UNITED STATES NUCLEAR REGULATORY COMMISSION

BRIEFING WITH ADVISORY COMMITTEE ON NUCLEAR WASTE (ACNW)

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THURSDAY

December 14, 2006.

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

NUCLEAR REGULATORY COMMISSION:

DALE E. KLEIN, CHAIRMAN

EDWARD McGAFFIGAN, JR., COMMISSIONER

JEFFREY S. MERRIFIELD, COMMISSIONER

GREGORY B. JACZKO, COMMISSIONER

PETER B. LYONS, COMMISSIONER

PRESENT:

MICHAEL T. RYAN, CHAIRMAN, ACNW

ALLEN G. CROFF, VICE CHAIRMAN, ACNW

WILLIAM J. HINZE, MEMBER

JAMES H. CLARKE, MEMBER

RUTH F. WEINER, MEMBER

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

2 CHAIRMAN KLEIN: Now we will move into our Commission meeting.
3 And today we will hear from the Advisory Committee on Nuclear Waste on the
4 status of the Committee's recent activities and its plans for next year.
5 The meeting, of course, is one of our periodic briefings of which the ACNW
6 has the opportunity to discuss significant matters with the Commission in more
7 depth than we normally get in briefings.
8 The Committee advises the Commission on a wide variety of nuclear waste
9 and material issues and today's meeting is focused on the risk insights and
10 emerging issues in low-level waste determinations and decommissioning white
11 paper, as well as an evaluation of the NRC Waste Safety and Technical
12 Assistance Programs.
13 So we are looking forward to hearing those briefings today. Before asking
14 my colleagues if they have any comments, I'd like to comment that this is John
15 Larkins' last meeting; that he's retiring.
16 So he's been a dedicated member of the Federal service for 37 years,
17 serving in a variety of capacities. So we wish John good luck in his future careers.
18 Also I'd like to recognize that Frank Gillespie will be joining as Executive
19 Director for the ACNW and the ACRS. Any comments from my fellow
20 Commissioners?
21 COMMISSIONER McGAFFIGAN: Mr. Chairman, I would just join in
22 congratulating John on a long and very productive career in the Federal

1 government and I wish him well in retirement.

2 COMMISSIONER MERRIFIELD: Ditto.

3 COMMISSIONER LYONS: Ditto

4 COMMISSIONER JACZKO: I would also like to wish you well, and

5 the other things as well.

6 [LAUGHTER]

7 CHAIRMAN KLEIN: Okay. With that, Dr. Ryan, we're ready to hear

8 from your Committee.

9 DR. RYAN: Thank you, Mr. Chairman. Good morning,

10 Commissioners. It's a pleasure to brief you today on the activities of the

11 Committees since our briefing last year and it was also a pleasure to cover some

12 of the Committee's activities as part of the decommissioning staff briefing on

13 Monday.

14 So, we will not overlap with that. We'll hear some new things from

15 Dr. Clarke in a few minutes. If I could have the slides, please.

16 Our accomplishments over the last year have really resulted in 15

17 substantive letters you. We held five working group meetings in support of the

18 Committee's information gathering. We believe this is an effective way for the

19 Committee to hear stakeholder and expert input to our activities. We always

20 appreciate the opportunity to do that information gathering.

21 In addition, we've coordinated that information gathering effort with some of

22 the staff's activities, particularly in the decommissioning area where we have

1 learned and heard from stakeholder input at the same time the staff has, which
2 makes our work a little bit more concurrent and current with the staff's activities.
3 We developed a comprehensive white paper on low-level radioactive waste.
4 I have a fresh, hot off the press copy just to have as a reference. And hopefully
5 that will provide you some insights on low-level waste management strategies.
6 This NUREG supports one of our letters to the Commission.
7 The Committee hopes, in addition, that this process of producing these
8 white papers will help with the Commission's goal of knowledge management.
9 We've in this case gone back to the ocean disposal activities of the early '60s and
10 tried to carefully and accurately document the entire regulatory history of low-level
11 waste management. So we hope that serves well in the years ahead.
12 We've worked hard in the areas of risk informing nuclear materials and
13 waste regulations and I'll just highlight a couple of these areas that my colleagues
14 will talk about them in more detail briefly.
15 We've looked at in-situ leach mining. We've looked at recycling issues,
16 institutional controls, decommissioning lessons learned, and of course, low-level
17 waste.
18 Next slide, please. One area of focus over the last year has been the many
19 reports from the International Commission of Radiological Protection, particularly
20 their principal guidance documents which they've drafted and redrafted several
21 times in the last year.
22 In summary, the ICRP recommendations fall into several categories. The

1 recommendations for protection of the environment, frankly, we found did not have
2 a scientific foundation; that this is a logical construct of an approach to
3 environmental protection. It really did not seem to fit into a scientific scheme that
4 we saw.
5 So, we recommend observing and seeing how they develop it over
6 time. But at this time it really doesn't offer anything that's helpful. The concepts of
7 optimization which the ICRP uses contain terminology and requirements that the
8 Committee believes serve just as well as the current ALARA regulatory
9 requirements and programs that exist under NRC regulations.
10 In fact, adopting optimization as the current ICRP concepts are put forward
11 really don't add any value and may, in fact, offer confusion to what is a robust and
12 effective program.
13 If you use it as a measure, for example, the reported values of worker
14 exposure in the industry today, we see continuing downward trends which we've
15 reported to you previously in our letter.
16 And we don't see that kind of a change would offer any improvement there.
17 It's a robust and effective program as it stands now.
18 And finally, we had to summarize that overall their draft recommendations
19 really don't provide any added value to the current radiation protection regulations
20 and programs that are in place.
21 So we'll continue to observe their drafts and review them and report to you
22 on them as they come out. I think we expect one early in 2007. So we'll be back

1 to you on this topic, but it's an ongoing activity for the Committee.

2 Based on your direction from last January, we revised our action plan. We
3 updated the plan based on directions from a Staff Requirements Memo and other
4 COMSECY communication.

5 We held working groups on decommissioning lessons learned. As a result,
6 we've focused some of our attention on modeling and monitoring and how better to
7 effectively use both of those activities together.

8 Dr. Hinze is going to report shortly on the white paper on igneous activity.
9 We are exploring a range of views on that important risk significant topic in the
10 Yucca Mountain area.

11 And we've just finished at this meeting our review and letter-writing on the
12 comparison of the French Academy of Sciences report and the BEIR VII report on
13 effects of low doses of radiation exposure, which I'll talk about briefly in a few
14 minutes.

15 Dr. Hinze, as I mentioned, will talk about the igneous activity white paper.
16 Dr. Wiener's going to talk about our efforts in in-situ leach mining, among a couple
17 other topics.

18 Mr. Croff will talk about our efforts on waste determinations and Dr. Clarke
19 will give you a preview of our decommissioning lessons learned and plans for a
20 white paper to follow up on our report and discussions of Monday.

21 Our future activities are as follows. We plan to follow the Yucca Mountain
22 pre-licensing issues with daily briefings as we can arrange them. We will tend to

1 stay focused on the risk significant issues.

2 Those include the igneous activity area, risk significant activities namely the

3 transportation, aging and disposal container issues as they develop.

4 Seismic initiated event sequences are now back on our agenda as a risk

5 significant issue and we will stay focused on these issues in 2007.

6 We'll also look at the nuclear fuel recycle initiatives using the acronym

7 GNEP for Global Nuclear Energy Partnership. We're beginning to study those

8 issues and how that information is emerging.

9 We will continue to work with the low-level waste staff on their strategic

10 assessment. Again I think that's an example of where we've worked concurrently

11 with the staff and I think it's been synergistic.

12 We've benefitted from their participation and hopefully they've benefitted

13 from out participation as well. Risk informing institutional controls, Dr. Clarke,

14 again, will cover that shortly.

15 And the West Valley Demonstration Project related to waste determinations

16 in decommissioning are also on our agenda.

17 And with that, that's my brief introduction and overview and my colleagues

18 will talk a little bit later on the next slide on low-level waste. I'd just like to make a

19 few additional points on that topic.

20 Can I have the slide, please? Thank you. We held a working group in May

21 of 2006. We reported on August 16 to you in a letter, and again, the NUREG

22 document has finally made press and hopefully that will be distributed within the

1 next couple weeks.

2 Some important points from our letter that risk informing low-level waste
3 management can be accomplished by the information we gathered and by our
4 own analysis.

5 There are four key parts for example in the regulations that can be used:
6 61.58 which gives the Commission authority to consider alternate classification
7 systems as long as the principal protection criteria are met; Part 30.11 and Part
8 44.14 again, which give the Commission authority to consider alternatives; and
9 20.2002 which also provides alternatives.

10 One of the other suggestions we heard was that it would be interesting and
11 helpful to assign performance credit for waste form, waste packaging, and site
12 design.

13 These are all issues where engineering features are now in common
14 practice where when the regulations were first drafted in the mid-70s, they were
15 not.

16 There's a lot that's evolved in the industry and if we think technically and
17 then use the regulations in Part, the industry and that community that were in our
18 stakeholder groups said that we don't need to rewrite the regulation, we just need
19 guidance and how do we use the Parts of the regulations that are out there now?

20 So, I think that's an important highlight from that information gathering.
21 They felt that we certainly could get there.

22 The mechanisms where guidance and regulatory guides or perhaps license

1 conditions or disposal requirements – they said there's a number of mechanisms
2 we can use. We just need to know what the goals need to be.
3 Next slide, please. A couple other points that would be helpful are
4 guidance for management of emerging waste streams. In the early days much
5 liquid waste was solidified in concrete.
6 Now using reverse osmosis and other techniques and with the emphasis on
7 clean cooling water and power plants, more concentrated dry solids are being
8 produced and not so much solidified concrete and not so much ion exchange
9 resins. So the waste forms and their characteristics have changed.
10 So guidance on emerging waste streams would be most helpful. One
11 aspect and a caution that we thought through and actually got some advice on the
12 staff that we need to think about is unintended consequences.
13 We all know 10 CFR Part 61 has been picked up by other regulations and
14 other laws. If any changes were anticipated or interpretations anticipated
15 evaluating potential for unintended consequences as the fingers of 10 CFR 61
16 touch other activities, would be something that would need to be assessed. That's
17 the one caution.
18 That ends my presentation. And I think with that I want to turn it to
19 Professor Hinze.
20 DR. HINZE: Thank you, Dr. Ryan. Good morning. I will be - if I
21 could have the first slide, please - I will be reviewing the highlights of the recent
22 activities of the Committee as they pertain to the potential igneous activity at the

1 proposed Yucca Mountain high-level waste repository.

2 If I could have the next slide, please. During the past several months, the
3 Committee has had very useful briefings from the NRC staff, the Electrical Power
4 Research Institute, the Department of Energy and consultants from the Center for
5 Nuclear Waste Regulatory Analysis, as well as our own consultants.

6 This has led to the preparation of an initial preliminary draft of the white
7 paper on igneous activity that you have requested from us. And also two letter
8 reports; one dealing with the igneous intrusions scenario, primarily, and the other
9 with the fluvial waterborne demobilization of radioactively contaminated ash.

10 If I could have the next slide, please. The tentative title of the -

11 COMMISSIONER McGAFFIGAN: The person in the room is one
12 slide ahead of you. Now we're okay.

13 DR. HINZE: There we are. We're in good shape. Thank you. The
14 tentative title of the white paper is Igneous Activity at Yucca Mountain: Technical
15 Basis for Decision Making.

16 The objective of this is to provide a review of the full views, as well as an
17 analysis, as they pertain to the Yucca Mountain repository.

18 We have prepared the initial draft built around the risk triplet as it applies to
19 igneous activity. That is, a chapter dealing with the potential nature of igneous
20 activity at the site, the probability, and finally the consequences to the repository,
21 the waste and dose to the reasonably, maximally exposed individual.

22 Our intention in this is to prepare a document that will be of assistance to

1 you in making technical decisions as they pertain to igneous activity at Yucca
2 Mountain.
3 Next slide, please. There are two basic igneous activity scenarios. The
4 first is the eruption scenario in which the volcano actually would erupt directly
5 through the repository.
6 And then there is the intrusions scenario in which a dike of molten rock,
7 magma, intersects the repository and interacts with the repository.
8 There are two alternative views regarding this intrusion scenario. Currently,
9 the staffs of the NRC and the Department of Energy invert a low viscosity magma
10 with significant flow of the molten rock into the repository from the intersecting
11 dike.
12 In contrast to that in our letter report to you, we reviewed an alternative view
13 that was presented to the Committee by the Electrical Power Research Institute
14 based upon a report they have prepared. And also, on information provided to us
15 by an ACNW consultant on magma dynamics.
16 This alternative view leads to a high viscosity and rapid quenching of the
17 magma. And the result is that we might anticipate a limited magma flow, molten
18 rock flow, into the repository.
19 We believe this alternative view is sufficiently viable and potentially
20 important enough that it needs a full airing and evaluation and that is what we are
21 proposing.
22 If I could have the next slide, please. The consequences of this alternative

1 view are listed here.

2 First, the magma is unlikely to flow a significant distance into the tunnels
3 and therefore interact with a minimal number of the waste canisters.

4 Secondly, the waste released from the containers that is in the tunnels may
5 be protected at least in part by quenching of the molten rock around the particles
6 of waste.

7 In addition, it is unlikely that the molten rock will flow sufficiently far into the
8 tunnels to provide an avenue for secondary breakouts or a flank eruption which
9 might carry the waste out to a secondary vent of the volcano.

10 It's also true that a lack of consideration of this alternative view may lead to
11 a conservative assessment, that is to a view of a greater release of the waste to
12 the environment.

13 We are very pleased to learn that the NESS staff is currently evaluating the
14 PERI report and we look forward to hearing their evaluation.

15 We believe that it is very important to keep an open mind on this issue until
16 all of the facts are available.

17 If I could have the next slide, please. The Center for Nuclear Waste
18 Regulatory Analysis, together with the NESS staff, have developed a model for
19 waterborne, or fluvial if you will, waterborne demobilization of contaminated ash
20 from ash distributed in the near vicinity of the repository, demobilizing that and
21 moving it to the compliance area in the vicinity of the reasonably maximally
22 exposed individual.

1 Their methodology, sediment mass balance technique, is robust and we
2 certainly support their use of that modeling technique.
3 However, we do believe that it is very important that they do complete their
4 analysis of not only the waterborne but the airborne, the so-called Eolian or the air
5 demobilization from the ash blanket near the repository to the compliance area.
6 We very much look forward to hearing their work on that. We believe
7 further that the model can be improved by incorporating the affects of infrequent
8 but large floods, floods which may carry the smaller particles, not only to the
9 compliance area, but beyond the compliance area.
10 And these particles are particularly important because they are the small
11 particles that are part of the inhalation process, where the reasonably maximally
12 expose individual receives the largest dose.
13 The last slide shows our path forward. We are in the throes - we are in the
14 process of completing the white paper on the range of views on igneous activity
15 built around the risk triplet and as part that, in support of that final completion, we
16 plan to hold a working group on igneous activity in early February which we are
17 asking the stakeholders, as well as a group of experts, to review our preliminary
18 document.
19 We want to make certain that the document that we send you is the very
20 best and the most up-to-date.
21 And finally, we look forward to reviewing and commenting to pass on to you
22 our views of the new NESS reports that deal with igneous activity.

1 And with that, I will close and pass it on to Allen Croff. Allen?

2 MR. CROFF: Thank you very much, Professor Hinze. This morning

3 I'll be summarizing the Committee's activities on Waste Disposal Technology and

4 the Standard Review Plan for Waste Determinations.

5 Can I have the first slide, please? Regarding waste determinations, we

6 reviewed the NRC staff's draft Standard Review Plan while continuing to track

7 relevant technology research and development activities.

8 Our activities concerning waste disposal technology have focused on the

9 recycle of spent nuclear fuel. In this area we tracked industry, technical, and

10 regulatory developments concerning fuel recycle while initiating activities to define

11 issues important to licensing, inspection and decommissioning of fuel recycle

12 facilities.

13 Next slide, please. Concerning the Standard Review Plan, our review was

14 based on the plan, per se, it's supporting documentation and multiple briefings by

15 NRC staff.

16 We recently sent you a letter containing our views on the Standard Review

17 Plan.

18 In summary, we believe the draft Standard Review Plan represents a

19 commendable effort by NRC staff to address a very complex topic. However, we

20 had a number of recommendations for improving the plan.

21 Next slide, please. First, the Standard Review Plan should focus the

22 reviewer on how much radioactive material will be left on site, in the tanks, and in

1 low activity waste and not on how much material has been removed from a tank or
2 from a waste stream.
3 Second, staff evaluation of a waste determination should rely on a robust
4 performance assessment, including sensitivity and uncertainty analyses, and not
5 future validation of important models or assumptions by monitoring.
6 Third, guidance concerning concentration averaging should be risk
7 informed by focusing the reviewer on whether scenarios and assumptions that
8 reflect the specific characteristics of the waste disposal site and method of the
9 disposal were used in the analysis.
10 Finally, guidance concerning the greater-than-Class C disposal
11 requirements should be risk-informed by focusing the reviewer on whether the 10
12 CFR 61 performance objectives will be met, again, for a specific waste disposal
13 site and method of disposal.
14 Can I have the next slide, please? Our efforts to track research and
15 development activities relevant to waste determinations continued in the form of a
16 working group meeting on the long-term performance of cement waste forms and
17 a letter to you on this subject.
18 The highlights of the letter are as follows. First, cement is
19 thermodynamically unstable in most environments relevant to near surface
20 disposal of waste because cement reacts slowly with carbon dioxide and water,
21 I'm sorry, and oxygen, and moist air or in the water.
22 These reactions eventually lead to cracking, increased water infiltration and

1 depletion of the capability of a tailored cement to maintain chemical conditions that
2 reduce radio nuclei mobility.
3 Second, there are substantial uncertainties in predicting the long-term
4 performance of cements. Reliable prediction of the performance of construction
5 concrete may extend to centuries.
6 Reliable prediction of the performance of cements containing waste
7 materials is likely to be shorter, although the experts were unwilling to speculate
8 on specifics.
9 Third, it appears that coupling state-of-the-art techniques for characterizing
10 materials at the molecular level with advanced computation techniques now offers
11 the possibility of interpreting the degradation of ancient cement analogs to provide
12 a basis for improving the prediction of the long-term performance of contemporary
13 cements.
14 We recommend that such studies be followed by NRC staff and supported
15 to the extent possible. An ACNW subcommittee and staff visited the Hanford site
16 with one purpose being to obtain insights concerning waste determinations.
17 During this visit, we participated in activities that describe the technical
18 status and open technical issues concerning tank cleanup, vault petrification,
19 waste retrieval technologies, waste processing technologies, and the waste
20 treatment plant.
21 Next slide, please. We've also been tracking the technical and regulatory
22 aspects of DOE’s fuel recycle program relative to NRC's interests.

1 Since we last reported to you, we acquired the services of a team of senior
2 consultants having expertise concerning nuclear fuel recycle.
3 Early this year these consultants provided a background briefing on
4 historical approaches to fuel recycle such as Purex and its predecessors. I'll
5 describe more recent activities of these consultants in the next slide.
6 We also received an initial briefing from NRC staff on licensing regulations
7 that are potentially applicable to nuclear fuel recycle facilities. This was a
8 preliminary briefing that raised many questions and which led to our plan to review
9 the planned NRC staff paper on recycle facility licensing.
10 And I'll also discuss this a little bit more in the next slide.
11 We received a substantial briefing on the Global Nuclear Energy
12 Partnership from the Department of Energy that emphasized the fuel recycle
13 technology and facilities they are planning to develop and deploy.
14 COMMISSIONER McGAFFIGAN: Which month was this? I'm just
15 teasing.
16 CHAIRMAN KLEIN: You mean which day.
17 MR. CROFT: Or, what were some of the recent changes?
18 COMMISSIONER McGAFFIGAN Version 2.357?
19 [LAUGHTER]
20 MR. CROFF: Next slide, please. As a primary basis for developing
21 recommendations concerning fuel recycle and part of our efforts on knowledge
22 management, we commissioned a white paper on this subject by the group of

1 consultants I mentioned earlier.

2 The white paper will address four topics. First, it will summarize historical

3 approaches to nuclear fuel recycle and the design of fuel recycle facilities.

4 Second, it will provide a detailed description of DOEs current baseline

5 process for fuel recycle, called Urex+1A.

6 Third, it will discuss the advantages and disadvantages of using various

7 existing or new regulations to license advanced fuel recycle facilities.

8 And fourth, the white paper will identify outstanding issues that need to be

9 addressed for the NRC to license fuel recycle facilities.

10 Yesterday the NRC staff briefed us on considerations in their analysis of

11 approaches for licensing fuel recycle facilities based on a forthcoming staff paper

12 on this subject.

13 Information from this briefing on their paper will be integrated into our white

14 paper which will then be circulated to the stakeholders for review.

15 Next slide, please. Finally, I'd like to summarize the path forward on the

16 two topics I've been discussing. Concerning waste determinations, we're

17 anticipating a briefing from NRC staff summarizing comments on the draft

18 Standard Review Plan and how they were addressed.

19 We may have additional comments on the Standard Review Plan

20 depending on what we hear.

21 In addition, we're going to continue to track development of technology

22 related to waste determinations with an emphasis on retrieval, separations and

1 waste form technology, a review of DOE reports and attending DOE workshops.

2 We plan on issuing the fuel recycle white paper and a letter based on it next

3 year. We also plan to continue tracking technology development related to fuel

4 recycle by means such as document reviews, briefings, attending DOE review

5 meetings and multipurpose site visits.

6 I'll now turn to Professor Clarke who will discuss decommissioning.

7 DR. CLARKE: Thank you, Allen. Good morning Mr. Chairman and

8 Commissioners. It's a pleasure to be here.

9 Dr. Ryan briefed you on Monday of the status of the Committee's activities

10 on decommissioning and as he indicated to you we are planning development of a

11 white paper that integrates what we've learned and the recommendations that we

12 made in the overall area of decommissioning.

13 The major areas we would examine developing a white paper are shown on

14 the slide. And I would like to take just a couple of minutes to provide an example

15 of what the Committee believes will be the outcome of the white paper.

16 In our briefing on the prevention of legacy sites, we learned that in several

17 cases actual decommissioning costs greatly exceed initial estimates.

18 We recommended the focus of preventing legacy sites beyond the

19 identification and implementation of measures to prevent releases and early

20 detection of inadvertent releases so the timely remediation could minimize soil and

21 groundwater contamination and the much greater costs incurred if remediation is

22 delayed until decommissioning.

1 We also recommended that licensees be provided with incentives, such as
2 reductions in financial assurance requirements, for taking steps to successfully
3 minimize the potential for legacy issues.
4 In our working group meeting on decommissioning lessons learned, we
5 learned that a large component of decommissioning costs has been waste
6 disposal costs and the costs due to disposal of large volumes of unanticipated
7 contaminated materials are a major contributor to that overall cost.
8 From our monitoring and modeling working group meeting, we see that
9 building confidence in models not only provides greater conceptualized codes,
10 facilities and site specific features that are important to decommissioning, but
11 enables demonstration of compliance as well.
12 This is just one example of a thread that runs through crosscutting areas in
13 decommissioning.
14 So we believe that preparation of a white paper will help the Committee
15 identify other examples of how to better manage nuclear facilities throughout their
16 lifetime.
17 This concludes my remarks. I now turn to Dr. Weiner.
18 DR. WEINER: Thank you, Dr. Clarke. I have several rather
19 disparate items to report to the Commission on.
20 If I could have the first slide, please. The Committee reviews the activities
21 of the Office of Nuclear Regulatory Research and we have had a presentations by
22 Dr. Schlomo Neuman on an extremely elegant method of accommodating

1 uncertainty in conceptual models.

2 This is a big, major problem. Although the method does not seem to have
3 applicability, it's becoming increasingly important, especially in coordination with
4 the work that Dr. Clarke reported on, on the coordination of monitoring with
5 modeling.

6 Uncertainty in both monitoring and as reflected in the models is a major
7 problem. Sometimes the uncertainties are very large so the extent to which this
8 can be rigorously mathematically incorporated is something that we look forward
9 to having a great deal utilization of.

10 In addition, we heard reports on the cooperative program with the U.S.
11 Department of Agriculture in evaluating models of groundwater recharge.

12 Can I have the next slide, please? Both of these programs, as well as other
13 programs in the Office of Regulatory Research are tailored to be responsive to
14 NRC regulatory responsibilities and the collaborative arrangements that occur
15 here really effectively leverage the very limited resources that can be put into
16 research.

17 Research is expensive. And to the extent that we can combine the work of
18 the staff with the work of other agencies, it redounds to everyone's benefit.

19 Can I have the next slide, please? A subcommittee of the ACNW
20 consisting of Professor Hinze, myself and Dr. Hamdan, visited the Crow Butte,
21 Nebraska in-situ leach mining site and Dr. Hamdan and I also attended a
22 workshop of the National Mining Association in Denver, Colorado on the question

1 of in-situ leach mining.

2 We also attended a public meeting on rulemaking. The interest that the
3 Committee has which reflects what our charge from the Commission is, is in-
4 ground water protection, since this is a method that essentially dissolves uranium
5 into water and then pumps the water out and removes it.

6 Currently, there are seven in-situ leach mining operations and two more
7 traditional uranium milling operations in the United States.

8 We have submitted, at Commissioner Merrifield's request, the trip reports
9 from our trip to Crow Butte and our meeting with the National Mining Association.

10 We plan to have a meeting for the entire Committee where we can hear the
11 views of all of the stakeholders in this activity – the industry, the Environmental
12 Protection Agency, representatives from the States, since the States have a great
13 interest in this, and particularly in-ground water protection, and other stakeholders,
14 perhaps such as the East Navajo Dine.

15 That meeting is planned for early in the year.

16 Finally, we heard from the Office of Spent Fuel Storage and Transportation.
17 They had two projects that they informed the Committee about.

18 The first was a combined project with the Office of Regulatory Research
19 which was a pilot study of the probabilistic risk assessment of moving spent fuel
20 from the fuel pools to dry cask storage.

21 We observed that this PRA was done independently by NRC staff and by
22 the PERI staff and interestingly enough they used considerable differences in

1 approach, but reached very similar conclusions.

2 In fact, even the quantitative results of the PRA were very close. The risk,

3 as might have been expected, is exceedingly small.

4 The analysis of the possible accidents, I do want to point out, was

5 deterministic rather than probabilistic. The PERI study incorporated some fault-

6 tree and parametric analysis, but essentially used a slightly different method.

7 The results of both studies, although they were expressed as latent cancer

8 fatalities per year, per cask moved, are useful for relative comparisons and we

9 found that the relative comparison was very interesting, being both a very low risk

10 and very close.

11 I would caution the Commission that the Committee feels that these results,

12 although they're reported as latent cancer fatalities, should not be interpreted as a

13 meaningful estimate of cancer probability.

14 Finally, we had a report from the Spent Fuel Storage and Transportation

15 Office on analysis of both the Caldecott tunnel fire and the Baltimore tunnel fire to

16 the extent that what might have happened had there been a spent fuel cask

17 involved in those fires.

18 The bottom line of the analysis of which we were privileged to get a draft

19 copy as well as the final copy and responses to comments, was that there would

20 have been no release of radioactive material in either case in spite of the relatively

21 long duration of the fires and the peak temperatures that were released.

22 The office received a number of comments on the draft report dealing with

1 possible loss of gamma shielding with the duration and severity of the fire.

2 Did they make is severe enough? What would happen if you're transporting

3 high burn-up fuel? How would the seals on the packages perform?

4 We really would like to commend the office for their very thorough analysis

5 of both fires and for their use of both conservative and more realistic risk informed

6 parameters to study the fires with.

7 And that ends my presentation. I'll turn it back to the Chairman.

8 DR. RYAN: Thank you, Ruth. Thank you to the other members. Mr.

9 Chairman, with that we would be happy to entertain questions and comments.

10 CHAIRMAN KLEIN: Thank you very much. I'd like to compliment

11 you not only on your work, but on your presentation. I found your presentation very

12 succinct.

13 You hit the high points and I think it really provides us a good opportunity

14 for questions. Sometimes the presentations - if you ask someone what time is

15 they tell you how to build a watch.

16 I thought your presentations today were extremely helpful at the level of

17 which we need to see what you're doing in a very diverse area, very broad.

18 DR. RYAN: Thank you.

19 CHAIRMAN KLEIN: So thank you for your presentations.

20 COMMISSIONER MERRIFIELD: Mr. Chairman, if I may inject. I think

21 John Larkins would appreciate this going out the door.

22 There have been occasions in the past, dating back when I first got here on

1 the Commission, when we had presentations that weren't quite succinct, had a lot
2 more acronyms, and I would also make an appreciation for the appropriate
3 balance there, and used sometimes unnecessarily colorful language in making
4 descriptions about the Committee's findings.
5 And I think in addition to your compliments I would also compliment for the
6 lack of acronyms and the appropriately balanced language used. And obviously,
7 that's a good success of John's having learned as well. Thank you.
8 DR. RYAN: We're trying.
9 CHAIRMAN KLEIN: Thank you very much. With that, Commissioner
10 Jaczko, will you begin?
11 COMMISSIONER JACZKO: Sure. Thank you, Mr. Chairman. I also
12 appreciate the discussion. I think it was a wide variety of topics.
13 Although I think it was interesting, if you look at a lot of the issues that were
14 discussed, so many of these issues are interrelated, I certainly would say that the
15 dry cask storage study certainly has some relevance to some of the comparisons
16 that could be made to some of the studies that are going on in the igneous activity.
17 I think it is a good sense of where we have a good understanding of storing spent
18 fuel and where I think there's still some areas of work that need to be done in
19 terms of understanding storage of spent fuel. So I think that's an interesting
20 comparison there.
21 I also think it's interesting to see some of the discussions on low-level waste
22 and some of the discussions on decommissioning and some of the discussions on

1 preventing future legacy sites.

2 Again, I think all of those issues are very closely related. I do perhaps have

3 a couple questions on that area that I would ask.

4 I think one of the common themes it seems to appear in each of those,

5 whether it's preventing legacy sites, there's always an underlying current of cost

6 considerations and the importance of reducing costs in this area.

7 One of the issues that came up at the meeting we had a few days ago was

8 looking at alternative waste disposal sites in a risk informed way.

9 Since the meeting we had on decommissioning, I came across some

10 interesting scenarios at some RCRA Subtitle C facilities that perhaps I could ask

11 you to comment on.

12 The scenario I'm talking about, apparently there's a facility in Colorado that

13 is a RCRA Subtitle C facility. It's an Agreement State, Colorado, and the facility

14 has obtained a Part 61, the Agreement State equivalent of a Part 61 license for

15 low activity A waste that they then dispose at that RCRA Subtitle C facility. So

16 perhaps it is a bit of an open-ended question, but wondering if you could comment.

17 Is that kind of scenario something you have looked at in particular in terms of

18 trying to solve some of the issues that we see with getting the cost down for

19 low-level waste disposal and for doing this in a risk informed way?

20 DR. RYAN: Maybe I can start, and then I'll ask Dr. Clarke to speak

21 to the Subtitle C issues because he has more expertise than any of us in the EPA

22 area.

1 The short answer to your question, Commissioner, is yes. I think
2 Commissioner McGaffigan on Monday pointed out that some of these facilities
3 receive materials that are infinite in half-life and carry with it hazards that are well
4 managed under their permit process.
5 COMMISSIONER JACZKO: One thing, if I could clarify, too. One of
6 the things that I think it was particularly interesting to me at this facility, was that
7 they also obtained a Part 61 license for low activity waste.
8 DR. RYAN: Exactly.
9 COMMISSIONER JACZKO: This wouldn't need to be done under
10 20.2002 alternate disposal scenario but rather their direct licensing.
11 COMMISSIONER MERRIFIELD: Which facility?
12 COMMISSIONER JACZKO: Deer Trail.
13 COMMISSIONER MERRIFIELD: What is it? Deer Trail?
14 DR. RYAN: Deer Trail. Yes. I think obtaining a license for some part
15 of what is regulated under 10 CFR 61 in a risk-informed way is certainly an option.
16 COMMISSIONER JACZKO: Do you think it's a simple option to get,
17 knowing your understanding of RCRA Subtitle C facilities, can you get to the Part
18 61. It may be restricted to low activity Class A waste. Can you get there in a
19 relatively straightforward way?
20 DR. RYAN: I think the application is simple and straightforward to put
21 together because typically the site has a well understood geohydrologic regime
22 that's been vetted for its permitting process on the other side of the house, so that

1 information is there.

2 I think just assessing what radioactive materials through a performance

3 assessment would be appropriate and what concentrations and quantities and so

4 forth would be straight forward.

5 I think the harder part, frankly, is the acceptance of that from the regulator's

6 perspective. Does the regulator have the structure and capability to address that?

7 In an Agreement State, that's typically a little bit easier.

8 I might add that in some cases in Agreement States, there are small

9 quantities of material that are disposed. There might be a small clean-up

10 operation where there's a few atoms of cobalt. And those are fairly routinely

11 considered by regulators in a number of Agreement States.

12 From my own personal experience, I can say that's true. So, it's a matter of

13 degree, quantity, and scope. As you go up in any of those, the difficulty, or

14 perhaps the bar is a little bit higher in terms of the scrutiny that that would receive.

15 But is it a viable way to go? Absolutely, in my view. Dr. Clarke?

16 DR. CLARKE: I agree completely. I would underscore Dr. Ryan's

17 comments that the wastes that are put into RCRA facilities, many of them are

18 forever. The design approaches is these facilities are state-of-the-art designs.

19 The hydro geological environment is well understood.

20 And I would add that the Department of Energy is doing this on five or six of

21 its former nuclear weapon sites. They're implementing what's called a RCRA/

22 CERCLA landfill and they're using it to dispose of clean-up materials.

1 COMMISSIONER JACZKO: I appreciate those comments. As I said,
2 I continue to believe that cost is such an important driver in all of these clean up
3 activities and often I think we're left with situations that are less than satisfactory to
4 some of the communities because the cost of moving this material is so prohibited.
5 It often may not be a technical challenge with decommissioning the site,
6 but it's simply a cost challenge for moving and storing these materials.
7 So if there are sites that we could find that would be acceptable, particularly
8 for some of the large volume low activity waste.
9 And so I thought this was a particularly unique solution where we not only
10 have the RCRA Subtitle C facility, but has the added benefit of having been
11 licensed as a Part 61 site that would also resolve some concerns that are often
12 expressed with moving some of this material to RCRA Subtitle C facilities.
13 I'll ask perhaps one more question and this isn't something that the
14 Committee - that you specifically spoke to - but I thought it might be interesting to
15 get your thoughts.
16 You touched on a little bit, Dr. Ryan, with some of your comments on the
17 ICRP recommendations. I believe one of the issues that they're grappling with in
18 the current round of recommendations is the use of collective dose.
19 I'm wondering if you could comment a little bit on your thoughts and again,
20 this is an area where I think we have - collective dose is something where I think
21 we have the advantage of being able to calculate something and the question is, is
22 it something that means anything?

1 Just because we can calculate it doesn't necessarily mean that it means
2 anything. So perhaps you could talk a little bit about that and if you think the
3 collective dose isn't really an effective mechanism, what do you think is the right
4 way to present some of the information about low dose exposures to large
5 populations?
6 How would you properly characterize that in a risk way or in a health-based
7 way?
8 DR. RYAN: Thank you, Commissioner. My non-technical view of
9 collective dose is collective dose treats 100-mile an hour wind for one hour, the
10 same as a one-mile an hour wind for 100 hours. They have different effects.
11 And that's in essence what happens with radiation at different doses and
12 dose rates. To solve the problem I think we need to change the metric to the dose
13 metric that we use in our regulation.
14 And I think when a regulation is enacted or put in place, that dose is the
15 law. That's what we need to follow.
16 You can always evaluate dose relative to other things, for example,
17 background, radiation exposure, or other kinds of exposure and look at it in terms
18 of relative measure.
19 But the problem with dose is that it actually assumes that there's absolutely
20 no repair from damage. That's not true.
21 At very low doses, it's the same at very high doses. We know that's not
22 true and so collective dose has very limited capability that I think has been taken

1 too far.

2 If I'm in a power plant and I'm doing a work activity planning, I can do it by
3 method A or B and this one has seven rem to the workers and this one has three,
4 but this one cost 10% more; I'm going to go with the 10% more and have the three
5 rem. That's a good way to manage work force exposure, but that doesn't measure
6 any kind of a risk. That's a metric for the purpose of work planning.

7 COMMISSIONER JACZKO: If you think of it for the low dose,
8 because I think that's where it's most problematic, how would you then try and put
9 some sense to the risk?

10 Should it be an individual risk basis? Is there a way that one could still try
11 and extrapolate some kind of risk information apart from the dose as you
12 suggested?

13 DR. RYAN: That is the essence of our study and effort which is
14 ongoing with regard to the BEIR VII report and the French Academy of Sciences
15 report and the follow-ups.

16 The French will tell you that at 10 rem, they believe they can't see much
17 below that, and they certainly believe they can't see much below one rem in terms
18 of risk.

19 They have set aside the question, frankly, what do we do administratively?
20 How do we deal with an administrative approach to low dose or collective dose?

21 They say if you want to use an administrative tool, that's fine, but let's not
22 confuse that with the science at these very low doses.

1 The BEIR VII integrated the policy question and the science question in
2 their final conclusion. In a further analysis, two of the academy members from the
3 French Academy Study did a further comparison of the BEIR VII report and their
4 own report and said that one result is that, it's a mis-communication of risk if you
5 try and carry it from the administrative interpretation to the science interpretation.
6 I wish I had better news, but they also forecasted that we're about a decade
7 away from really understanding the resolution of is there a threshold and if there
8 is, where is it in the dose profile?
9 We're well advanced from where we were 10 years ago. So that's basically
10 what will be in our letter to you that we're finishing up this week.
11 COMMISSIONER JACZKO: Thank you. You've used a little bit too
12 much of my time.
13 COMMISSIONER McGAFFIGAN: I think Dr. Ryan, foot noted his
14 slide on ICRP saying maybe one good element in the ICRP report, namely, their
15 comments on collective dose, which I think are consistent with the conversation
16 you just had.
17 DR. RYAN: And they're consistent with our letter on collective dose
18 that really has a relative value and some very limited assessments, but as an
19 absolute measure of risk, it's not appropriate.
20 CHAIRMAN KLEIN: Commissioner Lyons?
21 COMMISSIONER LYONS: Thank you. I'd start by echoing the
22 comments of our Chairman and of Commissioner Jaczko to thank you for really a

1 very, very succinct and excellent presentations.

2 It would be hard to list all the highlights there, but certainly the ACNW's
3 work on risk informing regulations, the discussion on reducing and accommodating
4 uncertainties in regulatory decisions, comments on the tunnel fires, the work on
5 the tunnel fires, all to me is just very, very important contributions. So, I
6 compliment you.

7 Commissioners Jaczko already started into the subject that I really wanted
8 to focus my attention on, and I'm not sure more how much more any of you might
9 be willing to add to it.

10 To me, the issue associated with the risk of exposure to low doses of
11 radiation really is of extreme importance to any number of regulatory activities that
12 we undertake here.

13 I think better understanding of those risks is fundamental to the public's
14 ability to understand many of our decisions to our ability to communicate many
15 elements of risk.

16 I think in some cases it leads to either overstatement or potentially
17 understatement in various public bodies of the type of risks.

18 In my mind, much of this comes back to the question of LNT and the extent
19 to which credibility should be associated with Linear No Threshold models.

20 I very much appreciate what you've done in the last year in terms of your
21 reviews, some of which are ongoing with ICRP and BEIR VII, which I would
22 paraphrase as saying yes, we'll use LNT but we recognize there's no scientific

1 basis for it.

2 Contrasted with the work of the DOE studies and the French Academy's,
3 which flatly would say that they already have enough data to say that the LNT
4 model is simply not appropriate.

5 You started down this path, Mike, and I would like to just explore a little bit
6 further, if any of you see ways to go further, on ways in which ACNW could try to
7 address the dichotomy - at least I see it as a dichotomy - between statements
8 being made in BEIR VII, or all the BEIR reports, but BEIR VII and ICRP as
9 contrasted with the French Academy's and the DOE work.

10 Certainly, speaking personally, I find it extremely frustrating that BEIR VII
11 elected to not consider the DOE work. The logic somehow escapes me. But in
12 any case, if any of you saw ways that ACNW with continued work, continued study
13 could perhaps lead to a more definitive statement on the extent to which we
14 should or shouldn't include LNT, I think that could be an extremely useful
15 contribution.

16 Maybe you've said everything you wanted to on this, Mike, but if you or
17 others would like to proceed further?

18 DR. RYAN: Well, I appreciate your comments, Commissioner
19 Lyons. I agree with your view for continued work going forward would be helpful.

20 The one fact I took away from the French Academy presentation was their
21 very crisp and clear separation between the fundamental radiation biology
22 questions relative to a threshold and an administrative guide.

1 They literally put the administrative decision-making off to the side and they
2 said we're going to leave that be. Now we're going to talk about the science.
3 I think that's a bit of a departure that was very clear to me in kind of a
4 refreshing sort of view. We weren't trying to argue policy with science and argue
5 science with policy thinking. That can get complicated. I think we want to explore
6 that.
7 The further thing I want to dive into in much more detail and I know the
8 Committee will certainly support it, is some of the - and we did answer your
9 question in our letter that there was some overlap of the references used, but not
10 complete overlap and certainly the more recent data from DOE that were reported
11 in abstract form in an open meeting are not in peer review publications yet and
12 some of that work did not appear necessarily in the BEIR Report.
13 There was also a timing issue. The BEIR Report had a cut-off time
14 because it went into review and publication and some of the other newer work.
15 Just because of the clock ticking at a different rate, it didn't get in and we
16 want to try and follow that, integrate that and identify any opportunities for clearer
17 thinking as we go along.
18 So we'd welcome the opportunity to continue our study in this area. I think
19 additionally we'll want to keep in touch with what ICRP is recommending and their
20 reviews of cancer risk questions and so forth, which will also be forthcoming.
21 I might also mention the National Council of Radiation Protection and
22 Measurements here in the U.S. has ongoing activities studying background.

1 They're reviewing what is the actual profile background in the U.S. with regard to
2 meta-exposure radon and other major sources.
3 So will see new information I think in the months ahead from the NCRP. I
4 think it's very important that we stay in touch with all this work as it emerges,
5 integrate our thinking and see if we can tease out a clearer path forward so that
6 we better understand the risks and better communicate them both in terms of
7 regulation and to the public.
8 COMMISSIONER LYONS: At least as one Commissioner, I think, to
9 me this is perhaps one of the most important areas where the ACNW could make
10 an immense contribution to improving the regulatory framework and as you noted,
11 the French work tended to isolate the science and the regulatory policy. And while
12 that may be very convenient from the standpoint of the report, I don't think it does
13 us very much good.
14 Perhaps if ACNW could serve to bring the science back into regulatory
15 policy, I think that would be an immense contribution.
16 DR. RYAN: We'll certainly take that charge.
17 CHAIRMAN KLEIN: Just a couple comments. A lot of discussion
18 has already been made on low-level radiation and that's, I think probably a few
19 years from now we'll all be sitting around this table with BEIR, probably 15 or 20 or
20 it just keeps going.
21 And at some point in time, there's this diminishing return on what do we do
22 regulatory-wise on these low-level exposures?

1 From a policy perspective, do you think there's anything the agency should
2 take to better educate the public on this issue that is being done?
3 DR. RYAN: If I may, Mr. Chairman, I'd like to think about that. I think
4 the answer is yes, but I'm not sure how I would prioritize that just in an ad hoc
5 thought today.
6 I think it's very important that it continue to fine translations of what is jargon
7 so that we can communicate clearly and effectively and find those analogies that
8 put risk in perspective.
9 CHAIRMAN KLEIN: I think it would be helpful if you could give us
10 you thoughts on it.
11 DR. RYAN: We will give it some thought and again I would welcome
12 some direction from the Commission and certainly work to shape an answer to
13 that question.
14 CHAIRMAN KLEIN: Thanks. On the area of leach mining, I think
15 that's an area that we can expect to see additional interest.
16 Just because as the price of uranium goes up, more people will be looking
17 for the mining opportunities. I've asked, and Commissioner Merrifield has agreed,
18 to sort of help take the lead for our agency so that we don't have dueling
19 regulations between the NRC and EPA. Do you have any thoughts on how we
20 should proceed down that path?
21 DR. WEINER: Echoing the Chairman, that's a very difficult question
22 and I'd like some time to think about that.

1 At the present time, it struck both Dr. Hamdan and Dr. Hinze and myself
2 that the agency, the NRC is really working extremely well with the States and with
3 the various stakeholders in the leach mining area.
4 There is very good, excellent communication, between the NRC staff and
5 the mining industry and the State regulators. I was quite impressed by that.
6 I think that might form a sort of template for how EPA could interact. I think
7 that the more that EPA is involved in the actual discussions with the industry and
8 with the various stakeholders, that we will come closer to a confluence of interests.
9 It struck me, and some of this is from my own experience in New Mexico,
10 that frequently the regulators have not communicated sufficiently.
11 The NRC staff that deals very closely with the mining industry, with what is
12 actually happening at the mines, has a much clearer picture of where there are
13 problems with ground water contamination and where there may not be enough
14 ground water to even monitor, let alone contaminate.
15 I think to the extent that that can be communicated to the EPA regulator,
16 that would help this regulatory framework a great deal. But I really would
17 appreciate getting back to you on that issue and thinking about is some more.
18 CHAIRMAN KLEIN: Thank you. Thanks again.
19 DR. HINZE: I was just going to add if I might to that. I think your
20 question is really central to the working group that we're proposing.
21 At this point our sample is pretty small and that's one of the reasons that we
22 are developing this working group and I think we'll be much more effective in

1 answering that.

2 DR. WEINER: Yes. We really hope to have a broad spectrum of
3 stakeholder participation in our working group so that - because there are some
4 very disparate views on how to best protect the ground water; where it should be
5 monitored, whether you protect at the well site, or whether you can move the
6 ground water, the point of compliance to the boundary. These are just some of the
7 problems that occur.

8 CHAIRMAN KLEIN: Well, thanks. Commissioner McGaffigan?

9 COMMISSIONER McGAFFIGAN: Thank you, Mr. Chairman. The
10 ICRP. The one place that I have a slight disagreement with you all is on the issue
11 of occupational dose.

12 I fully recognize that ALARA does a very good job, therefore - and this is
13 not an NRC decision, this is a Presidential decision that has to involve NRC, DOE,
14 EPA and OSHA.

15 If a future President, given governmental processes, it would be a future
16 President. If a future President were to decide to amend President Reagan's
17 guidance of, I think its 1986, and decide to go to the ICRP 60 recommendation.

18 This ICRP is merely picking up the previous ICRP - we would have to
19 accept, I think the outcome of that and it would have relatively little impact, maybe
20 we would have trouble with the backfit rule for certain licensees.

21 But the licensees now getting the doses are not the ones perfected by the
22 backfit rule, they're the folks who deal with the stuff day in and day out in the

1 materials facilities. There generally isn't a backfit. It's a nuance.

2 But I could fully understand why a future President might make that

3 decision and it isn't going to be made soon. And in order that we not be - I think

4 even Russia now has done ICRP 60.

5 We may be the only advanced developed nation that doesn't have that on

6 its books.

7 The issue that Commissioner Jaczko brought up with regard to RCRA

8 Subtitle C facilities, I entirely agree, obviously from Monday.

9 I think it's not necessarily the issue of getting a Part 61 license in addition to

10 your RCRA Subtitle C permit may be simple in some places and it may be

11 complex in others because the current behemoth that strides that area tries to

12 minimize competition.

13 Oftentimes by intervening and trying to get the public worried about very

14 low doses of radiation and get them diverted from the mercury and arsenic and

15 lead and all those wonderful things that are already in the Subtitle C facility.

16 So there's this huge political cost, I think, that potentially faces these folks,

17 even though their permits all typically allow Radium 226 up to 2,000 picocuries per

18 gram which is very hot material from the oil and gas sector and other activities, but

19 primarily from the oil and gas sector, to be disposed of at those sites very safely.

20 But the material we're talking about putting in is a lot cooler, even from a

21 radioactive perspective, than the stuff they've already got.

22 So it's sort of a peculiar thing, and then I'll transition to backing the

1 conversation that Commissioner Lyons and others have had that this issue of
2 low-level waste, the affects of low activity material, the effects of low doses is
3 something we have to find a way to communicate better to the public about.
4 The public is generally not very knowledgeable about these things and the
5 analogs you talked about, Dr. Ryan, in response to the Chairman, I think are
6 useful things.
7 I got teased at a ceremony internally. They gave me the banana license
8 last month. That's an inside joke.
9 Bananas have potassium 40 in them. If you eat enough of them you get so
10 many milligrams per year. Sleeping in a double bed with your wife, the potassium
11 40, bouncing off of each other. Usually the smaller mass person gets the larger
12 dose, but it’s a couple millirems a year.
13 Self radiation of potassium 40 is 40 millirems year. I think getting some of
14 that stuff out there - the Capitol I've measured, the Capitol from radium 226 alone,
15 I brought my microrem meter up there, is 10 times as radioactive as my office.
16 It's about 40 microrem per hour or so, if you were there 2,000 hours a year
17 you get about 80 milligrams. My office is 40 microrem per hour so I get
18 8 milligrams if I spent 2,000 hours a year in my office.
19 We've got to find a way to communicate some of this stuff so that I think
20 then it makes options like getting a Part 61 license - a Part 61 Class A license,
21 something that's more manageable.
22 On the collective dose issue, I'll just say in passing, I do entirely agree that

1 that's another - we do absolutely silly things as a nation. Maybe again the four
2 agencies could get together and say we're going to have cut-offs.
3 NASA launches a satellite to a distant planet and has to use plutonium 238
4 as an energy source. It has to. Not enough solar panels could get launched to
5 possibly get it to a distant planet.
6 You end up every time doing a calculation that involves microrems to
7 billions of people or tens of microrems to billions of people and tens of microrems
8 as we all know is an hour somewhere.
9 I just said its 15 minutes in the Capitol. It's not a calculation the President
10 should feel compelled that he has to do. But it's seized upon by those who oppose
11 launches of those satellites from Cape Canaveral to the distant planets and it's
12 silly. It's absolutely silly. So I guess I didn't get a question in, which is not the first
13 time.
14 [LAUGHTER]
15 COMMISSIONER McGAFFIGAN: Commissioner Merrifield always
16 likes to follow up when I don't get a question in.
17 CHAIRMAN KLEIN: Commissioner Merrifield?
18 COMMISSIONER MERRIFIELD: Well, I would say, starting off, I
19 want to concur with my fellow Commissioners about the value of the meeting.
20 It's very good and when we touch on important issues and I'm going to try
21 to work back through some of those. I do want to say with Commissioner Jaczko I
22 appreciate your comments on RCRA Subtitle C, as well. I think they are on the

1 mark.

2 I think historically, and Ed would back me up on this, we've been trying to

3 get the staff to think about these ways and think of other options.

4 And I think re-energizing ourselves is a good thing. So I appreciate that.

5 On the issue of the ICRP recommendations, this is pretty well plowed

6 ground today on slide five.

7 Only two things I'd say. One is relative to ICRP 60; just because everyone

8 is doing something doesn't make it good. This is my time now.

9 I appreciate your comments on that regard. The only thing that I would add,

10 perhaps to the very good things that Pete has said, we've got to engage on this.

11 We have to engage on this internationally. We as a Commission have to

12 deal with ICRP. Have to deal with our counterparts in IAEA and elsewhere.

13 I think I'd be interested in your further thoughts coming back to us. What

14 are some of the ways we can engage on this?

15 We have to be clever, we have to be smart, in terms of how we are

16 involving ourselves internationally, given the kind of recommendations you're

17 coming up with. So I'd like you to think a little further down that road.

18 Dr. Hinze, I very much appreciated the work you're doing to really push the

19 staff, to push our understanding of these issues associated with Yucca Mountain.

20 I don't have any questions, but I did want to recognize I though you brought

21 up some very good topics and asked some hard questions, which is precisely what

22 we want you all to be doing.

1 Dr. Weiner, as always, I appreciate your views on a variety of things, the
2 work on In-situ leach mining is one that as the Chairman noted I have been
3 working on for a long time and the staff has been working very hard with our
4 counterparts in the States, with their counterparts in EPA to try to come to a good
5 resolution.
6 That will be one, obviously, we can have a discussion offline about some
7 further thoughts. I think further discussion between you all and the staff at this
8 point is probably good.
9 On a question, and I guess this goes to Dr. Ryan, although Dr. Clarke, you
10 may well have some thoughts on this one as well.
11 In terms of waste streams, minimization, that's obviously an important
12 issue. I'm wondering if ACNW in light of the new reactor programs that we're
13 going down the line, whether you thought at all of how the utilities might build into
14 a new reactor program, waste minimization.
15 We went into the current program and have built improvements into that
16 significantly lower amount of waste being produced by reactors today than when
17 they first went on line 50 years ago. But there's more that would seem to me that
18 could be done and I didn't know if you had any thoughts, if you looked at that and
19 of so, if that's something you perhaps think about taking a check on.
20 DR. RYAN: There's some general thoughts that I can offer you and
21 then I'll offer a specific path forward. I think the answer is that utilities have
22 become much better at addressing waste questions.

1 We see, for example, that there are radioactive materials areas within the
2 plant are much smaller now than they've ever been before.
3 We see a high emphasis on water quality. So that all the issues of
4 maintenance become much more manageable because the contamination levels
5 are lower.
6 All of that, not only is a worker-dose issue but it's also a waste generation
7 issue. The amount of low-level waste that's been generated is much, much lower
8 than it's been in years past. So that's a very positive step.
9 Now that's operational. How they've pushed it back into design, I don't
10 frankly think we have studied the new radwaste systems or other approaches in
11 the design aspect that would further reduce it.
12 But all those things have to be considered if they're going to go to the next
13 step. But if that's something you want us to look at I'm sure we can take a look.
14 COMMISSIONER MERRIFIELD: It is worthy of discussion. I think it's
15 worthy of you all engaging with the utilities to at least find out what they're thinking.
16 This is an area which obviously in the greater scope of things that they're worried
17 about, power production. This doesn't really fall too high on their radar screen, yet
18 I think it's worthy with a relatively clean slate right now to at least inquire and see
19 whether there may be some further improvements that could be considered.
20 DR. RYAN: Thank you.
21 CHAIRMAN KLEIN: I think we pretty well covered a lot of issues.
22 We'll see if there are just any follow-up quick questions. Commissioner Jaczko?

1 COMMISSIONER JACZKO: This is more of a general question. A
2 lot of discussion, and I think good discussion and a lot of ideas about things that
3 ACNW can be doing.
4 Given a lot of uncertainties and one of your main areas of focus in the
5 high-level waste area and potential for maybe some slowdown in that area or at
6 least future static activity, I guess I could say, do you think it's time that we might
7 want to reevaluate ACNW's charter, to take a look at providing a more
8 comprehensive view of what ACNW can provide? Because I think - I don't want to
9 characterize anyone's comments, but I think I have a good sense that the
10 Commission values the work that you do in a wide variety of areas.
11 DR. RYAN: I think just to address our agenda, we have been
12 working under your direction at a shift in the last year and a half or so to be looking
13 a lot of materials issues across these broad spectrums of topics we've covered
14 today.
15 In addition to our focused efforts on the risk significant issues on Yucca
16 Mountain as we've been in this interim period with the standards development and
17 so forth. So we've made that shift.
18 I'd be remiss if I didn't recognize John Larkins' leadership in helping us do
19 that. Without his guidance and without his insights into the agency as a whole and
20 the Committee's, we would not nearly have been as efficient or effective in making
21 that transition.
22 So I think the answer that we've talked about is yes. We really view that we

1 are in the materials area as well as the waste area.

2 And I think that's helpful from the standpoint that we're on the front end of

3 what's the waste. For example, on Dr. Clarke's comments on our white paper on

4 how do we prevent legacy sites, how do we minimize waste?

5 We're kind of getting ahead of the curve on thinking about it from the

6 materials side and the operational side before we get to the waste question.

7 So the short answer to your question is yes. I think we could easily expand

8 our charter and address those questions.

9 COMMISSIONER JACZKO: Thank you. I appreciate that. Certainly

10 for one, I would think that that would be an important thing. As I said initially,

11 there's a tremendous nexus between all these things whether it's

12 decommissioning, low-level waste, preventing legacy sites.

13 I would certainly be open to examining ways to make it clear that the scope

14 of your work is broader and I think that would be helpful for the Commission.

15 Thank you.

16 DR. RYAN: Thank you.

17 CHAIRMAN KLEIN: Commissioner Lyons?

18 COMMISSIONER LYONS: I just wanted to flag one comment that

19 Dr. Clarke you made that I found particularly interesting perhaps to expand upon in

20 the future. And that's where you mentioned consideration and providing incentives

21 that could be used to avoid the creation of future legacy sites.

22 I can imagine, first, that that would be complicated. In some sense you're

1 rewarding people now for behavior that might cost more now and save money
2 later. So it might get complex.
3 But it's certainly a very, very good suggestion that I would be interested in
4 seeing the Committee further develop.
5 DR. CLARKE: Thank you, Commissioner. I believe that from the
6 presentation that we heard that thought is being given to having periodic reviews
7 for financial assurance requirements.
8 So there's a mechanism perhaps to do this in a way that as licensees
9 implement measures, it's not only in their benefit, it will take them to the end at a
10 much lower cost. But as they implement those measures there would be
11 opportunities for evaluation perhaps.
12 DR. RYAN: If I may, Dr. Clarke, just add from my own experience a
13 couple of examples as a former licensee and insured party from the American
14 Nuclear Insurers.
15 They both offer inspections and we had NRC and State license and ANI
16 inspections and every one of those focused on what's the facility going to do in the
17 future. Is it under control? Is it being well-managed?
18 I think the string that Dr. Clarke talked about is how do you take modeling
19 and monitoring and build confidence not only in current performance and
20 conformance with regulations but in the future behavior of that site.
21 It really gets to the heart of the question of well, what could an incentive
22 look like. Well, if there's a robust feeling that the facility is doing well and there is

1 some demonstration of that, perhaps the decommissioning costs funds don't need
2 to be as high. Something like that.
3 So that's just an offhand example. I think the idea of people investing
4 up-front and avoid potential for a legacy site or a large decommissioning problems
5 and costs which impose on staff time and efforts and all that, that's a structure at
6 least to think carefully about as a way forward. That's hopefully what we're going
7 to examine a little bit in more detail.
8 CHAIRMAN KLEIN: Commissioner McGAFFIGAN?
9 COMMISSIONER McGAFFIGAN: Just a couple comments on the
10 charter. I agree that your title as Advisory Committee on Nuclear Waste should be
11 changed. I think it's broader.
12 I think there's some overlap areas at the moment. ACRS got involved in
13 MOX; the MOX facility at Savannah River.
14 You guys probably have at least as much expertise as they, and on the fuel
15 cycle you're looking at the fuel cycle facilities which are going to look like the MOX
16 facilities. You divide the world between the ACRS and ACNW maybe in a more
17 rational way.
18 And the other comment, we are in the course of trying to figure out how
19 we're going to react to a continuing resolution that would extend all year.
20 NESS. You don't know what NESS and if some of your activities in FSME
21 now what they're saying, and I don't know what they're saying either in terms of
22 how to adjust.

1 But I know areas like rulemaking, just as a theoretical notion, have to get
2 delayed.
3 Some licensing activities might be delayed. There may be repercussions
4 for you all in terms of the timeliness with which you have to get us certain
5 products, because the staff won't be able to deliver to you, and therefore it may
6 take longer.
7 So I think you'll see some effects of that. So I'm saying let's run your
8 charter, but we may slow down in terms of some of your activities.
9 CHAIRMAN KLEIN: Commissioner Merrifield?
10 COMMISSIONER MERRIFIELD: Mr. Croff, so you think you won't be
11 getting out of this too easily. I do have one question.
12 [LAUGHTER]
13 COMMISSIONER MERRIFIELD: On page 23 of your slides, and I
14 appreciate the work you all are doing in looking at WIR and looking at the issue of
15 cementation. I understand the concerns being raised.
16 It sort of begs the question, if not cement to be used as a material for things
17 such as this, what do you use instead?
18 In addition to sort of asking all the hard questions about that material, is the
19 product going to be also thinking about other alternatives? Where are you taking
20 all this?
21 MR. CROFF: I hadn't intended to take it in the direction of implying
22 cement was bad or shouldn't be used.

1 Where we are taking this - some groups are starting to take credit for
2 aspects of cement that hasn't been done in the past.
3 Usually cement is regarded as a material for its strength, you hold up
4 something, you hold in something.
5 But now they're starting to look at the chemical attributes of it and look at it
6 as a hydrologic barrier and in claiming these in performance assessments. And
7 where we're going with this is trying to understand just how much credit can be
8 taken.
9 How good is it for how long? And that's the direction we're going. I
10 certainly wouldn't foresee moving away from cements to any great extent.
11 Alternatives have been looked at and some are available, but they're not
12 particularly widely used. Most of them aren't particularly expensive, either. And in
13 some applications some have gone to the extent of substituting vitrification for
14 cements for other reasons.
15 So there are other alternatives, but that wasn't our intent in doing this work
16 and in tracking this particular area. It's to inform performance assessments and
17 figure out just how far you can go.
18 COMMISSIONER MERRIFIELD: Okay. I may have sort of
19 misheard the direction you were going from the presentation and given that if you
20 just sort of go back and look at what you're intending and how you want to present
21 it. That's a little more helpful for me. Thank you.
22 CHAIRMAN KLEIN: I'd like to thank the Committee for all the work

1 you've done, very broad, very diverse. And the value that you add for us is very
2 helpful as you independently give us guidance.
3 And despite the name of your Committee, we do look at your assisting us
4 both for materials and waste. And so, the title might be misleading.
5 So on behalf of the Commission I'd like to thank you for all the hard work
6 that you do because you really do let us do our job in a better way.
7 DR. RYAN: Thank you Mr. Chairman and thank you Commissioners
8 for all of your insights in our conversation today. It helps us plan our path forward.
9 Thank you very much.
10 CHAIRMAN KLEIN: Meeting is adjourned.
11 DR. RYAN: Thank you.
12