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UNITED STATES NUCLEAR REGULATORY COMMISSION

MEETING WITH ADVISORY

COMMITTEE ON REACTOR SAFEGUARDS

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THURSDAY

June 4, 2009

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The Commission convened at 1:30 p.m., the Honorable Gregory B. Jaczko,
Chairman presiding.

NUCLEAR REGULATORY COMMISSION

GREGORY B. JACZKO, CHAIRMAN

PETER B. LYONS, COMMISSIONER

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KRISTINE L. SVINICKI, COMMISSIONER

1

2 PANEL: ACRS MEMBERS

3 MARIO V. BONACA, Chairman

4 GEORGE E. APOSTOLAKIS, Member

5 J. SAM ARMIJO, Member

6 MICHAEL T. RYAN, Member

7 WILLIAM J. SHACK, Member

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

2 CHAIRMAN JACZKO: Well, good afternoon, everyone. This is one of our
3 ACRS meetings which I think is an extremely interesting and important meeting for
4 the Commission. Your independent safety studies and evaluations for license
5 applications and a variety of other regulatory documents and guidance documents
6 serve as a vital set of fresh eyes for the Commission and an important set of
7 technical fresh eyes as well. This has been I think as usual, a very significant year
8 for ACRS and you have completed a wide variety of reviews on issues ranging
9 from operating reactors to license renewals and new reactor work as well.

10 Your work continues greatly to the agency's safety mission. I would also
11 like to acknowledge the recent reappointments of -- I probably should do better at
12 this but I'll probably mispronounce some names -- Dr. Armijo. Did I say that
13 correctly? I'm good with the J and Y's.

14 So I have a little experience with that one. And then also acknowledge the
15 reappointments of Dr. Banerjee and Dr. Powers, those were a little bit simpler. As
16 I said, the Commission has certainly benefited from your experience and others.
17 And I would also note that this is Dr. Powers 5th term and his contributions and
18 experience are certainly greatly appreciated. So unless there are comments from
19 any of my fellow commissioners, we can begin.

20 DR. BONACA: Good afternoon. I will start with an overview of ACRS
21 activities including past accomplishments, current workload and future activities.

22 Next. Among the accomplishments, we issued 16 reports since our last

1 meeting with the Commission on November 7, 2008. Topics covered by this
2 report include containment accident pressure credit issue, selected chapters of the
3 ESBWR design certification application.

4 Next, Vogtle early site permit application and limited work authorization.
5 The Technical basis for revising 10 CFR 50.46 (b) loss of coolant embrittlement
6 criteria for fuel cladding materials, and pressurized thermal shock rule.

7 Next. The regulatory guide on managing the safety/security interface.
8 Regulatory guide on cyber security programs for nuclear facilities, and finally,
9 options to revise NRC regulations based on ICRP recommendations.

10 Next. In the area of license renewal, since November, 2008, we completed
11 review of the Vogtle license renewal application and we have performed interim
12 reviews of four applications, Beaver Valley. Indian Point, TMI 1, Susquehanna and
13 performed the interim review of the NIST research reactor. Actually we completed
14 that review today, the final one.

15 Next: We have discussed with the staff the status of license renewal
16 activities, interim staff guidance and implementation of the recommendations from
17 the staff self assessment, following the Inspector General report.

18 Next: We plan to perform final review of six applications including NIST --
19 as I said we've already done -- during calendar 2009 and we will review updates,
20 the GALL report, and license renewal guidance documents. We have a keen
21 interest there and suggestions provided for improvements.

22 Next: In the area of extended power uprates, as you know, we have

1 expressed concerns with credit for containment accident pressure associated with
2 EPU's in our February 16, 2007 and March 18, 2009 reports. We plan to review
3 the Brown's Ferry Unit 1 EPU after receiving the complete safety evaluation report.

4 Next: So far as Brown's Ferry Units 2 and 3, EPU application review has
5 been deferred by the staff at the request of TVA. ACRS will review this application
6 after receiving the complete safety evaluation report.

7 Next: On new plant activities, we are quite busy there and we completed
8 the review of the SER chapters for the ESBWR design certification application and
9 provided 16 interim letters on 20 chapters. And we will review the resolution of
10 open items and the ACRS issues in the final SER.

11 Next: We completed the review of the early site permit application and
12 limited work authorization for the Vogtle plant. We are currently reviewing topical
13 reports associated with the U.S. APWR design and issued a report today,
14 actually.

15 And we are reviewing revisions to the AP1000 design control document.

16 Next: Review of the SER on the EPR design certification application
17 starting in July, 2009. There may be some changes in that schedule but not
18 because of us. We are ready. We will review the SER on North Anna COL
19 application, referencing the ESBWR design. That will begin June, 2009.

20 Next: And we will continue to interact with the NRO staff to establish a
21 schedule for the review of design certification and COL application to ensure
22 timely completion of ACRS review. We will focus on that.

1 Next: Regarding the ongoing future activities, I have four slides that contain
2 quite a number of items. I will not go through each one of them, but, on the first
3 page, clearly, we are committed to the combined license application and design
4 certification applications. We have already five subcommittees fully staffed with a
5 Chairman of the subcommittee dealing with each one of the new reactors we are
6 reviewing.

7 In the area of digital instrumentation and control systems, we continue to
8 review and provide a report.

9 Next: Here, I would like to highlight our involvement in high burnup fuel and
10 cladding issues.

11 Next page. In the safeguard and security models, we will continue to
12 support review consistent with the SRM issued by the Commission on October,
13 2003. That somewhat limited our scope of review.

14 Next: I see as important on the table, the fact that we are still involved in
15 some strainer issues – that's not fully resolved yet. We will support that area. We
16 have a subcommittee on waste management, radiation protection,
17 decommissioning and materials issues which is headed by Dr. Ryan. And we will
18 be reviewing the Watts Bar Unit 2 operating license. We have a trip scheduled to
19 the site for the later part of July. And that completes my presentation. Thank you.
20 Next presentation is by Dr. Shack.

21 DR. SHACK: Good afternoon. I will be discussing our current position of
22 crediting containment accident pressure in NPSH calculations and you will excuse

1 me if I flip the jargon around. Sometimes it will be containment accident pressure.
2 Sometimes it will be containment overpressure and sometime it will just be COP
3 credit, but they are basically all the same thing. NPSH margin -- NPSH is a net
4 positive suction head. It's a measure of the difference between the pressure and
5 the vapor pressure. Satisfactory performance of the ECCS and containment heat
6 removal system pumps requires adequate NPSH margin. In an accident as the
7 fluid heats up the vapor pressure increases, which tends to reduce the NPSH.
8 However generally there is a build up of accident pressure within the containment
9 and there's a question of whether that accident pressure can be credited as part of
10 the NPSH.

11 It's been a long standing regulatory position, Safety Guide 1.1 is the first
12 one that was issued, that one wouldn't take credit for that accident containment
13 pressure in maintaining and you should design your core cooling and heat removal
14 system so that adequate NPSH is provided to the system pumps assuming no
15 increase in containment pressure from an accident.

16 Next, please. This really provides defense in depth. It's desirable that the
17 ECCS function not depend on containment integrity so that an unexpected loss of
18 containment on integrity not lead to core melt. You can look at Reg Guide 1.1
19 provides this margin against unexpected losses in NPSH defense in depth. Most
20 plants meet Reg Guide 1.1. Some plants such as Duane Arnold, however, had
21 credit for containment overpressure in their original licensing basis.

22 In our discussions on the Duane Arnold uprate, the staff noted that in its

1 original analyses, the amount of credit was small compared to the amount of
2 accident pressure available and the duration was short. For EPU, the amount of
3 credit needed and duration was increasing.

4 Again, the intent of Reg Guide 1.1 was to ensure that the independence of
5 the ECCS function be maintained consistently for all reactors. And again, this is
6 additional margin of defense in depth.

7 We found that NPSH is a critical function that's been affected by some
8 unexpected problems that have arisen essentially with the sump strainer issue. It
9 is a complex issue. It is difficult to provide a demonstrably conservative answer to
10 the sump strainer problem. And we feel it is desirable to maintain margin to
11 address the uncertainties associated with this.

12 Next please. Now, with extended power uprates, for some plants
13 demonstrating adequate NPSH for EPU operation would require credit for virtually
14 all the predicted containment accident pressure.

15 Reliance on operator action to maintain NPSH and again, these are
16 operator actions that might be contrary to the usual expected operator actions in
17 an accident, introducing the possibility of creating an inadvertent problem.

18 Next please. And again, some of these EPU also require reliance on the
19 COP credit for a long duration again increasing the chances that you have an
20 unexpected containment loss of integrity. And in some cases even with the full
21 credit, the long duration, you still have some pump cavitation. Now, again you are
22 supposed to demonstrate that the pumps can in fact work in that cavitated region

1 but the fact remains that you are putting them outside their design basis.

2 The ACRS position on COP credit -- next please -- has been that the NRC
3 should seek to maintain the independence of the containment function and
4 accident mitigation, the defense in depth argument, and the additional margin for
5 NPSH provided by the containment accident pressure. So again, it goes all the
6 way back to Reg Guide 1.1 which again was an ACRS position in the 1970's and I
7 think we've been consistent on that since that time.

8 In our March 18, 2009 letter, we tried to set out a more explicit statement of
9 our position and exactly what information we would need to essentially look at
10 requests for COP credit. It was intended primarily to address voluntary requests
11 for a change for a licensing basis.

12 We did note that the SRP essentially asked for risk information only for
13 EPU's at the moment. We thought that that should be revised to state that if COP
14 credit was granted based on risk information, all subsequent licensing actions
15 involving COP credit should also consider that risk information.

16 Next. Our sort of first principle in dealing with a request for containment
17 overpressure is to ask that it be demonstrated that it's not practical to reduce or
18 eliminate the COP credit, the need for COP credit by hardware changes or
19 re-qualification of equipment. And again, that's consistent with the current Reg
20 Guide 1.82 Rev. 3 though it's not a new position.

21 We do feel that if credit for containment overpressure is granted, it should
22 be a limited amount in duration and again, that is consistent with the initial

1 requests for containment overpressure that were granted back in the early days of
2 the original licensing cases.

3 And finally, if operator actions are required to maintain this overpressure,
4 we have to have it demonstrated they can be perform reliably and any increase in
5 risk and possible inadvertent actions that might be taken during that attempt be
6 acceptably small.

7 Now, again this demonstration that the containment overpressure need is
8 small and short and limited in duration would require some additional analysis.

9 And so in essence, the practical effect of our letter is really to request or
10 suggest some possible revisions of the Reg Guide 1.82 which discusses long term
11 cooling and essentially an acceptable basis for granting a COP credit.

12 And again, we would continue to use the current guidance in 1.82 Rev. 3
13 where you look at licensing base analyses with associated conservatisms, a range
14 of design basis and licensing basis analyses, to show that available NPSH
15 exceeds that needed for the ECCS and containment heat removal pump.

16 So the current requirements will be there. They would be a final back stop
17 limit that we would not propose going anywhere beyond that. If the COP credit
18 based on those licensing basis analysis is not small and limited in duration, we
19 think that the Reg Guide 1.82 should be revised to request additional analyses and
20 information to demonstrate that the large amount and the long duration is really
21 due to conservatisms in the analyses and in realistic terms, that you are really
22 asking that the amount of COP credit is in fact small and limited in duration if we

1 looked at it realistically.

2 Again, next slide: Such information that we would look for in being provided
3 would be thermal hydraulic analysis that reduce conservatism but again, if you
4 reduce conservatism, you still have to address the problem of uncertainties. We
5 could also attack it from a PRA basis where we would look at the scenarios where
6 large COP credit was needed and show that they were very unlikely or very
7 infrequent.

8 Again, the whole goal here is to preserve the margin except in a few
9 unlikely situations.

10 Again, an extensive look at operator actions if they are required. We want
11 to show that they are implemented in procedures, can be performed reliably, and
12 any resulting increases in risk from operator errors would be small.

13 In the Reg Guide 1.1 essentially, there is no credit for containment
14 overpressure. We have tried to give some flexibility here through these additional
15 analyses looking at the frequency basis and the realistic estimate of the amount of
16 COP credit. Whether that should be granted, we have not tried to provide a set of
17 numbers. Zero is an easy number, none.

18 But, we think that it is an integrated decision-making that considers just
19 what less conservative estimates of the COP credit are and the likelihood of the
20 scenarios that require the COP credit and the operator actions and again it would
21 be a combination of those.

22 Next, please. We don't think there is anything new in our March 18, 2009

1 letter. If you go back and look at our previous presentation that Mario made on
2 containment overpressure credit, you will find that we are basically looking for
3 similar kinds of information both to show that the amount is small or if the amount
4 isn't small, that the likelihood that you need it is very low.

5 Again, the real goal was to help with development of a Revision 4 of Reg
6 Guide 1.82 that we think would provide the kind of information you need to make
7 an informed decision as to whether the COP credit is acceptable or not.

8 We've had a briefing on the draft of the staff's white paper on COP credit.
9 While comprehensive and giving a good history; it did not resolve our concerns.

10 One thing I should mention of course is in the review, I've been talking
11 generalities and principles at the moment. Again, in any particular application for
12 credit, we would also be concerned that the fidelity of the containment and core
13 calculations needs to be taken into account. We have to believe the calculations
14 that demonstrate these needs.

15 And again, we don't feel that we are asking for impossible things. The BWR
16 Owner's Group has submitted and the staff is reviewing a more realistic
17 methodology for evaluating COP credit. We haven't reviewed that yet and we
18 have not seen the staff's review of that yet, but it seems that at least the industry is
19 moving towards analyses that address some of our concerns. We are awaiting
20 their safety evaluation of the BWR methodology. That's all I really have to say on
21 containment accident pressure.

22 DR. BONACA: The next presentation will be from Dr. Armijo.

1 DR. ARMIJO: Good afternoon. In March of this year, we reviewed the draft
2 final rule 10 CFR 50.61a, the alternate fracture toughness requirements for
3 protection against pressurized thermal shock events. We recommended that the
4 rule be approved. We made two additional recommendations which I will discuss
5 shortly.

6 The draft rule is a voluntary alternative to the current rule and is applicable
7 to all operating PWRs. The draft rule is intended to ensure the integrity of
8 irradiated embrittled reactor pressure vessels during PTS events that produce
9 rapid cooling of their inner surfaces.

10 Sufficient cooling can produce thermal stresses capable of propagating
11 brittle cracks through the radiation hardened vessel material.

12 Application of the evaluation processes in the rule resulted in a through wall
13 cracking frequency metric. The acceptable limit on the through wall cracking
14 frequency has been established as 10^{-6} per reactor year.

15 Next slide. To comply with the rule, licensees are required to demonstrate
16 that the flaw distributions in their vessels are consistent with those used by the
17 PTS re-evaluation project. This requires verification by non-destructive
18 examination methods and analyses.

19 In the event the plant specific flaw distribution is not bounded by that used
20 in the re-evaluation project, the applicants must submit supplementary analyses
21 showing that the through wall cracking frequency remains less than 10^{-6}
22 per reactor year.

1 The rule contains correlations for the embrittlement of vessel materials
2 based on the best current understanding of known mechanisms. However, to
3 assure that the unexpected embrittlement phenomena are detected, as plants age,
4 the rule will requires that surveillance data from specific materials in each vessel
5 be evaluated for consistency with the predictions from these correlations.

6 Next slide: The initial phase in the development of technical basis for the
7 rule consisted of a detailed 3 plant study. The study included evaluations of a
8 Westinghouse, Combustion Engineering and Babcock and Wilcox plants. Despite
9 differences in designs and operating procedures among these plants, the PTS
10 challenges were found to be very similar.

11 The 3 plant study also showed that the medium and large break loss of
12 coolant accidents were the dominant contributors to through wall cracking
13 frequency for sufficiently embrittled vessels.

14 Further, it was found that the severity of the PTS was largely independent
15 of break size for breaks greater than 5-inches in diameter.

16 The reason for this is that the thermal stresses induced by the rapid cooling
17 of the vessel ID are controlled by the thermal diffusivity of the steel and its wall
18 thickness and are not significantly affected by other system variables. Because
19 the medium and large break loss of coolant accident frequencies are comparable
20 in PWRs, the likelihood in severity of the PTS challenge in other plants were
21 expected to be comparable to those determined in the detailed study.

22 Next: A generalization study was performed to confirm these expectations.

1 Staff evaluated the variability of the PTS challenges from internal events for 5
2 additional PWRs.

3 The staff found that the likelihood and severity of these challenges caused
4 by internal events were consistent with those in the detailed study.

5 Next slide: In addition, a bounding analysis of the effects of external events,
6 such as seismic events on probability of vessel failure was performed during the
7 generalization study. This analysis demonstrated that the external event
8 contribution to the probability of vessel failure due to PTS was lower than or
9 equivalent to the internal event contribution.

10 This finding together with the results of the Generalization Study led to the
11 conclusion that the likelihood and severity of PTS challenges found in the detailed
12 study were applicable to plants in the five plant study and by inference to all
13 PWRs.

14 Next slide: Based on the findings of the detailed study and the
15 Generalization Study, staff concluded and we agreed, that there is reasonable
16 assurance that the results of these studies can be generalized to all plants without
17 the need for plant specific evaluations of the frequency and severity of PTS
18 challenges.

19 Next slide: As mentioned earlier, the rule includes the requirement that
20 applicants perform inspections and analysis and verify that the flaw distributions in
21 their vessels are consistent with those used in the detailed study.

22 The flaws of interest are smaller in size than those usually addressed in the

1 ASME code, governing the inspection of pressure vessels. The staff believes that
2 the current inspection methods are sufficient to characterize the flaws of interest
3 but no documentation of the basis for this conclusion is available.

4 For this reason, we recommended that the staff undertake an effort to verify
5 and document the capability of non-destructive examination procedures used to
6 characterize the flaw distributions in vessels during in-service inspections.

7 Next chart. We support the requirement that the licensees analyze vessel
8 surveillance data to ensure that the properties of their vessels are consistent with
9 expectations and to ensure detection of new or unexpected embrittlement
10 mechanisms as vessels age.

11 However, in view of the limited number of remaining surveillance samples,
12 we recommended that the staff review their availability and develop a plan for their
13 most effective use.

14 The draft final rule is the culmination of over ten years of in depth research
15 and analysis by the PTS re-evaluation project team.

16 In closing, I would like to note that the ACRS commended the staff for the
17 outstanding technical work and for the thoroughness of the multi disciplinary effort
18 that led to the development of the new rule. Thank you.

19 DR. APOSTOLAKIS: The subject is digital I&C. Next slide, please. We
20 reviewed Regulatory Guide 571, cyber security programs for nuclear facilities, and
21 also two interim staff guidance No. 5, highly integrated control room human factor
22 issues, and number 6, licensing process.

1 Our letter dated March 19, 2009 deals with Regulatory Guide 571. This
2 guide was issued to support 10 CFR 73.54 which requires the licensees to protect
3 or to demonstrate that they protect digital systems with high assurance.

4 We found that the guide really repeated the requirements that are in the
5 rule without really providing any real guidance. And the reasons that were given to
6 us for this were several; among them, that the issue is very sensitive, that we don't
7 want to provide advice regarding the vulnerabilities to outsiders, and that the
8 technology changes very rapidly so if we provide advice now, that may be
9 obsolete a year from now.

10 The committee was very sympathetic to those concerns but also believes
11 that the guide can be made more useful. And we recommended as shown on this
12 slide, that the staff provide in the guide reference framework that would identify the
13 -- no, the previous slide please -- that would identify the critical assets, the
14 functions they perform -- previous slide. One more back. That's it. Thank you.

15 The critical assets, the functions they perform, how they are supported by
16 the infrastructure in the plan, how they communicate with each other and this
17 would be at a fairly high-level and this is fairly stable. We don't exactly this to
18 change as the technology of digital I&C changes but that would be a useful
19 framework within which further advice can be given.

20 Next slide, please. As I said, the guide really in its final form was not
21 specific enough and what was interesting is that when it was in a draft form as DG-
22 5022, it did have a lot of examples and specific guidance as to how the

1 requirements or the rule can be met.

2 So the committee asked the staff to go back and do something like this with
3 the guide before it is issued. And we also recommended that -- we were given a
4 couple of examples that we felt were from non real time information technology
5 system architectures and we recommended that additional examples be given that
6 deal really with digital I&C in nuclear facilities where the specific features of those
7 would be taken into account, for example, one way communications.

8 Next slide, please. In our letter dated April 29, we -- which was in 2008, we
9 requested that the staff look into three things to do a threat assessment and
10 dependency analysis and clarify how the insights from a probabilistic risk
11 assessment could be used in dealing with digital I&C.

12 The regulatory guide is silent on this so we recommended in the same letter
13 that the staff revisit those 3 issues and express their views on this.

14 In the letter -- next slide please -- yes, in the letter dated April 21, 2009, we
15 commented on ISG 5 and ISG 6. Interim Staff Guidance 5 deals with credit in
16 manual operator actions in the context of diversity and defense in depth. Interim
17 Staff Guidance Number 2 which had been issued earlier said that the credit for
18 operator actions could be taken only if the available time for action was at least 30
19 minutes. The industry objected to that and the ACRS also had some concerns of
20 why 30 and not some other number. Although we did acknowledge that the staff
21 had to pick a number, you always have to do something like that.

22 In any case, in ISG 5, the staff comes back and makes this inequality that

1 the time available to operators for action should be greater than the time required
2 for action, which is a good idea of course. Since we are not doing this
3 probabilistically, we have to convince people that it is two times different by a
4 significant amount. And what we are asking here on Slide 49 is that the estimation
5 of the time required should be more rigorous. We can't just say well we'll consult
6 various sources, ask some operators and give a number.

7 The time available of course will come from engineering analysis using
8 computer programs and so on. So we suggested that the staff provide more
9 guidance there. And one example is to go back to the so-called SHACK Report,
10 nothing to do with Dr. Shack here. It is a senior Seismic Hazard Analysis
11 Committee Report that dealt with expert opinions and we view the process of
12 asking operators regarding these time as eliciting the opinions of experts. And
13 there is a structured approach out there. It was supported by NRC, DOE and
14 EPRI so why not go to these sources and give more guidance on how to do it?

15 Of course in the deterministic world, as the two times come closer to each
16 other -- thank you for the slide -- one has to be convinced that indeed the time
17 available is longer than the time required, so as the time - as the difference
18 becomes smaller, we stated that obviously, you need to be more convincing that
19 this is the case and increase the rigors in the analysis required.

20 And finally, our comment on the next slide deals with Interim Staff Guidance
21 6 and we requested revision of two sections. And of course, this interim staff
22 guidance deals with the scope of the information that is required to be submitted

1 by the applicant so that the NRC reviewer will have sufficient information to make
2 informed judgments.

3 And we felt that the design detail that is required as stated in this ISG is not
4 detailed enough and we went into the deterministic behavior following the signal
5 from the sensors all the way to the actuators. And most importantly, what kind of
6 information needs to be submitted to convince the reviewer that the redundant
7 digital I&C trains are indeed independent. And with that, we will turn it over to Dr.
8 Ryan.

9 DR. RYAN: Good afternoon. The staff provided a detailed briefing to the
10 committee regarding a history of radiation protection guidelines and regulations in
11 their evolution over time.

12 They also provided a second briefing specifically presenting the options for
13 a path forward for agency choices. These included making no changes to the
14 existing regulatory framework, updating parts of the regulations not previously
15 revised to conform with 10 CFR 20 concepts based on earlier ICRP documents 26
16 and 30, and third, to begin to further align the NRC's regulatory framework for
17 publication 103.

18 Next slide, please: The staff in an SRM of course was directed to address
19 Option 3 which would begin to move toward greater alignment between 10 CFR
20 Parts 20, and 50 and Appendix I of Part 50 with recommendations in ICRP 103.

21 That would better unify the system of dose calculation and recording that
22 we have a wide array of different forms and regulations today. The committee

1 also concurs with the staff's position that the NRC's current regulatory framework
2 continues to provide adequate protection for health and safety for workers, the
3 public and environment.

4 And finally, the committee appreciates the Commission's agreement with its
5 recommendations that the staff should continue to monitor international
6 developments in this regard and keep the Commission informed and NRC should
7 not develop separate radiation protection regulations for plant and animal species.

8 Next slide, please. I would like to turn your attention now to my comments
9 on the Independent External Review Panel's report that it provided to you on
10 March 11, 2008. I will just recall for those that don't know Mr. Tom Hill, a former
11 state regulator from the State of Georgia and Mr. Ben Nerud from the Defense
12 Threat Production Agency, were part of that panel. I'm happy to report that the
13 staff has addressed the panel's recommendations quite well, and has addressed
14 the agency's pre-licensing guidance, licensing procedures and processes and the
15 good faith presumption that underpins the NRC licensing process.

16 Second, they addressed the panel's assessment of vulnerabilities
17 concerning the NRC's licensing and tracking programs for import, export and
18 specific and general licenses. And finally they addressed the agency's ongoing
19 byproduct material security efforts in other areas. Most importantly, the staff has
20 developed interim -- the next slide, I'm sorry -- most importantly, the staff has
21 developed interim staff guidance that addresses increased requirements for new
22 applicants including background investigations, on-site visits and other activities to

1 strengthen the initial licensing process for a new applicant.

2 This weakness was the one exploited by the GAO. This guidance
3 addresses issues that the panel raised about the presumptions of good faith for
4 new applicants and it's important to add a note that the panel concluded that a
5 credible and satisfactory record of performance supported by inspection can be
6 relied upon for existing licensees.

7 Next slide, please: The staff is moving toward the integration of a national
8 source tracking and web based licensing system as key components for the
9 licensing verification system. This combined system will eventually be a realtime
10 system that will afford the agency and Agreement States capabilities to have
11 realtime information regarding licensed materials and changes to licenses.

12 While in principle, this is straight forward, in practice this will involve the
13 integration of the developing national source tracking system, and the web-based
14 licensing system at NRC into the license verification system with each of the
15 programs and all of the current 26 Agreement States and perhaps two new states
16 in the months ahead.

17 It is an important step since it is the Agreement States that have authority
18 over most of the material licenses that will be involved. The NRC has
19 approximately 3400 material licensees and the Agreement States have
20 approximately 19,000. Staff uses the IMPEP Program for review and comment
21 regarding Agreement State programs. This program provides a mechanism for
22 ongoing assessment and feedback regarding staff initiatives and the Agreement

1 States implementation of these new requirements. Several years ago, the ACNW
2 did a review of the IMPEP Program and found it to be quite robust and capable of
3 making these assessments.

4 Next slide, please. Staff agreed with the panel's recommendation regarding
5 a risk-informed approach to physical security requirements. Staff is currently
6 gathering information from lessons learned from licensees, state regulators and
7 local law enforcement and assembling this information into a good practices
8 document. I'm sure when this effort is complete, they will have great insight from
9 that information gathering activity.

10 Staff has integrated this activity with planned rulemaking for larger sealed
11 sources. This is an appropriate efficiency since cesium and other large sources
12 are in categories for which enhanced security requirements are called for in the
13 IAEA code of conduct and are in fact at the attention of the Commission. A major
14 change that will take place some time down the road is a cultural shift to add
15 security as a fourth attribute of protection added to the attributes already in the
16 minds of NRC staff and that is health, safety and the environment.

17 This strategy is a new strategy, particularly for new licensees where staff
18 are always assuming that folks are going to do the right thing. And when I was a
19 licensee, I would never think of doing the wrong thing because the penalties were
20 so severe. But I think the GAO has shown that that may not always be the case,
21 that new attribute and that new way of thinking about certain categories of
22 licensees I think will be a needed cultural shift that might take some time.

1 In closing, however, though, I believe the staff has addressed in its action
2 plans all of the independent review panels recommendations provided to the
3 Commission in the panel's 2008 report.

4 Some of the short term goals have already been accomplished, especially
5 those related to new applicants for radioactive material licenses. And additional
6 time and resources will be needed to make progress and bring the staff's plans to
7 completion. Thank you very much.

8 CHAIRMAN JACZKO: You want to close Dr. Bonaca?

9 MR. BONACA: This completes our presentation.

10 CHAIRMAN JACZKO: As always, there is a wide variety of issues here and
11 very interesting issues and very interesting comments I think from all the members
12 of ACRS, certainly in the letters as we have seen in the past.

13 I'd probably like to start with an issue that Dr. Shack, you talked about, COP
14 credit and it seems in past meetings, we discussed this issue and one of the
15 issues that I think the staff had raised was looking to get greater clarity from the
16 ACRS on exactly what their position was. And certainly the letter I think you
17 indicated is not necessarily new.

18 I think did put that in a very clear way delineating exactly what the
19 committee's views are. That I think ultimately should provide us with a path
20 forward to resolve this issue because I think as I hear it more and more, it appears
21 that what is needed is a definition of small and short. And if we are not going do
22 small and short, then we need a clear understanding of methodology. And you

1 laid out an approach I think is acceptable to the committee for dealing with those
2 circumstances that would not necessarily be small and short.

3 This is probably more in the way of speeches than questions, but I do think
4 it's time that we do put some certainty to this issue and I think the staff I think
5 today did send a letter response and I'm not sure if you had a chance to process
6 that. If you had, if you wanted to comment on it.

7 MR. SHACK: No, we received it about 11:15. I would remark as we were
8 working on the letter, one of the staff did make a comment to me, they finally knew
9 how to revise 182 so that it would be acceptable to us. That was sort of the aim of
10 the letter.

11 CHAIRMAN JACZKO: That should help then to provide clarity and I think
12 these issues are -- they are certainly important from a safety perspective and has
13 a lot of impact and one that we do need to have a clear position on. I'm certainly
14 personally comfortable with the approach laid out by the ACRS as we go forward
15 and that will be -- I hope to see staff move closer to that and put some greater
16 clarity to their approach. Another issue that again, just would touch on in terms of
17 some comments, Dr. Apostolakis you talked about the work on reviewing the Reg
18 Guide 4, cyber security. That is an extremely important area one that I hope the
19 committee will continue to pursue because we've talked a lot about safety issues
20 with digital I&C. But, I think going forward, the real issues we are going to have to
21 be worried about and Commissioner Lyons talked about this in the past will be in
22 the areas of cyber security.

1 So I think the committee's involvement in that is extremely important and
2 very helpful as we go forward. By way of a question, this is a question for you Dr.
3 Armijo. You talked about the pressurized thermal shock rule, and it's perhaps no
4 surprise where I have been on that rule, I see margin and I see preserving margin
5 as an advantage of the existing system.

6 And one of the things that you were talking about that really dawned on me
7 this afternoon was the interplay between large break LOCA and pressurized
8 thermal shock. You indicated that most of the through wall cracking is dominated
9 by the medium and large breaks. I'm wondering and this may be something you
10 have not thought too much – I'm wondering if there is an interplay between that
11 and changes we might make in the 50.46A rule if we were to redefine the
12 transition break size and perhaps change how we review those large break
13 LOCAs. Could that potentially affect the data used to develop the basis for the
14 pressurized thermal shock rule?

15 DR. ARMIJO: I believe that the transition break sizes that we are talking
16 about today are far larger than this 5-inch diameter which really is the point at
17 which it does not make much difference as far as thermal shock. It really wouldn't
18 have an impact.

19 CHAIRMAN JACZKO: That is certainly helpful as we go forward and see
20 how that rule plays out. I think we will continue to get information on that.

21 George, if I can ask you another question: In your letter and I don't know if
22 you heard any of the discussion this morning – we had a meeting on digital

1 instrumentation and control.

2 MR. APOSTOLAKIS: I heard rumors.

3 CHAIRMAN JACZKO: I'm not sure what those rumors are but it's always
4 good to get the rumors out there. But there was certainly a lot of discussion about
5 level of detail and level of review. And I perhaps drug the ACRS into the
6 discussion, in particular and the comment you had there, maybe you can expand
7 on that a little bit.

8 MR. APOSTOLAKIS: I would rather have my colleague, Mr. Brown address
9 that. He has much more experience than I have.

10 MR. BROWN: I'm Charles Brown. Perhaps a little context since I was
11 really responsible for some of the input into the ISG. The ISG 6 is fundamentally
12 trying to clear up what I have observed over the last 13 months is a lack of detail in
13 certain areas when the digital I&C systems are submitted for review. And what's
14 presented to the committee and it also is reflected after questions were asked,
15 what was presented to staff. And when you look at that in the context of what are
16 the fundamental pillars of any I&C application in reality, which are redundancy,
17 independence, determination, in other words predictable and repeatable response
18 from a censor telling something to actuate something to actually to -- the
19 safeguard system or protection system, and then, defense in depth and diversity.
20 Redundancy and independence are obviously tied. Determinacy, I just gave you a
21 definition of.

22 But the independence when you look at some of the paper that's been

1 submitted on at least 3 of the programs that we have reviewed in last 13 months,
2 everybody kind of looks and say, okay, there is a fiber optic link between this train
3 and that train therefore, we're independent.

4 That's really not sufficient, if you communicating from one computer to
5 another computer. It depends on how you communicate, what you communicate.
6 Is it a serial data string? Is it an analogue signal? Does it go to a 2 out of 4
7 voting? What is it? That's the type of detail that you are really looking for. And it
8 has not been present in at least the designs with one exception, had some detail
9 on that but the others did not.

10 CHAIRMAN JACZKO: Which ones had the detail comparable to what you
11 think is acceptable?

12 MR. SHACK: The U.S. APWR submittal. There are still some more work to
13 be done on that. We've only seen I think 2 out of the 4 topical reports so there are
14 a couple more topical reports we will have to go through to really clarify all that. –
15 When we got ISG 6, since I am relatively new, I was not aware that was under
16 development and I was pleasantly surprised with the staff's work. They covered
17 what I call it a fairly high level but a desire to get early interaction with the licensee
18 and applicants in order to define what is necessary, so there are no surprises
19 when the paperwork or the proposals from the applicants are submitted to staff
20 and then to the ACRS.

21 So I thought it was a very good attempt to try to put some meat on a very
22 skeletal ghost which everybody has been grappling with obviously for some time in

1 order to address what's the level of detail needed. I suspect there will be some
2 give and take in that as we go through the first few projects that come in. It is a
3 little easier on the existing plants than it is on the new design plants such as US
4 APWR, EPR, et cetera.

5 CHAIRMAN JACZKO: I appreciate that, that's very helpful. It is always
6 useful to have very specific examples particularly if we can point to those
7 applications which have the kind of information that we are looking for. It gives
8 everybody else a place to look to when they have questions and appreciate your
9 answer.

10 Dr. Ryan, I had a question for you and this gets a little bit off the ACRS but
11 on your comment on the source security activities and the follow up staff has done.
12 It good to hear your sense that the staff has made progress in that area. One
13 area that you did touch on at the end is the cultural issue and getting the fourth
14 element of the security and health and the environment trio right now and adding a
15 fourth into that.

16 What's your sense of how that issue will play out? Do you have
17 suggestions on how best to accomplish that cultural shift?

18 MR RYAN: It's a great question. I've thought a good bit about it. I think
19 within the NRC and the NRC Regions, it's probably a little stronger foundation on
20 which to build a sense of security as part of the licensing activity. You have folks
21 in reactors with security, of course it's a much larger issue than somebody with a
22 cesium source so there is a resource here and I think skill sets in people that can

1 help their colleagues learn.

2 What is a harder problem to solve is for the Agreement States. Again,
3 19,000 licensees verses and 3400 and 35 states currently to the 36 and a 37th with
4 Virginia coming on. So, I think the challenge is how do you push that culture
5 forward into the state organizations that are the partners of the NRC and the
6 Agreement States Program.

7 So whether it's the Conference of Radiation Control Program Directors, the
8 Association of Agreement States, they have a couple of different organizations to
9 help them either find the support for, or deliver to them, the resources on training
10 and work that they then can implement in their own programs to help build those
11 skills. Again, I would offer the IMPEP Program as a strong program from our past
12 reviews and Aaron McCraw was the staff person who helped on this panel was an
13 important part of that program. That is a vital link to now test and see if those
14 things will be becoming implemented so it's not only training but verifying that it is
15 taking hold. Those are some of the efforts at least in concept that I would offer as
16 good steps forward.

17 CHAIRMAN JACZKO: I appreciate that and we had a discussion last week
18 about the safety culture policy statement that the staff is working on and part of
19 that is to incorporate security as well into that idea. And one of the issues that
20 several people brought up including Commissioner Svinicki was having the
21 importance of having the Agreement States involved in that process and figuring
22 out ways we can communicate that to the Agreement States and so that may be a

1 vehicle to help us with this particular issue as well as we continue work on that. I
2 appreciate your answers. We will turn to Commissioner Lyons.

3 COMMISSIONER LYONS: Certainly my thanks to the ACRS. I said before
4 my opinion has never changed, that I find your wisdom, your reports to be just
5 absolutely invaluable and truly vital to the operations of the agency. So thank you
6 very, very much.

7 I've truly enjoyed the interaction with ACRS in the time I've been here and
8 each and every one of you has my respect for the work that you are doing.

9 If I could start with a question, Mario for you: I may not have counted right
10 but I got a number like 25 for future activities that you listed. Your plate is full to
11 put it mildly. I'm curious if within the ACRS, you've been discussing ways to
12 prioritize that amount of work? And if there is any guidance that you feel you need
13 from the Commission or in general whether there's anything that the Commission
14 can be doing to ease your burdens?

15 DR. BONACA: Well, in the short term I would say we have planned
16 activities that we can support without really impacting the schedules of the other
17 stuff. So I think we are geared in a way -- we are now 15 members. We are never
18 more than 11 and actually, we are typically nine members. So, that's helpful. We
19 are trying to also improve the amount and quality of the support staff, so that we
20 have sufficient resources to deal with this workload. But I think that the way I see
21 it, the way it is planned for the next several months, I don't see a crisis there. I can
22 support that work.

1 COMMISSIONER LYONS: Perhaps another question Mario, if I may. It's
2 been a little over a year since the ACNW merged into ACRS. Just curious from
3 your perspective as Chairman, how that has evolved, if it's been relatively smooth?

4 DR. BONACA: I think that it has been very smooth. We have formed a
5 subcommittee now that deals with these issues and Dr. Ryan is chairing that
6 subcommittee and of course he is bringing a lots of knowledge of the past
7 activities within the ACNW and I think it's working very well.

8 COMMISSIONER Lyons: I'm glad to hear that. I was certainly one who
9 among the Commissioners who thought that was an appropriate thing to do and
10 I'm glad it is working.

11 MR. BONACA: I would appreciate feedback also from Mike.

12 DR. RYAN: Thank you Dr. Bonaca. I appreciate the comment. I'm glad.

13 COMMISSIONER LYONS: If I can turn to an area probably everyone is
14 going to turn to sooner or later, Bill. And Greg started out with some questions on
15 COP for COP whatever you want to call it. Greg mentioned the challenge of
16 defining small and short. I can imagine that another challenge is going to be
17 defining practical which is also part of the guidance or the letter that ACRS
18 released. Has there been any discussion of sort of practical relative to what or any
19 discussion that could help the staff get a better handle on in addition to small and
20 short, practical. I think all of those are going to be very key as you are asking that
21 changes be practical in some way?

22 DR. SHACK: We've had discussion on that. Part of the reason you see

1 small and short and practical, it is easier to get agreement on small and short
2 versus exactly what small and short is. I think that's something that needs to be
3 worked out perhaps in further interactions with staff to refine those concepts and
4 make them as definite as we can. But, at the moment, I don't have any -- there
5 are many considerations that go into what is practical, worker exposure, costs,
6 location.

7 COMMISSIONER LYONS: Throughout the agency, we use the word
8 practical and adequate. But I can imagine that's going to be a continuing
9 challenge, obviously, will be a continuing challenge for staff. And for the ACRS as
10 you are faced with different approaches and different suggestions. The staff is
11 faced with that too. Perhaps vaguely related to that question, again, I may have
12 the number wrong but I think there has been 28 cases of extended power uprates
13 that do take some advantage, some use of COP. Did the ACRS weigh in on all of
14 those or some of those?

15 MR. SHACK: It's actually been a matter of concern and interest from almost
16 the first one which is Duane Arnold and I think that's part of it. It just of continues
17 to grow. We've actually been back looking at the transcript for Duane Arnold and
18 the discussion and the original licensing basis they had credit for small, short
19 amount of overpressure, it increased with it. And there were discussions of where
20 would it stop. And nobody had a clear answer then, and we are kind of working
21 our way through that.

22 And we first came out with we should be looking at the risk involved with

1 this and I think that's certainly one issue that does not fully address the defense in
2 depth question. We really think that should be -- I hate to use the word but I will,
3 structuralist. It is very hard to put a probability on that containment, loss of
4 containment and integrity during the accident.

5 And we have -- most of the PRAs deal with the possibility that you're going
6 into the accident with a loss of containment and integrity and that probability is
7 small, but under these situations, it is difficult to quantify that. So we do like to
8 minimize those challenges without feeling that we will be able to really quantify the
9 probability of failure. Our goal is rather to seek to minimize the frequency of the
10 challenge. And so that was one thing that we've been looking at. This came out
11 in Vermont Yankee where we were faced with something that looked fairly large.
12 Again, that's where we went back to a more realistic analysis for the large break
13 LOCA case and discovered that in fact, it really was small and short on a realistic
14 basis, we grumbled as we usually do about the ad hoc nature of the calculations
15 and the inadequate -- and so we are looking for a more systematic approach but I
16 think that that's been our concern.

17 We noticed these and sort of noticed the trend that they get larger and
18 larger. And again, it's very difficult to assess the real degree of challenge. You
19 don't know because the assumptions may vary from case to case and you don't
20 really know how much is built in -- there is some margin presumably in the
21 calculations but exactly how much. Some of the scenarios that we are looking at
22 that lead to large challenges are very unlikely but how unlikely they are, again,

1 that's the kind of information we are trying to get seeking in this notion of revising
2 182 to provide that kind of information so you can make those judgments.

3 MR. BONACA: I would like to add just one thing: The grant in credit applies
4 a full understanding of the availability of credit. And you know, if you look at the
5 suction strainer issue, we don't have a full appreciation of what is available. And
6 so it hard do this kind over assessments but we will attempt to do that.

7 COMMISSIONER LYONS: I appreciate the difficulty of the challenge and
8 continue to look for staff and ACRS to work together on this.

9 If I can turn Sam to some of your comments on pressurized thermal shock
10 issue: I'm not sure if it was in your comments or the letter that there was reference
11 to exploring advanced non-destructive evaluation tools to get a better
12 understanding of the flaw distribution which I thought would be a very interesting
13 approach. But it did get me wondering, if you had a better handle on the initial
14 flaw distribution, to what extent is the pressurized thermal shock concerns
15 amenable to first principle calculations. Do you think that's possible?

16 DR. ARMIJO: You mean certain assumptions -- it all depends on what the
17 flaws are. Your starting with a clean piece of metal.

18 COMMISSIONER LYONS: I guess what I'm asking, if you had a better way
19 of characterizing the initial set of flaws on some volumetric basis and some type of
20 flaws, probabilistic distribution of the flaws, would it be possible to go from that
21 type of information. I'm calling it a first principle's treatment. I think that is an
22 appropriate way of describing the type of calculation that I'm envisioning, that I

1 would have thought would have been able to go from an understanding of the
2 flaws to a more precise understanding calculation of the PTS issues.

3 DR. AMRIJO: I think that staff has done exactly that. I think they have a
4 very detailed way of treating flaws that are known to be there. Many cases, as a
5 result of experiments, both non-destructive and destructive characterization of the
6 flaw distributions. And then, a very detailed -- I would call it as first principles as
7 you can get, fracture mechanic, probabilistic fracture mechanic analysis of the
8 probability that these flaws will grow under the stresses of a PTS. So I believe that
9 this is about as good as you can get short of investigating a new methodology.

10 COMMISSIONER LYONS: I hope we can continue to progress in this area.
11 Part of my reason for asking is because I think the same question or the same line
12 of reasoning that I was trying to pursue here applies in 50.46a too. That one could
13 potentially -- I don't know how 50.46a will evolve into the future -- but it seems to
14 me that many of the same questions involving transition break size and
15 probabilities would flow from that same ability to go from initial flaw distribution to
16 possible impacts?

17 DR. ARMIJO: I agree with you and I think the staff in the research planning
18 is going to exploit what they have learned on PTS for a broader use of these tools
19 in any kind of a fracture analysis of the coolant boundary system. It could be
20 applied to the pipes, forgings, valves. So I think that the tools are there and I think
21 personally, I'm very impressed with the work done on the PTS because it is a tour
22 de force. So I think we have the tools to do the kind of analyses that need to be

1 done.

2 COMMISSIONER LYONS: Well, I appreciate your comments. I do hope
3 that between ACRS and Research, we continue to try to see how far we can push
4 first principles or whatever other words you want to use, first principles
5 understanding of what these phenomena are. I think that would be a useful
6 improvement in safety.

7 DR. ARMIJO: I totally agree.

8 DR. SHACK: If I could just make a comment on that. I hate to use the
9 words "first principles" with fracture mechanic but its very impressive at any rate.
10 The pressure vessel in many ways is the easiest problem, which is the reason
11 we've have done it. It has a flaw distribution that sits there. With the pipe the
12 problem is in fact not the initial flaws, it's the flaws that initiate and grow. Research
13 is off looking at that and they are trying to put things together. But it is a much
14 more difficult problem, and coming back to advanced NDE, the wisdom of the rule
15 is that in many ways, the thing we probably understand least in the pressurized
16 thermal shock is that initial flaw distribution.

17 The staff has made measurements on a fairly small sample of welds. I
18 think they have picked a conservative representation of that distribution but again,
19 that becomes the critical item to essentially verify that that distribution is applicable
20 to your vessel.

21 COMMISSIONER LYONS: And this is certainly another great application
22 for such advanced NDE. I'm way over time. Sorry.

1 CHAIRMAN JACZKO: Dr. Klein.

2 COMMISSIONER KLEIN: I would like to also thank all of the members of
3 the ACRS for your contributions. It really does help us in our deliberations and I
4 would particularly like to thank those who have re-upped for additional terms. Dr.
5 Powers is on his way to double digits on his number of terms, so thank you. I
6 assume the fact that you've been willing to serve, you found it challenging and
7 productive. I'd also like to comment, when you look at the list of activities the
8 ACRS is involved in, it is a very dynamic time probably for those of you in the
9 academic world or for those that used to be in the academic world, it certainly is an
10 exciting time I think in the nuclear field and your contributions along this broad
11 spectrum is certainly exciting and appreciated.

12 I would like to start questions first with Dr. Bonaca. And if you look at our
13 license renewals, we've done now about half and half may be yet to come. Could
14 you comment in general about the quality of the applications and how the staff is
15 doing in those reviews?

16 DR. BONACA: I think in general, the applications we see are really
17 consistently high quality. By now, there is such a lot of experience in the industry,
18 on what goes, what does not go, that very few issues remain to be dealt with.
19 They are typically ISGs; there are very few right now for resolution. And some
20 issues of course drag gone. For example, weather cables, that is an issue that
21 has become part of the current licensing -- but in general I would say that we see
22 applications of high quality and the SERs are good SERs. And the other thing is

1 that more and more of the SERs are being supported by inspections which are
2 quite thorough and effective in providing for example, to this committee, the eyes
3 of the inspector and what he sees to corroborate certain conclusions.

4 COMMISSIONER KLEIN: And could you comment on the staff's review of
5 those applications, the thoroughness and completeness?

6 DR. BONACA: I think that generally they are thorough and complete. Of
7 course, there is a long history of experience now in the license renewal that is in
8 GALL. There is a dependency on GALL -- we are welcoming the update of GALL
9 because there are opportunities there to improve even further the reviews and
10 acceptability of the applications. We have commented before that we have felt at
11 times that the current GALL is overly prescriptive. It specifies, for example,
12 surveillance of inspection intervals in a very strict fashion and then, you have
13 applicants coming in and saying well, I don't expect this every six months I do it
14 every year and they have a history of success.

15 So we have recommended a number of times that GALL be modified to be
16 more flexible, to allow in fact this flexibility for licensees to use their own past
17 experience and to objective to would be to reduce the number of exceptions to
18 GALL. I think that is an objective that the staff is pursuing in the updating of the
19 GALL.

20 COMMISSIONER KLEIN: Thanks. Well, Dr. Shack, I know you will be
21 surprised when I make a comment also on the COP. I would like to compliment
22 both the ACRS and the staff for working through the differences. As you know,

1 honorable individuals have legitimate differences of opinion and I think both the
2 staff and ACRS have worked through a lot of those issues.

3 I noted that additional information has come through, and now you're going
4 to start analyzing that. Any time line as to when you might come back to sort of
5 narrow those differences?

6 DR. SHACK: No, I think we sort of agreed to work on it but we have not
7 gotten to the point of coming up with a schedule. I don't know whether Mario has
8 had further discussion. We are continuing to work on it.

9 DR. BONACA: No we haven't yet.

10 DR. SHACK: We are continuing to work on it.

11 COMMISSIONER KLEIN: Keep working. That is a positive and healthy
12 sign. Thanks.

13 Well, Dr. Apostolakis, I liked your comments about the guidance.
14 Sometimes stealth guidance is hard to follow on cyber security. That is I think a
15 challenge in the security area having lived that for five years in the five sided
16 building, that it is difficult to give guidance when you can't comment on some of
17 the issues. Do you have any thoughts as to how one could balance the issue of
18 not playing your hand to the bad guys versus giving guidance on what's needed?

19 DR. APOSTOLAKIS: Again, you're asking me to do work Mr.
20 Commissioner..

21 COMMISSIONER KLEIN: That's why you get paid so much.

22 DR. APOSTOLAKIS: We tried to give some guidance in the letter. It

1 seems to me you can - you should -- one should try to be general but not to the
2 point where the document is useless. So that the framework we are proposing.
3 We're always in the digital I&C area of identifying critical digital I&C assets that will
4 appear just about everywhere. What are the infrastructure needs o make them
5 work fine, how they communicate with other parts of the plant and so on. I don't
6 think you're giving information that would be useful to an adversary if you do that.
7 And then try to identify vulnerabilities, now that's where the issues is of course.
8 We can also have, I presume, guidance that would be classified. It seems to me
9 we should take advantage of that. We don't have to have everything in public that
10 would go into the potential vulnerabilities and provide of course advice on how to
11 protect the system from adversaries.

12 As a side remark, it seems to me that we have not taken -- and this is not
13 committee consensus yet -- we have not taken advantage of the intellectual
14 structure we have developed, the PRA for safety. We have not taken advantage
15 of that in the security area.

16 I think we can learn a lot by trying to apply the same kind of systematic
17 thinking that has been tried now for more than 30 years in the safety area, and
18 apply it to the security area. And again, most of it would have to be classified of
19 course, especially the details, but I think that would be a great approach to trying
20 to blend safety and security which I believe the Commission talks about a lot.

21 So this is not only digital I&C, I think it is a broader issue but I other than
22 that Commissioner, I'm not sure I can give you more useful advice right now. But

1 this is something that the Committee would be glad to investigate.

2 COMMISSIONER KLEIN: Thanks for those thoughts.

3 Well, Dr. Ryan, obviously, the ICRP 103 and moving with harmonization is
4 always a challenge. What do you think our next big hurdle is on the
5 implementation of merging the staff guidance and ICRP 103?

6 DR. RYAN: I think it will be 3-fold. First, is to identify all the many fingers
7 where there is something that needs to be addressed that's not ICRP 103. There
8 are a lot of little bits and pieces scattered across regulations, guidance, even
9 license conditions in various licenses across the materials world and maybe the
10 reactor world.

11 So trying to get a road map of what needs to be fixed, I think is the first
12 challenge. The second is maybe to prioritize with some systematic approach how
13 you want to approach that change process. And then of course the third is
14 implementation. So it is a multi year process clearly to do all those things. I think
15 it's very important because once we get it all up to date and of course give it to the
16 Agreement States, through their regulatory process, we will have one system that
17 really is up-to-date with the science of radiation protection and it will be well worth
18 the effort I think. But those are the 3 basic areas I see.

19 COMMISSIONER KLEIN: Do you think we are integrating enough with the
20 Agreement States as we move down that path?

21 DR RYAN: I believe so. If you look at any Agreement State regulations
22 particularly with regard to radiation protection, they are pretty much in lock step

1 now with what exist and even those changes from ICRP 2 to ICRP 26 and 30,
2 they've all done a good job of getting on board with that. There are a number of
3 other organizations, the Health Physics Society, the Organization of Agreement
4 States, the Conference of Radiation Program Control Directors, that are actively
5 involved with NRC and even the EPA on their regulations on integrating those
6 things in the state Government regulation.

7 So I think the mechanisms are there to do that. It's challenging, but, I think
8 the infrastructure is there. They might ask for some funding now and then, but I
9 think the basic infrastructure and the committees and all the things that would do
10 that are there to help to make that happen.

11 COMMISSIONER KLEIN: Thanks to all of you for your hard work. I think
12 the subjects that you all address, we could probably have all day meetings but due
13 to finite time, we will keep our questions somewhat limited. Thanks again.

14 CHAIRMAN JACZKO: Commissioner Sivinicki.

15 COMMISSIONER SVINICKI: Thank you. I will begin as my colleagues
16 have done by thanking all of the panelists for their presentations and all the
17 members of the committee for their willingness to serve and for their very valuable
18 input on all of these matters.

19 We talked about many of the topics already. I appreciate -- I think we had a
20 very good exchange on containment overpressure. And since I'm just learning
21 these acronyms I'm not going to learn new acronyms so it's going to be COP for
22 me but, I know that this is not something that we are necessarily proud of but, as a

1 regulator, we take the care and thoughtfulness to work through these issues.

2 There are many things we work on that don't lend themselves to speedy
3 resolution and I know it's taking a lot of really thoughtful and patient deliberations
4 between staff and the committee members on containment overpressure and a
5 host of other issues and I think oftentimes it is more important that we do it right
6 than we do it quickly. And it is a threshold issue as has been discussed here
7 today.

8 You know we can go back and revisit the transcripts of other EPU's that
9 were examined but it's a comfort threshold that at some point the ACRS looked at
10 the issue in its totality. And I don't think, you know, I would find any productive use
11 in saying well, why didn't you object to this 15 EPU's ago? Well, maybe it is just of
12 historic interest but I don't think it is not necessarily something that will solve the
13 question for us now.

14 So I appreciate just your continued efforts on that. The one topic we have
15 not talked about is something that has really been of interest to me lately and it
16 has to do with the use of design acceptance criteria.

17 And I am going to mention that there is an interim letter 6 on ESPWR.
18 Review of Chapter 7 and 14, was one of the ACRS letters that was issued prior to
19 today's meeting. But, it's not so much for this instant case but just that there is
20 one of the committee's conclusions in this particular case was the DAC for, in this
21 case, distributed control, and the instrumentation systems are incomplete. And it
22 notes that staff has issued an RAIs on it.

1 But it goes on to make a statement that to me is much more general about
2 the use of design acceptance criteria. With your patience, I'll refer to it. It says,
3 "The use of DAC is justified for detailed elements of I&C systems that may use
4 specific hardware software that are prone to obsolescence" -- and this is certainly
5 really the genesis of DAC.

6 "However, the functional architecture and logic design of the integrated I&C
7 systems are determined by the fundamental plant protection and control
8 requirements. Those requirements and the designer's decisions about how to
9 functionally achieve them are not altered by evolving technology for the hardware
10 and software."

11 And so I'm wondering as you have reviewed a lot of different chapters now
12 of various SERs with open items, has the committee drawn any kind of thematic
13 conclusions about the use or misuse of design acceptance criteria and would offer
14 any observations or recommendations to the Commission?

15 It seems to me that there is a point at which the RAI responses if technically
16 sufficient and adequate, it would seem to me at some point could obviate the need
17 to even use DAC. So is there any one who would offer even just broad -- it
18 doesn't have to be about the ESPWR.

19 DR. CORRADINI: Thanks for asking the question. Let me say that you
20 happened to pick the one paragraph that I had help by 3 or 4 colleagues so
21 even though in theory I started this process, I may turn to others. I think the
22 essence of your question is really thematically, how often should DAC be used --

1 COMMISSIONER SVINICKI: Yes, based on what you all reviewed to this
2 point, you know, have you reached a point in seeing enough of them that you can
3 offer some broader conclusions about it?

4 DR. CORRADINI: Well, I think what we are coming to in terms of evolution
5 is if you look back all the way to the CE 80 plant where that started and then,
6 we've come to this point. I think we are seeing that we would like it to be used few
7 and infrequently as possible.

8 COMMISSIONER SVINICKI: Which is the Commission's policy going back
9 to I think 1992.

10 DR. CORRADINI: Correct.

11 CHAIRMAN JOCZKO: Those are comparable words it seems like, short
12 and duration.

13 COMMISSIONER SVINICKI: And we are not to ask them to do any work.

14 DR. CORRADINI: He said that. No, I do think though that thematically
15 though, what we are seeing is that at least with the one example case that I had
16 the enjoyment of dealing with which is the ESBWR, I think that we felt that it was
17 too big as a committee. And so we pushed back in that letter in particular and
18 from a consensus standpoint that we really wanted to see and Charlie hit the four
19 characteristics. And what we felt uncomfortable with was it was too vague in all
20 four of those characteristics.

21 We wanted to see more detail. And that's what drove us to push there and
22 more RAIs were essentially submitted to the applicant to see if we could get more

1 details of logic diagrams independent of what the hardware or the software was.
2 So that's the essence of where we were there. But if you go back historically, I
3 think initially it was piping diagrams and then it emerged to I think --

4 COMMISSIONER SVINICKI: Radiological protection was one we are not
5 seeing invoked these days.

6 DR. CORRADINI: In terms of certification, I think there was piping
7 diagrams and I&C, and then, eventually into human factors. And as this grew, at
8 least in the last few years that I've been around watching this, we are quite
9 uncomfortable with the growth in this and the vagueness and that's where you see
10 it relative to this interim letter.

11 COMMISSIONER SVINICKI: So is it improper of me to read more -- I mean,
12 this statement arises in the letter specifically on those chapters related to the
13 ESPWR. Are you more comfortable having me confine this conclusion just to
14 these chapters?

15 DR. CORRADINI: I think it's fair to say that -- now, it is my opinion -- I think
16 it's fair to say if we go back which we will have to go back with the AP1000 and the
17 ABWR, that if we get into DAC world, we might see some uncomfortable attitudes
18 from some of us or maybe all of us.

19 Again, I think the one exception that you asked Charley for an example was
20 at least for the U.S. APWR, they have a goal, a vision to be as detailed as they
21 possibly can be going in and therefore, we are hoping to see more specificity
22 there.

1 Does that help?

2 COMMISSIONER SVINICKI: Yes, that is. I might have been generalizing a
3 bit, over broad there.

4 DR. CORRADINI: I've been trying to follow this because I have to admit,
5 I'm probably the least knowledgeable person in this area and I keep on reading
6 trying to go back historically understanding how it evolved to this point. But I hope
7 it helped.

8 COMMISSIONER SVINICKI: That does help. I appreciate the clarification.
9 Thank you Mr. Chairman.

10 CHAIRMAN JACZKO: Does anyone have any other questions? Well,
11 thanks for a good presentation. I think we covered a lot of interesting topics.
12 Certainly Commissioner Svinicki's comments on DAC is one that is important and I
13 see Bill Borchardt sitting in the audience and I recall a meeting several years ago
14 where he expressed some comments about DAC. It's a part of the process we
15 have and in hindsight is one that is more challenging than we ever anticipated.

16 COMMISSIONER SVINICKI: Perhaps you've done this but what I
17 recommend is if you can get access to some of our rehired annuitants who have a
18 long history on DAC you can get the real story.

19 CHAIRMAN JACZKO: That is certainly an interesting approach. Again, I
20 want to thank everybody for a very good meeting and a good discussion as
21 always. We are 35 minutes away as Commissioner Lyons reminded me from ice
22 cream. We will be celebrating today the best place to work in the Federal

1 Government and certainly encourage all of you and any of you to come to that if
2 you would like to see us in aprons and serving ice cream.

3 So welcome, open invitation to everyone, and again, thank you for your
4 work and a good meeting.

5 (Whereupon the meeting Adjourned)

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