAN: Maybe I could ask Allen to take a couple minutes and summarize what's in our White Paper and at this point we're kind of on hold with that in mind and then we'll take it up as the situation changes.

MR. CROFF: Thank you, Mike. We did prepare a White Paper that you have seen and an associated letter, a rather long letter and I won't go through it in extensive detail. I think the first points were to reiterate some obvious, I guess, philosophies on going forward in developing regulations in terms of risk informed probabilistic and along these lines.

Secondly, to take a look at the technology and to make some

assessments of where I guess the critical paths would be, the long lead time items, again, from a regulatory perspective and areas related to wastes and waste management, some of the unique wastes that might come forth and some of the off gas regulatory issues promise to beat long lead time items in a rather complex area and when the time looks right, I think they will deserve priority attention. Not necessarily immediately.

A third area is, there are ongoing staff efforts concerning looking at some low-level waste disposal issues and others not directly focused on GNEP that might be usefully enhanced at this point. If they're going through an analysis, for example, on depleted uranium there are a few other key radio nuclides that we're processing and recycle would bring up that have some of the same issues. How much, if any, can go to near surface waste disposals?

And finally, some regulatory and research areas that we think would deserve some attention. That in a nutshell is the highlights.

COMMISSIONER LYONS: Thanks.

MR. CROFF: Thank you.

CHAIRMAN KLEIN: Well, thank you very much for all of your hard work and your participation. These advisory Committees really help us do our jobs better in getting that additional technical insight to these complicated issues that we need to address, both as regulators and for what we think the nation

needs. We appreciate all the effort that you put in and good luck in your third retirement, Bill.

DR. HINZE: Thank you. Perhaps I won't flunk this time.

COMMISSIONER LYONS: Perhaps you can advise me.

CHAIRMAN KLEIN: Thank you very much. Meeting is adjourned.