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U.S. NUCLEAR REGULATORY COMMISSION

BRIEFING ON LICENSE RENEWAL FOR RESEARCH AND  
TEST REACTORS

MARCH 27, 2012

9:00 A.M.

TRANSCRIPT OF PROCEEDINGS

Public Meeting

Before the U.S. Nuclear Regulatory Commission:

Gregory B. Jaczko, Chairman

Kristine L. Svinicki, Commissioner

George Apostolakis, Commissioner

William D. Magwood, IV, Commissioner

William C. Ostendorff, Commissioner

## APPEARANCES

## NRC Staff:

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Executive Director for Operation

Tim McGinty  
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NRR

Jessie Quichocho  
Branch Chief, RTR Licensing Branch  
NRR

John Adams  
Senior Level Advisor for RTR  
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## External Panel:

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Chair, National Organization of Test, Research, and  
Training Reactors, Inc. (TRTR)  
Reactor Supervisor, Nuclear Radiation Laboratory  
University of Massachusetts Lowell

## Facility with LR Review Completed:

Sastry Sreepada  
Director, Walthausen Reactor Critical Facility  
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## Facilities with LR Review In-Process:

Ralph Butler  
Director, University of Missouri Research Reactor (MURR)

Stephen Miller  
Armed Forces  
Radiobiology Research Institute (AFFRI)

## 1 PROCEEDINGS

2 CHAIRMAN JACZKO: Well, good morning everyone. We're  
3 meeting today to talk about the license renewal status of research and test and  
4 training reactors. This is certainly an important issue as we work to deal with  
5 what has been a significant backlog of renewals for the RTR licenses. I'm  
6 certainly pleased to hear that we've made considerable progress in this area  
7 since, I think, the last meeting we had in August of 2009, so almost three years  
8 ago. As I look at today's meeting agenda, I think this will be an important  
9 opportunity to strengthen the continued partnership we've had with the research  
10 and test reactor community in looking at the issues of license renewal.

11 I think, though, there will still be challenges on both sides, as we  
12 work through this backlog, but I'm certainly very interested in hearing about the  
13 progress that we've made in the last two years. I think this has certainly been a  
14 very good work on the part of the staff to get us in a place where we can more  
15 faithfully process these applications, and I think there's been a lot of work on the  
16 part of the RTR community, as well, to improve the applications and improve the  
17 submittals, and improve the timeliness. So I look forward to hearing about the  
18 progress, and what the challenges are, and offer my colleagues, any comments  
19 they'd like to make? Okay, Bill, you want to start?

20 BILL BORCHARDT: Good morning, thank you. NRC staff  
21 recognizes that research test reactors are a very important and valuable national  
22 asset. These facilities have relatively low risk, and they have a timely renewal  
23 provision. Those two factors, in my mind, have allowed us to utilize some  
24 resources, and make budget decisions over the years, that have, at times, staffed  
25 the renewal process with fewer resources than we might have preferred to do,

1 and it seems that a number of events have happened over the years: Three Mile  
2 Island, the 9/11 event, now Fukushima, at unique time periods which made the  
3 problem even a little bit worse.

4           Having said that, well that created a backlog in renewals, but  
5 having said that, we have maintained the appropriate level of regulatory oversight  
6 of these facilities throughout that time period, and are quite comfortable with the  
7 decisions that had been made. Today in the staff briefing you're going to hear  
8 some very good news that the staff's worked very hard, and made significant  
9 improvements in that backlog, making significant process improvements as well,  
10 which will ensure that the backlog continues to work down, and that the new  
11 renewals coming in will be worked on a timely process. So with that introduction,  
12 we'll turn it over to Tim.

13           TIM MCGINTY: Thanks Bill. I'd like to start today's presentation by  
14 providing background information on the organizational structure for research  
15 and test reactors, and a description of the license renewal backlog and its  
16 causes. Following me, Mr. Jessie Quichocho will provide you information on  
17 current status, and our activities to complete the license renewal backlog, and  
18 following Jessie Mr. John Adams will provide information on the current status  
19 and activities underway to address streamlining of the research and test reactors  
20 license renewal process. Next slide please.

21           There are currently 30 research reactors and one test reactor  
22 licensed by NRC to operate. Two branches in the Office of Nuclear Reactor  
23 Regulations Division of Policy and Rulemaking share responsibility for the  
24 licensing and oversight regulatory functions. The research and test reactor  
25 licensing branch is responsible for licensing actions, including the renewal of

1 operating licenses. Of these 31 facilities, license renewal applications for 19  
2 facilities comprised the license renewal backlog at the beginning of fiscal year  
3 2009.

4           So regarding the causes for the license renewal backlog, the  
5 foremost cause, as Bill mentioned, was the deferral of license renewal work due  
6 to emergent issues. The majority of our RTRs were originally licensed for 20  
7 years in the late 1950s and early 1960s. The majority of the RTR licenses  
8 expired in the period of time that coincided with the years following the accident  
9 at Three Mile Island. Work to review those renewal applications was deferred to  
10 focus on post-Three Mile Island priorities. The option to defer license renewal  
11 was acceptable, given the minimal operational impact on the research reactor  
12 licensees due to the timely renewal provision of 10 CFR 2.109 alpha that Bill  
13 mentioned. That provision allows for continued operation of an RTR during the  
14 review of the renewal application, as long as the applicant has provided an  
15 acceptable application at least 30 days before the expiration of the license.

16           The resulting backlog was eventually eliminated, but did result a  
17 concentration of renewed license expiration dates. Jumping ahead 20 years, the  
18 majority of the research and test reactor licenses were once again expiring in the  
19 early to mid 2000s. This time the license expirations coincided with the post-9/11  
20 security initiatives, and license renewal work was again deferred creating the  
21 current backlog.

22           Considering the circumstances, the deferral option was again  
23 deemed acceptable considering the timely renewal provision. Other factors have  
24 also contributed to the license renewal backlog. Early in fiscal year 2005 staffing  
25 levels were recognized as inadequate to address the current and expected

1 emerging license renewal backlog. The staff communicated these workload and  
2 human capital issues to the Commission in SECY-05-0062. The Commission  
3 responded by providing resources requested by the staff, however, the staff was  
4 not able to complete the license renewals at the rate estimated in the SECY  
5 paper. There were two reasons for this.

6           First, the rate at which the staff was able to fill these new positions  
7 was much slower than estimated. Second, the conversion of research reactor  
8 high enriched uranium fuel to low enriched uranium fuel became a higher priority,  
9 demanding the attention of staff that would otherwise be reviewing license  
10 renewal applications. The resources necessary to complete the HEU to LEU  
11 conversions was not considered in the original staffing estimate. Next slide  
12 please.

13           The staff also did not accurately estimate the availability of the  
14 licensee's resources in the development of backlog elimination estimates and  
15 schedules. This miscalculation contributed to significant delays to the estimated  
16 backlog completion schedule. Many RTRs have limited staff and resources  
17 available for licensing. Licensee's staff at small research reactor facility can be  
18 as small as one part-time employee. In most cases, the staff that performs  
19 licensing functions do so in addition to their many other organizational  
20 responsibilities.

21           Licensing infrastructure and guidance changes has also negatively  
22 impacted the rate of completing license renewal application reviews. The last  
23 time that many of the licenses in the current backlog came due for renewal was  
24 in the 1980s. In the period between the first and second license renewal  
25 applications, a number of changes occurred. Most notably was the development

1 of NUREG 1537, Guidelines for Preparing or Reviewing Applications for the  
2 Licensing of Non-power Reactors. NUREG 1537, issued in 1996, describes the  
3 necessary content for research and test reactor safety analysis reports.  
4 Guidance and staff review process preceding the issuance of NUREG 1537 were  
5 informal, which resulted in varying levels of completeness and consistency.  
6 Many of the safety analysis reports submitted with the most recent renewal  
7 applications did not include the necessary information. This resulted in a need  
8 for staff to issue numerous requests for additional information to licensees,  
9 further burdening their limited resources and requiring additional reviews by NRC  
10 staff, and thus resulting in additional delays. Next slide please.

11                 So on October 24th, 2008, staff provided options and  
12 recommendations to the Commission in SECY-08-0161 for the elimination of the  
13 current license renewal backlog. In the subsequent Staff Requirements  
14 Memorandum, the Commission directed the staff, in conjunction with the  
15 research and test reactor community and the public stakeholders to develop both  
16 short-term and long-term approaches to address the backlog. Direction for the  
17 short-term approach specified the development of an interim, streamlined  
18 process to focus reviews on the most safety significant aspects of the license  
19 renewal application, and to apply a graded approach.

20                 In October, 2009, the staff issued interim staff guidance on the  
21 streamlined review process, to address the backlog in the short term. Based on  
22 the feedback from the RTR community, and the NRC project managers, the use  
23 of a graded approach within the interim streamlined review process has resulted  
24 in fewer requests for additional information, more effective licensee responses to  
25 issues, and has significantly reduced the level of effort to submit and review a

1 license renewal application.

2 Concurrent with the short-term activities, the staff commenced work  
3 to develop a more efficient, streamlined process for the long term. The staff  
4 acquired contractor support for the development of a regulatory basis that will  
5 determine if rulemaking is an appropriate remedy to streamline the license  
6 renewal process. John Adams will be addressing this issue in more detail during  
7 his presentation.

8 At this point, I'm going to ask Mr. Quichocho to present his  
9 information on the status and activities underway to address these challenges,  
10 and to complete the remaining license renewal reviews in the backlog.

11 JESSIE QUICHOCHO: Thank you, Mr. McGinty. I will be  
12 discussing activities that the staff performed to reduce the backlog as well as  
13 current status of license renewal activities. Since 2005, the staff hired at a slow  
14 pace due to the limited availability of specialized and highly valued skill sets, and  
15 research from test reactor experience. The staff aggressively pursued alternative  
16 means of hiring, and incentives to attract experienced and highly qualified  
17 candidates. In 2010, we were successful to fully staff the research and test  
18 reactor branch to accomplish the work at budgeted levels. With sufficient staff on  
19 hand to maintain project management activities for the renewals, and address  
20 emergent and higher priority activities, the staff developed a path for success: a  
21 streamlined review process for license renewal. The staff developed an interim  
22 staff guidance that focused on the most safety significant aspects of the license  
23 application, and applied a graded approach for those facilities less than two  
24 megawatt thermal.

25 Following multiple interaction and input from external stakeholders,

1 and the research and test reactor community, the staff issued the interim staff  
2 guidance in 2009. This focused review process has been a key contributor to the  
3 significant completion of many research and test reactor license renewal reviews  
4 to date. With the streamlined review process in place, the staff initiated Lessons  
5 Learned activities after the first few applications were completed. The staff  
6 identified flexibilities in the review based on varying degrees of designs, technical  
7 issues, and operational characteristics of research and test reactors, and applied  
8 them to subsequent applications resulting in a more efficient and effective  
9 process.

10           To address the limited resources, to perform thermohydraulic and  
11 neutronic analyses that licensee's face with their license renewal applications,  
12 the staff coordinated efforts with the Department of Energy, Office of Nuclear  
13 Energy Science and Technology, in identifying technical expertise to assist  
14 licensees. To date, five facilities have received Department of Energy  
15 assistance. The availability of these resources has proven indispensable in  
16 contributing to the reduction of the research and test reactor backlog. The staff  
17 and research and test reactor community continue to work together throughout  
18 the license renewal process. Next slide please.

19           The staff reinforced the Commission direction to continuously  
20 interact with external stakeholders in all NRC regulatory activities. During the  
21 license renewal process, the staff increased face to face meetings and  
22 developed, and sustained, a dialogue for those facilities that require additional  
23 time to respond to requests for additional information due to limited technical and  
24 budget resources. The staff had many discussions with licensees, who seldom  
25 used the licensing process during their 20 year license period. By performing

1 these activities, the project managers developed a more detailed understanding  
2 of their assigned facilities, and licensees developed an understanding of the NRC  
3 licensing process and requirements.

4           The staff recognizes that early communication of regulatory  
5 activities specific to the research and test reactor community is important to the  
6 development of informed regulation, and improves the licensee's understanding  
7 during implementation. The staff implemented initiatives to encourage the  
8 research and test reactor community to engage and provide feedback to the  
9 development and implementation of our regulatory process. Some of these  
10 initiatives include quarterly meetings with the National Organization of Test  
11 Research and Training Reactor Executive Committee, substantial participation of  
12 the staff and the annual and National Organization of Test Reactor and Training  
13 Reactor Conference, and quarterly newsletters called "The Nonpower Reactor  
14 Explorer."

15           The staff has routinely engaged in the research and test reactor  
16 community through public meetings on topics such as developing interim staff  
17 guidance for a digital instrumentation and control standard review plan,  
18 developing a regulatory basis for a streamlined license renewal process, and  
19 most recently, the development of staff's interpretation for 50.54(m). These types  
20 of engagements are more than information sharing. It sets the tone and standard  
21 we would like to achieve to develop good working relationships and a more  
22 collaborative working environment with the research and test reactor community.

23           Perhaps the most significant program accomplishment of the  
24 research and test reactor community and the NRC, after undergoing license  
25 renewal, is the mutual thorough understanding of the design and operational

1 characteristics of licensed facilities, having a documented safety analysis from  
2 which to base future licensing actions, and clarity of the technical specifications  
3 and bases. So you may ask where are we today with research and test reactor  
4 license renewal backlog? Next slide please.

5           Here is a graphical representation of the number of renewals in the  
6 inventory by fiscal year. Since the implementation of the streamlined review  
7 process in 2009, and after reaching a fully augmented staff in 2010, the staff  
8 reduced the backlog from 19 in 2008 to 9 today. This graph also illustrates the  
9 amount of effort the licensee's have contributed in working with the NRC staff to  
10 reduce the backlog. Recognizing the challenges faced by the NRC staff and  
11 licensees, the staff, in applying the streamlined review process with its current  
12 staffing levels and improved licensee interactions, expects to complete all  
13 renewals in the backlog by fiscal year 2014.

14           The staff continues to work on license renewals not part of the  
15 backlog. For those we have received, the staff has taken a more interactive role  
16 in engaging with the licensees early and prior to the renewal date. Approximately  
17 12 months prior to a license renewal is expired, the staff sends a letter to the  
18 facility describing the required contents of renewal -- of a renewal application,  
19 including information used by other similar facilities as examples. The staff  
20 conducts a follow up site visit a month or so afterward.

21           With early engagement and communication, the licensees are  
22 provided the opportunity to interact with the staff during the development of their  
23 safety analyses that may help minimize requests for additional information during  
24 the review period. The staff is working on four license renewals not part of the  
25 backlog. Of those, one is expected to be completed this fiscal year. I will now

1 ask Mr. John Adams to discuss the long-term plan.

2           JOHN ADAMS: Good morning. On March 26, 2009, in response to  
3 SECY-08-0161, the Commission directed the staff to develop and submit a long-  
4 term plan for an enhanced research and test reactor license renewal process for  
5 Commission review. The plan was to include the development of a basis for  
6 redefining the scope of the process as well as a recommendation regarding the  
7 need for rulemaking and guidance development. On June 24th, 2009 the staff  
8 provided that plan to the Commission in enclosure two of SECY-09-0095. Since  
9 that time, a contract has been awarded for assistance in the development of a  
10 regulatory basis. The contractor commenced work on the regulatory basis on  
11 April 11th, 2011. Next slide please.

12           Four major tasks related to the development of the regulatory basis  
13 have been completed to date. The contractor has completed their analysis of the  
14 current regulatory requirements related to research and test reactor license  
15 renewal, conducted two public meetings to solicit input related to the research  
16 and test reactor license renewal from public stakeholders and from the research  
17 and test reactor community. They've completed an analysis of the potential  
18 efficiencies that could result from the segregation of regulations applicable to  
19 research and test reactors from regulations that apply only to power reactors,  
20 and they've completed the analysis of license renewal methodologies used by  
21 other agencies such as the Department of Energy, and the Department of  
22 Defense, and by other organizations such as the International Atomic Energy  
23 Agency. Next slide please.

24           The NRC staff is currently reviewing the contractor's results and  
25 recommendations from those completed tasks, and has recently commenced an

1 early review of a first draft of the regulatory basis. The staff will soon begin  
2 preparation for a third public meeting to solicit input from public stakeholders and  
3 the research and test reactor community on the draft regulatory basis. Following  
4 the public meeting, the staff will commence work on the final regulatory basis.  
5 Regulatory basis completion is anticipated in the fourth quarter of fiscal year '12.  
6 Next slide please.

7 All proposed rulemakings were assessed using the agency's  
8 common prioritization of rulemaking process to assign each proposed rulemaking  
9 a priority. Based on the process criteria, the research and test reactor license  
10 renewal streamlining rule was ranked as a medium priority. Faced with a  
11 significant number of high priority rulemakings in fiscal year '13, the Office of  
12 Nuclear Reactor Regulation decided not to work medium priority rules in fiscal  
13 year '13. Should the regulatory basis provide the necessary justification to  
14 conclude that rulemaking is an appropriate remedy to streamline the research  
15 and test reactor license renewal process; the staff will request the necessary  
16 resources through the budgeting process in fiscal year '14 to develop the  
17 proposed and final rules. Concurrent with the development of the proposed rule,  
18 the staff will update existing implementation guidance where appropriate, and  
19 develop new implementation guidance where necessary. I would now like to turn  
20 the presentation back to Mr. McGinty who will provide a brief summary of key  
21 points from today's presentation.

22 TIM MCGINTY: Okay, a brief summary. First, the backlog of  
23 renewal applications resulted from an NRC focus on emergent high priority  
24 issues. Second, the staff implemented processes to address the backlog of RTR  
25 applications as directed by the Commission, proactively engaged external

1 stakeholders throughout the regulatory process, and reduced a significant  
2 number of license renewal applications in the backlog.

3 Finally, the staff is actively working on a long-term solution to  
4 streamline the research and test reactor license renewal process. This  
5 concludes our prepared remarks, we look forward to your questions.

6 CHAIRMAN JACZKO: Thank you for that presentation, we'll start  
7 with Commissioner Magwood.

8 COMMISSIONER MAGWOOD: Morning, first let me thank the staff  
9 for the work they've done over the last several years to pursue this. The  
10 research reactor community is different, as you indicated in your opening  
11 remarks, than many of our other licensees, and I wanted to explore some of that  
12 with you. One aspect, and I think that Tim you focused on this, of the research  
13 reactor community is the fact that staffs are relatively small for the most part, in  
14 some cases it's one person or maybe even less than one person. Can you talk in  
15 some -- give us a little bit more specificity, how the staff deals with that situation?  
16 I think the staff is much more used to having a licensee relationship where the  
17 NRC asks a question, and the licensee uses whatever resources necessary to  
18 get the question answered in a very timely fashion. In this case, you may have,  
19 you know, half a professor who's responsible for the research reactor who's off  
20 grading papers somewhere, and you're asking these thermohydraulic questions.  
21 How does the staff deal with that?

22 BILL BORCHARDT: Before I ask Tim to answer that, I'm -- just  
23 provide some background on how the NRC's adapted to that, and a long time  
24 ago, 20-plus years ago, research and test reactors were treated like a power  
25 reactor. They were -- the work was accomplished through a matrix kind of

1 review, and we made the mistake, which we learned a lesson, of treating them  
2 just like a power reactor, and the kind of issues that you raised really caused a lot  
3 of problems. I think it was back in the mid-90's we made the decision to have a  
4 self-contained -- more or less self-contained organization within NRR that would  
5 be the point of contact for all RTRs, and since that time, there's been an  
6 increased learning from the NRC's staff on how to interact, so I'll let Tim talk  
7 about the specific of how we accommodate the resources.

8           TIM MCGINTY: There are a number of different ways. One of the  
9 most significant, of course, is the availability of resources to focus on individual  
10 licensees, so this organization was relatively small up until, as we discussed  
11 during the presentation, there was on the order of three or four licensing project  
12 managers in the organization historically, but with the HEU and LEU work, as well  
13 as with the renewal backlog, and now on the horizon utilizing the same staff for  
14 the Moly-99 which will be the subject of a future Commission meeting, we've  
15 staffed up significantly and that really has enabled us to leverage our ability to  
16 personally interact with the RTR community on a much more proactive basis.  
17 Then I'd like to point to Jessie because we've talked about this, there's about  
18 three or four different avenues that we'd like to call your attention for this  
19 particular element.

20           JESSIE QUICHOCHO: Yes, thank you. There's -- more  
21 specifically I discussed dialogue. It's important to create this dialogue with each  
22 facility. The importance of that so that we understand, like you said, if they have  
23 minimal staffing efforts, or if they're limited budgeted resource; and so creating  
24 that dialogue early on, and understanding the facility provides us with, now, an  
25 understanding of -- or how do we mitigate -- what strategies do we put in place to

1 mitigate the impacts to the facility as well as to the NRC.

2           So what we did was -- some of the things that we have performed,  
3 we communicate with the facilities to identify those questions, a request for  
4 additional information that are least complex, and focus on certain ones to be  
5 accomplished in a given period. That period, defined by the licensee, as you and  
6 Bill alluded to was that before in power reactor space, we were so used to the  
7 response within 30 days within a short timeframe. Here, in the way we interact  
8 with our licensees is, we ask the licensee how long would it take you to provide  
9 that information, and have them give us that timeframe.

10           COMMISSIONER MAGWOOD: When -- and I appreciate that, and  
11 as you -- give you a chance to sort of give us a little bit more of a -- maybe I'll ask  
12 Bill to do this, but more of a general view of how this should be viewed by the  
13 public because in the case of a commercial reactor, for example, the long drawn  
14 out process driven by the willingness or the ability of the licensee to respond to  
15 questions would probably raise issues with the public. In the case of these  
16 facilities, it doesn't, and I wonder if maybe Bill or others could just give a general,  
17 more or less, for the record explanations as to why that's not a safety concern to  
18 let these -- because some of these reactor processes have been going on for  
19 almost a decade.

20           BILL BORCHARDT: In my mind, I think there's two factors. One is  
21 that these facilities have significantly less risk in their operation than power  
22 reactors, so from that perspective we're being risk informed. The second is that it  
23 doesn't impact our ongoing and continuous oversight inspections and interactions  
24 between the staff and the licensee, so that continues regardless of whether or not  
25 the license renewal has been completed, so there's ongoing active engagement,

1 so we're confident in the safe operation of the facilities.

2           TIM MCGINTY: I would add that it's just become quite apparent to  
3 me, personally, that developing the relationship between the licensing staff at the  
4 facility and our staff, and the process of having gone through in the past decade  
5 of upgrading the applications to be in conformance with the SRP. It's a mutual  
6 learning by both the facility as well as the NRC staff. And in this particular case,  
7 in an area of limited resource where the resources -- where the risk is not  
8 particularly high, that's the opportunity to leverage a mutual understanding. And  
9 that's what we try to do with the community.

10           COMMISSIONER MAGWOOD: Let me shift to the long-term, and I  
11 appreciated John's discussion of the process leaning towards the regulatory  
12 basis for potential rulemaking in the future. Can you -- and in your remarks you  
13 didn't really give a -- I guess I'd say didn't really -- I didn't hear you making a  
14 strong case that this was something we need to do. It was more a response to a  
15 Commission direction, but what is the case to go forward with the rulemaking. I  
16 realize the staff hasn't gone down this path yet well enough to make a  
17 recommendation, but I just wanted to get your personal views on this. You know,  
18 we'll have gone through most of these renewals. Obviously, someone will come  
19 back around in the future if some of the reactors continue in operation, but what  
20 is really the value at this stage of the game in implementing a new rule, and just  
21 getting your opinion after looking at this for some time.

22           JOHN ADAMS: Well, right now, as you know, we're in the  
23 regulatory basis development stage. And the purpose of the regulatory basis is  
24 to determine if rulemaking is the appropriate remedy. We have a lot of  
25 information through the work that has been done; that work is really just coming

1 together now in its entirety so we can, as I pointed out, we have a very, very  
2 rough draft of the -- first rough draft of the regulatory basis. Right now, that has  
3 more areas that require further assessment and evaluation than has the answers  
4 at this point. So that work needs to be completed. I believe there is a good  
5 chance that this could show that rulemaking isn't necessary. There are some  
6 potential options that such as you could rely possibly more heavily on your  
7 inspection program that would, in turn, minimize the impact or the burden of  
8 license renewals. You could shift more of the burden to the inspection side from  
9 that. And there are probably other methods too that I'm not aware of, but by no  
10 means have we reached a conclusion that rulemaking will be the option that we  
11 need to pursue. I think the direction that we got in SECY-08-0161 to provide a  
12 plan we did have to make an early assessment at that point to provide to the  
13 Commission whether we believed that rulemaking could be necessary. And I  
14 think that that was our response there, that it was likely that we would have to  
15 rely on some level of rulemaking. I hope I've answered your question.

16           TIM MCGINTY: I would only add that that's where the importance  
17 of the stakeholder and the public interaction and the public meetings, that really  
18 helps reveal whether there's any sticking points where the rulemaking is the most  
19 appropriate outcome.

20           COMMISSIONER MAGWOOD: I appreciate that. One last quick  
21 question, just in summary, do you feel you now have the right balance in the  
22 interactions with the research reactor community regarding the intensity of the  
23 effort?

24           TIM MCGINTY: There's more to work on. I think the way you  
25 phrased it really enables me to say yes. I think the -- we have the correct

1 balance now, but it's always a work in progress. There's improvements that we  
2 can make, and we'll continue to strive to do those, but yes.

3 COMMISSIONER MAGWOOD: Okay. Thank you very much.

4 Thank you, Chairman.

5 CHAIRMAN JACZKO: Commissioner Ostendorff.

6 COMMISSIONER OSTENDORFF: Thank you, Mr. Chairman. I'll  
7 add my thanks to those of others for the progress you've made in reducing the  
8 backlog. I know there's still much more work to be done, but I think the trend  
9 looks good.

10 I think I'm going to start out with you, Jessie, in I want to react when  
11 -- and then ask you a question on the skill set issue you raised that applies to the  
12 people. And I know that this agency has been challenged at times in trying to  
13 have the resources to deal with NFPA 805, PRA, et cetera. Can you comment  
14 on the top challenges you faced, that your area faced in trying to bring on board  
15 people to the NRC staff to deal with the RTR license renewal?

16 JESSIE QUICHOCHO: Sure.

17 COMMISSIONER OSTENDORFF: And specifically any particular  
18 skill sets you found were either a niche or a unique capability that created some  
19 challenges.

20 JESSIE QUICHOCHO: I think the niche here is that the skill sets  
21 with experience in the research and test reactor background whether the  
22 individual was licensed at a facility that performed a health physics operations at  
23 a facility, and with nuclear engineering background. It's, you know, as you  
24 recognize, we have 31 research reactor facilities. Already we're starting out with  
25 a small pool of individuals. It definitely provides breadth and -- to the -- and

1 complements our process in what we do here at the agency. And that's pretty  
2 much the complement that we're looking for, is the research and test reactor  
3 experience, the operations at a facility. It's very small; that pool of individuals is  
4 small.

5 COMMISSIONER OSTENDORFF: So, that most of the people that  
6 were hired since 2005 have actual RTR operating experience?

7 JESSIE QUICHOCHO: Yes, the -- for the folks that are working on  
8 the backlog, that's correct.

9 COMMISSIONER OSTENDORFF: Okay. Jessie, I'm going to stick  
10 you another question. In your slides, you talked about two public meetings that  
11 were -- I think it was your slides, or were those John's? Okay, John's. Okay.  
12 John, let's shift to you. Thank you, Jessie. Can you kindly summarize -- I'm  
13 interested in knowing what kind of feedback you got from the public meetings at  
14 a high level.

15 JOHN ADAMS: Actually, the public meetings that have been held,  
16 we've gotten considerable, actually more than normal feedback. The TRTR  
17 community has been very active in this particular effort. They see that it's, I  
18 think, very important for their continued operations of their facilities. And they will  
19 be the first to tell you that they believe that we need to enhance this process to  
20 make it more efficient. And they've been very forthcoming with  
21 recommendations and ideas that have been communicated to us through  
22 comments in these public meetings.

23 I think that there will be significant participation, and you'll probably  
24 hear about that in the second half of this meeting, with the upcoming meeting  
25 where we actually put a draft regulatory basis on the table in front of them,

1 because that's where this is all going to come together and they can see the  
2 direction that we are leaning towards with the information that we gained through  
3 the regulatory basis development and can start comparing that to their actual  
4 operations and see how that impacts them. I find that's when we get the best  
5 comments, is when our licensees can compare the impact of a proposed  
6 direction to their specific operation. That seems to be where we get the best  
7 comments and ideas to inform our process. So, I think there has been good  
8 participation on this, and we expect that that will only get better at this point.

9           COMMISSIONER OSTENDORFF: Okay, let me understand this  
10 thing a little bit. That same slide, you mentioned also about benchmarking  
11 against the Department of Energy, the Department Defense, IAEA, license  
12 renewal methodologies -- can you -- are there any fundamental or significant  
13 differences between how the NRC is approaching this issue compared to those  
14 other three organizations?

15           JOHN ADAMS: There are some minor differences. The biggest  
16 difference that I've ascertained out of the information that we've received from  
17 the contractor on this comparison and contrast has been the amount of public  
18 involvement. Our process tends to involve the public much more than the DOE  
19 methodologies and the DOD methodologies. So, I'm not sure -- I really don't  
20 want to reach conclusions on the work that's ongoing and the regulatory basis,  
21 but I suspect that we will find that the methods used there aren't going to fit our  
22 needs where we want a significant participation --

23           COMMISSIONER OSTENDORFF: Well, let's -- I'm sorry, just  
24 because to be mindful of the time, let's put aside the process. I'm talking about  
25 as far as the substance of the safety approach, anything in the technical area

1 that's different than those other organizations compared to how we are currently  
2 doing business here.

3           JOHN ADAMS: Well, we use a graded approach, which the  
4 Department of Energy, who has several large research and test reactors, they  
5 don't rely as heavily on that graded approach because we have to deal with 5  
6 watts to 20 megawatts. So, a graded approach becomes very, very important in  
7 our process. So, again, I think that when we come right down to it, I don't believe  
8 that we're going to gain any synergy between the processes used for those  
9 facilities because they're significantly different.

10           COMMISSIONER OSTENDORFF: Okay. One area that -- this will  
11 be an anecdote, but I'll ask you to react to it, and then Tim, and Jessie, and Bill,  
12 as well, if you'd like to. I've heard one concern voiced by operators of research  
13 test reactors that falls in this kind of category that, gosh, these guys are asking  
14 me -- "these guys" being the NRC -- to go back 30 years in the past, recreate a  
15 design basis for, you know, this reactor, those license and I'm going to make up  
16 this data of 1975, and the people that were involved at that point in time, the  
17 contractor, the research university support, some of that information is just not  
18 available. So, why doesn't NRC just look at what's changed, just look at the  
19 aging management kind of issues? That's been a -- I'm trying to capture a little  
20 bit of a theme I've heard in two different conversations with RTR operators at two  
21 different universities. Can you react to that?

22           JOHN ADAMS: Well, I can say that that's one area that we did task  
23 our contractor to look at, is that specifically, so -- but I can't comment in any great  
24 detail because I haven't really been --

25           COMMISSIONER OSTENDORFF: Well, do you have any

1 assessment -- I mean, obviously, you guys have experience, so let's put aside  
2 the contractor work. What do you -- you must have some gut feel on that -- you  
3 know, some reaction to that statement.

4                   JOHN ADAMS: Well, I can go back to the day when I was the  
5 reactor manager at Iowa State University. And I have some sympathy that I  
6 share with those folks that have given you that position. It would seem very  
7 logical that you could do that. But what's important to realize is with the creation  
8 of the standard review plan we have, I think that's where the difficulties have  
9 arisen is we've established a more formal process that ensures that we look at all  
10 aspects relative to safety. And that is a much more formal process than it has  
11 been in the past when most of these facilities were issued a license. So, I'll let  
12 Tim --

13                   COMMISSIONER OSTENDORFF: Tim, do you want to add to  
14 that?

15                   TIM MCGINTY: It's -- we have to be reasonable about this, but  
16 creating or reestablishing the platform, the safety basis platform for which you  
17 assess changes from now and into the future is an important endeavor, and it  
18 can be somewhat frustrating. But that's why, you know, we have, as a staff,  
19 we've tried to work more with our licensees to establish that co-understanding as  
20 opposed to just doing it, as Bill was mentioning, with the traditional reactor  
21 process where there's a lot more resources available. So, there -- as John said,  
22 there is some logic to the views that the community has, but from the position of  
23 a regulator, having an established basis from which to assess is paramount.

24                   COMMISSIONER OSTENDORFF: Okay. Thank you. Thank you,  
25 Mr. Chairman.

1 CHAIRMAN JACZKO: Commissioner Svinicki.

2 COMMISSIONER SVINICKI: Well, I'll begin by commenting on the  
3 progress that has been made. I think Chairman Jaczko mentioned the meeting I  
4 think three years ago, but there might have been one in 2008 as well. And I  
5 recall when the Commission first directed some focus on this, there was a really  
6 substantial backlog. We talked about 19, but I think there were more, of course,  
7 at that time. And on a denominator of, you know, 30-some facilities, it was a  
8 substantial backlog. So, I think to sit here in 2012 and have really worked it  
9 down and to have a clear path forward on the remainder is a really commendable  
10 amount of progress. And I don't know, given some of the things we've touched  
11 on here in terms of the needing to remediate or rehabilitate some of the existing  
12 safety analyses within staffing and resources on the university side, all of these  
13 things that are just the factors that contributed to having the backlog. And then,  
14 of course, there's the kind of accident of timing that many of them were licensed,  
15 you know, at the same time. So, we've got this clump.

16 I'm actually trying to -- so I'm happy about the progress that has  
17 been made. I'm going to ask you a couple of questions about continuing to push  
18 forward on elimination of the backlog, but I'm also trying, as we talk about the  
19 long-range plan, John, that you talked about, trying to think about the next wave,  
20 you know, 20 years from now, and how can the NRC position itself to not have to  
21 go -- well, first of all, we hope that there won't be another large external event  
22 that has just been an accident of history, I guess, that's contributed to the  
23 demands on the NRC's resources every time we're up against this 20-year wave,  
24 but how can we have the regulatory framework in the best shape. And I think  
25 that when we think about rulemaking, we need to think not just about near-term

1 benefits. We might be feeling good that the backlog is gone and we will leave to  
2 our successors 20 years from now the next wave, but we also have some  
3 obligation to enshrine whatever it is that we learned in this wave and move  
4 forward, and perhaps have our successors 20 years from now best positioned to  
5 deal with the next wave of renewals, however many there might be at that time.

6 I will ask just on status, in the presentation today, I think that what  
7 was presented was the RTR license renewal backlog would be eliminated by the  
8 -- oh, this is a projection, of course -- by the end of fiscal year '14. In December,  
9 just this past December status report, the staff was projecting that in March of  
10 2013, so, the backlog could be eliminated -- I think if I have those dates right.  
11 So, it seems like something has caused us in just about four months or so to  
12 push that out. Tim, do you want to talk at a high level about what -- what you  
13 attribute that to?

14 TIM MCGINTY: That is -- it's certainly not an issue of availability of  
15 staff resources. The backlog -- for terms of definition, the backlog -- and I think  
16 you touched on it already -- as new license renewals continue to come in, they  
17 are part of what's not done yet and part of a backlog, if you will. And so, we've  
18 frozen a point of time. Instead, in 2009, there were 19 RTRs in the backlog.  
19 What has -- it's -- and I don't know actually the actual facility that has been  
20 deferred out of 13 into 14. But I believe it's relatively small delays associated  
21 with working with the facility on a time scale that they can respond to the  
22 necessary -- to the questions that we --

23 COMMISSIONER SVINICKI: That's kind of what Jessie had talked  
24 about, working with them, too. And so, it sounds like you're saying it's really  
25 only, as you recall, at one facility that has kind of pushed that out. And again, it's

1 because we're working and collaborating on when they can provide responses.

2 JESSIE QUICHOCHO: Absolutely. The 2013 timeline was based  
3 on the staff's projection on schedule. The 2014 timeline is based on what we've  
4 seen in how to create the dialogue and interacting with the licensees to provide  
5 us their timeline. And so, that's the 2014.

6 COMMISSIONER SVINICKI: Okay, I appreciate that clarification.  
7 That's very helpful. Also, at the meeting, if I'm recalling three years ago or so,  
8 we talked about we were heavily contractor-dependent in terms of conducting the  
9 reviews. We've talked about staffing up the branch on our side of the house. But  
10 one of the things that the RTR community panel had talked about at that meeting  
11 was if contractor personnel changed, they got a whole new set of RAIs as if  
12 someone was beginning their review all over again, and they indicated  
13 sometimes the RAIs didn't even show an awareness of the technology or the  
14 differences between power reactors. Has that situation changed from three  
15 years ago? And if so, how?

16 JESSIE QUICHOCHO: Yes, that has changed for the better. The -  
17 - what we've done is we've basically educated the contractors on numerous  
18 occasions to get them to understand the philosophy behind licensing research  
19 and test reactors. We've held numerous training sessions since then. In fact,  
20 we've just completed another session this year. And we also hired a different set  
21 of contractors that are more familiar with the research and test reactor  
22 community. So, there is still some work. We are taking other actions to minimize  
23 the impact to the facilities.

24 TIM MCGINTY: And I think the use of the graded approach has  
25 allowed us as part of screening the contractors' work has allowed us to more

1 efficiently reduce the number of unnecessary questions. But, again, this is an  
2 area that we also will need to continue to improve.

3 COMMISSIONER SVINICKI: Okay, thank you. And on the DOE  
4 assistance that was mentioned, I wasn't that familiar with that, but it sounded like,  
5 from your presentations that that was in some measure a contributor to being  
6 able to work off the five in one year, I think, in 10, and the five in 11 out of the  
7 backlog. Could you talk -- is that an ongoing assistance program, and does that  
8 continue to be available to some of these applicants who might need some  
9 technical assistance?

10 JESSIE QUICHOCHO: Yes. The assistance is still available to  
11 applicants. We do highlight the DOE assistance to licensees. There have been  
12 a few that have taken advantage of it. In addition to that as well, there are a few  
13 that reach out to those facilities that just recently were issued a renewed license  
14 to assist them of similar design. So, does that answer your question?

15 COMMISSIONER SVINICKI: Yes, yes, thank you. I appreciate it.  
16 Sounds, again, like that was a positive contributing factor, but I wouldn't want us  
17 to have too much of a reliance on that. I know that DOE's budget is under, you  
18 know, some stress, so it may be something that, again, it's been very beneficial it  
19 sounds like in working down the backlog, so I just wanted to ask a little bit more  
20 about that.

21 This was a question that Commissioner Ostendorff had raised, but  
22 it is this general theme that, at the time of originally licensing these RTRs, the  
23 standards were different in terms of having the documented, the safety bases,  
24 you know, the safety analysis reports. So, from what I have observed on this  
25 issue is that those seeking renewal have had to undergo at times a very, very

1 substantial reconstitution of our safety basis. On the other hand, if the NRC is  
2 needing to make contemporary findings, we have to make findings now about the  
3 safety of continued operation. It seems to me that, as Commissioner Ostendorff  
4 said, those seeking renewal may say, "Well, why can't you just look at the years  
5 of operation we've had," and I'm sure we're informed by that, but at some point, if  
6 we have to make findings today, we have to have some sort of something that is,  
7 you know, a contemporary basis upon which to make those findings. But I also  
8 understand, at times, that requires a very substantial undertaking by some of the  
9 licensees.

10           Now, one of you had made mention of the NUREG that came out in  
11 1996. Do you think, again, looking 20 years into the future, if enough of during  
12 this round of renewal that reconstitution and documentation has had to be done,  
13 and I know that conformance with the NUREG is not compulsory, but I took from  
14 some of the presentations that a number of the facilities are now at least more in  
15 alignment with a more contemporary safety analysis report. Will that stand us in  
16 good stead? Will that help in the future so that is this the kind of reconstitution  
17 we'll only have to do once?

18           TIM MCGINTY: The short answer is yes. I think you initially raised  
19 in your opening remarks that we have a responsibility 20 years from now to leave  
20 a legacy that best enables the community and the staff to make timely and safe  
21 decisions and minimize the impact on the licensees. And that is exactly it.

22           COMMISSIONER SVINICKI: Jessie, did you want to add  
23 something?

24           JESSIE QUICHOCHO: Yes. Early on, we recognized that -- we  
25 recognized that documentation was lacking. The goal is that all facilities will

1 have a documented safety analysis and that future licensing actions, whether it's  
2 a license amendment, a simple license amendment, or a complex renewal, the  
3 licensees and the NRC are more in a better -- in a more better position to  
4 perform those more efficiently and effectively. I just do want to make one more  
5 comment on that. And that is that I see the future of renewals, in my opinion,  
6 could be early engagement with the facilities. And based on the documentation  
7 that they have today, with all of the renewals being completed, I feel it would be  
8 more efficient than it is today.

9 COMMISSIONER SVINICKI: Okay, thank you. Thank you. And  
10 on that positive note, thank you, Mr. Chairman.

11 CHAIRMAN JACZKO: Commissioner Apostolakis.

12 COMMISSIONER APOSTOLAKIS: Thank you, Mr. Chairman. Is  
13 the graded approach to the licensing the same as focused approach? I think  
14 they are the same. Or the focus is different from graded?

15 JOHN ADAMS: Well, the graded approach takes a look at the  
16 hazards based on the specific facility. And with our research and test reactors,  
17 the driving cause for increased hazard is typically power level, and because of  
18 increased source term and things of that nature. So, for the most part, as the  
19 power levels go up, we engage more in depth to ensure that we've addressed all  
20 of the safety-significant aspects of that facility. With a lower source term,  
21 typically, we don't have to look at the -- well, actually, for the smaller facility; they  
22 don't have the systems that the larger facility has. So, they're not there, so we  
23 don't have to dwell on the KE removal as much, because the small facilities  
24 actually can air cool quite nicely. So, they don't need engineered systems to do  
25 that. So, I'm not sure what the focus to -- if you're referring to the focused review

1 in the ISG, that does take -- does employ the graded approach, if I understand  
2 you right.

3 COMMISSIONER APOSTOLAKIS: Well, they are two different  
4 things. Graded means you take into account the power level, which is two  
5 megawatts, I believe.

6 JOHN ADAMS: Well, the focused review on the ISG used the two-  
7 megawatt criteria as being eligible for the focused review. You had to be less  
8 than two megawatts.

9 COMMISSIONER APOSTOLAKIS: Graded means I'm looking at  
10 the power level, and then if it's below two megawatt, I apply the focused review.  
11 Correct?

12 JOHN ADAMS: That's correct.

13 COMMISSIONER APOSTOLAKIS: Okay. And in the focused  
14 review now, you look at the reactor design and accident analysis and so on, but  
15 not -- you don't look into the system analysis itself in the detail. That's my  
16 understanding.

17 JESSIE QUICHOCHO: Correct. We -- what we do in the focused  
18 review is we look at those components, equipment and systems programs that  
19 are safety significant to the facility. And so, there's -- we look at the technical  
20 specifications, the operations of the facility, the accident analysis, things of those  
21 -- in those areas where we focus on the facility at two megawatts and below, or  
22 less than two megawatts. And the reasoning for that is that at two megawatts  
23 and greater, there's a higher risk. As John mentioned, there's an increased  
24 source term. For facilities of two megawatts or greater, their emergency planning  
25 zone now expands beyond the facility of the controlled area. So, there are --

1                   COMMISSIONER APOSTOLAKIS: Just take one system. Let's  
2 say that system appears in some version in a smaller reactor, less than two  
3 megawatts in the larger. What would you do different? I mean, you still have to  
4 remove heat, right. So, how -- what would be different in the focused review?  
5 How much more would you do in the complete review?

6                   JESSIE QUICHOCHO: I understand. The question -- if I  
7 understand your question correctly, it's what areas do we look at in the focus  
8 review versus --

9                   COMMISSIONER APOSTOLAKIS: Yeah, what do you think about  
10 -- I mean, if I had to do a complete review for a 10-megawatt reactor, but then the  
11 same system appears again, say, in a smaller reactor, what would they leave  
12 out? Or what is it that I would not pay as much attention to, because we rarely  
13 leave things out?

14                  JESSIE QUICHOCHO: The development of the interim staff  
15 guidance was to narrow the scope of the review, and that was based on  
16 determining what chapters -- there is 18 chapters, and it was part of an  
17 application. And so, we focused on, I believe, four chapters that were, you know,  
18 contributed to the safe operation of the facility. And that's the -- the focus review  
19 is we chose not to look at other chapters and looked at those chapters that were  
20 pertinent to safety --

21                  COMMISSIONER APOSTOLAKIS: I assume you look but not in  
22 detail.

23                  JESSIE QUICHOCHO: Correct.

24                  COMMISSIONER APOSTOLAKIS: Okay. Now, in this review, are  
25 you looking at aging effects?

1           JESSIE QUICHOCHO: We do -- we look at, for example, we look  
2 at operational history. We look at if there was a -- we look at inspection reports  
3 in the last so many years. If there was something that was documented  
4 inspection report that, say, there's a tank leakage, we would ask questions on  
5 that, what have they implemented to mitigate against any future happening of  
6 that. Some facilities changed their tank liner, have changed their tank liner out  
7 as a result of that, not necessarily as a result of their license renewal, but has  
8 taken steps to address that. Some facilities have installed pool level devices so  
9 that they can monitor should there have any leakage.

10           COMMISSIONER APOSTOLAKIS: But, as you know, in the  
11 license renewal process for power reactors, the whole process is aging oriented.  
12 And they don't just look at past incidents. I mean, they go into details of analysis  
13 and so on. And here, it appears -- I mean, you have reactors that are very old,  
14 right. You said some of them are from the '50s. It would seem to me that the  
15 aging would play a major role. Why isn't that so? I mean, you seem to imply that  
16 it's part of what we do, no big deal. Is that -- is that a correct impression? It is a  
17 big deal? Okay.

18           JESSIE QUICHOCHO: No. I don't want to leave you with that  
19 impression. We do look at, when we -- when the applications do come in for  
20 renewal, and we do look at the operation for the next 20 years, absolutely. And  
21 so, we do look at if the facility's going to be operating for the next 20 years, how  
22 do we address some of the operational issues that they have gone through.

23           COMMISSIONER APOSTOLAKIS: But, again, if I look at the  
24 power reactors, typically what happens there is the licensee is asked to establish  
25 more programs to manage aging. Do you ever do that?

1                   JESSIE QUICHOCHO: Well, there is no specific program for  
2 managing aging, for research and test reactors.

3                   COMMISSIONER APOSTOLAKIS: That's what I'm getting a little  
4 confused. Why? If I have a reactor that's 50 years old, that's not an issue?  
5 Maybe you can give us an answer --

6                   TIM MCGINTY: Maybe we can give an answer after. Maybe you  
7 could also ask some of the presenters that will follow us what their views are --

8                   COMMISSIONER APOSTOLAKIS: I may do that. Thank you.  
9 Now, another topic. With -- I mean, I understand the review, the license renewal  
10 review is really deterministic, right. You're relying on very conservative  
11 assumptions and all that -- which is what we used to do -- well, we still do with  
12 power reactors. And then, we did PRAs and we discovered that certain  
13 sequences were a surprise to us like station blackout, anticipate the transit  
14 without scram and so on.

15                   Now, I fully appreciate these are low source term reactors, but,  
16 again, these reactors are in the middle of cities. The MIT reactor is in  
17 Cambridge. You know, people walk outside and drive and so on. And you don't  
18 have to kill people to create a problem. I'm wondering, has anybody thought  
19 about doing maybe a mini PRA so that we'll not -- we will be assured that there  
20 will be no surprises, that the intent would not be to see, you know, whether you  
21 have health effects, because I'm pretty sure you don't. But, again, you know,  
22 there may be something that the deterministic methods have missed and like a  
23 station blackout. And would that be helpful, or -- I don't know. You realize I had  
24 to ask a question like that.

25                   [laughter]

1           JOHN ADAMS: Actually, we could do an interim -- or a study of -- I  
2 would recommend if we were going to pursue that, we would take one of the  
3 larger research and test reactors that we have, and you could do some PRA  
4 work. Historically, we have never felt that we're going to gain a lot of information  
5 that's going to significantly direct our regulatory framework in a different direction.  
6 So we didn't think we'd ever get any return on our investment there. But you're  
7 right. We could do a test case and see what we do learn. In fact, given that  
8 information, it could possibly enable us to further risk inform our regulatory  
9 framework. We could be enlightened by information that would lead us to believe  
10 that where we are focusing our inspection program currently isn't the areas of  
11 highest risk, and it could inform our inspection program.

12           So, there is the possibility to learn usable information from a pilot  
13 risk assessment program is certainly there. But to require our licensees to  
14 implement a program specific for their facility, as you probably are well aware of,  
15 the cost of conducting probabilistic risk assessments can be significant. And I  
16 think our licensees would need some type of assistance if we found a direction  
17 we wanted --

18           COMMISSIONER APOSTOLAKIS: No, I appreciate that. And I  
19 didn't mean that we should demand PRAs from the licensees, but I am thinking in  
20 terms of power reactors, it seems to me we will feel much better about our  
21 license renewal approach if we eliminate the possibility of a surprise that, you  
22 know, you might look into systems analysis and find, my God, I hadn't thought  
23 about that. So, it would really be internal, and it doesn't even have to be a  
24 complete full scope and all that. Thank you, Mr. Chairman.

25           CHAIRMAN JACZKO: Well, I just had a couple of questions.

1 Touching on what Commissioner Svinicki asked a little bit about, which I think is  
2 a very good point is that the licensing basic reconstitution seems to have been  
3 the big part of a lot of the challenge as we go forward, and I tend to agree with  
4 her assessment. And I think, Tim, you hinted at that as well, that that is  
5 something that should make the next round better, assuming we properly  
6 maintain it. So, that -- if there's any question I have on that, it's that question.  
7 Do we have the right programs, whether it's guidance on licensing, or whatever,  
8 or regulatory, to ensure that the licensing basis are maintained for the next 20  
9 years, so in 20 years, when we're back here again, we're not trying to  
10 reconstitute a licensing basis again. Is that your sense or do we need work  
11 there? Anybody...

12 TIM MCGINTY: Yeah, I think we have established a program that  
13 has more rigor and durability that is focused -- it's related to -- we've got more of  
14 a focus on process, putting documentation into ADAMS, for example. That's  
15 occurred since the 1980s -- a general focus in training our staff in how to conduct  
16 review for documenting the basis for our decisions, through our qualification  
17 programs, a number of different facets that lead to a essentially a more durable  
18 record of the facility licensing basis that sets us up for that.

19 CHAIRMAN JACZKO: Well, that's good to hear. And I think that  
20 should hopefully help in this area. The -- which leads me to another thought or  
21 question. In 20 years from now, we'll be looking at reactors that are significantly  
22 older, and again, appreciating that they have very different source terms, they  
23 have a very different radiation field than power reactors that we're more  
24 accustomed to, well, certainly, I would say, I'm more accustomed to dealing with.  
25 Have we asked ourselves the question, I mean, is there a finite life for these

1 reactors? Are we -- is the next 20 years even feasible, another 20-year renewal,  
2 or will we at some point reach the stage at which we're looking at  
3 decommissioning for really most of these reactors? I mean, you know, right now,  
4 mostly for the larger reactors we're looking at, you know, there's questions about  
5 60- to 80-year operation. I don't think we have definitive answers yet on whether  
6 that's feasible or whether that's doable or what the cost would be to do  
7 something like that. Do we have a similar sense with these reactors? Are they  
8 on the same kinds of timeframes, or given the source term, the different radiation  
9 field, that you don't have the same kind of effects on materials that could shorten  
10 life spans?

11           TIM MCGINTY: And also, given our tracking operating experience  
12 and our inspection and oversight program, which continually verifies the status of  
13 the facility, I hesitate to compare the timing of commercial power operating  
14 reactors to RTRs. We haven't systematically asked ourselves that question,  
15 though, and assessed it in detail. And there's always a significant cost in terms  
16 of effort and on the licensees associated with such an effort. And so, we haven't  
17 formally energized that.

18           JOHN ADAMS: One consideration with research and test reactors,  
19 many of them are small enough and the complexity of systems is not great, that  
20 you can actually replace any component in the facility with a new one, which is  
21 not very feasible with power reactors. So, they are very maintainable.

22           CHAIRMAN JACZKO: Anybody else? Okay, well good. Well,  
23 thank you for those -- I think I, as well as my colleagues, look forward to, you  
24 know, the completion of the regulatory basis and what your recommendations  
25 are as far as possible regulatory changes as we go forward. But I think we've

1 heard a lot of progress has been made, and we'll keep working through it.

2 Thanks. We'll take a quick break.

3 [break]

4 CHAIRMAN JACZKO: Well, we'll get started. We'll start with Leo  
5 Bobek who is the chair of the National Organization of Test Research and  
6 Training Reactors.

7 LEO BOBEK: Good morning Commissioners, and thank you for  
8 the opportunity to provide this briefing to you. My name is Leo Bobek, I'm the  
9 2012 Chairman of the TRTR --

10 FEMALE SPEAKER: The microphone is not on.

11 LEO BOBEK: Again, I am Chairman of the National Organization  
12 of Test Research and Training Reactors, and my other full-time job is director of  
13 the University of Massachusetts Lowell Research Reactor. Before providing you  
14 the take or TRTR perspective on relicensing issues, I wanted to take the  
15 opportunity and provide a perspective on TRTR and research reactors in general.  
16 I believe both are relevant to this discussion.

17 The TRTR membership includes NRC-licensed facilities, DOE-  
18 licensed facilities. We have members from Canada and, at various times, other  
19 nations including countries in South America, Australia, European and Asia  
20 Pacific nations. So we have quite a broad membership and diverse membership.

21 We do refer to ourselves as research and test reactors. The  
22 regulations refer to us as non-power reactors, or NPRs. I'm sorry, I'm not sure  
23 which slide we're on. I should be saying "next slide." There we are. Research  
24 and test reactors are termed non-power reactors under 10 CFR 50.2 definitions.  
25 The only other definition associated with research and test reactors is for testing

1 facility, which describes a reactor that is 10 megawatts or greater and has  
2 various other differentiating factors such as fueled experiments or liquid fuel  
3 loading. Other than that, you're a research reactor.

4           As far as RTR's overview, you've heard some of this from the staff,  
5 there are 42 RTRs licensed under NRC. Thirty-one of those are currently  
6 operating. Twenty-five of those facilities operate at university campuses. Most  
7 of these facilities are class 104 licenses for research and development. And  
8 most were built, as you were told, between 1960 and 1980, which has been  
9 significant for the relicensing issues. The licensed thermal power levels range  
10 from a few watts up to 20 megawatts of power. Next slide, please.

11           It's important to emphasize that RTRs are not small nuclear power  
12 reactors, and I think that point has been made several times during the  
13 presentation. RTR usage requires a much different design from power reactors.  
14 RTRs are designed to produce high thermal neutron outputs at a much lower  
15 thermal neutron power level. And the reason for that is because these are  
16 facilities that are used for neutron research. And we'll talk about that in a minute.

17           The RTR core volumes are physically much smaller than a power  
18 reactor. Most of the research reactors have core volumes that are less than a  
19 cubic foot. Power reactors are tens of cubic feet. And so, RTRs require much  
20 less fuel, a few kilograms of uranium versus tens of kilograms for power reactors.  
21 RTRs have far lower fission product inventories, a few orders of magnitude for  
22 most of these facilities. And RTRs lack the thermal hydraulic energy to disperse  
23 fission products in the event of an accident. And that's not to say that these  
24 facilities are not safety concerns at all. The reactors do provide a significant  
25 source term, depending on the power level. However, it is fractional compared to

1 power reactors. And I keep on referring to power reactors in comparison to non-  
2 power reactors, and that is because we are licensed under the same regulations  
3 as power reactors. But, again, we are much different. Next slide.

4 As mentioned in the previous slides, RTRs are designed to produce  
5 neutrons for research and education purposes -- studies in the fundamental  
6 nature of matter, neutron physics, probing the molecular structure of materials  
7 using neutron scattering, imaging items that cannot be imaged with X-rays using  
8 neutron radiography, and the production of radioisotopes for experimental and  
9 research purposes. Next slide.

10 Research and test reactors are used for non-destructive analysis,  
11 neutron activation analysis, which is used to determine the elemental  
12 composition of materials. And the production of neutrons and the use of  
13 neutrons can be used for changing the characteristics of materials, and both  
14 structural and chemical for beneficial applications. Next slide.

15 So, RTRs offer a unique tool for instructing nuclear engineers,  
16 technicians, and scientists in radiation physics and nuclear engineering. The  
17 research reactors can be used for everything from subcritical multiplication of  
18 neutrons to measuring reactivity, higher-power level reactors; you can measure  
19 temperature and xenon effects. Again, these are all teaching and research  
20 applications at these facilities. But it's important to recognize that the margin of  
21 safety on these facilities is very high such that they can be used by students.  
22 And engineering students make mistakes. And these facilities are very forgiving.  
23 They're designed such that students can work on them. If we have a scram of a  
24 reactor, it's not as a significant event as it is with a power reactor. In fact, a lot of  
25 times that's a teaching moment for the students. You can teach them how to

1 evaluate a scram and then use procedures to restart the reactor and recover  
2 from the event. But, again, it's not the type of event like what you would have  
3 with a power reactor. Next slide, please.

4           So, again, RTRs are a unique educational tool. We're also used for  
5 educating the public on nuclear technology. We offer tours of our facilities. In  
6 fact, some of our facilities may provide tours to hundreds of people in any given  
7 year. And one of the advantages of a non-power reactor, research reactor, is  
8 that you can actually look down into the tank of water and see the reactor  
9 operating. You've all seen the pictures or experienced it for yourself of the blue  
10 Cherenkov Effect. And that's very useful for when you're teaching the public  
11 that, first of all, nuclear power can be safe. It is highly regulated. There are  
12 many safety systems involved. You can look down into the tank of water, see the  
13 reactor operating and not become radioactive and go off to tell about it. So,  
14 again, very unique and very useful teaching tools.

15           So, now we get to the position of TRTR on the license renewal  
16 process. And, first of all, TRTR recognizes the unique challenges that have been  
17 posed on the NRC during RTR relicensing in the last decade or so. Some of that  
18 has already been addressed; for example, staffing issues, the situation with 9/11.  
19 And so, we certainly understand why a backlog occurred. And TRTR certainly  
20 appreciates all of the efforts that have been made by the Commission and the  
21 staff to alleviate the relicensing backlog. And we also appreciate the updates to  
22 guidance and the opportunity that TRTR has been given to participate via the  
23 public meeting process to provide input to that guidance.

24           However, in polling the research reactor community, we find that  
25 the relicensing process has become very complex compared to the way it was 20

1 years ago. And we understand that is because of the process. The process has  
2 changed and is more formal. However, I put the question to you whether or not  
3 there is a quantifiable improvement in safety due to this process since 20 years  
4 ago. Most of these facilities have not changed. And the amount of effort  
5 required in order to relicense them has been significant.

6           Some of the suggestions that have been provided to me by others  
7 in the TRTR community is that did the NRC consider a generic thermal hydraulic  
8 analysis for models of trigger and plate-type fuel reactors. Again, the facilities  
9 that are one megawatt or less, it's a very significant effort on their parts to do this  
10 type of analysis, and this has already been addressed, there is some efforts to  
11 get funding from DOE to do this. But for a small facility to do something like this,  
12 it's very difficult.

13           Similarly, for the maximum hypothetical accident analysis for non-  
14 power reactors, this is very similar to the beyond-design-basis event. For  
15 research and test reactors, it usually involves the release of fission products or  
16 hypothetical release of fission products from the fuel. And then the analysis has  
17 to be done to assure that that fission product release does not reach the public  
18 dose levels that are provided in 10 CFR Part 20, which, again, can be a very  
19 significant analysis for non-power reactors that are small in nature and small  
20 staffs.

21           As far as some additional generic suggestions for streamlining  
22 relicensing, one comment was to develop a systematic way outside of the RAI  
23 process to correct typographical and editing errors -- there seems to be a  
24 significant number of questions associated with that -- to develop a generic  
25 decommissioning cost analysis associated with previous experiences of facilities

1 that have decommissioned and indexed at the power level and inflation, and then  
2 to endorse more of the usage of ANSI and ANS standards of regulatory  
3 guidance. And I see my time is up. And, again, I want to thank you on behalf of  
4 TRTR for this opportunity.

5 CHAIRMAN JACZKO: Thank you. We'll now hear from Sastry  
6 Sreepada, who's the director of the --

7 SASTRY SREEPADA: Walthusen Reactor.

8 CHAIRMAN JACZKO: Walthusen Reactor Critical Facility at RPI.

9 SASTRY SREEPADA: Yes. Thank you, Mr. Chairman, for inviting  
10 me to come here and tell you our experiences in relicensing. And, as you said,  
11 I'm Sastry Sreepada. I'm the director of the Reactor Critical Facility for about a  
12 year and a half. Just after Commissioner Ostendorff's visit, I became the director  
13 of the facility. So, at that time, we were in a transition.

14 Now, we talked about the big differences between power reactors  
15 and research reactors. Now, compared to most research reactors, we are  
16 another order of magnitude below that. We are licensed for 100 watts. We  
17 operate to a limit of 15 watts. Mostly we run the place at 10 watts, and we run for  
18 about five or six hours a week. So I want you to keep that when I make the  
19 safety considerations in this. Next slide, please.

20 Now, to appreciate it, let's look at the facility itself. The facility is a  
21 pool-type, light-water, light-water reflector reactor, we use water only for  
22 moderation and shielding, and we don't need to remove any heat because it's  
23 only 10 watts. It's not there for cooling. The reactor core itself is sitting in a  
24 2,000-gallon water tank, 7-feet diameter, by 7-feet high. And most important, the  
25 burnup is so negligible, it's about two kilowatt hours per year for the core. So, in

1 the next 20 years, probably, we'll have 40 kilowatt hours. As we said, it tests the  
2 specification limit. But we operate much, much less than that. And right now, we  
3 use a low enriched fuel. Probably we are the only one with commercial rod type  
4 fuel. We use the spent fuel. And that's obtained from the Department of Energy.  
5 The core is approximately three feet high. And due to the extremely low burn-up,  
6 we can access the reactor core, even touch the fuel minutes after we shut it  
7 down. So, the students can load the fuel, take the fuel out in the middle of an  
8 experiment, move the rods to learn more about what the impacts are.

9           So, because of this, the facility is mostly suited for critical  
10 benchmark tests, student training in designing experiments, student training in  
11 operations. And you do license our operators to run the facility, too. And it is  
12 potentially really good to train on the fundamental knowledge base for even  
13 power reactor operators for a continuous education, because that's one thing  
14 which they don't have an ability to train themselves. Next slide, please.

15           Now, like any of the research reactors, this facility was built a long  
16 time ago. It was built by an American locomotive company in 1956 to support the  
17 research for the Army reactors. And in 1964, Rensselaer Polytechnic assumed  
18 the operation of this. In '65, we had the first license in the name of the  
19 Rensselaer Polytechnic Institute. We had highly enriched uranium, we had in  
20 plate form.

21           And then, July 1969, we applied for the first renewal. We got that.  
22 And the second renewal, now we -- this is how far I tracked with the system --  
23 second renewal, we submitted in 1979. There was one RAI, and it was licensed  
24 in 1983. Those were the good days with a lot of people working in the nuclear  
25 field all around the country. So it's not a question of lack of understanding on

1 both sides, but it took four years even then. And we amended the highly-  
2 enriched uranium to low-enriched uranium. We submitted that amendment in  
3 October '86. We had one RAI. And it was approved in April in 1987 for the low-  
4 enrichment core. And recent renewal, it was submitted in November 2002, and it  
5 was licensed last year.

6           And let's talk a little bit about the perspective on the safety and  
7 scope in licensing. We said we operate the core below 100 watts, and mostly 10  
8 watts, less than two kilowatt hours per year, which is a few micrograms of burn-  
9 up, [unintelligible] if we had run the whole year. And in its lifetime, a few  
10 milligrams of uranium-235 is fission, 20 years.

11           So, the reactor has a 2,000-gallon tank, and we don't need any  
12 cooling. The reactor room is surrounded by one-foot-thick concrete on three  
13 sides, and three feet between the control room and the reactor. The only thing  
14 we have is we have a vault where we store the fuel. My first concern when we  
15 had the flood was what are the extremes. We can flood the whole building with  
16 water. We are still separated out. So we will only have to clean up the place  
17 physically rather than have any criticality problems.

18           So the RTR building is supported on 104 treated wooden pylons  
19 each can take 20 tons. I know it was built in '56, but it was built strong in that  
20 sense. So, really, if we start the reactor and doubled its license to power like 200  
21 watts, made the worst possible accident, we will release 10 kilojoules of energy,  
22 which will raise the cladding temperature by a tenth of a degree Celsius. So,  
23 now, we made the submittal and the submittal was 200 pages, 70 pages of  
24 safety analysis. Now the big question I always have is if I ask a graduate  
25 student, like a Ph.D. student, to go and write me a safety analysis report, he's

1 totally confused with all these numbers, NUREG 1537.1 reports to so many other  
2 areas, so unless somebody's already familiar with that, we tell him what it is. He  
3 can't do it and it should be done in three months as far as I'm concerned, for the  
4 reactor of this type. So now let's see -- next slide please.

5           So what worked well? The initial submittals from the last three  
6 renewals were prepared under the same director. We were very lucky. We had  
7 the same director from that day until the recent one. And the recent submittals  
8 we had the excellent contribution by our volunteer, our really very smart part-time  
9 employees of the old lab who help us run the place; it's run on that basis mostly.  
10 So we gain a lot of experience from them. So they have prepared the whole  
11 thing for us.

12           So graduate students help and basically the bulk of the material  
13 from the last low enriched core we updated the safety analysis report to bring it  
14 into the new format. So is this format going to be same 20 years from now? I  
15 doubt that, because if you have a focused report for a facility like ours, I should  
16 be licensed for a three milligrams of fission product handling than all these  
17 complications.

18           So beyond that, if you change the system again, if you analyze it  
19 with new systems, you have to have new computer course and I will demand  
20 computer course qualified if I am a good engineer. So that's a lot of work. So we  
21 have to have simple generic matters to qualify extremely small reactors like ours.

22           And what didn't work well? We are run on part-time staff.  
23 Substantial turnover of people and I sit here for five directors during licensing  
24 process. If we had five directors change during the period of 2002 until now,  
25 which is nine years, five operations supervisors, five nuclear safety review board

1 chairmen, three radiation safety officers; it's not a good thing to have a coherent  
2 picture coming out unless we spend more time every time people change.

3           The first request for the additional information came almost six  
4 years after the submittal, so the director left, all the staff left, so we are working  
5 on papers. So what didn't work well? Difficulty to be on the same page with the  
6 constant change in personnel from our side. Even if we had a face-to-face  
7 meeting, we couldn't improve that, because the best thing if we ever had good  
8 record of all the telecoms we had and there were records written, how could I  
9 follow that? When I came and I spent almost six months reading the whole  
10 documents, but I was lucky because I was at the end of the licensing process.

11           So where did we spend most of the time? In decreasing order,  
12 technical specifications? Or the maximum time we spent safety analysis and  
13 other sections. What kinds of things we had to do? A lot of editorial changes,  
14 definition of terms, nothing related to the safety. But in three years if I really take  
15 from the first area I did good with 5 reactors changing so I think if we had a face-  
16 to-face meeting once or twice it could have been licensed.

17           So when we talk about focused approach for small reactors, I'm the  
18 smaller of the smallest. And it is necessary to have a continuity of personnel  
19 throughout process and some documentation of the discussions would have  
20 helped us a lot. And other than that, this is good.

21           What did we accomplish? We put the safety analysis in the new  
22 format. I can give it to students and say now you design the experiment. Tell me  
23 what part of this has to be changed because of that? So that's something that is  
24 good and the biggest problem we have at our end is attrition of the staff and most  
25 probably all the senior people are on the way out. I am a retired employee from

1 Lockheed Martin, so that tells you the story.

2           So basically if we can increase the new faculty for [unintelligible]  
3 we'll be in a better shape. So other than that I think our licensing process is not a  
4 bad process, but is it needed to be this complicated this long? That's something  
5 we all can ask. Thank you for the opportunity.

6           CHAIRMAN JACZKO: Thank you. We'll now turn to Ralph Butler  
7 who is the director at the University of Missouri research reactor.

8           RALPH BUTLER: Well, thank you for this opportunity to come  
9 before you and share our experience with the license renewal process. As a  
10 quick overview of the facility on slide two, we are located on the University of  
11 Missouri Columbia campus approximately one mile south of the main campus.  
12 We are a pressurized beryllium and graphite reflected reactor in an open pool,  
13 light water moderated and cooled. We are at 10 megawatts and, as such, we are  
14 the largest of the university-operated facilities with a staff, full-time staff, of about  
15 160 FTE. We fully support the four missions of the University of Missouri of  
16 research, education, service, and economic development. Next slide please.

17           We initially began operation in October of 1966 at five megawatts  
18 and in the mid-70s we upgraded to 10 megawatts. The facility was originally  
19 designed for 10, but operated at five for the first few years. An important note is  
20 that we started operating seven days a week, or six and a half days a week,  
21 greater than 150 hours a week, in 1977, and we have continued to do that  
22 around the clock. We submitted our license renewal application in August of  
23 2006. Obviously a vast amount of resources went in to developing the revised  
24 safety analysis report and recapturing the construction period point. So, today  
25 we've probably invested 10 to 12 years worth of effort toward license renewal

1 with significant resources. I also need to state that we are working toward fuel  
2 conversion from high enriched to low enriched. This also puts a strain on the  
3 limited resources that I'll mention later on. Next slide.

4           Just a couple of slides on the timeline. As you can see, some three  
5 years elapsed between the time we submitted our application until we received  
6 the first RAIs, which were more on the simpler items of decommissioning and  
7 financials. And I'll come back to that in a moment. And then some on reference  
8 material and environmental report. On the next slide, you'll see we began to get  
9 into the technical questions in May of 2010 timeframe with 19 questions, what we  
10 considered to be extremely complex, given 120 days to respond, and then in  
11 June of 2010, another 167 questions with 45 days to respond.

12           On the next slide we talk about our comments and our experience  
13 and observations. Some of the things we struggled with was during that three  
14 year lapse of starting the RAI process, we felt like we had to go back and  
15 reconstitute some of the questions we had already provided, such as in the  
16 financial and decommissioning. We had to go back and update all of that  
17 previous information we submitted in the application. A very large number of  
18 questions of varying complexity limited resources to respond in such a short  
19 period of time. I stated we had 160 full-time employees, but there might be  
20 perhaps five of the knowledge base necessary to respond to these types of  
21 technical questions. Those same five individuals also support our fuel  
22 conversion effort. At the same we had Argon National Labs supporting us on  
23 field conversion effort and I cannot emphasize the importance of that effort for  
24 fuel conversion that helped us on the relicensing effort. But I must say that the  
25 sheer number of questions to answer and given 45 days, we obviously walked

1 out of the room overwhelmed, to say the least.

2           On the next slide, some of the questions required significant  
3 computer code work. This obviously creates a challenge. I know it does for the  
4 smaller facilities, because it created a huge challenge for us. We have limited  
5 resources who are competent in some of these computer codes. Some of our  
6 computer codes that we've been using were older versions, so we had to go out  
7 and acquire the latest versions. We had to send an individual off to training to  
8 learn some of these new versions, and again, this is where Argon helped us  
9 tremendously. We piggybacked off the fuel conversion mark so that we could  
10 come up to speed on developing a model of our reactor to use with these  
11 computer codes. But it did require significant resources. In some cases we felt  
12 some of the questions were already answered and that the reviewer either  
13 missed it in the review of the safety analysis report, or asked for greater detail.  
14 Anyway, we spent considerable time going back and saying it's on this page.

15           On the next slide, one of our recommendations is to increase the  
16 number of site visits. We had two site visits and one site visit when you're  
17 handed 167 questions, you spend all day in a room trying to reach some  
18 consensus on the interpretation of the question. With that many, at the end of  
19 the day there were still quite a bit of vagueness in our mind on how to answer  
20 some of the questions. So it would've been nice to have had broken the  
21 questions up or had multiple site visits so we could've spent more time trying to  
22 understand what was being asked of us.

23           One of the other suggestions that we have is perhaps a database  
24 or access to some of the common design features among reactors wherein that  
25 the questions asked of any of the facilities are just generic questions as the NRC

1 follows its process that even though we might know the answer, we didn't know  
2 whether we were answering it sufficiently or over-answering or if we could've had  
3 access to other facility's questions and how they responded. Certainly for the  
4 smaller facilities it would've been beneficial to say this is what the answer should  
5 be or -- excuse me, or this is sufficient enough. So we spent considerable  
6 amount of time kind of arguing among ourselves are we answering the question  
7 and are we answering it to the level necessary?

8           On the next page, next slide, one of the good things you come out  
9 of trying to reconstitute some of your safety basis, we found a discrepancy in the  
10 work that was done in 1974 going from five megawatts to 10 megawatts and the  
11 Bernath coefficient caused us to question one of the safety limits and with a vast  
12 amount of work with Argon National Laboratory. And because of our work on  
13 fuel conversion we had new modeling and a new set of peaking factors, so with  
14 that we were able to show that the safety limit really had no impact in margins  
15 and safety had remained the same. But this probably consumed six months of  
16 our time in just trying to address this thing, but the positive side is we identified  
17 something that was -- the interpretation of the Bernath equation was different and  
18 so we were able to solve that issue.

19           The other suggestion we have is some more realistic timelines on  
20 trying to respond to questions. Forty-five days for 167 is kind of scary.

21           I guess the positive thing is here -- again, we were very fortunate  
22 and I can't say enough about the support from Argon and the fuel conversion  
23 market. We were just fortunate that these two things were running in parallel, so  
24 it supported us greatly. We had a vast amount of support from our senior project  
25 manager. We spent a lot of time on the phone going what do you mean here?

1 Or seeking his guidance. But in the same line the staff has been very supportive  
2 and understanding of our requests for additional time. They know that we are a  
3 staff dedicated to attempting to answer these questions and we're making pretty  
4 steady solid progress, it's just a time-consuming effort. So we appreciate the  
5 NRC staff's understanding on that.

6 On the next slide, where are we today? I think the end is in sight.  
7 We have six questions remaining. These are in the code work area, so requiring  
8 a vast amount of effort, but we hope to have these completed by the April  
9 timeframe and submitted, so we'll have completed the RAIs. One of the other  
10 things that happens to us with the revised safety limit, and we have an  
11 amendment in for that, is that we'll have to go back and rewrite portions of our  
12 chapter four.

13 So, anyway, thank you for your attention and I look forward to your  
14 questions.

15 CHAIRMAN JACZKO: Well, thank you for your presentation. We'll  
16 now turn finally to Stephen Miller, who is the head of the Radiation Sciences  
17 Department and the reactor facility director at the Armed Forces Radiobiology  
18 Research Institute.

19 STEPHEN MILLER: Thank you. So, next slide please. So I  
20 thought I'd start with a little bit of history of the facility. We achieved our first  
21 criticality impulse in 1962. It was August so we're coming up on our 50th year.  
22 We were in the middle of relicensing in 1984 and I was involved in that and I  
23 knew that I was never going to be involved in another one, I'd be somewhere  
24 else. And, of course, here I am.

25 So, during that 1980 renewal, we did completely rewrite our SAR

1 and we decided on our own. It was not an NRC request, but we decided that we  
2 needed to refresh that and have a good starting point so that we wouldn't be  
3 doing this in the future. So, our current renewal package was submitted in July  
4 of 2004, under timely renewal and AFRRRI to date has logged over 50 years of  
5 safe operations. Grand total for our operational history to date is about 40  
6 megawatt days. Okay? We're a biological research facility, cell cultures,  
7 electronics to go up into space, those sorts of things. So we run for an hour at  
8 relatively low power levels here and there and move on. So we haven't burned  
9 up a lot of fuel. Next slide please.

10           So, in August 2005, we started our relicensing process. We had  
11 NRC along with the contractor at Brookhaven visit AFFRI and we discussed the  
12 first round of 95 questions that were put in front of us on the table. All but seven  
13 we were able to answer to everybody's satisfaction on the spot. And we were left  
14 with seven that were either highly complex or needed a great deal of work. And  
15 the license process stopped. There weren't resources, you know, a lot of  
16 reasons. In June of 2010 we started up again and we started out with four RAIs  
17 that were financial questions. We submitted about a 300-page financial  
18 statement for a government-owned facility to show that we'd be solvent when it  
19 came time to decommission. Next slide please.

20           So, in July of 2010 we received our first round under the focused  
21 review process of 41 RAIs and working on those RAIs we eliminated all but about  
22 three that required some modeling support that we just simply didn't have at our  
23 facility. So, the budget year in September in the federal government is over. We  
24 couldn't do anything until October, so as soon as October rolled around we were  
25 going to request some funding. Along the way we requested some assistance

1 that we had talked about from DOE. We are also a university. We do fall under  
2 that category. And DOE looked at the questions, prepared a package to go to  
3 General Atomics and said you've got to be kidding. This is way outside of our  
4 budget range. You're on your own. So anyway, we were waiting for money.  
5 With the budget year closed out, October is coming upon us. Next slide please.

6           And the entire budget year for FY11 there was no budget. We  
7 were under a continuing resolution and we were told that under a continuing  
8 resolution we can't start this and we'll just have to wait for Congress to approve a  
9 budget. So, we still had those three RAIs that we were pushing farther and  
10 farther down the line. We just received our budget on March 8 of this year, so it  
11 has taken that long. Completely out of our control. We kept telling the -- our  
12 project manager, we get our budget when we get our budget. We can't -- there's  
13 nothing we can do about it. So anyhow, so the contracting process to General  
14 Atomics is underway and next slide please.

15           Okay, so to date where have we been? In addition to the original  
16 95 RAIs, we've exchanged 143 RAIs back and forth. Some of them were as  
17 simple as state for the record that you're not owned by a foreign government and  
18 others were extremely complex, outside of the expertise that we have on our staff  
19 and needed outside assistance. The good news is that we're almost done. We  
20 expect the process will be complete this year, but at what cost? We've estimated  
21 our outlay for this process to be in excess of a million dollars and that's not  
22 including what NRC has put into the process, which is probably very close to it.  
23 That included money to yet again rewrite our SAR and modeling assistance from  
24 General Atomics and the staff time and other resources that were necessary  
25 within the institute and an additional temporary hire. Next slide please.

1           So we're hoping to be done by the end of this FY. So that's the  
2 good news. We're all very excited about it. So, next slide please.

3           So I was asked to speak a little bit about our experience with it, so  
4 as I stated earlier, I've been involved in two licensing activities for this reactor:  
5 two licensing activities and two refueling for a large cobalt facility, as well as a  
6 great deal of work on our by-product license. So, I've been around the block  
7 once or twice with this. First one being four years and USCR was put out at that  
8 time. The current effort began in 2004, and we have on staff to help with this  
9 process, three people that are permanent. I have an electronics technician. I  
10 have an administrative specialist. And I have an engineer. In addition to that we  
11 have three Military people that are here for training, so in addition to that we have  
12 a continuous training burden. And that's what we're given to handle the process.

13           So, the mention was made of the staffing up of NRC. My comment  
14 to that is where do those people come from? A lot of them came from the  
15 research reactors. In fact, one of my people is working on licensing process.  
16 Not for our reactor, but -- so there are a small number of people in the community  
17 and when one person hires, generally somebody else is the loser in the  
18 transaction. So, even though NRC was staffing up, that pool of personnel came  
19 from somewhere, many of them from the nonpower world. Next slide please.

20           Without exception, everybody that we were involved with, the  
21 NRC, the NRC contractors were helpful, professional. Everybody was  
22 reasonable. When it came to deciding timeline for RAIs they were very  
23 understanding. My commitment to NRC was that if I was going to be late I would  
24 let them know long in advance and not just let it sit wondering where, you know,  
25 so we kept that part of the deal. But everybody was easy to deal with. They

1 were professional. The questions were clear. Next slide please.

2           So I really don't have any complaints. The question really is what  
3 are we doing? So, I'm sure everybody's brought this up on numerous talks with -  
4 - so, the NRC is -- the Atomic Energy Act stipulates that the Commission shall  
5 impose minimum regulation to protect the public health and safety. I'll say no  
6 more about that. Next slide please.

7           NUREG 1537 Part 1, Chapter 13.1.1, states that for a trigger  
8 reactor, which we do have, the MHA is a fuel element that's broken on the deck  
9 after sustained operations and the resulting accident is analyzed, releases,  
10 doses to the public, et cetera, and we found that we were within Part 20 limits. At  
11 that point, do we stop? That's the question I have. We've shown that there's not  
12 a significant safety issue with the operation of the facility and the rest of it are the  
13 nuts and bolts of the facility itself. So, that's -- that was one question that I had  
14 for everybody to ponder. Next slide please.

15           So, what was the benefit of public expenditure in excess of a million  
16 dollars to do a new safety analysis report? To do thermohydraulic analysis and  
17 all those things? Was there a safety benefit in addition to what had already been  
18 done? So, next slide please.

19           So in the '60s when these reactors were built, GA took a few apart,  
20 blew a few up, and did whatever they could to make them fall apart and found out  
21 that the world was safe. Do the analyzed safety margins from all the  
22 mathematical modeling that we've done really add to that? Is -- you crack an egg  
23 you know how it breaks, right? Does modeling it enhance that? So, next slide  
24 please, and last.

25           So, my question would be is there a more efficient way to license

1 these reactors, particularly at the level that we're running at? Are we getting an  
2 increase in safety for the money that was spent for the resources that were  
3 spent? They could've been put toward research. With that, I'd like to thank you  
4 for the opportunity to present.

5 CHAIRMAN JACZKO: Well, thank you, and thank you for your  
6 presentation. We will start with Commissioner Magwood.

7 COMMISSIONER MAGWOOD: Well, thank you all for your  
8 presentations this morning. Some of you I've known for quite some time. Some  
9 of you I don't think -- I think I actually have met you. You came to visit a while  
10 back. And, you know, as you know I've visited many of the facilities over the  
11 years. I haven't kept a tracking list. Maybe I should start doing that and start  
12 checking them all off so I don't miss anybody. I have not been to RPI, so I have  
13 to correct that.

14 It was interesting. I was watching a -- I won't say which network. I  
15 was watching a television news, "news," yes for the record he used the quotation  
16 sign, program that was looking at the issue of research reactors and during this  
17 discussion and interview, a government official sort of jokingly indicated that, you  
18 know, that we now have to clean up the mess left by the Eisenhower  
19 administration from putting these reactors all over the place, and everyone kind  
20 of chuckled about that. But I was thinking about this and it seems to me that, you  
21 know, the research reactors that were deployed, not just in the United States, but  
22 really worldwide, have provided tremendous benefit for many, many years. In  
23 fact, when you think about the initial investment at the time, to think that these  
24 reactors have been in operation for some of them, in the case of yours, coming  
25 up on 50 years. And when you think about the numbers of people that were

1 trained in these reactors, it's really quite remarkable and a real success story.

2           And so we are now at the point where these facilities had to go  
3 through another round of relicensing and it's also worth noting that we went  
4 through a period during the, I guess you'd say the '90s for the most part, where a  
5 lot of these facilities were shut down. I probably -- probably Leo remembers  
6 numbers better than I do, but I seem to remember number 67 reactors at one  
7 point, maybe like in the very early '90s or late '80s, now down to I think you said  
8 25 university-based research reactors. And it seems like that number stabilized.  
9 Before I ask specific questions about the relicensing, I just wanted to just turn to  
10 Leo since you were sort of the leader here. Have things stabilized in the  
11 community? I know there were so many things. You went through the HEU  
12 conversions, the security issues, questions about the future of many programs.  
13 Do you feel that the situation is stabilized as far as the future of these facilities?

14           LEO BOBEK: They have and they haven't. As you mentioned, in  
15 the 1990s we were losing about two facilities a year, probably from 1980 to 2000  
16 we were losing about two facilities a year. When the Department of Energy  
17 started funding funds for upgrades to these facilities and for research dollars to  
18 use these facilities, we saw a slowing down. However, in the last couple of years  
19 we have lost some additional facilities. University of Arizona was the Polytechnic  
20 Institute and so these facilities are always at risk and a lot of it is funding based,  
21 whether or not there are research programs associated with them and whether  
22 there's funding to upgrade them. But there has been a stabilization, to answer  
23 your question.

24           COMMISSIONER MAGWOOD: Okay. I'm pleased to hear that.  
25 Let me start with you, Ralph. You talked about the large number of questions

1 that you received. Can you characterize what -- I don't think you gave a  
2 breakdown of what sorts of questions. What were they aimed at for the most  
3 part?

4 RALPH BUTLER: Most were aimed at just coming back to the  
5 safety analysis report and trying to better understand the basis that were in  
6 those. There -- in some cases there's probably six factors that were in our tech  
7 specs that just numbers that there was no design basis. Nothing written down  
8 about where did these numbers come from. I mean, it's kind of like the 10  
9 megawatt number used for the separation of test and research reactors at NRC.  
10 There's no documentation on where that number came from. So we spent a lot  
11 of time trying to rebuild, trying to rethink what they were thinking in the early  
12 1960's about how did you come up with this number? Most of them were not that  
13 difficult, it's just time consuming in that you have to make sure you get them in  
14 the correct format, that you're fully answering the question, researching the  
15 material to find out, you know, do we have sufficient evidence to support that  
16 answer?

17 COMMISSIONER MAGWOOD: Some of what I can figure all of  
18 you had to say was that there was some degree of pain as you went through the  
19 license renewal process, but I also had the impression and this is open to any of  
20 you -- I also have the impression that now that the process is over, you now have  
21 the completed safety analysis. That's a good thing. Having it in hand however  
22 you got there is a benefit that will serve both us as a regulator and you as a  
23 licensee going forward. Is that a fair statement?

24 RALPH BUTLER: I know for us at the MU Research Reactor it  
25 certainly gives us confidence in the safety basis and our goal is to maintain that

1 safety analysis current and up to date so that if we come back in 20 years all that  
2 information is there and our successors don't have to come back and try to figure  
3 out what the heck were those guys thinking, you know, 20 years ago. So, I think  
4 it's very beneficial. I think for the community it's beneficial, so I'm glad we  
5 underwent the process. I think it was important to do that. It likened  
6 reconstituted some of that safety basis and I think it serves the public well.

7 COMMISSIONER MAGWOOD: Yeah. Others? Any other?

8 STEPHEN MILLER: Although I think we learned a lot through the  
9 process, the question is, you know, back to the initial safety question. Is there --  
10 was there an increment in safety when we haven't changed the facility. We  
11 haven't changed what we do there. We haven't changed the design. And all we  
12 did was reaffirm what we thought we already knew with calculations that were  
13 done with destructive testing in the '60s, perhaps not in a very scientific way, but  
14 you know, they did break a few to find out what happens.

15 COMMISSIONER MAGWOOD: And I appreciate your comments  
16 on that and, you know, it's a little late I guess in terms of most of the facilities, but  
17 I still think it's worth remaining about, because I think you raise an interesting  
18 policy question about how we approach facilities like this. But it's, you know  
19 again, a lot of that is water under the dam at this point. One thought. I was  
20 listening to Commissioner Apostolakis' earlier dialogue about whether it be useful  
21 to have a, I think he used the term, a mini PRA. I think that was the term -- to  
22 look at these facilities and I suspect, especially after hearing what you just said,  
23 that you know, the idea probably doesn't sound that attractive to you, but I  
24 wonder, though, one thing that I think does raise some issues that might be  
25 interesting to talk about and maybe this is more -- this might be something we

1 can look at. It might be more of a DOE activity, but it might actually be an  
2 interesting project for graduate students. Because I think there is a need to  
3 enhance the level of PRA expertise nationally and there might be some  
4 opportunity there. So I thought I'd just sort of put that idea on the table for others  
5 to consider, because I do think that there's a value in the exercise. Whether  
6 there's value in the product is -- let others debate, but I think the exercise itself  
7 would actually be something worth considering.

8           Now you heard Mr. McGinty at the end of his time with me indicate  
9 he thinks that the balance is now about right. And I recognized this process has  
10 gone on for some number of years and there's been a lot of back and forth with  
11 the agency, but I did hear almost all of you, I think, indicate that you felt the staff  
12 was -- had been very professional and very fair and very flexible in how they  
13 dealt with you. And I wanted to give each of you a chance to react to the -- to his  
14 conclusion at the end that the balance is about right now, after recognizing that  
15 there's been a lot of things that have happened, but where we are today, do you  
16 feel that the balance is right? And maybe all of you just give me a quick answer  
17 to that.

18           STEPHEN MILLER: The -- as I already stated, the NRC has been  
19 very, very nice to deal with. Everybody's been professional and so nobody can  
20 say that somebody's come down on us with, you know, with a brick, but for these  
21 types of processes, I'm not sure that we really are striking a balance at this point  
22 between the actual risk to the public for the facilities versus the amount of  
23 regulatory oversight. We had talked about aging issues a little bit and for a  
24 facility like the one that we have at AFRRI, there is nothing that isn't replaceable.  
25 There is nothing that can't be serviced. There is nothing that's going to wear out

1 and irreparably damage the facility. The question might be is it cost effective?  
2 Do we need to continue operations if it's going to cost this much money to fix a  
3 tank? You know, those decisions will be made, but as far as aging, there's very  
4 little risk to the public for the facility and there's nothing that can't be replaced,  
5 unlike a power reactor. So, the purpose of a probability risk analysis when you  
6 just don't have the source term to reach outside of your walls would seem to be,  
7 although very interesting, maybe not from a regulatory standpoint, necessary.

8 COMMISSIONER MAGWOOD: Well, my time is up. If maybe Leo  
9 you could just give a quick response to the balance question.

10 LEO BOBEK: The only other point I would make is that, again, as  
11 far as a balance for these smaller facilities that have to put in significant  
12 resources to doing some sort of thermohydraulic or hypothetical analysis, that it  
13 would be beneficial to have a generic analysis that would be available to them  
14 that they could use to simplify the process. Now again, as you mentioned, it's  
15 sort of water under the dam. We won't have to do this again for about 20 years,  
16 but it is something to consider.

17 COMMISSIONER MAGWOOD: All right. Thank you. Thank you  
18 very much. Thank you, Chairman.

19 CHAIRMAN JACZKO: Commissioner Ostendorff.

20 COMMISSIONER OSTENDORFF: Thank you, Mr. Chairman.  
21 Thank you all for being here today. I think Commissioner Magwood has really hit  
22 on a very critical aspect and I want to follow up and tag team on some of his  
23 questions and comments. It is helpful for us to hear in your briefings the impact  
24 in answering various RAIs has had on time periods, et cetera, and I think our  
25 staff has been pretty candid in the first panel about okay, here's where we are,

1 here's where we were in the past. I think you have been as well and I commend  
2 you for your candor.

3 I'm going to try to ask a question that, you know, in a little bit  
4 different way than Commissioner Magwood posed, but I think it might help us --  
5 me understand a little bit better what you think of the current practice by the NRC  
6 staff. The question I'd ask each of you to respond to is, and I kind of whispered  
7 over to Tim a few minutes ago, Tim McGinty, to ask a question. I think the  
8 standard review plan that is in use right now is what Ralph, your organization  
9 was responding to for these questions and I think Steve had the same  
10 experience. And I don't know, Sastry, if you've had the experience with the  
11 standard review plan or not.

12 But let's just put a different hat on. Assume that you were where  
13 you are right now with respect to your individual facilities and that you are coming  
14 up for initial licensing, not a renewal, but initial licensing at a research test reactor  
15 in your current organization. Do you think the standard review plan, the types of  
16 things the NRC staff is looking at for initial license are about right going back to  
17 the balance question that Commissioner Magwood was asking? Or is the  
18 agency far off the mark? And I'm trying to ask this from a standpoint that a  
19 different way was used 20, 30, or 40 years ago to look at these things and now  
20 something -- now we know a lot more, trying to fill in some gaps of knowledge.  
21 So, does that question make sense to you, Leo?

22 LEO BOBEK: I'm going to pass that on to my colleague since I  
23 have not relicensed and I haven't used NUREG 1537.

24 COMMISSIONER OSTENDORFF: Okay.

25 RALPH BUTLER: I believe it was beneficial. It did feel, you know,

1 that we were doing an initial license, the level of effort and the rigor that went into  
2 it was -- felt like we were applying for an initial license. I'm not sure that -- how  
3 you would change that level of rigor in today's environment to go back to the old  
4 days of just a few list of questions because the standard review plan did provide,  
5 you know, a methodology of going in and asking questions of pertinence, so I  
6 think it's okay, I just -- the level of rigor was a heavy burden, but I think the  
7 process was probably suitable.

8 COMMISSIONER OSTENDORFF: And one of the motivators from  
9 our question was, it's my sense in talking to staff in prior sessions before this one  
10 is that there were some significant gaps in being able to document the design  
11 basis, the safety analysis of various facilities, so part of their effort was to go  
12 through in a comprehensive manner and to capture these issues, recognize that  
13 years ago it was not.

14 RALPH BUTLER: Yeah, and it served that purpose, you know,  
15 there was gaps, there was documentation or the couch missing from some of the  
16 numbers used back in the '60s, and so it served that purpose well, to go back  
17 and have to reconstitute that, so otherwise, you know, we would have continued  
18 on without that information. Now, did it really make a difference, as Steve says,  
19 in the safe operation of our facility? No, but it was good to have that information,  
20 to have it documented, so it's there in case we ever need to answer that question  
21 again.

22 COMMISSIONER OSTENDORFF: Okay, Sastry?

23 SASTRY SREEPADA: I think one of the -- one of the things I  
24 realized was yes, it is complicated, we're loaded down. Now, when there is a  
25 flood like Irene, you get questions from the community. They can always point

1 and say, "This is the basis on which we are safe." That makes people  
2 comfortable. I know it is a pain when I had to answer the question, but I have a  
3 basis to say NRC looked at it, we looked at it, this is the worst thing that can  
4 happen. That normally quiets people, so basically it is not the safety that is  
5 improved, it is the public relations and the security because we monitor now the  
6 facility 7/24, so those are the things that are changed, and my future students  
7 can look at this and say, "My experiment falls into this chapter." That's the thing  
8 we accomplished, and we were lucky to have the people help us from part-time  
9 employees from Notre Dame which helped us a lot, basically.

10 COMMISSIONER OSTENDORFF: Thank you. Steve, did you  
11 want to --

12 STEPHEN MILLER: If for an initial license, given that, A, we're not  
13 going to be cracking a few open to find out what happens in today's day and age,  
14 the level and types of questions that were asked, I think, would be reasonable,  
15 but once again, you know, for a relicensing where the operation has been  
16 sustained for so many years, I think we've already proven the safety of the  
17 facility.

18 COMMISSIONER OSTENDORFF: I appreciate your response,  
19 and I think it's -- when one's in a nine inning baseball game, if I can use that  
20 analogy, and the rules somewhat change the fourth, fifth, or sixth inning  
21 depending upon where you are, there'll always be these questions about well, it  
22 was not done this way, you know, for the last game we were in, now it's -- we're  
23 in this game, and it's -- things have changed, but I appreciate your comments,  
24 Steve from your experience that you thought the questions were fair, but you did  
25 not necessarily see any safety enhancement of the facility as a result of this

1 exercise, and I can reconcile both of those statements. Recognize that we're  
2 trying, as an agency, to go back and fill in gaps, and provide a more  
3 comprehensive approach that perhaps, in an ideal world, would have been done  
4 at initial licensing, it just wasn't done.

5 Not a question, but I'll just comment that as the staff goes forward,  
6 and John had talked about that with the regulatory analysis that's being  
7 evaluated, and if there is a -- if there is a rulemaking that comes up in the future, I  
8 think you'll have a great foundation to provide substantive helpful comments to  
9 the agency if we do preserve rulemaking.

10 Leo, I want to go back to a comment that Ralph made on his slide  
11 eight. This deals with knowledge management and databases, and so forth, and  
12 Ralph had a very, I think, constructive comment about lesson learned database  
13 that might help with common design features, and seems like also, from a  
14 knowledge management standpoint for individual facilities, would be faculty or  
15 students, and NRC staff, there's some attractiveness to this. Do you have any  
16 comments or thoughts on that suggestion on Ralph's slide for the broader  
17 community?

18 LEO BOBEK: Once again, like the power reactor community, a lot  
19 of these reactors are different in their design, and the way they are configured.  
20 RPI is much different from Ralph's facility, and my facility is much different from  
21 either one of them. However, there are commonalities. This MTR flat plate fuel,  
22 this trigger fuel, so there's certain analyses that can be done that are generic to  
23 those, and again, safety significance associated with fission product releases,  
24 that can also be generic. When you get to the individual components of whether  
25 or not you have a certain pump for a 10 megawatt reactor versus a 250 kilowatt

1 reactor is going to differences, so there's only so much you can do.

2 COMMISSIONER OSTENDORFF: Okay. Any other comments on  
3 that? Okay, again, thank you all for being here today, and for your presentations.

4 Thank you, Mr. Chairman.

5 CHAIRMAN JACZKO: Commissioner Svinicki?

6 COMMISSIONER SVINICKI: I want to thank each of you for your  
7 presentations as well, and also for the support for your institutions, and the  
8 involvement you've had in the public meetings, and I'll begin by platforming off  
9 what Commissioner Ostendorff said, I hope that if the recommendation is that  
10 NRC move to make some modifications to our regulations in this area, I think that  
11 that record could be very beneficially informed by your experiences, so I hope  
12 that your institutions will continue to stay involved in this process, and I  
13 appreciate your candor as well. I've met some of you privately, and I expect to  
14 know less, of course, I know you're all very candid and forthcoming individuals,  
15 but I realized, as I listened to your presentations, that I was imprecise in the first  
16 round because I think I slipped between relicensing and renewal, and I know that  
17 that's a core, really, of a philosophical question at the heart of is this a relicensing  
18 or is -- we don't have what we would formally call, you know, a renewal process  
19 for RTRs that is of a different scope, so I know in the past it's probably been more  
20 ad hoc.

21 We heard from the NRC panel they're attempting to have a much  
22 more disciplined and documented process going forward, but moving into long-  
23 range thinking, of course that becomes a question of whether we should have  
24 something akin to the license renewal process that we have for power reactors,  
25 and again, there's a change or a limiting in scope there from initial licensing. I

1 think, from what I've heard from the NRC staff, though, in the first panel is that  
2 the analogy with just aging management, isn't really probably an easier, maybe  
3 appropriate fit here in terms of how you would have a true license renewal for  
4 RTRs going forward, and of course, as we referenced earlier, it's really an  
5 investment in the future because this would be something that be in place for  
6 those seeking relicensing or renewal of sometime in the coming decades. So  
7 again, I think your continued insights and involvement in our public workshops  
8 and public comment processes on that will be very helpful.

9           The other thing that I took from some of the Q and A with my  
10 colleagues, and also your presentations, was that I think most of you commented  
11 on the professionalism and how it was -- in working with the NRC staff, I have no  
12 doubt that they were very pleasant through the process, but I would use the term  
13 reasonable as being very different than being professional and easy to work with,  
14 and I thought of a question about RAIs that any of you have received. You  
15 mentioned, you know, day-long meetings where you would talk about what was  
16 intended, and what would likely form an adequate response to particular RAIs.  
17 Did any of you ever have an experience, though, where in talking about what was  
18 being asked for, and what was being expected, that there was an agreement to  
19 limit the scope of an RAI?

20           What I'm trying to get to is when you receive RAIs, did they look as  
21 if someone had done a reasonableness check? Again, three years ago, I had a  
22 sense from some of you or your predecessors that we had contractors working  
23 on these reviews, and I know in the case of one university, they asked questions  
24 about a reactor technology that we don't even have, so you know, did they -- did  
25 this contractor look at anything we submitted because, you know, it was almost

1 as if they just had a template that they were sending around, but I'm getting kind  
2 of beyond the, you know, appropriateness of RAIs to a sense where, again, I  
3 guess, Steve, and this gets to something you mentioned, if you're going to GA to  
4 get four -- three or four RAIs answered, if that cost estimate comes back, you  
5 know at \$5 million or something to do some analysis for you, do you feel that the  
6 NRC's process allows you to come back and go, hey, you know, this is going to  
7 just break the bank, could we agree what do you really need to know to make  
8 your safety finding. So I'm trying to get to kind of a pushback on RAIs to say  
9 you're asking for an awful lot and I don't doubt that you would find it informative,  
10 but what do you really need?

11                   STEPHEN MILLER: Those questions were never asked, and --

12                   COMMISSIONER SVINICKI: I guess we discovered another way  
13 you differ from the power reactor community if you didn't ask those questions, so  
14 --

15                   STEPHEN MILLER: No, I mean, we weren't provided an  
16 opportunity to say, you know, no, we really don't want to do this because this is  
17 going to cost us \$100,000 and what are we getting out of it? The questions were  
18 asked, we -- the NRC was open to discussion as to whether or not the questions  
19 were relevant to our facility, nobody asked us questions about the steam  
20 generator that we don't have. So from that perspective, everything that came  
21 through the screening process from the contractors through the NRC to us were  
22 relevant to our facilities, absolutely, but we were expected to answer the  
23 questions. The thing that was negotiable is whether I have a day -- 45 days, and  
24 when I told them two years, they said, "What do you mean two years?" I said,  
25 "Well, you know, we've got to appropriate money."

1                   COMMISSIONER SVINICKI: Well, and there's been mention  
2 made, I think on both panels, of the Atomic Energy Act, you know, information --  
3 then when I interpret the purpose of that historically it is, as I think Commissioner  
4 Magwood was saying, that there is basically science, kind of, in the public  
5 interest here, meaning that the original purpose was that people would have  
6 research reactors, and that the regulatory footprint on that needs to be balanced  
7 against the fact that these research reactors both advance the state of science,  
8 and they train the future generations without which you can't have future  
9 regulators, and you can't have future operators; so that appropriate balance  
10 needs to be struck, and a number of my colleagues have asked about whether  
11 we're striking that appropriate balance.

12                   I might ask if any of you are aware of any facilities -- we also talked  
13 about the decline in the number of licensed and operating research reactors. Are  
14 you aware of universities and institutions that felt that the process of relicensing  
15 was so expensive or so daunting that it had at least some strong or dominant role  
16 in decisions to discontinue operating? Could you sit here and represent that you  
17 think that -- is there's some likelihood that occurred, or you know for a fact that  
18 occurred?

19                   LEO BOBEK: I can answer just for one facility. I know, as far as  
20 Worcester Polytechnic Institute, it wasn't the major factor, but it was a  
21 contributing factor in them deciding to shut down that facility.

22                   COMMISSIONER SVINICKI: Okay, thank you for that. I think the  
23 other -- and I'm not sure I have a question here, but we've talked about what was  
24 the safety benefit of some of the -- you know, if it cost a million dollars to be  
25 relicensed -- I would just say that I think, given the risk profiles being so low, it

1 might be very, very difficult for us ever to establish what was the safety  
2 improvement or benefit. I would say, and I think some of you have substantiated  
3 this, it's my sense that maybe it isn't so much safety improvement as it is  
4 defensibility. I will say that as the safety regulator, and I think that Sastry was  
5 talking about, you know, as being in a community and having a facility, it's the  
6 same thing from a different vantage point, but there does need to be just some  
7 level of defensibility of the conclusions that we've drawn, and as painful as the,  
8 you know, finding the documentation or reconstituting it or getting it in place, I  
9 think at the end of the day, maybe that didn't improve a safety margin in any way,  
10 but I do think that it has provided the fundamental, and frankly, essential level of  
11 defensibility for both our safety conclusions and your operational conclusions  
12 about the safety of your facility; so I do think it provides that benefit, and Sastry I  
13 appreciate you mentioning the flooding event, and the needing, you know, to be  
14 able -- that it is a good place to be to be able to say this an analyzed situation  
15 and we can confirm that this is the worst possible consequence that would occur  
16 if we had that level of flooding.

17           So, again, I thank all of you, I hope -- I think your experiences are  
18 very valuable, and please don't undervalue the specifics you've given because I  
19 will say, as a Commissioner, I hear a lot of generalities about processes, but to  
20 hear that you had, you know, this many RAIs broken down in this way, it's very,  
21 very helpful for me to be able to understand the process. So thank you again.  
22 Thank you, Mr. Chairman.

23           CHAIRMAN JACZKO: Commissioner Apostolakis.

24           COMMISSIONER APOSTOLAKIS: Thank you, Mr. Chairman. I'll  
25 come back to a question I asked the staff earlier. The whole issue, when we are

1 renewing licenses for power reactors, is aging management, and yet none of you  
2 mentioned aging once. Mr. Miller, you said that you had 50 years of -- I mean,  
3 your reactor, has had 50 years of safe and incident-free operations. Did you  
4 have any aging problems during those 50 years? Did some structure or  
5 component degrade due to some mechanism and you had to replace it?

6           STEPHEN MILLER: Structures? No. In fact, in 2004, I was part of  
7 some routine maintenance just to replace ball bearings for our lead shield doors  
8 and those sorts of things. We put a team of Navy divers in the pool, and they  
9 took a very close look at the walls of the tank, places where you really couldn't  
10 see well from 20 feet away through ripply water.

11           As far as electronics, instrumentation, those sorts of things,  
12 absolutely. We are on our third or fourth console now; we've replaced all of our  
13 instrumentation multiple times over the years. The question is not so much aging  
14 management, it's just whether it's cost-effective, and we've been asked that  
15 before. You know, we're in the process, we've been funded for a new console  
16 currently, and everybody sat down around the table and said, okay, do we want  
17 to continue if this is going to be the bill for the console? But it was never a  
18 question of whether the facility is capable of sustaining another 20 or 40 years of  
19 operations, it's -- you know, it's a pool with 13 feet of concrete in all directions, so  
20 the thought of the facility having structural problems never has come up. It's not  
21 in the design.

22           COMMISSIONER APOSTOLAKIS: Mr. Butler?

23           RALPH BUTLER: If I may, from a research reactor perspective, we  
24 do consider the aging management issue. Every eight years we tear down the  
25 reactor to replace the beryllium reflector. That means we disassemble the whole

1 reactor, it's a very modular reactor, it comes apart, it becomes back together.  
2 That only takes us a week to do that. During that timeframe, every eight years,  
3 we go in and we hire engineering firms to come in and inspect the pressure  
4 vessel. Even though we do -- we have a spare pressure vessel sitting on a shelf,  
5 so there's really no reason -- I mean, this reactor wouldn't operate for another 60  
6 years, but we have them come in and look at all the welds and the piping, and so  
7 forth on the primary coolant system, and so we have that all documented. We  
8 have testing companies come in and do all that. On the pool liner, we've had  
9 engineering firms come in and video and inspect the entire pool liner because  
10 that is an issue. We don't want to have any leaks in the pool liner, so it is a  
11 matter of aging management. How is the facility aging, what's the condition of  
12 some of the critical components that provide that barrier of safety? So we do  
13 look at some of those things.

14 COMMISSIONER APOSTOLAKIS: Okay, good, thank you. Yeah?

15 SASTRY SREEPADA: I think aging-wise, structurally I don't see  
16 many problems.

17 COMMISSIONER APOSTOLAKIS: Your reactor is so small, it's  
18 growing up, it's not --

19 SASTRY SREEPADA: Yes, but the other issues -- the other issues,  
20 the control drive mechanisms.

21 COMMISSIONER APOSTOLAKIS: Yes.

22 SASTRY SREEPADA: It is going to fail. My power channel failed  
23 last year, and we were down for four months to fix it, but these things come out of  
24 the surveillance program and regular checks.

25 COMMISSIONER APOSTOLAKIS: But did the regulations ask you

1 to do any of that?

2 SASTRY SREEPADA: The surveillance program demands that as  
3 a part of my relicensing, so it is --

4 COMMISSIONER APOSTOLAKIS: So during your relicensing, it's  
5 not --

6 SASTRY SREEPADA: Yeah.

7 COMMISSIONER APOSTOLAKIS: -- license extension. Thank  
8 you.

9 LEO BOBEK: As far as the majority of the non-power reactors,  
10 you'll find that aging issues are associated with replacing components that are  
11 failing or failed over time, for example chart recorders, and smaller components  
12 like that. The smaller facilities don't have the neutron fluxes that create  
13 embrittlement of materials, so that's not a concern. One of the major concerns,  
14 though, non-power reactors have had over the decades, is leaking tanks. Most  
15 of the tanks are lined, either with stainless steel or aluminum or concrete, and  
16 they tend to develop small leaks over time, and these are being addressed by  
17 everything from replacing the tank liners with stainless steel to putting in epoxy  
18 fillers to fill in the leaks. I would say that the staff is addressing some of the aging  
19 issues right now, the RTR staff in that a lot of the upgrades that these facilities  
20 are doing are digital upgrades, replacing various components with digital systems  
21 that were analog previously, and so we are working with the RTR group, and  
22 addressing how that's done.

23 COMMISSIONER APOSTOLAKIS: Thank you. I'm sorry.

24 STEPHEN MILLER: Over the past 50 years we have replaced our  
25 coolant systems, all of the piping, cooling towers. Everything short of the actual

1 structure that the facility sits in has been looked at and replaced with regularity.  
2 You asked if it was in our license, it is in our technical specifications and our  
3 surveillance programs. We measure and look at our fuel each element every  
4 year. So all those things are being addressed, but the actual structure is sound.

5 COMMISSIONER APOSTOLAKIS: Okay. Now, I would just finish  
6 by saying that I fully support Commissioner Magwood's suggestion. This would  
7 be, I mean, getting a few students trying to do a PRA, you don't have to follow --  
8 we're not going to review it with -- pick up the ASME and ANS standard and use  
9 it as a way to train students how to do a real PRA with a small reactor, and that  
10 would be very useful, it seems to me, especially if you have courses in PRA. I  
11 don't know whether RPI has one or Missouri, but that would be a good exercise,  
12 a good exercise, without the burden of submitting it to us. Thank you, Mr.  
13 Chairman.

14 CHAIRMAN JACZKO: I just had a couple questions. One, the, I  
15 think you, Mr. Bobek, you brought up the issue of, concerning the development of  
16 a generic thermo hydraulic analysis, and -- which I think is a good idea. I don't  
17 think we can do that. It's probably DOE, I would think, would be the right person  
18 or the right place to do that, or, you know, maybe you all get together as a  
19 community and pool some money or TRTR does it. I don't know if you have  
20 thoughts of who would do that.

21 LEO BOBEK: Well, it would certainly have to be funded at the  
22 government level. It would have to be the Department of Energy that would fund  
23 something like that, but we would have to make sure before we appropriate that  
24 funding that the NRC would accept a generic analysis from many of these  
25 facilities.

1                   CHAIRMAN JACZKO: I know we can probably pursue that  
2 question, but my thought would be, I mean, it's principle. You should be able to  
3 submit something. I mean, it's kind of a topical report, you get it reviewed, and  
4 then it's approved, and then could be relied on. So, I think that should be  
5 something that would work, but I, obviously, as I said, I think somebody else  
6 would actually have to do the analysis, and then we would review it. But, we can  
7 pursue that, I think, for sure. I think that makes a lot of sense.

8                   The -- since I'm getting back to a question, I think, you raise this,  
9 and I think Commissioner Ostendorff touched on this, the issue of the database,  
10 which I think, again, is a good idea. And I, you know, I would think that perhaps  
11 this is a good activity that TRTR could do, because then, again, I don't know that  
12 we necessarily need to do that, but you all have, I mean, you all have all of the  
13 questions. You all have your responses. So, the information is out there, it's just  
14 a question of cataloguing it and publishing it and making it available. And, so,  
15 you know, I would, I think, again, I think it's a very good idea, and, you know,  
16 again, to the extent that that's easy for us to do. I think it's, you know, if we have  
17 those, we could, but again, some of those, I don't know to the extent that there  
18 may be some issues that are, well, may be of some proprietary issues, maybe  
19 one or two of the research reactors could fall in that category. But, you know,  
20 again, I would think that that's something that's out there that could be leveraged  
21 with some of your existing resources, so I think those were all good suggestions.

22                   Mr. Miller, you mentioned, I think, that you did a licensing basis  
23 reconstitution in 1980 if I remember what you said, right? Why didn't that take in  
24 1980? Did things, did our analysis, methodologies, evolve enough that that just  
25 wasn't valid anymore by the time you got around to this time, or --

1           STEPHEN MILLER: It's not that it wasn't valid, really, it was more  
2 format and lack of some content that was -- when the new 1537 came out in the  
3 '90s that we just didn't have. So, in fact, much of what we had is being used, but,  
4 you know, I brought that up because a statement was made that we don't keep  
5 our SER's up to date. We don't, and, in fact, some of us do.

6           CHAIRMAN JACZKO: Well, that's helpful, and I appreciate that.  
7 So, in hindsight, probably, if you'd done that in 1995, then you may have been  
8 better off this time around.

9           STEPHEN MILLER: The question would be why would we have  
10 done it in 1995 --

11          CHAIRMAN JACZKO: Yeah, well, as opposed to 1980.

12          STEPHEN MILLER: But nothing had changed.

13          CHAIRMAN JACZKO: Yeah, but as you'd done it in 1995 versus  
14 1980, I mean, I'm trying, you know, one of the things we're hanging our hat on, I  
15 would say, is that we are going to not have to do this again in a couple of years.  
16 But, if you had experience with an updated, a voluntary ultimately updating SAR,  
17 but it didn't really get you where you needed to go. So, I guess the differences  
18 when we put out the guidance in the '90s, that kind of gave a better template then  
19 for going forward. So, as long as we're consistent with that guidance in 15 years,  
20 then the SAR should be useful again.

21          STEPHEN MILLER: And I will concede that, you know, to state  
22 that they broke one apart in 1960, and we don't really know why it behaved the  
23 way it does, but, by god, it does. It probably wouldn't, it wouldn't pass public  
24 muster today.

25          CHAIRMAN JACZKO: Well, that's helpful. The last question I just

1 ask you all, I mean, we are embarking on this activity to consider doing a rule  
2 change, and I would just ask all of you, do you all want a rule? I mean, if, do you  
3 want, do you see value in a new rule? I mean, if you all don't and we've been  
4 able to do what we've done now, I'm not sure that there's a reason to do it.  
5 Here's your chance, okay? Speak up now or --

6 RALPH BUTLER: Well, my suggestion is we've undertaken this  
7 relicense or new license activities to create these safety analysis reports. To  
8 think somewhat differently, if the Commission was to require the community --  
9 and my colleagues may slap me here -- but to maintain the safety analysis  
10 report, to develop an aging management program, why undergo a 20-year  
11 license renewal process? Where does it say you have to go in every 20 years  
12 and do the relicense, especially for the university research reactors? If we are  
13 maintaining, if we are required to maintain our safety analysis reports current and  
14 up to date, maybe a two year submittal of changes to the facility, an update on  
15 aging management from time to time, then why undertake another round of  
16 relicensing of these, you know, university research records, when we are all  
17 pretty confident that there's no additional safety margin to be gained, there's no  
18 additional protection of the safety and health of the public if we maintain our  
19 safety analysis reports and our aging management program current, so.

20 CHAIRMAN JACZKO: So, I would take that as you want a rule  
21 change, because I think we would have -- that would require a rule change. Or,  
22 no. Yeah. That would require a rule change. So, that's a yes for a rule change.  
23 Anybody else?

24 STEPHEN MILLER: Yeah. I would agree with that.

25 CHAIRMAN JACZKO: You'd want a rule change?

1           STEPHEN MILLER: It's been suggested, in fact, that on many  
2 levels, as we all talk about what we're doing that perhaps an enhancement to the  
3 inspection program that would include those things that a relicensing gets you  
4 would be adequate, and just keep going until its, the facility's no longer needed.

5           LEO BOBEK: I've been involved with this process for 25 years. I'm  
6 always wary of rulemaking. However, I will echo the sentiments of Steve and  
7 Ralph. I think for a majority of the facilities, it would be beneficial. Many of these  
8 smaller facilities, it has been a very difficult process relicensing, and so therefore  
9 if we could eliminate the relicensing process by just keeping an updated FSAR  
10 process, I think it would be very beneficial.

11           CHAIRMAN JACZKO: So, Trip, is there a statutory requirement on  
12 the 20-year --

13           TRIP ROTHSCHILD: Well, no, but you've got, we've never issued  
14 licenses beyond 40 years, you know, we haven't issued licenses beyond 40  
15 years, as you know, and the power reactor renewals have been for 20 years  
16 increments. And, you know, I think --

17           CHAIRMAN JACZKO: But, so, we don't, the statutory --

18           TRIP ROTHSCHILD: I think you've probably got some discretion if  
19 you wanted to change the time limits, I would think.

20           CHAIRMAN JACZKO: To an indefinite timeline, essentially?

21           TRIP ROTHSCHILD: I don't know whether we've gone beyond 40.

22           CHAIRMAN JACZKO: In the spirit of getting out in front of all of my  
23 headlights, you know, why don't you all send us a petition for rulemaking that  
24 says that, and then we can get in the process of looking at a specific proposal. I  
25 mean, I can't tell you we'll agree with it, but, you know, you have to make that

1 calculus whether it's cost-beneficial for you to go through that, and, but it may  
2 give us something specific to focus on as a particular rule change and go from  
3 there. Any comments?

4 Well, again, I appreciate this, and I think it's been very helpful. It's  
5 always an interesting discussion. Oh!

6 COMMISSIONER MAGWOOD: Just, first, let me second your  
7 suggestion for a petition. I think that's probably a smart way to proceed so they --  
8 we can see what you think needs to be done, and then we can react to that. I  
9 think that's a good idea. Also, I wanted to pick up on your line of questioning  
10 about the generic items that could be analyzed. I wonder if it would be useful to  
11 have staff provide maybe a CA note to give us their thoughts as to what that  
12 process might look like you, I'd like to sort of understand how we would receive  
13 something like that. Thank you.

14 CHAIRMAN JACZKO: Sure. Okay. Well, thanks, and, yeah,  
15 again, thanks everybody for being here. I think it was very helpful, and as  
16 Commissioner Svinicki said when -- things have certainly gotten a lot better since  
17 2008, and I think, you know, and as you've said, the staff has done very well in  
18 the work that they've done, and so we'll continue to plug away. Thank you.  
19 We're adjourned.

20 [Whereupon, the proceedings were concluded]