

UNITED STATES  
NUCLEAR REGULATORY COMMISSION

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BRIEFING ON THE STATUS OF SUBSEQUENT LICENSING RENEWAL  
PREPARATIONS

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WEDNESDAY,  
APRIL 26, 2017

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ROCKVILLE, MARYLAND

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The Commission met in the Commissioners' Hearing Room at the Nuclear Regulatory Commission, One White Flint North, 11555 Rockville Pike, at 8:58 a.m., Kristine L. Svinicki, Chairman, presiding.

COMMISSION MEMBERS:

KRISTINE L. SVINICKI, Chairman

JEFF BARAN, Commissioner

STEPHEN G. BURNS, Commissioner

ALSO PRESENT:

ANNETTE VIETTI-COOK, Secretary of the Commission

MARGARET DOANE, General Counsel

**EXTERNAL PANELISTS PRESENT:**

PAUL AITKEN, Manager, Second License Renewal,

Dominion Resources, Surry Power Station, Units 1 and 2

SHERRY BERNHOFT, Program Manager, Long Term

Operations, Electric Power Research Institute

MICHAEL GALLAGHER, Vice President, License Renewal

Projects, Exelon Generation Co., LLC, Peach

Bottom Atomic Power Station, Units 2 and 3

DAVID LOCHBAUM, Director, Nuclear Safety Project,

Union of Concerned Scientists

RICHARD REISTER, Director, Light Water Reactor

Sustainability Program, U.S. Department of Energy

S. JASON REMER, Director, Plant Life Extension,

Nuclear Energy Institute

**NRC STAFF PRESENT:**

VICTOR MCCREE, Executive Director for Operations

STEVE BLOOM, Office of Nuclear Regulatory Regulation

MICHELE EVANS, Deputy Director, Officer of Nuclear

Regulatory Regulation

ALLEN HISER, Senior Technical Advisor for License

Renewal Aging Management, Division of License

Renewal, Office of Nuclear Reactor Regulation

JOHN PARILLO, Office of Nuclear Regulatory Regulation

JEFFREY POEHLER, Office of Nuclear Reactor Regulation

BRIAN THOMAS, Director, Division of Engineering,

Office of Nuclear Regulatory Research

GEORGE WILSON, Director, Division of License

Renewal, Office of Nuclear Reactor Regulation

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

8:58 a.m.

1  
2  
3 Good morning and we will begin our topical meeting on  
4 subsequent license renewal preparations. Could I ask the panelists for the first  
5 panel to please take their seats?

6 Good morning. Again, thank you all for being here today and  
7 to our panelists on both panels for presenting to the Commission this morning.

8 We need for the Commission to entertain a discussion on the  
9 status of issues related to subsequent license renewal application and the NRC  
10 staff's preparedness to review an application. Since the Commission's action  
11 on this matter substantively in 2014, the staff has continued to work on the  
12 Guidance and other documents that will guide their reviews of subsequent  
13 license renewal applications and the Commission. I think that this is very timely  
14 that we meet today to hear a status of the staff's work and also to hear from a  
15 panel of outside participants, who will provide us with perspectives both on how  
16 that work has developed and also other status updates and information relevant  
17 to the topic.

18 Before we begin, I would ask if my colleagues have any  
19 opening comments. Okay, thank you.

20 With that, let us then turn to the External Panel. I will simply  
21 just do an introduction of each of the panelists and then we can begin. And if  
22 you all can hand off to each other in the order in which you are seated, that  
23 would be very helpful. Thank you.

24 So we will begin with Richard Reister, director of the Light  
25 Water Reactor Sustainability Program from the U.S. Department of Energy.

26 We will also hear from Sherry Bernhoft, the Program Manager

1 of Long-Term Operations at the Electric Power Research Institute.

2                   Following Sherry, we will hear from Jason Remer, Director of  
3 Plant Life Extension of the Nuclear Energy Institute.

4                   Next we will hear from Michael Gallagher, Vice President  
5 License Renewal Projects of Exelon Generation Company.

6                   Following that we will hear from Paul Aitken, Manager -- I'm  
7 sorry if I have mispronounced anyone's names. I hope you will correct me  
8 when you begin your talk. Paul is the Manager of Second License Renewal for  
9 Dominion Resources.

10                  And we will than hear from Mr. David Lochbaum, Director  
11 Nuclear Safety Project Union of Concerned Scientists.

12                  Thank you all again for participating in this morning's meeting.  
13 Let's begin with Mr. Reister.

14                  MR. REISTER: Good morning and thank you for inviting me  
15 here today to discuss the Department of Energy Office of Nuclear Energy's  
16 program on Light Water Reactor Sustainability or LWRS, as we say.

17                  The LWRS program began in 2009 with the recognition that the  
18 U.S. Government had a strategic interest in the long-term operation of our  
19 existing fleet of nuclear power plants in support of energy security, which  
20 includes attributes such as fuel supply, diversity, and grid reliability, and to help  
21 avoid or at least defer the high cost of building replacement capacity.

22                  The LWRS program has partnered with industry and the  
23 Nuclear Regulatory Commission to closely coordinate our research needs and  
24 share costs. Next slide. I guess -- oh, there we go.

25                  This graph illustrates the current and projected capacity of  
26 existing nuclear power plants with 40-, 60-, and 80-year licenses, accounting for

1 publicly announced shutdowns and ongoing new construction. Assuming all  
2 plants receive 60-year licenses, the slope of retirements of very steep, about  
3 five plants per year in the 2030 to 2035 time frame.

4 The rate of retirements that would occur without subsequent  
5 license renewal would clearly present a significant challenge to our electricity  
6 supply, infrastructure, and our energy security. Next slide.

7 The key objectives of the light water reactor sustainability  
8 program is to extend the life of our existing fleet of operating plants but this can  
9 only be accomplished if they remain safe and economic to operate. The LWRS  
10 research program has four main technical focus areas: materials, aging, and  
11 degradation; advanced instrumentation, information, and control system  
12 technologies for improving performance and economics through better use of  
13 digital technologies; risk-informed safety margin characterization, which  
14 develops advanced modeling and simulation capabilities to better manage  
15 safety margins; and reactor safety technologies, which examines severe  
16 accident progression and supports improvements to severe accident  
17 management guidelines.

18 I will focus on the materials area in more detail, since it directly  
19 relates to the licensing topic. Next slide.

20 The LWRS program conducts research that is generally longer  
21 term, higher risk than what industry typically performs, along with materials  
22 issues typically a focus of licensing. The LWRS address long-term viability or  
23 economics of continued plant operation. We believe this federal program, by  
24 reducing uncertainty, helps create an environment for industry to make the long-  
25 term investments necessary to keep these plants operating safely and  
26 efficiently.

1                   As plants age, the potential for material degradation occurs.  
2                   Our research is focused on being proactive by conducting research on relevant  
3                   materials. This includes materials harvested from plants and materials that  
4                   undergo accelerated aging.

5                   When possible, mechanistic aging models are developed and  
6                   validated. The results of our research are used by industry and the regulator  
7                   to inform an update of their Aging Management Programs. More than half of  
8                   our research funds are devoted to materials research.

9                   For material degradation issues, we cover these five elements:  
10                  the collection of high-quality data on observed degradation; determining the  
11                  underlying physical phenomena causing the degradation; development of  
12                  mechanistic models, based on the physical mechanisms rather than just  
13                  empirical trends; developing improved monitoring techniques by taking  
14                  advantage of new sensors and advanced data analysis; and investigating  
15                  mitigation strategies to limit degradation and, if needed, economic repair or  
16                  replacement with materials less susceptible to degradation. Next slide.

17                  The expanded material degradation assessment was a joint  
18                  DOE and NRC effort to determine knowledge gaps, along with our associated  
19                  risk significance. This assessment helped us working with EPRI and NRC to  
20                  determine the key areas of focus of our research in reactor pressure vessels,  
21                  core internals and piping, concrete, and cables. We believe we made  
22                  significant progress in our understanding of degradation in these areas. No  
23                  technical showstoppers to long-term operation have been identified through our  
24                  research.

25                  Our research continues to improve our understanding and  
26                  reduce uncertainties which can be used to further improve Aging Management

1 Programs. Next slide.

2 The embrittlement of reactor pressure vessels has been  
3 generally understood and managed for many years. Our research is being  
4 conducted on test specimens that have undergone accelerated irradiation at  
5 test reactors and will soon include samples collected from a shutdown Zion  
6 plant.

7 Based on research to date, U.S. reactor pressure vessel  
8 embrittlement or hardening of the steel is following predicted trends and  
9 appears to be managed well within the 60- to 80-year time period. Continued  
10 research will help develop RPV embrittlement models that go beyond 80 years.  
11 Next slide.

12 Our research on core internals has focused on conducting  
13 microstructural evaluations of both laboratory materials irradiated in test  
14 reactors and the examination of materials taken from operating reactors. We're  
15 using the results of this research to develop and validate physics-based models  
16 of key degradation mechanisms. These models can be used by industry to  
17 better understand and manage core internal degradation as plants age. Next  
18 slide.

19 We are conducting research on the effects of fatigue and  
20 thermal aging on reactor piping materials. Current fatigue models use  
21 empirical methods based on testing conducted in air, rather than water. We  
22 have developed a thermal fatigue model for reactor pressure vessel structures  
23 which will be developed further next year to focus on the dissimilar metal weld  
24 transitions at the nozzles. Our current effort is on completing the thermal  
25 fatigue model for a PWR surge line pipe. In both models, fatigue life is based  
26 on more realistic conditions that can account for actual plant operating history.



1 These aging models will be validated based on operating experience within  
2 vessel materials and service materials. Next slide.

3 Concrete makes up the largest volume of materials used in  
4 nuclear power plants. We are conducting research on two forms of concrete  
5 degradation, irradiation and alkali-silica reaction, or ASR.

6 ASR effects can appear to be contradictory. When sheer  
7 reinforcement is present, the expansion due to ASR results in a pre-stressing of  
8 concrete that favors an increase in sheer capacity. In other words, it gets  
9 stronger. However, excessive ASR-induced self-pre-stressing may cause  
10 reinforcement yielding and failure. Of particular concern is the case of beams  
11 or slabs in the absence of sheer reinforcement.

12 Through our research, we hope to provide a better predictive  
13 capability for ASR's long-term impact on the structural integrity of large  
14 reinforced concrete structures. Generally, our research indicates that concrete  
15 structures have significant safety margins during the 60- to 80-year time period.  
16 We are also developing advanced nondestructive examination techniques for  
17 thick concrete structures. Next slide.

18 In the absence of either mechanical injuries or the presence of  
19 unplanned environmental conditions, cables have an excellent history of long-  
20 term performance. Our research is focused on developing a predictive aging  
21 model that will encompass most of the cable types used at U.S. plants.

22 Working in collaboration with the NRC's Office of Research and  
23 the Electrical Power Research Institute, we have harvested cables from  
24 operating and shutdown plants to help validate our aging models. We are also  
25 investigating promising nondestructive examination technologies that may help  
26 predict remaining useful life. Next slide.

1                   In summary, DOE research is focused on supporting continued  
2 safe and economic operation of our existing fleet. We are proactively focusing  
3 on degradation that might occur beyond 60 years of operation.

4                   Our research has not identified any technical showstoppers to  
5 long-term operation. We are developing improved materials monitoring  
6 techniques that will help detect degradation earlier, should it occur. We work  
7 with industry so that our research results can be used to update and enhance  
8 their Aging Management Programs.

9                   Thank you.

10                  CHAIRMAN SVINICKI: Sherry, please proceed.

11                  MS. BERNHOFT: Yes, thank you. Good morning. I'm  
12 happy to be here today to provide an update on the EPRI research efforts to  
13 support the technical basis for subsequent license renewal or SLR.

14                  Our long-term operations program actually has two purposes.  
15 The first purpose is to provide technical information to the utility plant owners,  
16 the decision-makers, so they can make informed decisions about plant long-  
17 term operations. The second purpose of our program is to support and inform  
18 the technical basis for the Aging Management Programs. Next slide, please.

19                  I last presented to this committee on May 8, 2014. At that time,  
20 the conclusion was that the technical basis for aging management is well-  
21 established and in use. The Aging Management Programs, that is the AMPs,  
22 ensure detection of aging effects, provide the technical basis for assessment,  
23 and, as needed, corrective actions. This conclusion remains unchanged.

24                  The overhead depicts the elements from the EPRI reports that  
25 are incorporated into utility Aging Management Programs. The NRC Generic  
26 Aging Lessons-Learned Report, or the GALL, or SLR, references over 125 of

1 the EPRI Technical Reports as the basis for aging management.

2 With this, research continues working with our research  
3 partners, such as the DOE and NRC research to further enhance our ability for  
4 aging management and assessment. This includes but is not limited to  
5 improved modeling, improved inspection technologies, advances in  
6 assessment, and evaluation methodologies and online condition monitoring.  
7 In addition, we also look for opportunity to harvest materials where that can add  
8 to the database and knowledge as well. Next slide, please.

9 Our research for SLR is built on EPRI's living issue  
10 management programs. This approach encompasses decades of research on  
11 reactor pressure vessels, metals, concrete, and electrical cables. A former  
12 process to review and prioritize our research needs, the collaboration with the  
13 Department of Energy, NRC Research and international research partners,  
14 coordination under NEI Initiative 03-08 -- 03-08 is the industry standard for  
15 inspection assessment and sharing of information from the Aging Management  
16 Programs; and technology transfer, which includes supporting the lead plants.

17 The technical basis for the reports are and will continue to be  
18 updated based on the research findings, operating experience and inspection  
19 results. Next slide, please.

20 As identified, there are four key technical areas for research for  
21 the subsequent license renewal. Joint research roadmaps were developed  
22 and substantial progress has been made in these four areas. Over the past  
23 several years, EPRI and DOE have interacted with the NRC Division of License  
24 Renewal and Research Staff, and held a number of deep-dive technical  
25 discussions, provided updates to the ACRS License Renewal Subcommittee  
26 and full committee, participated in a number of public meetings, and have made

1 our Technical Reports available to the NRC staff. Next slide, please.

2 For reactor pressure vessels, the aging management effect to  
3 be managed is reduction in fracture toughness of the vessel material due to  
4 irradiation. The vessel material properties are assured through periodic  
5 removal and testing of surveillance specimens to establish trend correlations.  
6 As Rich mentioned, there is a well-established embrittlement trend correlation  
7 to predict material properties out to 80 years of operation. However, we  
8 recognize additional data will enhance these trend correlations and programs  
9 have been established. For the PWRs, which have a higher fluence than the  
10 BWRs, EPRI and the industry are working together to implement the PWR  
11 Coordinate Surveillance Capsule Program and the Supplemental Program to  
12 gain additional data.

13 For the BWRs, there is an existing method to fulfill the  
14 surveillance requirements with an integrated program. We are working with the  
15 BWRs to extend this program for the period of SLR. Next slide, please.

16 For reactor pressure vessel internals, the degradation that  
17 occurs is irradiated-assisted stress corrosion cracking or IASCC of the stainless  
18 steels as a result of neutron fluence in the operating environment. The EPRI  
19 materials programs for PWRs and BWRs have published management  
20 guidelines which are referenced in the AMPs. These reports provide the basis  
21 for inspection scope, frequency, assessment, and repair and replacement  
22 criteria. These fall under the NEI Initiative 03-08 that I previously discussed.

23 A recent example is the fall 2016 baffle former bolt inspections.  
24 The occurrence of IASCC was anticipated, which is why the guidance was  
25 developed. The inspection results were documented and evaluated.  
26 Notifications have been provided and interim guidance has already been shared

1 with the industry, in addition to a number of technical briefings with the NRC  
2 staff and the ACRS. This demonstrates the effectiveness of the programmatic  
3 approach under NEI 03-08 and the Aging Management Programs.

4 In collaboration with other research parties, significant progress  
5 has been made on the crack growth rate modeling and this data has been used  
6 to develop crack growth rate criteria that is being used in the ASME Code.  
7 Harvesting of materials have also provided an opportunity for further testing and  
8 evaluation.

9 EPRI is leading an international project of which the NRC is a  
10 member, that harvested internal materials from the Zorita plant in Spain.  
11 Testing of the actual materials to date has confirmed the existing models are  
12 conservative for defining AISCC thresholds and crack growth rates. Next slide,  
13 please.

14 Moving to the area of concrete, EPRI has performed research  
15 on concrete structures for several years and has made significant progress.  
16 The main area of study for SLR is the alkali-silica reactions and the irradiation  
17 and gamma heating effects.

18 For ASR there is operating experience from a plant in Canada,  
19 one in the U.S., and extensive information available from the Department of  
20 Transportation.

21 EPRI has published reports on screening for ASR and  
22 guidance if ASR is detected. We are publishing a series of white papers and a  
23 comprehensive ASR aging management guidance later this year. Research  
24 continues on nondestructive methods to detect for ASR and modeling to  
25 improve growth rate predictions and structural assessments.

26 Substantial research has been completed on the area of

1 assessing the impacts of irradiation effects on concrete. Fundamental work  
2 was completed by the DOE program and was used to build a PWR biological  
3 shield final element analysis, which is shown on the picture. The model  
4 showed that at the projected 80-year fluence level, there is still remaining a  
5 significant structural margin and that radiation effects will not be an issue for our  
6 subsequent license renewal. Next slide, please.

7 Under the area of electrical cables, EPRI has been conducting  
8 research for over 25 years to characterize cable insulation material aging and  
9 degradation mechanisms. The stressors are radiation and temperature for the  
10 low-voltage cables and submergence for the medium-voltage cables.

11 Based on our research, aging management guidelines have  
12 been published and provided to the NRC staff for their information. We also  
13 have a well-established cable users group. This group shared operating  
14 experience and best practices for cable monitoring and aging management. A  
15 detailed joint R&D roadmap was developed and activities are well underway to  
16 collect additional data on thermal and radiation age cables and improve  
17 technology for cable condition monitoring. Jointly, we have recently harvested  
18 cables from the Crystal River Unit 3 plant to confirm the as-found condition and  
19 additional aging tests are planned.

20 The tools and guidance exist for aging management which will  
21 provide a reasonable assurance of safety and compliance with the current  
22 licensing basis. Continuing research and condition monitoring technology will  
23 provide the tools for plant owners for their asset management programs. Next  
24 slide, please.

25 So in conclusion, we started off developing detailed joint  
26 research roadmaps, we worked in collaboration with our research partners, and

1 we have made substantial progress. Based on this work, our conclusions  
2 remain unchanged. The technical basis for aging management exists and is in  
3 use. We are actively working on technology transfer and support for the lead  
4 plants.

5 Thank you for your time.

6 CHAIRMAN SVINICKI: Thank you. Jason, please proceed.

7 MR. REMER: Chairman, Commissioners, thank you. It is a  
8 pleasure to be with you this morning. Thanks for the opportunity to share an  
9 update on second license renewal or subsequent license renewal. Next slide.

10 What we are going to talk about today is basically how SLR is  
11 a bridge to the future; how key safety principles are maintained; how we have  
12 optimized the process through this last three years; and what the SLR looks like  
13 moving forward. Next slide.

14 As you know, nuclear plants, our 99 nuclear plants are critical  
15 infrastructure. They are the largest and best run fleet of nuclear plants in the  
16 world. Everybody uses our technologies. The NRC's rules and guidelines are  
17 copied regularly and just pasted into nation's requirements. We have to stay  
18 in that leadership position.

19 As you know, we generate around 20 percent of the electricity,  
20 over 62 percent emissions-free electricity, 24/7 always on, fuel on-site. No  
21 other source of power in our country can provide what nuclear power provides.  
22 In addition to millions and millions of dollars for the local economies, it runs  
23 entire counties. Where I was from in Russellville, you either worked at the  
24 nuclear plant, you knew somebody that worked in the nuclear plant, or your  
25 family was working at the nuclear plant. It supported the economy in those  
26 small towns and it continues to across America. We are seeing some of the

1 shutdown plants, the devastating effect that those shutdowns have on those  
2 small plants. Next slide, please.

3 So how does second license renewal fit into the overall horizon  
4 for nuclear power? As you see here, we have laid out kind of an initial idea of  
5 where we are at today, the current reactors, advanced technology fuel, how that  
6 is going to help us, new light water reactors, hopefully we can get them off the  
7 ground, SMRs and then advanced reactors. It is clear that second license  
8 renewal is a key bridge to the future. We have to keep the technology for our  
9 light water reactor fleet alive through technology, suppliers, labor and training.  
10 If our current fleet of reactors shuts down and we lose the capabilities to produce  
11 these equipments and staffing to run them, we will have to basically start over.  
12 We need advanced reactors to come online or SMRs or other non-light water  
13 technologies.

14 So it is clear SLR plays a critical role in the future of nuclear  
15 power. Next slide.

16 So this slide here is from our May 8, 2014 presentation that I  
17 made before you, as Sherry was alluding to. I just pulled it back out. I said  
18 let's take a look at that. What's happened in the last three years?

19 Well, the key principles are still the same for license renewal.  
20 The current regulatory process is adequate to ensure acceptable levels of  
21 safety. And each plant's licensing basis will be maintained during any license  
22 renewal period to the same manner and to the same extent. These are our  
23 guiding principles for license renewal, for original operation, and for second  
24 license renewal and what might come after that.

25 What we found is second license renewal is not only possible,  
26 but it is a solid bridge to the future of nuclear. I remember when I started about



1 five years ago back in NEI looking at second license renewal, when you talk to  
2 folks about going out to 80 years, they kind of give you a twisted look, like are  
3 you serious. And now it is worked through. We have asked the questions.  
4 We have got the answers and it is no longer just a dream. It really is reality.  
5 Second license renewal is sound. Next slide, please.

6 So the regulation is based on 10 CFR Part 54, which  
7 anticipated further rounds of license renewal. It didn't say you could only go 20  
8 more years. It anticipates further rounds.

9 The existing processes ensure safe plant operation. 10 CFR  
10 50, Appendix B, our quality processes, corrective action, all those things going  
11 on 24 hours a day at every plant right now. Right as we speak, these  
12 processes are maintaining safety.

13 Aging Management Programs, you have heard a little bit about  
14 already. They are solid. We've worked them their first round of license  
15 renewal. They work. We made them better.

16 Maintenance Rule, active equipment -- we don't talk much  
17 about active equipment but our maintenance rule has proven itself to be not only  
18 adequate but helping us improve plant performance on a daily basis to ensure  
19 that our design basis are maintained.

20 When we started these slides in '14, there were 73 plants that  
21 have had license renewal. Now there are 86, 13 more. Back then, 27 plants  
22 had entered into the period of the extended operation, greater than 40 years.  
23 Right now, there is 42, which if you do the math it comes up to around 128  
24 reactor years in the PEO. So there is a lot of information about how these  
25 plants are running in the period of extended operation.

26 Reliable, predictable processes. We are not seeing any

1 effects. We are seeing plant availability, plant efficiencies at all-time highs.  
2 They are maintaining a very high level of operational and safety performance.  
3 Next slide, please.

4 So the regulation is sound and the regulatory guidance is  
5 sound. We used the GALL process, Generic Aging Lessons-Learned, to help  
6 us run through the first round of license renewal.

7 Second license renewal, the GALL has been updated. There  
8 has been an extreme amount of work for your staff and our industry as well.  
9 We have been heavily involved in that. We have had many, many meetings.  
10 I think we actually submitted 300 pages of comments, not because it was so  
11 wrong but because it was so big. I don't know if you stacked it up. I think the  
12 GALL is you know it is getting close to -- it is nuclear math for sure. A lot of  
13 stuff in there. A lot of good stuff. A lot of lessons learned. So we are making  
14 it better.

15 We submitted comments. We got the draft. There has been  
16 really good cooperation between your staff, DLR in working on the GALL, as it  
17 should be. We are going to have the final copy -- we have had the final copy  
18 for stakeholder review. We anticipate the final copy coming out later on in the  
19 year.

20 We also developed a guideline, NEI 17-01, that helps our plants  
21 and utilities prepare adequate license packages, SLR packages. That's NEI  
22 17-01. Previously, we have used 95-10. So that is going to be -- that has  
23 already been sent to you for evaluation and review.

24 As well as the safety side, on the environmental side, we are  
25 working with your staff to make sure we smooth out any rough edges on the  
26 environmental review so that those two processes can proceed together. Next

1 slide, please.

2 As you have already heard already, research, our associates  
3 at DOE and EPRI have both concluded there are no fatal showstoppers for  
4 operation beyond 60 years. Given that you continue to maintain your plants at  
5 the high level of safety and performance you are doing and you continue to use  
6 Aging Management Programs, you continue to learn lessons. These are living  
7 products. They are not static products.

8 We also -- not only did we -- you know it is one thing to see a  
9 PowerPoint slide of the research that is going on but what we did is we said hey,  
10 let's go out and see what's going on at DOE, at the National Labs, at some of  
11 our key vendors, at EPRI, at some of our licensees. Let's see what they're  
12 doing in this area.

13 So we have hosted seven site visits since 2015. We actually  
14 go out in the field. In fact, last week we conducted a site visit at University of  
15 Tennessee on concrete. And so that was very helpful. Both the staff and the  
16 utilities participated. It has been an extremely valuable process and we have  
17 all learned a lot. Next slide.

18 Quickly, we have optimized the process. Your staff have  
19 looked through how we can do better. We have come to agree on an 18-month  
20 review schedule which I think is not only doable but we can probably beat that.  
21 We have looked at ways to improve efficiencies using electronic  
22 communications processes, reducing unnecessary meetings, and being  
23 disciplined in our schedule and RAI process on both sides, make sure we write  
24 good applications, make sure the staff gets the answers they need. Next slide.

25 As you are going to hear in a few minutes, our SLR lead plants  
26 are on track. It is very exciting. I think they have to go and do a good job in

1 producing the first applications to get through the process and then I think you  
2 are going to see many, many more applications coming through.

3 We took a survey last year on how many plants might be  
4 interested in second license renewal -- next slide -- and this is the data we got  
5 back. There is about 20 -- these are sites and so there may be more plants in  
6 this but it is 20. It just shows you there is some interest. From what we have  
7 heard, everybody that is interested in going forward and can see through this  
8 current economic situation I believe would be interested in second license  
9 renewal. It is a good deal and it is a good insurance for the future. Next slide.

10 So in summary, our technical data supports second license  
11 renewal. The SLR GALL incorporates lessons learned from the first round.  
12 We believe the 18-month schedule is reasonable and doable. Our lead plants  
13 are on track. We are going to turn in the highest quality applications possible  
14 so that your review can be efficient and productive. And the plant safety is and  
15 will be maintained throughout the license period.

16 Thank you.

17 CHAIRMAN SVINICKI: Thank you, Mr. Remer.

18 Mr. Gallagher.

19 MR. GALLAGHER: Okay, thank you. Thanks for inviting me  
20 to talk here today about Exelon's Peach Bottom second license renewal  
21 application. And again, I am Mike Gallagher. I have been with Exelon for 36  
22 years. My background is in engineering and operations and I was a senior  
23 licensed operator at Limerick Generating Station.

24 Since 2006, I have been the Vice President of License of  
25 Renewal, having responsibility for all the license renewal applications and  
26 projects. And over that period of time, we did seven applications for 13 units.

1 I was also the Long-Term Operations Integration Committee  
2 chairman in the EPRI Long-Term Operations Committee. That was 2009  
3 through 2016.

4 And I am currently a member of the NEI SLR Working Group.  
5 Bring up slide 1.

6 So Exelon, we believe Exelon well-positioned to be a lead  
7 subsequent license renewal applicant. Exelon and its legacy companies have  
8 completed 13 applications for its 22 units. We have 13 units in the period of  
9 extended operation right now. And our Clinton facility is the only plant not  
10 renewed and we are scheduled to submit that application in 2021.

11 We worked with EPRI and NEI on the initial industry roadmap,  
12 which ensured SLR readiness by 2019. And Exelon has heavily participated  
13 in the SLR GALL reviews.

14 So based on the fact that the license renewal rule is  
15 unchanged, our involvement in the GALL SLR review and its similarity to the LR  
16 GALL, and our extensive experience in developing license renewal applications,  
17 you know I am very confident that we will submit a high-quality application.

18 We understand the staff is developing an 18-month review  
19 plan. We think that is very achievable and we will do our part to submit a high-  
20 quality application so that review can be completed.

21 Go to slide 2, please.

22 So Peach Bottom, we select Peach Bottom as our lead BWR  
23 plant and we think that is a great plant to be the lead BWR applicant for Peach  
24 Bottom was the 8th license renewal application to be approved in 2003 and  
25 original license renewal. And we have been operating in the period of  
26 extended operation since 2013.

1 Peach Bottom runs very well. It is highly reliable. We have  
2 not had an automatic scram at Peach Bottom in the last 11 years. We have  
3 invested a lot into the plant. We have invested over \$1.3 billion in capital  
4 improvements in the years 2012 to 2016. We achieved extended power uprate  
5 for both units in 2015 and we get high marks from INPO.

6 At Peach Bottom, we have been part of the community for a  
7 very long time. Peach Bottom Unit 1 was the construction started in early  
8 1960s. And so we have had a lot of employees part of that community for a  
9 long, long time. We are committed to the community and as an example here,  
10 I just put one of our donations have been to local nonprofits. We have donated  
11 over \$416,000 last year.

12 If we go to slide 3. So, our approach to subsequent license  
13 renewal is similar to the approach that we had for our license renewal project.  
14 And we will be consistent with the guidance in the GEIS and the GALL to the  
15 maximum extent possible. The way we do that is you can see here we will do  
16 the Part 51 review using the GEIS and it is very -- it has been updated. They  
17 are very similar to what has been in the license renewal projects.

18 And Part 54, again, we have been very involved in reviewing  
19 and commenting on the SLR GALL so we understand what's in it and the  
20 expectations and it is basically built off of the original GALLs which went up to  
21 Rev. 2.

22 And basically, we will do the integrated plant assessment, the  
23 TLA evaluation with the ultimate goal of identifying and establishing the Aging  
24 Management Programs.

25 And so one key point that we want to make sure everyone is  
26 aware of is the Aging Management Programs are the key and so that is how we

1 will manage the aging of the in-scope equipment so that we maintain its  
2 intended function. A lot of people think that you know you really have to like  
3 predict how long things are going to last. Are they going to last 80 years or this  
4 or that. That's really not the case and the rule doesn't require it. Really what  
5 you want to do is manage the aging. And if you think about it, that's really the  
6 right way to go.

7 If you had an analysis that predicted the end of life, you'd still  
8 have to monitor it and keep an eye on it all along. So really what we want to  
9 do is have effective Aging Management Programs so we can monitor the effects  
10 of aging and take appropriate corrective action before there is a loss of intended  
11 function.

12 If you go to the next slide, slide 4, this is just the overall process  
13 review. You probably have seen this. This is the integrated plant assessment  
14 and basically we identified the scope. We identified all the aging effects and  
15 materials. And then we do a matchup for all those components to an Aging  
16 Management Program and then ensure we have all the Aging Management  
17 Programs address the in-scope equipment.

18 Part of this review, you know we do extensive reviews and we  
19 are bringing Peach Bottom's application. We are not like just going to send in  
20 the original Peach Bottom application with a few addendums. No, we are  
21 starting over and we basically do an update to today's standards. It will look  
22 more like our LaSalle application, which was our last application, than our  
23 Calvert Cliffs application, which was our first application.

24 And in this process, we review all the performance at the plant  
25 and our internal operating experience. And just to give you an idea of the  
26 extent of reviews, we have -- our operating experience is going to put Peach

1 Bottom, so this is basically corrective actions, it is industry operating experience  
2 and so on, we have 365,211 items that we are going through to review. Right  
3 now, we are about 85 percent done on that and that is to determine -- make  
4 sure we have identified any plant-specific aging effects and plant-specific  
5 operating experience for our Aging Management Programs.

6 And if you go to the next slide, slide 5, it basically just  
7 summarizes the programs. Again, we're not done right now. We're still in  
8 process but we are anticipating we will have about 48 Aging Management  
9 Programs. These all line up with the GALL, the SLR GALL. So this is just the  
10 listing of it and it is quite extensive to ensure that, again, we maintain the  
11 intended functions of the in-scope equipment.

12 So in summary on slide 6, you know the GALL, SLR, and the  
13 GEIS guidance is comprehensive. We believe it is very clear and has been  
14 developed based on learnings from the first renewal research and operating  
15 experience and we have been involved in that and reviews of that so we  
16 understand it and it has been built off of the first renewal and we understand  
17 how to do that.

18 The Peach Bottom SLR application will be consistent to the  
19 GALL, SLR, and the GEIS to the greatest extent possible. We will submit a  
20 high-quality application that can support an 18-month staff review and we are  
21 on track to submit in the third quarter of 2018.

22 CHAIRMAN SVINICKI: Thank you very much.

23 Mr. Aitken, did I pronounce that correctly?

24 MR. AITKEN: Thank you.

25 CHAIRMAN SVINICKI: Thank you. Please proceed.

26 MR. AITKEN: Thank you. Good morning. My name is Paul



1 Aitken and I am the manager responsible for the subsequent license renewal  
2 project at Surry. I appreciate the opportunity to come and speak to you today  
3 about the progress of Dominion's efforts to prepare for the submittal of the  
4 application.

5 So what I will do is I will present a brief overview of Surry Power  
6 Station, Dominion's industry involvement in preparing for subsequent license  
7 renewal and our current schedule for submittal of our application.

8 So by way of my background, I was involved with all the first  
9 renewals for Dominion, starting with North Anna, Surry, working towards  
10 Millstone, and then Kewaunee.

11 So with that, next slide, please.

12 Surry Power Station is a Westinghouse 3-loop pressurized  
13 water reactor with an output capacity of nearly 1700 megawatts. Together,  
14 these two units are capable of producing 15 percent of Virginia's electricity  
15 needs.

16 Surry is located in Surry County, Virginia on the south side of  
17 the James River, approximately 25 miles upstream where the river enters the  
18 Chesapeake Bay.

19 Unit 1 was originally licensed in 1972, while Unit 2 was licensed  
20 in 1973. Surry entered the first period of extended operation in 2012 for Unit  
21 and 2013 for Unit 2.

22 Similarly, as Exelon, Dominion has invested nearly \$1 billion in  
23 capital investments into Surry since the first renewal was issued in 2003. And  
24 plans and will continue to invest in Surry to maintain plant reliability for the  
25 current and subsequent period of operation. Next slide, please.

26 So I just want to spend a moment and discuss the experience

1 of the Dominion team. My project team is composed, in part, with individuals  
2 involved with the first Dominion renewals like myself. I also brought others from  
3 within the industry who had extensive and current license renewal experience  
4 to complement the team.

5 Since the team formed in late 2015, my focus was to become  
6 integrated with various industry groups sponsored through NEI and EPRI. As  
7 a result of our integration into the various industry initiatives, it has not only been  
8 beneficial for Dominion but also for the betterment of the industry. As Mike  
9 said, I am currently the Vice Chairman of the EPRI Long-Term Operation  
10 Integration Committee, as well as point man for second license renewal or  
11 subsequent license renewal within NEI.

12 So as Mike said, Dominion was directly involved with the NRC  
13 staff during the public meetings, heavily involved. The meetings were  
14 extremely beneficial to the industry and the other stakeholders to better  
15 understand the background on the evolving requirements. We worked through  
16 the industry questions and concerns and we were able to find common ground  
17 with the staff. I thought that was very beneficial.

18 So a key takeaway on how we are able to get this point in the  
19 process continues to be the open communication that we have demonstrated  
20 over the last couple of years. Next slide, please.

21 I'm sorry. Okay, could we go back two slides where I have  
22 data review? I'm sorry, I skipped a slide by accident.

23 So the decision making to operate Surry for an additional 20  
24 years was founded on the station's very good operational performance. The  
25 investments made in the station as Surry being the first station in the Dominion  
26 fleet to reach 60 years. It also made sense for the stakeholders and customers,

1 since Surry Station is one of the lowest cost producers of electricity in the United  
2 States.

3 Dominion employs around 900 employees at Surry, coupled  
4 with the tax revenues into the local communities makes operating 20 additional  
5 years very significant.

6 I would also add that pursuing a subsequent license renewal is  
7 viewed positively by the State Corporation Commission as a viable energy  
8 source for the Commonwealth in the foreseeable future.

9 As a result, Dominion notified the NRC in late 2015 of its intent  
10 to send in subsequent license renewal application in the first quarter of 2019.  
11 Based on this announcement, Surry has been identified as one of the lead  
12 plants along with Peach Bottom.

13 Okay, next slide -- next two slides, I guess. I think we covered  
14 that, right? There we go. I'm sorry for the confusion.

15 So I just want to take a quick look at the levels of support  
16 needed to develop a renewal application. Developing an application is the  
17 responsibility of each utility but there is also a great deal of collaboration and  
18 support required with other entities in the industry. To put this in perspective, I  
19 want to provide a quick visual representation of the involvement by many groups  
20 and companies currently involved with Surry. Next slide please.

21 Here is what I categorize as the first layer of support. It  
22 represents the organizations that you have already heard from today. First, we  
23 have the independent research organizations working to address the critical  
24 research activities and programs needed for subsequent license renewal. The  
25 other support identified reflects utilities like Exelon that we work closely with to  
26 provide insights, and we collaborate on industry initiatives, and we peer review

1 each other's applications.

2           Lastly, we rely on the leadership at NEI to provide strategic  
3 advice, along with facilitation with the License Renewal Executive Working  
4 Group, License Renewal Task Force, and the various discipline groups.

5           NEI stands with the industry and ensures there is an alignment  
6 on issues as we work together on second license renewal. Next slide.

7           And the last circle reflects the various vendors that are currently  
8 supporting Surry. Collectively, the diverse group of supporting organizations will  
9 provide Dominion the expertise and support to develop a high-quality  
10 application, as we will discuss in the next slide.

11           I believe that subsequent license renewal is really a continuum  
12 from the first renewals. The renewal process is stable. It is predictable. And  
13 as the regulatory framework remains unchanged, I further believe the renewal  
14 of those 86 licenses, as Jason has mentioned, is a testament to the viability of  
15 the process.

16           As the lead plant, similar to Exelon, Dominion will provide an  
17 application that incorporates the latest GALL requirements and most recent  
18 industry guidance. We will also work closely with our utility and industry  
19 partners through peer reviews to draw on the collective experience base to  
20 develop a high-quality application.

21           We also expect to maintain a high degree of consistency with  
22 the GALL, to realize the highest degree of efficiency and expected savings in  
23 NRC review time. We will demonstrate how the Aging Management Programs  
24 will provide reasonable assurance in effectively managing the effects of aging.

25           Based on this approach, the NRC should be in a position to  
26 support an 18-month review.

1                   Let's take a high-level look at the AMPs that we proposed to  
2 use. This slide reflects the various Aging Management Programs that will likely  
3 be used to manage the effects of aging. My purpose in showing this isn't really  
4 to give you an eye test but it is really just to provide a sense of how Surry will  
5 align with the GALL.

6                   Just to provide a quick perspective, a fair amount of these  
7 Aging Management Programs are currently in place from the first renewals and  
8 will require some updating to meet the new requirements but the impact should  
9 not be overly significant.

10                  The remaining AMPs will require some changes or  
11 enhancements and/or are considered new or one-time inspections that will need  
12 to be created and in place prior to entering the subsequent period of operation.  
13 I expect I have very good alignment with the GALL. Next slide, please.

14                  So in 2015, NEI published an SLR roadmap to provide  
15 information for the public and other stakeholders. The document provided a  
16 comprehensive outline on the various initiatives and items that were identified  
17 to meet the objective of submitting the lead plant applications, which are shown  
18 in the middle there around the 2018-2019 time frame.

19                  I don't know if you have seen this document. I have just a prop  
20 here but it is very informative and I would encourage you to take some time to  
21 read it, if you haven't.

22                  The time line shown on the slide is within the roadmap  
23 document and the time line provides a high-level illustration of some of the  
24 markers along the way to support the lead plant applications. It starts in 2009,  
25 when the first plant entered the period of extended operation and continues until  
26 the first plant reaches 60 years of operation in 2029. Everything in-between is

1 the work that has been completed or is ongoing to support the industry in  
2 preparing for the lead plant applications.

3 As you can see, I bubbled our announcement in late 2015, as  
4 well as our intended submittal date of the first quarter of 2019. And we remain  
5 on target with the industry time line with a planned submittal in early '19. Next  
6 slide, please.

7 So as I wrap up, I first want to commend the NRC staff on their  
8 efforts over the last couple of years. The staff has worked very hard in  
9 developing the SLR GALL and SRP and provided ample opportunity for  
10 stakeholder feedback. We have a great starting point for the lead plants, as  
11 well as those likely to follow.

12 I want to reiterate that Dominion has been engaged and  
13 integrated with the work leading up to the GALL SLR issuance. We have been  
14 heavily invested, along with the others in the industry over the last couple of  
15 years, to ensure that we have the appropriate guidance and have explored  
16 areas for optimization with the staff based on the vast experiences during the  
17 first renewals.

18 Finally, we are ready to develop a high-quality application using  
19 a very experienced team that will provide a high degree of consistency with the  
20 GALL, which should ultimately support an 18-month NRC review schedule.

21 That's all I have. Thank you very much.

22 CHAIRMAN SVINICKI: Thank you.

23 Mr. Lochbaum, please proceed.

24 MR. LOCHBAUM: Thank you and good morning. We  
25 appreciate this opportunity to share our perspectives with you and other  
26 stakeholders. Slide 2, please.

1 I will focus on these issues today. We have some other issues  
2 but if we can't sell you on these, we're not likely to convince you about lesser  
3 concerns. Slide 3, please.

4 As other presenters have done, I recycled this slide directly  
5 from my presentation during the May 8, 2014 Commission briefing. Although  
6 35 months have been ripped off the calendar since then, this point remains valid,  
7 as do our concerns. Slide 4, please.

8 Our first concerns the one-time evaluations of severe accident  
9 mitigating alternatives. For example, because the Limerick plant evaluated  
10 SAMAs during initial licensing, SAMAs were not reevaluated for their license  
11 renewal application. Slide 5, please.

12 One-time SAMA evaluations rely on three tenuous  
13 assumptions that safety innovations will not have emerged, that populations will  
14 not have changed, and that costs will not have changed. Slide 6, please.

15 NEI petitioned the NRC to eliminate the need to submit SAMA  
16 evaluations with license renewal applications. The NRC denied the petition for  
17 reasons including the legal need to consider new and significant information  
18 since the original licensing during this major federal action. Slide 7, please.

19 The many reasons the NRC found for denying NEI's petition to  
20 remove SAMAs from the initial license renewal application seemed equally valid  
21 for subsequent license renewal. One and done seems both illegal and  
22 imprudent public policy. Slide 8, please.

23 Our second concern involves the bizarre position and line  
24 approach to nuclear safety. Ginna and Point Beach are very similar plants in  
25 terms of design and age but because the NRC revised its license renewal  
26 standards, Point Beach was required to have an Alloy 600 Aging Management

1 Program while Ginna was not. Slide 9, please.

2 If NRC would no relicense Point Beach without an Alloy 600  
3 Aging Management Program, 10 CFR 50.100 gives the NRC the authority to  
4 require already relicensed Ginna to have this safety justified measure. 50.100  
5 also gives the community around Ginna the right to expect equal protection from  
6 the NRC. Slide 10, please.

7 If safety warrants that measures x, y, and z be done during the  
8 period of extended operation, then the public living around all reactors deserve  
9 those protections from undue risk. If such safety measures are not justified,  
10 then the owners of all reactors deserve protection from undue costs. Slide 11,  
11 please.

12 If I lived around a reactor, I would wish for it to be late in the  
13 subsequent license renewal queue in order to obtain protection for my  
14 community. If I owned a reactor, I'd wish for it to be early in the subsequent  
15 license renewal queue to get through as cheaply as possible.

16 The NRC must stop being regulatory leprechauns by granting  
17 wishes. Slide 12, please.

18 The NRC's regulations in 50.100 and 50.109, if followed, would  
19 require all relicensed reactors to have the same suite of Aging Management  
20 Programs. Subsequent license renewal gives the NRC a second chance to get  
21 this right. Slide 13, please.

22 No members of the public attended the final three NRC public  
23 meetings in 2012. Two NRC staffers called me to invite me to the November  
24 meetings, even if remotely via phone bridge. I declined on grounds that the  
25 concerns raised in the May meeting had never been addressed. If my  
26 concerns were going continue to be ignored, I would just save myself and the



1 staff the charade.

2 I hadn't realized that the staff would address my concerns four  
3 and a half years later. I will block out some time in late 2021 to review their  
4 take on my concerns today and save some time in 2022, in case they don't get  
5 to it as expeditiously next time. Slide 14, please.

6 It turns out the staff's response wasn't worth the wait. True,  
7 Point Beach was not required to have an Alloy 600 Aging Management  
8 Program. True, it could have endeavored to convince the NRC staff that not  
9 having one at all was just as good. Maybe that gambit would have worked but  
10 it is also true that it costs Ginna much less to have neither a program nor an  
11 acceptable excuse. Slide 15, please.

12 I contended earlier that the NRC is cheating somebody. I  
13 contend now and formally request that the NRC Inspector General investigate  
14 whether the NRC is violating 50.100 or 50.109, both cannot be met the way the  
15 NRC is handling license renewals. Slide 16, please.

16 I have participated in many processes during which public  
17 meetings provided two-way communication between the NRC staff and external  
18 stakeholders to facilitate progress toward the outcome and I have participated  
19 in the license renewal process. Fortunately, that process is atypical but it is  
20 unacceptable and must change if the SLR process is to yield a good outcome.

21 One might have thought that the NRC staff would address  
22 public concerns in the policy paper put before the Commission. One would  
23 have been wrong. The NRC staff waited until two years after the commission's  
24 vote on the policy issues before addressing public concerns. Slide 17, please.

25 This is the first car that I bought. It's a 1976 Ford Pinto. I was  
26 still in college working towards my nuclear engineering degree at the time. This

1 now antique car is newer than Peach Bottom, Surry, Oconee, Point Beach, Nine  
2 Mile Point Unit 1, and many other reactors operating today. By the way, I no  
3 longer have this car. It's not so much that it aged badly. It was hard to get  
4 eight-track tapes anymore. Slide 18, please.

5 We commended the NRC for its knowledge management  
6 efforts begun a decade earlier. The Agency's graying staffers were retiring and  
7 being replaced by individuals who type with their thumbs on very small smart  
8 phones. Slide 19, please.

9 As millennials replace nuclear plant workers, they must try to  
10 answer safety questions using owner's manuals of varying degrees of detail and  
11 try to understand regulatory requirements that may provide scant insights into  
12 their bases. Slide 20, please.

13 Considerable industry and staff resources have been spent in  
14 recent years trying to determine whether what was done then needs to be  
15 redone now. It is a reflection on a game and not its players. This game is  
16 really hard to play, really, really hard. Slide 21, please.

17 And time won't make this game any easier to play unless steps  
18 are taken within the SLR process or in parallel to it. Nuclear plant workers and  
19 NRC staffers must be given a proper foundation for making safety decisions in  
20 the future.

21 Thank you.

22 CHAIRMAN SVINICKI: Thank you all very much for your  
23 presentations. We will begin the question and answer period this morning with  
24 questions of Commissioner Baran.

25 COMMISSIONER BARAN: Thank you. Well, thank you all  
26 for being here and for your presentations.

1                   There seems to be broad agreement on the key outstanding  
2 technical issues that need to be resolved for subsequent license renewal.

3                   Richard, your presentation covered DOE's main research  
4 areas and schedules and it looks like most of the testing and predictive model  
5 development is scheduled to be completed by 2019-2020. How confident are  
6 you that the various projects will be completed in those time frames?

7                   MR. REISTER: I think we are making good progress on the  
8 development of those predictive models and so I am hopeful that we will be  
9 successful.

10                  And those models aren't really, just to be clear, I don't feel those  
11 models are necessary for a plant to submit a subsequent license application.  
12 What they are most useful for is predicting long-term degradation so you can  
13 anticipate many years down the road what the degradation might be so there's  
14 no surprises is the main point. And that is really more of an economic issue  
15 than a licensing issue, in terms of being able to get ahead of the degradation  
16 and anticipate it in terms of the maintenance of your plant.

17                  COMMISSIONER BARAN: And so in your presentation, you  
18 said you are not seeing any technical showstoppers that would prevent  
19 operation out to 80 years. Of course there is all this research going on still.

20                  What level of confidence should the Commission have that  
21 none of the ongoing research will reveal a significant problem with plants  
22 operating for 80 years?

23                  MR. REISTER: Well when I say technical showstoppers, I  
24 mean there are no cliff-edge effects that a large portion of a plant would degrade  
25 to a point where it would be uneconomic to make the repairs.

26                  So the degradation models and predictions that we see, based

1 on our research, is that it is a gradual process that is manageable by plants.  
2 And so they can make repairs or replacements as needed to the equipment.  
3 It's passive equipment that you would be monitoring during extended operation.

4 But you know as we have seen, you know some of those  
5 repairs might make it uneconomic to continue to operate a plant at some point.  
6 But it is a slow process and a manageable process for the most part. That's  
7 what I'm trying to say by no showstoppers.

8 COMMISSIONER BARAN: Okay. Well, let me ask the rest  
9 of the panel the same basic question. How confident are you that the  
10 outstanding technical issues can be addressed with good Aging Management  
11 and Maintenance Programs? Anyone want to share their thoughts on that?

12 MS. BERNHOFT: I'll chime in next. You said the key word  
13 there, that is having the Aging Management Programs in effect and we talked  
14 about the technical basis exists for those now.

15 The continued research really helps with driving out a lot of the  
16 uncertainties on how some of the models work, how the aging works. So think  
17 of it. You start with a little more conservative approach. Like when we start at  
18 management of Alloy 600 we probably did more inspections than were needed.  
19 As we gathered data, as we gathered insights from the research, we were able  
20 to better focus the inspections to look at the areas of question and concern. It  
21 helps with the safety case and it also helps with managing the economics and  
22 the outage durations for the plants as we continue to improve our  
23 understandings and our models through the research and through gathering the  
24 OE. So gathering the inspection results is also an important element to that.

25 So, it is reducing the uncertainties. And we are also doing a  
26 lot of work to improve the inspection technology so you can get faster inspection

1 results, better information from your inspections.

2 COMMISSIONER BARAN: Any thoughts?

3 MR. REMER: I think the key is the living Aging Management  
4 Programs because we collect OE on every plant, on every event, every  
5 situation. And when we start seeing operational experience pile up in a certain  
6 area, we look back at our Aging Management Program and ask the question  
7 are we monitoring this properly to identify degradation.

8 You combine that with new technology insights and scientific  
9 insights and it gives you an extremely high level of confidence that you can  
10 operate your plant safely and identify anything that happens early before it leads  
11 to degradation.

12 MR. LOCHBAUM: I would just complement what Jason said  
13 by the NRC's Generic Communications Program. If something does emerge,  
14 the Generic Communications Program writes a Generic Letter or bulletin has  
15 been shown to step in and address that surprise or that new evolving issue.  
16 That's a complement to the industry's internal efforts.

17 MR. AITKEN: Yes, and I would just add as well I think the  
18 GALL provides us what we know today and I think we have a good starting point,  
19 as I said in my presentation.

20 And as new information becomes available, there is vehicles to  
21 communicate and impose on licensees. And we talked about Generic  
22 Communication. We have ISGs, Interim Staff Guidance documents, we have  
23 seen a lot of those. So as the information becomes available out of the  
24 research area, then we will evaluate and if we have to adjust, we will adjust.  
25 But based on what we know today, I think we are on solid footing.

26 MR. GALLAGHER: I'll say ditto with Paul but I mean we

1 manage all active equipment and all passive equipment. And the passive  
2 equipment is much easier to manage than all the active equipment and we are  
3 on top of all that and the plant reliability reflects it.

4 COMMISSIONER BARAN: Thanks for all those responses.  
5 In terms of -- to kind of follow-on what Jason was saying in terms of having these  
6 be living programs, Aging Management Programs, I wanted to kind of turn to  
7 and ask folks for their views on where Dave kind of ended his -- or maybe you  
8 didn't end your presentation but in your presentation raised this concern about  
9 different plants being subject to different revisions of the GALL, based on where  
10 they are in timing in their applications.

11 What do others think about that? Is that a problem? Does it  
12 make sense for every plant operating beyond 60 years to be using the most  
13 recent version of the GALL, including updates as they go so that everyone is  
14 using the latest methodologies? How do you all think about that issue?

15 MR. GALLAGHER: Well, I can address that. I think you  
16 know I personally don't think it's an issue because the Aging Management  
17 Programs have two elements to them that you have to have and one is operating  
18 experience, the other is corrective action. So when Jason they are living  
19 programs, that is true.

20 You know the example of Ginna not having an Alloy 600  
21 program, Ginna has an Alloy 600 program. It wasn't put in place in the license  
22 renewal. It was put in place subsequent with ongoing operating experience.

23 And I think if you step back and think about it, you wouldn't want  
24 to have it any other way. Like the folks that came up with the rule were  
25 geniuses because it was built off of where you are now but then had the  
26 corrective action and operating experience element to it.

1                   Because if you step back and say you want to have a static  
2 program, you want to have everything in there and then do that, first of all, you'll  
3 never get there. And second of all, if that was the case, then once you had  
4 approval in that, you wouldn't be required to make any changes to it. And you  
5 know we learned throughout the years, the research, the operating experience,  
6 and so on. So you want to have that feedback mechanism and I think it is in  
7 there and it is very robust.

8                   COMMISSIONER BARAN: Dave, do you have any further  
9 thoughts on hearing Mike's response on that?

10                  MR. LOCHBAUM: If I owned a plant like Ginna and I wanted  
11 to save money down the road, I'd just eliminate my Alloy 600 Aging  
12 Management Program because I'm not required to have it. The NRC might not  
13 like that but the NRC would have no regulatory hook to make me continue that  
14 program.

15                  So, again, the whole backfit thing, if it is a justified measure,  
16 then it should be required for everybody. If it is not justified, it should be  
17 voluntary for everybody. But to have this mishmash of some that is required,  
18 some that's not required, makes no sense, legally or morally.

19                  MR. GALLAGHER: Just to respond to that, there is a  
20 regulatory hook. You have to maintain the intended function of the in-scope  
21 equipment. And so if you don't manage the aging and you have a problem,  
22 there is a definite regulatory hook. You know so -- and it is required in your  
23 operating experience review program to review that and add it as necessary.

24                  So I think there is a regulatory hook and I think it's there.  
25 That's why the utilities continue to add the programs and manage the aging, in  
26 addition to everything else you have to do.

1                   COMMISSIONER BARAN: Let me quickly ask about one of  
2 the other issues that Dave raised, which was his concern about not performing  
3 updated SAMAs as part of subsequent license renewal. And he made the point  
4 well costs change over time, safety innovations over time. What do others on  
5 the panel think about that concern or that issue?

6                   MR. GALLAGHER: Well, I can address that. Limerick is a  
7 case example. And we did the Limerick application. You have got to step  
8 back and look at what the purpose of the SAMA is. The SAMA is part of the  
9 NEPA evaluation in the Environmental Report. So it is kind of a mishmash on  
10 purpose. If you want to do updated risk analysis, then there should be  
11 requirements to do updated risk analysis. And we do do updated risk analysis  
12 on -- you know we update the PRAs frequently and that type of thing and any  
13 insights are acted upon.

14                   So when you step back and say what was the purpose of the  
15 SAMA for the original licensing or license renewal application, it is for the NEPA  
16 evaluation.

17                   So then when you do, the rule only requires you to do one  
18 SAMA analysis, unless there is new and significant information that would drive  
19 you to do another. So in the second renewal, we will do a new and significant  
20 review to determine whether or not an additional SAMA is needed to be done  
21 and there is a process to do that.

22                   But the success criteria on whether you need to do that is  
23 NEPA. And the NEPA is there a seriously different picture in the environmental  
24 consequences. And if you step back and think about SAMA, SAMA only if you  
25 implement a SAMA, it only improves your risk because you are implementing  
26 something that will reduce risk.



1                   So it is really a mishmash of purpose and I think the staff -- you  
2 know the rule was correct in saying okay, let's do it once to figure out if there  
3 any significant seriously different -- it would paint a seriously different picture  
4 and in subsequent actions do a new and significant review to see if you have to  
5 do that again. So, I think it is well covered.

6                   COMMISSIONER BARAN: I am a little over on time but I am  
7 curious. Do you have a sense, or Paul if you have a sense, do you have a  
8 sense if you reran the SAMAs using kind of current data, do think there would  
9 be appreciably different results, or no, or you don't have a sense?

10                  MR. AITKEN: That's a good question. I think what we're  
11 finding is we are evaluating the previous SAMAs that we had. We are also  
12 looking at all the SAMAs that other utilities have done and we are running cases  
13 on -- we started with maybe 150 to 170 and maybe we have 25 and we are  
14 going to go through the process of determining if there is new and significant  
15 results. And at this point, we don't anticipate any, even with the population or  
16 the dose consequences.

17                  COMMISSIONER BARAN: Are you effectively doing an  
18 analysis to determine whether any new or significant changes?

19                  MR. AITKEN: Yes.

20                  MR. GALLAGHER: Yes, we do a new and significant review,  
21 which is very robust and there is technical reviews in that on other SAMAs. And  
22 basically, since the Fukushima mods were put in and the Fukushima FLEX  
23 equipment, you know you really don't have a lot of significant cost beneficial  
24 SAMAs.

25                  Now, it is not saying you never have a cost beneficial SAMA  
26 but usually, and even in the first renewals, if you look at all the SAMAs that were

1 cost beneficial, they are usually very, very small things. You know it is like well  
2 if we change these procedures, then -- or if we put a portable battery someplace  
3 and have a procedure on how to hook it up, you can reduce the risk. Well you  
4 know we do those kind of reviews when we do the PRA updates. So you know  
5 that is -- I think it is covered like that.

6 COMMISSIONER BARAN: Okay, I'm over my time but Dave,  
7 are there kind of closing thoughts you had on this since you raised this issue?

8 MR. LOCHBAUM: Well the SAMA, many of those cost  
9 beneficial SAMA evaluations were not implemented, like the flood alarm in the  
10 switch gear room at Indian Point but they are being litigated. You know those  
11 are contentions raised in the Indian Point proceeding. So they must be new.  
12 They must be significant. They must meet all those criteria because they are  
13 still being litigated.

14 The fact that we are going to take that off the table and put it  
15 clearly within the purview of the licenses, I don't think that is a sound approach  
16 to the issue before the Commission.

17 COMMISSIONER BARAN: Thanks.

18 CHAIRMAN SVINICKI: Thank you.

19 Commissioner Burns.

20 COMMISSIONER BURNS: Thank you. Thank you for the  
21 presentations this morning, as we consider this topic or where we are in terms  
22 of subsequent license renewal.

23 I had participated in the first round, in the early rounds of license  
24 renewal back in the 1990s and I think it is --

25 CHAIRMAN SVINICKI: Does that mean you were one of the  
26 brilliant people?

1                   COMMISSIONER BURNS: Yes, I was looking for that. But I  
2 also noticed I will be 100 years old if they get their 80 -- if Peach Bottom or no  
3 Surry, if Surry 2 goes to 100 or 80 years of operation, I will be 100. I'm not sure  
4 I'll be around.

5                   But anyway, but I think --

6                   CHAIRMAN SVINICKI: I think with the right Aging  
7 Management Program --

8                   COMMISSIONER BURNS: Well I think that's maybe too late  
9 for that. I don't know. That's a good point.

10                  But Surry, I think the interesting thing to recall is that there was  
11 sort of a move forward and then sort of reconsideration with respect to renewal  
12 to get it to where it is today in terms of the approach actually taken.

13                  One question I found the discussion I think very interesting in  
14 terms of the differences in GALL reports. And one thing I would reflect on, I  
15 might take a different viewpoint in terms of where Mr. Lochbaum does with  
16 respect to the legality of differences. I think I would probably take a very  
17 different viewpoint. I mean if I actually, if I look back and I can remember doing  
18 research over the years in terms of initial regulations. I would love for most  
19 regulations to be like they were in the 1950s or 1960s. You just had the darn  
20 regulation there and I didn't have to wade through a thousand pages of text like  
21 say I have to do on the Fitness for Duty Rule or something like that.

22                  But all kidding aside, I think it is an interesting issue in terms of  
23 -- and have had it dealt with as a line attorney in terms of enforcement of license  
24 conditions, procedures, things like that. So one of my questions, Mr. Gallagher  
25 when you said there is an enforcement hook, the thing that came to mind, is that  
26 hook the maintenance rule? Is that what you were speaking of? I'm trying to

1 get more information where you see that hook.

2 MR. GALLAGHER: Well you have to maintain the intended  
3 function of the equipment.

4 COMMISSIONER BURNS: Right.

5 MR. GALLAGHER: So if your equipment was inoperable then  
6 there would be some type of reportability issue, some type of regulatory issue  
7 associated with it.

8 If it was not maintained operable and you didn't take corrective  
9 action, you could go through the corrective action Appendix B issues, those kind  
10 of things.

11 COMMISSIONER BURNS: Okay.

12 MR. GALLAGHER: So in a broad sense, we have to maintain  
13 the equipment that is in scope and we have to maintain its intended function.

14 COMMISSIONER BURNS: Yes.

15 MR. LOCHBAUM: Could?

16 COMMISSIONER BURNS: Sure. Yes, yes. It is an  
17 interesting discussion.

18 MR. LOCHBAUM: You wouldn't need a rule at all, you have  
19 Appendix B that says you are required to maintain equipment. So why do you  
20 have all this nonsense if Appendix B -- I think the reason for all that nonsense  
21 that the geniuses came up with is that it avoids waiting for something to break  
22 before you step in and fix it under the regulatory hook. It would be nice if you  
23 didn't challenged highly reliable safety systems. Building a wall around  
24 Fukushima is a little bit too late today.

25 So I think Ginna is not protected to the same extent that Point  
26 Beach is, unless something breaks, and then you have a regulatory hook. I

1 don't think that's the way NRC wants to regulate safety in the United States.

2 COMMISSIONER BURNS: Okay one of the other aspects of  
3 that discussion that I want to delve into a little bit is the challenge of sort of what  
4 I will call older FSARs, although when I say older FSARs, we have had  
5 provisions that you have to continue, you have to do continual updates of  
6 FSARs so you have a USAR, I guess, and continue that.

7 But I would be interested in both from Exelon or from Dominion  
8 how do you deal with that issue in terms of the plants that you have, that an  
9 earlier plant is probably going to have an FSAR that doesn't look like let's say  
10 Watts Bar 1 or 2 FSAR does in terms of perhaps the granularity or the depth or  
11 that. Are there particular -- and I am talking, obviously, at a high level. It has  
12 been a while since I probably have delved into one of them. But how do you  
13 think about that issue in terms of that longer term knowledge management issue  
14 when you have got people, maintenance people, operations people and all  
15 going back over the years during the period of extended operation?

16 MR. GALLAGHER: Well, I mean there's been a number of  
17 initiatives over the years. You know we have design basis documents you  
18 know DBDs at the sites and that was in the vein of getting all the current  
19 licensing basis together.

20 COMMISSIONER BURNS: Right.

21 MR. GALLAGHER: You know the UFSAR, as you said, is  
22 maintained and in the context of license renewal we have to have our Appendix  
23 A Aging Management Program summaries and commitments in the FSAR and  
24 that is put in place right after the license is renewed and then it is updated every  
25 two years.

26 So you know I think we are required to maintain the current

1 licensing basis and that is what we do.

2 COMMISSIONER BURNS: Okay, let me --

3 MR. LOCHBAUM: Could I just?

4 COMMISSIONER BURNS: Sure.

5 MR. LOCHBAUM: I think the challenge is if I was a plant  
6 worker not maintaining the plant because that is pretty clear but if part of that  
7 means replacing something because it's worn out, I have to make sure that that  
8 replacement part meets the same safety function of the original. And with the  
9 documentation light plants, that decision is going to be a little bit harder than it  
10 would be at a more recent plant.

11 So I think it is not so much in maintaining the plants the  
12 challenge arises it is in if you end up having to replace a component or a  
13 structure because it is worn out.

14 COMMISSIONER BURNS: Okay.

15 MR. AITKEN: I would just say that I mean the equipment, if it  
16 breaks and it needs to be replaced, there are processes in place. Sometimes  
17 we have to reverse engineering things. That's not uncommon but we do  
18 maintain our records and we do have information available so we can go back  
19 and figure out what is required as part of the licensing basis requirements for  
20 that piece of equipment that hypothetically failed.

21 So we're not in a vacuum. We do have processes in place and  
22 they have been effective and they are evaluated by the NRC.

23 COMMISSIONER BURNS: Okay, let me turn to Mr. Reister  
24 from the Department of Energy. Of the four knowledge gaps that were  
25 identified in this DOE-NRC expanded materials degradation assessment, is  
26 there one that is proving most difficult to fill?

1                   And to put it another way, is there one that might have a higher  
2                   uncertainty -- higher level of uncertainty with respect to the outcome?

3                   MR. REISTER: I wouldn't characterize it as higher uncertainty  
4                   but I think in terms of -- and it is just my personal opinion of what the industry  
5                   would have to deal with it would be core internals in terms of the need to repair  
6                   and manage the degradation of core internals. And that could lead to some  
7                   economic challenges by plants.

8                   The other issues, you know reactor pressure vessel  
9                   embrittlement is more of a long-term issue. And concrete and cables have  
10                  pretty good performance. I think they are in the period of extended operation.  
11                  You know cables will have to be replaced and managed but it is not as high a  
12                  cost or impact compared to core internals.

13                  COMMISSIONER BURNS: Okay. And Ms. Bernhoft, is there  
14                  an area that you think is most challenging in terms of the research that is  
15                  underway for subsequent license renewal?

16                  MS. BERNHOFT: I don't think there is one particular area that  
17                  is a challenge. I think what is important was touched in is we need to continue  
18                  to develop the state of the art for the inspection methodology. As the plants  
19                  continue to age, we do expect things to exhibit aging degradation.

20                  You know you used the example of core internals. You know  
21                  it is closest to everybody's heart right now but as we improve the ability to do  
22                  the inspections for the core internals, it gives better information to the utilities  
23                  for their asset management. And that's making the economic decisions is a  
24                  repair or replacement needed.

25                  COMMISSIONER BURNS: Okay. And I think a number of  
26                  you may have mentioned that there is some international cooperation going on

1 in some international work. If you could give me some brief description of what  
2 type of work is being done overseas that is contributing to the understanding  
3 here, particularly since in terms of outside the U.S., a lot of these countries, I  
4 know for example, the French, they are really dealing with first term license  
5 renewal. But any research that is worth highlighting.

6 MR. REISTER: Well just as an example, we created an  
7 International Committee on Irradiated Concrete. So we collected different  
8 countries and France and Japan in particular I think that we are doing work on  
9 irradiated concrete and how it was effecting -- irradiation was effecting the  
10 degradation of concrete. So that's just one example where we have an  
11 international work.

12 There is some work through the NEA and the IAEA as well.  
13 And we also do some bilateral cooperation on various issues.

14 But so we're trying to seek targets of opportunity where there is  
15 like-minded research and share that information and not duplicate effort.

16 COMMISSIONER BURNS: Okay, great. Thanks. Oh, go  
17 ahead. I'm sorry.

18 MS. BERNHOFT: I can give really just three really quick  
19 examples. ERPI is a member of the Material Aging Institute with EDF and  
20 TEPCO and some other international members.

21 We do a lot of fundamental work on material characterization.  
22 And a project we have going on right there is they built a scale-sized version of  
23 a containment concrete or you know the containment model that we'll be doing  
24 some testing on.

25 Another is working with the Japanese CRIEPI, which is  
26 somewhat equivalent to EPRI. We have done quite a bit of work on the



1 modeling for IASCC, a lot of international collaboration on that.

2 And another quick one is we worked with NRC as well and we  
3 have harvested materials from the Zorita plant in Spain. It has 36 effective full  
4 power years of operation. It is a small PWR.

5 We have harvested sections of core internals. And we have  
6 also just recently worked with them to harvest sections of the biological shield  
7 wall.

8 COMMISSIONER BURNS: Okay, thanks very much.  
9 Chairman, thank you, Chairman.

10 CHAIRMAN SVINICKI: All right. Well, thank you all for your  
11 presentations, for your answers to the questions of my colleagues. It has been  
12 a very interesting discussion. I might focus on a few different areas, since we  
13 have covered a lot of ground already.

14 Jason, your slide 11 had an anticipated -- has a charge of  
15 anticipated submittals per year for subsequent license renewal applications,  
16 based on a survey that NEI conducted.

17 How would you characterize the dependence of that type of  
18 submittals over years? How dependent is that on the reliance on the 18-month  
19 review schedule? If the first few of these were to take three or four years, do  
20 you think it would paint a seriously different picture of the follow-on applications?

21 MR. REMER: I think that the expectation based on our work  
22 with your staff over the last three or four years and the success of first license  
23 renewal have given people a confidence to say that it is essentially the same  
24 process; we are making some improvements; we have upgraded the AMPs.  
25 The expectation is that we will be more efficient the second round.

26 So I think if the first lead plants -- of course we had to get the

1 lead plants to bite on this idea, right? So the idea that it is going to be better,  
2 they were able to take it to their management to get approval to go forward with  
3 really a brand new process.

4 I think if it took a long time that there would be a chilling effect  
5 in the industry on second license renewal. I think people would be afraid to  
6 possibly submit if there was a lot of delay and it wasn't based on something we  
7 did wrong.

8 So I think it is very important that we stick to the schedule. It  
9 is a published 22-month review schedule right now without hearings. And  
10 we're looking at 18 months. I think if we can kind of stay within that pocket, we  
11 will be fine. If not, there must have been something that came up that we didn't  
12 anticipate.

13 CHAIRMAN SVINICKI: I asked the question, basically, for two  
14 reasons. First of all, my understanding of the history is the same as  
15 Commissioner Burns. While I appreciate that people have been called  
16 geniuses or brilliant or whatever the term was, but the truth was they were  
17 hiccups.

18 COMMISSIONER BURNS: I'm not claiming that title.

19 CHAIRMAN SVINICKI: Well no, I know you're not because  
20 you are a very humble individual but also you are aware of the fact that there  
21 were significant hiccups. And the license renewal processes that exist today  
22 is an evolution over some hard lessons learned. I think Calvert came in and it  
23 didn't go well and there was a fundamental regrouping. And the Agency re-  
24 looked at the scope of license renewal. And so there were some very  
25 foundational changes that were made at that time.

26 So I can't be the only person in the room who has had the

1 experience that the first or second time you do something, it is not generally  
2 your most efficient. But it may be that the broader perspective is that it is not  
3 the first or second time that license renewal itself has been looked at. It might  
4 be the first or second or the lead applications for subsequent license renewal  
5 but there is a tremendous body of experience that is the foundation. It is the  
6 initial license renewal.

7 So I don't know which way it will go but I kind of ask it for that  
8 reason. The second reason I ask it is that we do have a little bit of this foot  
9 race. I think all three members of the Commission now will have explored the  
10 timeliness of the research results to the initial submittal. So I think we have  
11 explored that fully already but the underlying question is are there research  
12 results that won't be timely to the initial submittals? And I think we have  
13 received answers in the general spirit that that isn't a principle concern right now  
14 because the research that is ongoing is going to undergird perhaps some longer  
15 term conclusions and the ability to have a better anticipatory knowledge of  
16 phenomenology to the relevant and most important Aging Management  
17 Programs.

18 So but it is, I think, a significant, I won't say pressure for the  
19 NRC, but it is important that we understand the dependency maybe even for  
20 our own planning and resourcing purposes, the dependency in the industry as  
21 a whole on the attractiveness of SLR based on keying off that 18-month  
22 schedule. There are, of course, separate contested proceedings and  
23 adjudicatory processes that, of course, will be available to those who choose to  
24 intervene in the process. So that is another element of the license renewal  
25 process as we move forward.

26 Moving to another topic it is a little --

1 MR. REMER: Can I say one more thing --

2 CHAIRMAN SVINICKI: Sure, Jason, go ahead.

3 MR. REMER: I'm sorry, just to respond is it the reason we are  
4 calling them lead plants, rather than pilot plants is that we see it as the first  
5 license renewal was a big step and we had to work out the details but second  
6 license renewal really follows right along the same path as license renewal.  
7 We just made it a little bit better.

8 So that is why they are lead plants and not pilot plants because  
9 we don't think there is anything fundamentally different about the first and the  
10 second, other than we have upgraded the processes.

11 CHAIRMAN SVINICKI: Well and of course the Commission,  
12 itself, in its 2014 decision disapproved the staff's proposal that we undertake  
13 rulemaking in this area. And the Commission, at that time, on which I served,  
14 validated that the current framework was the right framework for follow-on  
15 license reviews -- license renewal reviews.

16 So that is consistent with the Commission's policy view of the  
17 matter.

18 The staff will present next and I don't mean to steal their thunder  
19 but they will talk about developments and comments that they received on  
20 various documents under development. And they will indicate that the area  
21 that received the most comments from industry on the changes that they put  
22 forward were to the reactor vessel material surveillance Aging Management  
23 Program. And this has to do with the surveillance capsules.

24 So this isn't my area of expertise and I was reading only a  
25 summary of this. Is there any concern that there will not be enough of these  
26 surveillance capsules or with these newly instituted -- I was about to call them

1 requirements but of course if it's guidance it can't be requirements -- but with  
2 the new definition of this, are we going to run out of surveillance capsules?

3 Is there anybody who can address that? I'm not sure what the  
4 industry's principle concern was.

5 MS. BERNHOFT: I will take a stab at that.

6 With regard to the Surveillance Capsule Program with the  
7 PWRs, yes, there were a number of comments on that particular Aging  
8 Management Program and I will let the staff better characterize some of those.

9 Some of them had more to do with like the timing for harvesting  
10 of some of the capsules. And we had quite a few comments on that particular  
11 aspect that we felt the timing that they were specifying in the AMP may not have  
12 given some of the best value for some of the capsules. And it also had a  
13 specification that some people have to capture an 80-year capsule, which in  
14 some cases has already been harvested.

15 So the staff was very willing to listen and make some  
16 adjustments there. And I think we have ended up in a good place. I'll let Paul  
17 speak more to that because he was instrumental in some of those.

18 But with regard to your question on the number of surveillance  
19 capsules, EPRI actually started proactively looking at this in about 2010 and we  
20 designed two programs working collectively with the PWR community. One is  
21 that we delayed the surveillance -- or the harvesting schedule for 13 capsules  
22 so that we could, knowing that plants were going to start talking about 80 years  
23 of operation, instead of harvesting them within that 60-year period, we delayed  
24 those 13 capsules so that we will collect data out to the 80-year period and they  
25 will start to be harvested about 2021 to 2025.

26 That required license changes or changes in license

1 commitments. Those letters have been prepared and submitted to the NRC an  
2 approved. So that implements that Coordinated Surveillance Capsule  
3 Program.

4 In addition, we took some capsules that had already been  
5 irradiated and have reintroduced them into two host plants. One has already  
6 been reintroduced. The other is going to be reintroduced later this fall. We  
7 will harvest those in about the 2025 time frame also.

8 So there will be additional capsule data coming out for the  
9 period of operation.

10 CHAIRMAN SVINICKI: Okay. The staff's information  
11 indicated that some licensees may have to test and existing capsule that was  
12 previously a standby capsule.

13 Again, it's not my area of knowledge but I think there is benefit  
14 in having standby capsules because we will be going into further extended  
15 operations and we may have new phenomenology that we wanted to study. So  
16 I think that keeping -- this is very inartful terminology -- but keeping some  
17 capsules in reserve for the exploration of emergent issues that we can't see  
18 today I think is of value. And it was my hope that we weren't going to use this  
19 -- I am probably speaking of this in such amateur terms but we weren't going to  
20 use up all the capsules for things right now that we're worried about.

21 And so it sounds, Sherry, from your answer like we're not in  
22 danger of doing that.

23 MS. BERNHOFT: No, no, we worked hard, knowing this was  
24 coming in 2010, to extend out that period for harvesting.

25 CHAIRMAN SVINICKI: Okay and my last question is one that  
26 I am sure that Sherry and Richard don't want me to ask. And it may not make

1 any sense. So if that is your answer is that my question doesn't make any  
2 sense, that's fine.

3 But so we are working on these models for some of the  
4 phenomenology in the materials aging area that we know is relevant or we  
5 predict is very relevant to these decisions to operate these plants for 60 to 80,  
6 80 to 100, whatever it is. Your researchers or researchers often look at once I  
7 develop a model, maybe it's just me, but the fun thing to do sometimes is to run  
8 it way out for long periods of time and see like what it predicts.

9 Now sometimes what it gives you in the really long periods of  
10 time is just junk so it is not really relevant to anything but is there any sense --  
11 do you have any kind of curious researchers that right before they go home at  
12 night say let me run this; since the computational availability is a lot cheaper  
13 than it used to be, I'm going to run out some of these models and see if I could  
14 get a general sense of how long is too long to operate the current generation of  
15 operating reactors in the United States. Is that question meaningful?

16 MR. REISTER: Well, I think the models that we are trying to  
17 develop are physics-based models, as opposed to empirical models. So, it  
18 does have the underlying physics of the chemistry and the thermodynamics and  
19 the chemical or interreactions that are physics-based.

20 So you can run the models. It doesn't take that hard to run  
21 them out into time as long as you want to run them. And there are some  
22 phenomena that can occur that become significant in the longer periods of  
23 operation.

24 One example, you talked about reactor pressure vessel, there  
25 are some concern about late-blooming faces where some of the chemicals,  
26 minor materials in the reactor pressure vessel can actually coalesce at periods

1 of time beyond 80 years kind of in the 80 to 100 years and actually cause some  
2 embrittlement that is not seen with just in the current time frames.

3 And so that is exactly what the models are designed to do is to  
4 look out into the future, in the long-term future to see what might happen and  
5 try to predict that. And of course part of the modeling would be to take actual  
6 materials, either in test reactors that have been accelerated irradiation or  
7 harvested from plants and maybe re-irradiated for those longer periods of time  
8 to validate the model and say is that something we are actually seeing.

9 So the physics-based models can actually make those  
10 predictions and then you can go back and look and validate it to see is that really  
11 going to happen. And you are trying to do that ahead of time to get that 10, 15,  
12 20 years ahead of time prediction to anticipate and eliminate surprises.

13 CHAIRMAN SVINICKI: The reactors that you're harvesting  
14 from like Zion, though, the lifetimes are the lifetimes of the materials and their  
15 exposure during the operating life of plants. And I think also there are reactors  
16 around the world where materials have been harvested as well.

17 Did they run long enough to enter into the regimes of the  
18 materials' properties where it is terribly good for validating these models?

19 MS. BERNHOFT: They are good for validation. They're not  
20 -- you know you bring up an interesting point. We recently had a workshop on  
21 harvesting and one of the comments that was made is that they're good for  
22 confirmation but they're not good for prediction.

23 So remember what harvesting is important for, you know you  
24 don't have an 80-year plant out there that we can go take apart. That would be  
25 a sweet spot.

26 But if you want to validate points on your curve, then they can



1 provide a lot of value if it is the right materials and we have a good history of  
2 that piece of material, too, as we harvest it. So we spent -- with Zorita we spent  
3 a lot of money on really validating the history of those core internals when we  
4 harvested them. And what they showed is that they showed that our models  
5 are conservative right now with regard to IASCC.

6 So one other point on Rich's comment, you know they are right,  
7 they are physics-based models. We validate them with points that we can take  
8 from test reactor data or from actual physical data and then we also rely on  
9 expert elicitation as well.

10 You know one of the things with the IASCC, it is very much an  
11 international panel. It has been put together and it takes all of those things,  
12 including the expert elicitation as well to make sure it makes sense.

13 CHAIRMAN SVINICKI: Okay, thank you all. Well, thank you  
14 gain for a good discussion.

15 Do either of my colleagues have any additional questions?  
16 No, okay.

17 We will take a brief break while we reset for the NRC staff  
18 panel. Let's resume at quarter to. Thank you.

19 CHAIRMAN SVINICKI: All right, thank you. We will  
20 reconvene and come back into order here to hear from the NRC staff panel.

21 We will begin with our Executive Director for Operations, Victor  
22 McCree.

23 Victor, please lead off the staff's presentation.

24 MR. MCCREE: Good morning, Chairman, Commissioners  
25 Baran and Burns. It's good to see you.

26 During today's briefing, we will provide updates on a number of

1 items associated with subsequent license renewal.

2 As the industry mentioned this morning, we anticipate an influx  
3 of subsequent license renewal applications submitted to the NRC in the very  
4 near future.

5 We remain committed to our proactive engagement with both  
6 internal and external stakeholders so that our review of subsequent license  
7 renewal applications will be as or perhaps more successful than our review of  
8 the first license renewals.

9 Next slide, please?

10 Today, you will hear from four presenters who will emphasize  
11 four key messages.

12 The first is the license renewal framework is the basis for  
13 subsequent license renewal.

14 Secondly, that the NRC is ready to accept and review high  
15 quality sites subsequent license renewal applications.

16 Third, that we will issue new subsequent license renewal  
17 guidance in July of this year following our extensive engagement with  
18 stakeholders and a reflection on how best to optimize our reviews.

19 And, fourthly, confirmatory research is ongoing for a number of  
20 the key technical issues that were mentioned this morning related to subsequent  
21 license renewal.

22 Our first presenter to my right is Michele Evans who's the  
23 Deputy Director of Reactor Safety Programs and Corporate Support in the  
24 Office of Nuclear Reactor Regulation.

25 Michele will discuss how the established license renewal  
26 framework which is contributed to the successful issuance of 87 renewed

1 operating licenses is adequate for the review of subsequent license renewal  
2 applications.

3 Our second presenter is George Wilson, to Michele's right, the  
4 Director of the Division of License Renewal and NRR.

5 George will provide a status of the development of the  
6 subsequent license renewal guidance documents which are expected to be  
7 issued in July.

8 George will also discuss how we plan to optimize the  
9 subsequent license renewal review process in a way that demonstrates our  
10 effectiveness, our efficiency and agility.

11 Our third presenter is Allen Hiser. Allen's the Senior Technical  
12 Advisor in the Division of License Renewal and NRR.

13 Allen will provide a high level overview of the changes to the  
14 guidance documents as compared to the current revision of the Generic Aging  
15 Lessons Learned report, or GALL report.

16 He'll also describe how the subsequent license renewal  
17 guidance documents were refined to ensure that the aging management  
18 programs and activities will support up to 80 years of plant operation.

19 Our fourth presenter is Brian Thomas, the Director of the  
20 Division of Engineering in the Office of Nuclear Regulatory Research.

21 Brian will conclude our presentation with a status of the  
22 confirmatory research activities that address significant technical issues related  
23 to subsequent license renewal and support up to 80 years of safe operation.

24 So, with that, I'll now turn the presentation over to Michele.

25 Next slide, please?

26 MS. EVANS: Thank you, Vic.

1 Good morning, Chairman, Commissioners.

2 As Vic mentioned during his opening remarks, we are here to  
3 discuss how the staff is preparing to receive subsequent license renewal  
4 applications.

5 As you can imagine, many of the activities that were performed  
6 to demonstrate our readiness to review a subsequent license renewal  
7 application have been derived from our experience with reviewing and  
8 processing license renewal applications.

9 This slide illustrates the overall regulatory process for safety  
10 during the license renewal period where the principle change from the initial  
11 40-year operating period is additional aging management of passive long-lived  
12 structures and components to ensure safe plant operation during the license  
13 renewal period.

14 Next slide?

15 Okay, the regulations in 10 CFR Part 54 established two  
16 fundamental safety principles.

17 First, the existing regulatory process is adequate to assure safe  
18 plant operation for license renewal.

19 Part 54 establishes additional requirements to address the  
20 effects of aging.

21 Second, each plant's current licensing basis must be  
22 maintained throughout the license renewal period.

23 The regulations for license renewal focused on ensuring that  
24 the long-lived passive structures and components in scope for license renewal  
25 are aged-managed so that they will continue to perform their intended function  
26 during the 20-year period of extended operation.

1                   The focus of the renewal review is on the aging management  
2 programs associated with passive long-lived components.

3                   The application reviews for license renewal include the  
4 evaluation of both safety and environmental aspects.

5                   NRC's review is accomplished through a combination of on site  
6 and in office reviews, audits and inspections.

7                   Under a renewed operating license, the licensee is responsible  
8 for all existing NRC requirements associated with the current licensing basis as  
9 well as additional requirements related to aging management.

10                  The reactor oversight process verifies that the licensee's  
11 programs and processes maintain plant safety for active and passive system  
12 structures and components during the entire operating life of the plant.

13                  Next slide, please?

14                  In SECY-14-0016, the staff provided potential rulemaking  
15 options for subsequent license renewal. In response to that SECY, the  
16 Commission did not approve the rulemaking options, leaving in place the license  
17 renewal rule that has provided an effective basis for ensuring safe operation  
18 during the license renewal period and will continue to be an effective basis for  
19 subsequent license renewal.

20                  The Commission directed the staff to update its guidance  
21 documents for subsequent license renewal and to keep the Commission  
22 informed on the progress in resolving technical issues as well as the staff's  
23 readiness for accepting a subsequent license renewal application.

24                  The staff has provided several briefings and products to the  
25 Commission including a letter to Congress on subsequent license renewal  
26 activities sent by NRR in March of 2016, an NRC and Department of Energy

1 Commission briefing in June of 2016 and an Operating Reactors Business Line  
2 briefing in July of 2016.

3 Consistent with the license renewal rule, the focus of  
4 subsequent license renewal is on the adequacy of additional aging  
5 management programs and activities to ensure safe plant operation during the  
6 subsequent period of extended operation.

7 Our next presenter, George Wilson, will discuss the  
8 development of the subsequent license renewal guidance documents.

9 Next slide?

10 MR. WILSON: Thank you, Michele.

11 Good morning, Chairman, Commissioners.

12 As Michele stated, an important component of the subsequent  
13 license renewal application review is determining the adequacy of aging  
14 management programs and activities to support operation up to 80 years.

15 To facilitate a more effective and consistent review, the staff  
16 developed a General Aging Lessons Learned for subsequent license renewal  
17 report which provides guidance for subsequent license renewal applicants,  
18 contains the NRC staff's generic evaluation of acceptable aging management  
19 programs and establishes the technical basis for confirming the adequacy for  
20 the aging management programs.

21 The report also provides acceptable methods to manage aging  
22 effects up to 80 years of plant operations, although the applicant may propose  
23 plant-specific alternatives.

24 The staff also developed a standard review plan for review of  
25 subsequent license renewal applications for nuclear power plants which  
26 provides guidance to NRC staff reviewers, ensures quality and uniformity in the

1 NRC staff's reviews and presents a well-defined base from which to evaluate  
2 applicant programs and activities for the subsequent period of extended  
3 operation.

4 Both subsequent license renewal guidance documents were  
5 developed using Revision 2 of the license renewal documents as a starting  
6 point.

7 The staff published drafts of subsequent license renewal  
8 guidance documents for public comment in December 2015.

9 Dr. Hiser will describe other information that was considered as  
10 the staff developed the subsequent license renewal guidance documents.

11 Both documents provide transparency to the public for the  
12 subsequent license renewal application review process.

13 Over 300 pages of comments were received and evaluated by  
14 expert panels consisting of staff from numerous divisions in NRR and Research.

15 The staff also held nine public meetings in 2016 to facilitate  
16 discussions of the comments and their resolutions.

17 The staff has completed its disposition of the public comments  
18 and revised the documents as appropriate.

19 The staff discussed how the comments were dispositioned as  
20 well as the other technical issues related to subsequent license renewal  
21 guidance documents during the Subcommittee and Full Committee meetings  
22 held with the Advisory Committee on Reactor Safeguards in late March and  
23 early April of this year.

24 The final guidance documents will be issued in December of  
25 2017 prior to the anticipated receipt of the license renewal applications.

26 Next slide, please?

1                   As the representatives from the industry indicated, two letters  
2 of intent have been sent to the NRC stating that the licensees will submit  
3 applications for subsequent license renewal in mid-2018 for Peach Bottom  
4 Atomic Power Station and early 2019 for Surry Power Station. However, more  
5 applications are expected.

6                   The staff continues to emphasize the usefulness of the letters  
7 of intent to inform the NRC of the anticipated subsequent license renewal  
8 application submittals so that we can adequately budget and plan for the  
9 reviews.

10                  We encourage the industry to continue to submit the letters of  
11 intent so we can prepare for the reviews.

12                  Next slide, please?

13                  In the spirit of Project AIM and consistent with the efficiency  
14 aspect of our principles of good regulation, a subsequent license renewal  
15 optimization working group was developed to evaluate the license renewal  
16 application review process and determine areas that could be modified to  
17 optimize the overall review process for subsequent license renewal  
18 applications.

19                  The optimization working groups obtained feedback from NRC  
20 staff during internal meetings and also engaged with the industry and public  
21 through several public meetings to better understand their experiences with the  
22 NRC staff reviews of license renewal applications as well as their ideas on how  
23 efficiencies could be gained.

24                  We are adopting the recommendations of the working group in  
25 four key areas.

26                  First, the staff will increase the use of portals to review



1 documents related to the SLR application and the use of teleconferencing and  
2 video conferencing for the discussions with the applicant.

3 This will maximize the in-office review time and will help focus  
4 the on site audits.

5 Secondly, the staff will fully develop the safety evaluation report  
6 and the environmental impact statement prior to attending on site audits to focus  
7 the audits on outstanding issues resulting in reduced staffing and time for the  
8 on site audits.

9 This is also intended to minimize the potential for additional  
10 rounds of Requests for Additional Information and help further focusing on site  
11 audits.

12 Thirdly, the staff will eliminate redundant inspections for  
13 subsequent license renewal. This will eliminate the scoping and screening  
14 activities associated with the preparedness to implement aging management  
15 programs which were fully vetted for the license renewal.

16 Lastly, the staff will hold a public meeting to explain the generic  
17 issues associated with the required consultations for the environmental reviews  
18 for other federal agencies.

19 This will ensure that the licensees are aware of the required  
20 biological studies necessary to ensure that the consultations with other federal  
21 agencies are effective and timely.

22 A license renewal application review is typically performed in  
23 22 to 24 months for a high quality application.

24 We project that we can reduce our safety review time by about  
25 25 percent by implementing these efficiencies.

26 The overall review time could be achieved in 18 months after

1 completing the acceptance review.

2 Of course, this relies on receiving a high quality application with  
3 no unusual technical issues or contentions as well as timely responses to any  
4 requests for additional information from the licensee.

5 We will continue to look at our processes and schedules as we  
6 progress with SLR reviews and apply lessons learned as we go.

7 I will now turn the presentation over to Dr. Allen Hiser. Allen  
8 will discuss the staff's process for developing the staff's renewal guidance  
9 documents.

10 Next slide, please?

11 MR. HISER: Thank you, George.

12 Good morning. The Commission SRM regarding  
13 SECY-14-0016 directed the staff to keep the Commission informed on the  
14 progress in resolving several technical issues related to subsequent license  
15 renewal, identifying the four issues on this slide related to the reactor pressure  
16 vessel, vessel internals, concrete, and electrical cables.

17 You will hear more about these issues in the next few slides  
18 and from Brian Thomas later.

19 Overall, the industry is responsible for developing a technical  
20 basis to demonstrate that aging effects for these and other technical issues will  
21 be managed for subsequent license renewal.

22 The NRC is carrying out confirmatory research, as Brian  
23 Thomas will describe in a few minutes.

24 For those aspects of these technical issues that are not fully  
25 resolved on a generic basis, the applications for subsequent license renewal  
26 will need to address these issues on a plant-specific basis.

1 Next slide, please?

2 To implement subsequent license renewal, the staff has  
3 developed two main guidance documents, the GALL-SLR and the SRP-SLR  
4 which parallel the Generic Lessons Learned Report Revision 2 and a Standard  
5 Review Plan for License Renewal Revision 2 that are used for license renewal.

6 The GALL-SLR report identifies those material environment  
7 and aging effect combinations that require aging management, during the  
8 subsequent period of extended operation, including identification of appropriate  
9 aging management programs.

10 Applicants are responsible for identifying in their applications  
11 any additional items that require aging management.

12 Although the GALL-SLR report identifies one acceptable  
13 approach to manage aging effects, applicants may propose plant-specific  
14 alternatives along with sufficient justification that the program will adequately  
15 manage the aging effects.

16 While the GALL-SLR report is geared toward use by applicants  
17 to identify acceptable aging management approaches, the SRP-SLR provides  
18 guidance to the staff for its review of SLR applications.

19 The SRP-SLR ensures a consistent and transparent review of  
20 SLR applications by documenting the acceptance criteria and review  
21 procedures that will be used by the staff in its reviews.

22 Next slide, please?

23 In order for plants to operate for 60 to 80 years during their  
24 subsequent period of extended operation, we needed to determine the aging  
25 effects that could occur during the operating period up to 80 years to ensure  
26 that these aging effects can be detected in a timely manner and appropriately

1 managed.

2 The relevant aging effects could include known mechanisms of  
3 age related degradation that are found in new locations or are found to be more  
4 severe than previously identified due to exceeding incubation times or activation  
5 energies that govern the mechanism.

6 Further, new phenomena that could induce aging represents  
7 another area of interest. We need to remain alert to new aging related  
8 phenomena that can occur.

9 Because the plants have operated for less than 50 years, other  
10 information beyond an exclusive reliance on operating experience is being used  
11 to identify the aging concerns for the operating period up to 80 years.

12 To that end, in 2014, we formed subsequent license renewal  
13 expert panels from staff in the Office of Nuclear Reactor Regulation and the  
14 Office of Nuclear Regulatory Research to begin developing the guidance  
15 documents for subsequent license renewal.

16 These panels started with the Revision 2 versions of the GALL  
17 report and the SRP-LR that were developed for license renewal.

18 The panels then reviewed and deliberated on the information  
19 contained in various sources as outlined on this slide.

20 We reviewed the information from the expanded materials  
21 degradation assessment which Rich Reister described earlier in which NRC,  
22 DOE, industry, and international experts identified the areas that they believe  
23 will be the most challenging for subsequent license renewal.

24 In addition, we reviewed reports from audits that were  
25 performed at several plants that had operated for several years in a period of  
26 extended operation.

1                   These audits were intended to qualitatively assess the  
2 effectiveness of the AMPS and to identify unexpected aging phenomena.

3                   These audits reviewed all of the AMPS implemented at the  
4 plants, including those implemented on a one-time basis to ensure effectiveness  
5 of preventive programs such as water chemistry programs as well as aging  
6 management programs that implemented on a periodic recurring basis.

7                   We also reviewed operating experience from both domestic  
8 and international plants within these panels.

9                   And, lastly, we considered comments from stakeholders that  
10 were collected during public meetings as well as comments from the staff.

11                   Next slide, please?

12                   In the next several slides, I will describe some of the  
13 refinements in the GALL-SLR report and the SRP-SLR as compared to the  
14 Revision 2 versions of the GALL report and SRP-LR that are used for license  
15 renewal from 40 to 60 years.

16                   Two new aging management programs are included in the  
17 GALL-SLR report. One program addresses fluence monitoring of the reactor  
18 pressure vessel and reactor vessel internals as applied to both time limited  
19 aging analyses and aging management review for the vessel and internals.

20                   This new program provides a consistent generic approach for  
21 existing plant programs that are used to monitor neutron fluence.

22                   In addition, a new program to manage aging of high voltage  
23 insulators is including the GALL-SLR report.

24                   The inclusion of this new aging management program provides  
25 a generic aging management approach in lieu of the previous treatment on a  
26 plant-specific basis by each applicant.

1                   This new aging management program is an example of our use  
2 of lessons learned from review of prior applications to improve both the  
3 applicant's development of its subsequent license renewal application and also  
4 the staff's review of the application.

5                   The aging management program for reactor vessel internals of  
6 pressurized water reactors and the Generic Aging Lessons Learned report  
7 utilizes as its basis an industry report that addressed conditions for license  
8 renewal at 60 years of plant operation.

9                   This program uses a sampling approach to inspect the  
10 components that are the leading indicators for degradation.

11                   For example, those with the highest neutron fluence or stress  
12 levels.

13                   The industry has stated that it will submit a similar analysis for  
14 80-year conditions in 2020. In the absence of this generic 80-year analysis,  
15 GALL-SLR states that each applicant may use its existing program for 60 years  
16 as long as they supplement the program with a gap analysis to identify the  
17 aging -- the additional aging management activities, if any, that would be  
18 necessary to ensure adequate aging management for 80 years.

19                   We received the most comments from industry on the changes  
20 we drafted to the reactor vessel materials surveillance aging management  
21 program.

22                   The updated guidance for this program ensures that plants will  
23 develop sufficient vessel material surveillance data to cover the entire  
24 subsequent period of extended operation.

25                   Specifically, licensees are expected to test the surveillance  
26 capsule that bounds the fluence the vessel would see over 80 years of

1 operation.

2                   However, we do not want licensees to accomplish this objective  
3 by deferring testing of a license renewal capsule that they plan to test to address  
4 60 years of operation.

5                   Many licensees will need to update their surveillance programs  
6 for subsequent license renewal, some by testing an existing capsule that was  
7 previously a standby capsule and others by reconstituting samples from tested  
8 capsules and reinstalling these samples in a new capsule in the vessel.

9                   In this way, we have timely verification that the vessel is  
10 operated with appropriate safety margins consistent with NRC regulations and  
11 an early indication of any potential concerns.

12                   Next slide, please?

13                   In the electrical cable area, one program for electrical insulation  
14 of inaccessible cables that are underground and not subject to environmental  
15 qualification requirements was expanded into three aging management  
16 programs to account for aging of cables at low and medium voltages along with  
17 instrument and control cables.

18                   This change was made to address the differences in both aging  
19 effects and testing for the three types of cables.

20                   For concrete, we have made changes to the guidance to  
21 address aging management of alkali-silica reaction and irradiation of concrete,  
22 both of which are covered by further evaluations that require plant-specific  
23 attention.

24                   For alkali-silica reaction, the further evaluation identified in  
25 Revision 2 of the GALL report for license renewal was updated to include recent  
26 operating experience and additional understanding of this mechanism.

1                   A new further evaluation on irradiation of concrete provides a  
2 means for applicants to identify plant-specific conditions that would indicate  
3 either a need for aging management or a technical basis for concluding that  
4 irradiation of concrete is not a relevant aging issue for the plant.

5                   Next slide, please?

6                   The guidance documents for subsequent license renewal  
7 provide means for applicants to develop adequate programs and for the plant  
8 or for the staff to review applications.

9                   Most of the relevant aging issues are addressed by generic  
10 aging management programs in these documents.

11                  For the few remaining issues, the guidance documents identify  
12 further evaluations for the applicants to describe and justify their plant-specific  
13 proposals to manage the aging effects.

14                  In all cases, applicants are responsible to ensure that they have  
15 identified the relevant aging issues for their plants, appropriate aging  
16 management activities, and adequate justification for their programs.

17                  With the completion and issuance of these guidance  
18 documents, the NRC is prepared to review subsequent license renewal  
19 applications.

20                  I will now turn the presentation over to Brian Thomas who will  
21 discuss the confirmatory research activities that are occurring related to  
22 subsequent license renewal.

23                  Next slide, please?

24                  MR. THOMAS: Thank you, Allen.

25                  Good morning, Chairman and Commissioners.

26                  As Dr. Hiser has outlined earlier, I will provide a status of the



1 confirmatory research supporting SLR regulatory decision making focusing on  
2 the four key technical issues identified in the 2014-SRM.

3 In that SRM, the staff has made progress -- since that SRM, the  
4 staff has made progress in conducting research to resolve the key technical  
5 issues.

6 This progress has been accomplished through a staff research  
7 coordination with DOE and EPRI through deep-dive meetings and other  
8 meetings on electrical cable aging, concrete degradation, and vessel internals.

9 The progress resulted in enhanced aging management  
10 programs which are addressed in the subsequent license renewal guidance  
11 documents as Dr. Hiser just discussed.

12 Subsequent license renewal applicants need to address the  
13 issues not resolved on a generic basis with plant-specific basis submittals.

14 Data and knowledge from near-term and longer term  
15 confirmatory research will be obtained to augment SLR guidance as needed.

16 First, I will address research on the reactor pressure vessel  
17 embrittlement.

18 As one aspect of maintaining reactor pressure vessel integrity,  
19 the NRC requires licensees to monitor the embrittlement of the reactor vessel  
20 steel through surveillance programs. These programs are conducted  
21 according to the requirements of Appendix H to 10 CFR Part 50.

22 Using the data from these programs as input to a  
23 well-established predictive model, information on the future state of the vessel  
24 embrittlement can be obtained.

25 For example, surveillance capsule specimens withdrawn and  
26 tested over 40 years of operation could have experienced radiation exposure

1 equivalent to that of the vessel wall after 60 to 80 years of operation.

2 The graph on the right of the slide shows the U.S. operating  
3 experience resulting from these surveillance programs.

4 The staff continues to use these data to assess the accuracy of  
5 the embrittlement prediction model in the NRC's Regulatory Guide 1.99  
6 Revision 2.

7 Allen Hiser discussed a new aging management program  
8 included in the GALL-SLR report that will provide a consistent generic approach  
9 for existing plant surveillance programs.

10 The capsules from such programs will be removed from their  
11 host reactors in the coming decade.

12 Additionally, EPRI has undertaken supplemental surveillance  
13 programs to obtain data at high fluence for the PWR fleet.

14 The staff will use the data from these programs to assess the  
15 continued validity of the NRC predictive model and to confirm the adequacy of  
16 the RPV aging management programs.

17 Next slide, please?

18 The objective of the staff's confirmatory research on reactor  
19 vessel internals and primary system components is to independently assess the  
20 effects of irradiation on material properties.

21 Irradiation can lead to irradiation assisted stress corrosion  
22 cracking, IASCC, loss of fracture toughness, and joint swelling resulting in  
23 potential loss of materials performance and component integrity during the SLR  
24 period.

25 Materials removed from decommissioned plants are being  
26 tested through international collaborative programs and at the Argonne National

1 Laboratory and are subjected to additional irradiation at the Holden reactor to  
2 confirm the current understanding of the aging effects.

3 This additional irradiation will simulate the irradiation assisted  
4 degradation expected in some critical components during the SLR period.

5 The NRC's collaborating with EPRI and with international  
6 regulators to obtain data on irradiation assisted degradation representatives of  
7 materials during the SLR period.

8 For example, the Zorita Internals Research Project is  
9 examining irradiated material specimens from the decommissioned Zorita plant  
10 in Spain, which operated for approximately 30 effective full power years.

11 The data from this program will offer insights on the irradiation  
12 damage expected during the SLR period.

13 The staff will use the confirmatory research results in their  
14 evaluation of the revision to EPRI's MRP-227 report from the Materials  
15 Reliability Program entitled Pressurized Water Reactor Internals Inspection and  
16 Evaluation Guidelines.

17 The results from this research will also be used to confirm the  
18 adequacy of inspection plans and other aging management guidelines.

19 Next slide, please?

20 Degradation of concrete structures is another technical issue  
21 that the staff is examining. The NRC's cooperating with the National Institute  
22 of Standards and Technology to evaluate the effects of alkali-silica reaction on  
23 nuclear power plant concrete structures through the SLR period.

24 This project will assess the effects of ASR and structural  
25 performance of concrete under design basis static and dynamic loads for  
26 current operating conditions and performance into the license renewal SLR

1 periods.

2 The NRC is participating in an international cooperative  
3 research program to assess structures subjected to concrete pathologies under  
4 the Nuclear Energy Agency.

5 In addition, the NRC is involved in a collaborative program with  
6 the technical support organizations for the French regulator.

7 The material characterization and structural performance data  
8 from our research will inform the review of the plant-specific evaluations and the  
9 development of generic guidance for the review of aging management  
10 programs.

11 Next slide, please?

12 The staff is coordinating with the Department of Energy on  
13 concrete irradiation damage and with EPRI on structural safety performance of  
14 concrete under design basis loads to support confirmatory reviews.

15 The staff is also assessing EPRI's approach to evaluate which  
16 plant structures and configurations are most susceptible to the irradiation  
17 damage.

18 Also, the staff is reviewing models of neutron fluence and  
19 gamma dose to determine whether degradation of biological shield concrete is  
20 a concern during the SLR period.

21 Based on the reviews, the staff will determine whether  
22 additional confirmatory research on irradiated concrete is warranted. The  
23 results will inform any necessary future refinements in SLR guidance.

24 Next slide, please?

25 The staff is also evaluating the adequacy of the electrical cable  
26 condition assessment techniques in harsh environment qualification methods.

1                   The staff has recently begun confirmatory research on aging of  
2 cables that mimic up to 80 years of operation.

3                   The cable samples harvested from ex-plant and laboratory  
4 aged, will be subjected to a loss of coolant accident test to evaluate performance  
5 of their intended safety function during and after a design basis event.

6                   The staff is assessing synergistic or concurrent thermal and  
7 radiation aging processes and evaluating condition assessment methods for  
8 detecting changes in electrical, mechanical, and chemical properties of cables.

9                   The industry's performing research to determine the  
10 susceptibility of low and medium voltage cables to degradation and potential  
11 failure in wet and submerged environments.

12                  The staff is coordinating with EPRI in evaluating the need for  
13 additional confirmatory research on wet and submerged cables.

14                  The NRC is also participating in international cooperative  
15 research on cable assessment under the auspices of the Nuclear Energy  
16 Agency.

17                  This program aims to establish the technical basis for  
18 assessing the qualified life of electrical cables in light of the uncertainties  
19 identified following the initial qualification testing.

20                  In this and related areas, the staff will likely continue research  
21 for the next three to five years to confirm the adequacy of the safety basis for  
22 SLR and refinement of the aging management programs.

23                  This concludes my presentation and I would like to turn over  
24 the presentation to Victor McCree.

25                  MR. MCCREE: Thanks, Brian.

26                  Chairman and Commissioners, we appreciate the opportunity

1 to provide you an overview of our proactive activities to prepare for subsequent  
2 license renewal.

3 In light of these activities, we feel that we're well positioned to  
4 review subsequent license renewal applications that we'll soon receive.

5 Furthermore, we have confidence that the framework used for  
6 license renewal remains sound and is sufficient to facilitate successful  
7 subsequent license renewal application reviews.

8 Throughout this process, we've engaged representatives from  
9 the industry on the guidance that will be issued in July so that they can get an  
10 early start in preparing their applications.

11 We've also captured ideas and recommendations from external  
12 stakeholders and used them to optimize our safety review process so that we  
13 can be more efficient and effective.

14 We value those exchanges which are ongoing and we'll  
15 continue to engage in them so that our subsequent license renewal activity  
16 efforts are optimized.

17 As you heard, there are confirmatory research efforts underway  
18 on the technical issues that were described today.

19 If any of this changes the basis for our generic guidance, we'll  
20 leverage our current well-functioning guidance update process to make  
21 appropriate changes including engaging in public communications on such  
22 issues.

23 So, with that, we welcome any questions.

24 Thank you.

25 CHAIRMAN SVINICKI: Thank you to each of the staff  
26 presenters for that information.

1 We will begin, once again, with Commissioner Baran.

2 COMMISSIONER BARAN: Thanks.

3 Well, thank you for your presentations and for all of your work  
4 in this area.

5 We talked a bit about reactor vessel internals during the first  
6 panel, baffle bolt degradation is an example of an aging management issue  
7 related to internals.

8 I think one of Sherry's slides actually had a few baffle bolt  
9 pictures on it.

10 The bolts degrade over time due to radiation exposure and  
11 differential pressure stresses in the core.

12 Recently, licensees have discovered a surprisingly large  
13 number of degraded baffle bolts at four loop PWRs with a down-flow  
14 configuration.

15 Although the NRC staff was aware of this degradation  
16 phenomenon, the number of bolts with indications of problems was much higher  
17 than expected.

18 For example, visual and ultrasonic testing revealed that around  
19 a quarter of the baffle bolts at Indian Point Unit 2 showed indications of  
20 degradation.

21 Based on Unit 3's shorter run time, the staff predicted fewer  
22 degraded baffle bolt indications at Unit 3. But, again, the testing results were  
23 surprising. Unit 3 turned out to have more indications of degraded baffle bolts  
24 than the older Unit 2.

25 What's the staff doing to understand the gap between what was  
26 expected and what actually occurred?

1 MR. MCCREE: If we'd have Jeff Poehler --

2 COMMISSIONER BARAN: Sure.

3 MR. MCCREE: -- from the staff take that question.

4 MR. POEHLER: I'm Jeff Poehler, Senior Materials Engineer  
5 in the Vessel and Internals Integrity Branch in NRR, Division of Engineering.

6 So, yes, I just wanted to say, yes, at Indian Point Unit 3 there  
7 was a larger number of baffle bolts found potentially degraded than at Indian  
8 Point Unit 2 by about -- it was about 30 bolts more, 259 potentially degraded  
9 bolts versus 227 which is, you know, is a little bit counter to what was predicted  
10 based on the operating history of the plants.

11 But, when we looked at the degradation, the actual severity of  
12 the degradation at Indian Point 3, although the numbers of bolts were somewhat  
13 greater, it appears that the degradation of the bolts is actually less severe.

14 And, if you look at based on removing bolts, when you remove  
15 the bolts with indications, if they break, that's an indication of a more advanced  
16 state of degradation.

17 So, at Indian Point Unit 2, about 30 percent of the bolts broke  
18 upon removal. Whereas, only about 15 percent of the defective bolts or  
19 potentially degraded bolts are breaking at Indian Point 3.

20 So, that's one indicator that the indications may be smaller, in  
21 other words, the cracks in the bolts are smaller and not as old or not as  
22 advanced.

23 Also, at Unit 3, there was no bolts that were observed to be  
24 visually failed. While, at Indian Point Unit 2, there are about 30 bolts that were  
25 visually found completely broken before they even began the UT examination.

26 So, based on those indicators, although the numbers appear to



1 be larger at Unit 3, we don't necessarily think it's a worse state degradation.

2 And, in order to help us understand this better, the staff is  
3 keeping close tabs on some destructive laboratory work that the industry is  
4 doing. They've withdrawn quite a few bolts from at least two of the first three  
5 plants last year that found large numbers of bolts degraded.

6 So, those laboratory exams are ongoing. We've seen some of  
7 the preliminary results and we're following that closely.

8 And, we're also following closely what the industry is doing as  
9 far as developing -- revising their guidance. And, we've already received two  
10 interim guidance letters issued by the EPRI Materials Reliability Program that  
11 the staff is currently evaluating.

12 We held a public meeting two weeks ago to discuss the latest  
13 guidance letter.

14 So, we will eventually document our position on that in a  
15 publically available document.

16 COMMISSIONER BARAN: Let me ask about the guidance.  
17 Are you talking about surveillance requirements guidance?

18 MR. POEHLER: This is guidance that relates to the inspection  
19 schedule for both the initial inspections of the baffle form bolts and subsequent  
20 inspection.

21 Once they do the initial inspection, how long do they have to do  
22 the next inspection, the follow up inspection?

23 MR. HISER: This guidance impacts directly on the aging  
24 management program.

25 COMMISSIONER BARAN: Right.

26 MR. HISER: So, the PWRs have implemented and that are

1 addressed in the renewed licenses and will be addressed as well in the  
2 subsequent license renewal.

3 COMMISSIONER BARAN: Okay. And, what's the  
4 sense -- so, it sounds like that effort's ongoing in terms of updating the  
5 inspection guidance.

6 What is the sense about the adequacy of the current inspection  
7 schedules, timing and nature of inspection? Is it the view that there are some  
8 changes that should be made to the inspections?

9 MR. POEHLER: Yes, well, the staff agrees that, for a certain  
10 category of plants, there's seven plants that were in the most susceptible  
11 category and those are the plants -- Westinghouse units with four loops and a  
12 down-flow configuration and Type 347 stainless steel bolt material.

13 So, that includes the Indian Point units, DC Cook, Salem, and  
14 one of the Diablo units.

15 So, it appears that the initial schedule that was originally in the  
16 MRP guidance, MRP-227, was a little bit maybe optimistic for those plants.

17 But, for all the other plants, all the other PWRs, it appears to be  
18 right on. We have quite a few other Westinghouse units like two and three loop  
19 downflow units that are older units and they seem -- the guidance seems to be  
20 appropriate for them, at least as far as the initial inspection schedule.

21 Although, even the latest guidelines from EPRI have moved  
22 that up a little bit. Before, they had until 35 effective full power years, now they  
23 have to move back to 30.

24 And, some of the other categories of plants are still allowed to  
25 go out to 35 EFPY.

26 COMMISSIONER BARAN: So, for the seven plants you're

1 talking about there, what you're envisioning, I understand that decisions aren't  
2 made on this, what you're envisioning is that initial inspections would start earlier  
3 on this and that there may be increased frequency of those inspections?

4 MR. POEHLER: Well, yes. They've already started earlier.  
5 In fact, the first interim guidance came out last summer. So, four of those  
6 seven plants have already implemented their -- done their baseline initial UT  
7 examinations and the other three will complete them by the end of this year.

8 One of them is doing it this week and another starts next week  
9 and then one in the fall.

10 So, they'll all have done their initial exams. And then, their  
11 follow up exams, they've also -- the latest interim guidance from EPRI MRP also  
12 puts some limits on how many years they can go before they have to do a follow  
13 up.

14 And, they also have to do a plant-specific evaluation to verify,  
15 you know, how long they can go. It might be less, it might -- it could be only  
16 two years and some plants, like Indian Point has -- not voluntarily, but they've  
17 modified their program to do the UT at each subsequent refueling outage until  
18 they shutdown.

19 COMMISSIONER BARAN: And, what's the time line for the  
20 staff deciding on guidance?

21 MR. POEHLER: As far as reviewing the industry's guidance,  
22 we're doing that right now. I don't know if I have an exact date for when we'll  
23 be publish our final position on that, but I think it will be this year.

24 We also, in house, we are also reviewing a revision to the  
25 MRP-227 guidelines. That's the overall guidelines for all the internals, not just  
26 baffle bolts. And so, that is underway and the safety evaluation for that would

1 probably be final third quarter of 2018.

2 But, in that, we would also document our position on the EPRI  
3 interim guidance for baffle-former bolts because the interim guidance actually  
4 modifies the standard guidance.

5 COMMISSIONER BARAN: Thank you. Thank you for that  
6 update.

7 Baffle bolts, I think, raise the broader question of how NRC's  
8 going to address unexpected new technical issues or results in the context of  
9 subsequent license renewal.

10 We know there are outstanding technical questions related to  
11 operation beyond 60 years, but, as Allen mentioned, new issues are also likely  
12 to arise that we aren't currently focused on.

13 How are we going to address those issues in the subsequent  
14 license renewal process or, put another way, how do we ensure that aging  
15 management programs can adequately address the unknown unknowns?

16 MR. WILSON: A couple of the ways that we do that is, as we  
17 get new operating experience and we evaluate new issues, the staff issues  
18 interim staff guidance so that industry understands that they have to address  
19 the issues.

20 We also, if we would have the applications in house, we would  
21 ask RAIs on those issues to the applications that we had in house because the  
22 ISGs would be forward looking.

23 We also, one of the things the industry pointed out that is  
24 correct, the aging management programs are living. So, we actually have  
25 inspection processes that will go back out and look five to ten years in the  
26 license renewal.

1                   We just made a brand new inspection, 7103 Phase IV, which  
2 will actually go out and that evaluates the aging management program  
3 effectiveness and we evaluate that.

4                   It's actually a performance-based inspection review. It starts  
5 out with 7103 Phase II which does a baseline inspection and looks at the  
6 performance of the licensee.

7                   Then the regional management along with headquarters  
8 management decides if, like if it was a dual unit site, whether we would go do  
9 another full blown team inspection in the second unit or the first unit did fine and  
10 we would just send a smaller team out and only focus on those areas.

11                   If we see a degrading performance, then there's another Phase  
12 III inspection that we could do at the one to two year point that they were in  
13 license renewal or we could pull that based on the performance, we would work  
14 with the region.

15                   So, those are some of the ways that we look at the overall  
16 effectiveness of the aging management programs for each individual plant.  
17 And, we would expect them to -- everything's in their FSARs and their Corrective  
18 Action Programs and they would make adjustments as necessary because they  
19 have to keep the aging management programs effective to, you know, prevent  
20 long-term degradation and make sure that safety systems can perform their  
21 function.

22                   COMMISSIONER BARAN: And, I'm going to try not to go as  
23 over as I did with the first panel, so let me just close with this.

24                   So, you know, Dave Lochbaum on the first panel raised this  
25 point about, you know, as time passes and there's more operating experience  
26 and lessons learned, we're seeing revisions to the GALL reports and to the

1 methodologies and the AMPS.

2 And, he argued that, well, it's a problem that, you know, later  
3 plants are basically subjected to or complying with better versions of the  
4 guidance than earlier plants.

5 Do you have thoughts about that?

6 MR. WILSON: No, I think they, once again, it's living. And, if  
7 you look at the way that a license renewal rule Part 54 was written, let's say like,  
8 you know, he brought the alloy 600, if it becomes, after even after we issue a  
9 license, a renewed license to a licensee, if there's an SSC that should have  
10 been scoped and that we originally didn't scope, then the licensee should look  
11 at that, evaluate that, put their Corrective Action Program, and either modify an  
12 aging management program or a TLA they have at the site or make a new one  
13 which is in accordance with 54.37.

14 So, the regulation has that along with the Corrective Action  
15 Program, we'll expect the licensee to make those necessary adjustments as  
16 new operating experience comes throughout the plan.

17 COMMISSIONER BARAN: Thank you.

18 CHAIRMAN SVINICKI: Thank you.

19 Commissioner Burns?

20 COMMISSIONER BURNS: And, let me follow up -- give a  
21 follow up question to that.

22 So, what you're expecting to do is for the licensee to continue  
23 to evaluate the aging management program to make adjustments to reflect  
24 operating experience, industry-wide experience.

25 So, what is the consequence of the failure to do that? Is that  
26 a violation? I don't recall the --

1 MR. WILSON: I would have to --

2 COMMISSIONER BURNS: -- provision in Part 54.

3 MR. WILSON: Well, a lot of this falls back into Appendix B  
4 Criterion 16, the problem identification and resolution to the Corrective Action  
5 Program that a licensee has.

6 As additional information comes in, we would do an expectation  
7 that the licensee evaluate to see if they have to do any necessary adjustments.

8 If we did not agree with the licensee and they continue not to  
9 make, then we could take enforcement actions under 50.100 and/or 50.109 the  
10 backfit or, you know, the orders.

11 But, right now --

12 COMMISSIONER BURNS: On the basis of Appendix B or --

13 MR. WILSON: Correct.

14 COMMISSIONER BURNS: Okay.

15 MR. WILSON: Because --

16 COMMISSIONER BURNS: Because the violation isn't  
17 50.109.

18 MR. WILSON: No, well, that would be looking at doing a  
19 backfit.

20 COMMISSIONER BURNS: Right, okay.

21 MR. WILSON: So, you were asking what would I do with  
22 enforcement, I was just running through --

23 COMMISSIONER BURNS: Okay.

24 MR. WILSON: -- the different scenarios. But, we would first  
25 start out hope that the licensees their Corrective Action Programs, we evaluate  
26 then they make the necessary adjustments in accordance with their programs.

1 COMMISSIONER BURNS: Okay.

2 MR. HISER: One of the difficulties --

3 COMMISSIONER BURNS: Go ahead.

4 MR. HISER: One of the difficulties with a lot of the things that  
5 Mr. Lochbaum mentioned is that aging management is intended to preserve  
6 margin. So, it's to maintain margin against having a safety issue.

7 50.109 puts a very high hurdle on the staff to implement a  
8 backfit. You really have to have a safety issue.

9 So, if now you have just a slight degradation in the margin,  
10 you're not at the level that you can implement a backfit because of 50.109.

11 COMMISSIONER BURNS: Okay. Let me address one other  
12 thing and give the staff an opportunity to address.

13 Mr. Lochbaum was, I think, probably, as I would expect and I  
14 probably would be disappointed that it took four years for the staff to respond to  
15 a comment he made. How would the staff respond to that?

16 What is their rationale for that or an explanation?

17 MR. BLOOM: Steve Bloom, the Branch Chief in charge of  
18 Generic Subsequent License Renewal Operations and Guidance.

19 I don't want to throw anyone under the bus, but before I got to  
20 the branch, those meetings happened before that. But, when I got here and I  
21 saw that they hadn't been responded to, I made sure that, as we were going  
22 along, my staff started looking at those old comments from 2012 and I said, this  
23 is -- we have to get something done before we're finished because it's not -- it  
24 was not appropriate that we didn't answer him.

25 COMMISSIONER BURNS: Okay, thanks for --

26 MR. HISER: And, part of it, I think, that was with our panel



1 process that we took comments like that in. So, it really was until that point that  
2 we had resolved the issue. And so, then, we had a response to the comment.

3 COMMISSIONER BURNS: Okay, thanks for that.

4 I think you've recently been before the ACRS on SMR  
5 expectancy. When do we expect an ACRS letter on this?

6 MR. WILSON: The letter is completed.

7 COMMISSIONER BURNS: Is it?

8 MR. WILSON: If you would like to see it.

9 COMMISSIONER BURNS: No, that's okay.

10 MR. WILSON: There you go.

11 (LAUGHTER)

12 COMMISSIONER BURNS: So, what did they say and some?  
13 I haven't had a chance to --

14 MR. WILSON: Well, they said that the documentation, the  
15 guidance documents are good and 71003, the inspections will ensure the  
16 material condition of the plant along with the audits that will be performed during  
17 the review.

18 And, we are ready to receive and evaluate a subsequent  
19 license renewal, basically is what the letter says.

20 COMMISSIONER BURNS: Okay.

21 One of the -- as we've noted, I think, Commission Baran sort of  
22 touched on and we talked about a little bit in the first panel, there is some  
23 research underway, ongoing, that will inform, you know, long-term, but also  
24 short-term, where we go in terms of our evaluation.

25 We've set objectives, which I think is a good thing in terms of  
26 how we -- or how long we anticipate the review would take.

1                   What do you see -- but, I think as the Chairman noted in one of  
2 her comments from the last panel is, while we're in a different place, I think, than  
3 we were for the -- when the license renewal rule was first promulgated, because  
4 actually we sort of reset the rule in some respects, and we've focused, and I  
5 think rightly so, on the aging management mechanisms to the extent that we've  
6 had this discussion earlier that the living nature of the aging management  
7 system within the regulatory context, which I think is a good thing.

8                   But, you know, again, we have some things that may come up  
9 as the research concludes. How do you see -- how do you prepare for that with  
10 respect to looking at applications that may be underway, that may be in front of  
11 us or these initial ones?

12                   And, you know, how do you -- how are you planning for or  
13 positioning yourself to work through that in the light of what I would say is an  
14 ambitious objective to come through?

15                   MR. WILSON: So, overall, you know, the -- some of the issues  
16 where we're doing confirmatory research, the plants will end up sending a  
17 plant-specific evaluation that will evaluate their individual aging management  
18 program.

19                   We expect them to be a high quality and actually have  
20 pre-submittal meetings with the licensee to address something where there's  
21 going to be a plant specific evaluation so that we can get a heads up on it.

22                   If, during the process as Commission Baran had asked, if  
23 something comes up and we get new information, we will have to ask additional  
24 RAIs to address the new information, have the licensee explain how they would  
25 deal with that new aging phenomena that we did not have.

26                   And then, forward looking, we would an ISG to send out for all

1 the future applicants and then make the changes to the SRP and the GALL as  
2 necessary once we have written those ISGs.

3 So, we don't anticipate, you know, as we get more and more  
4 information, we'll sit back and we'll, you know, if we get -- we'll look at it to see  
5 if there's a degradation or a phenomenology that we haven't evaluated and  
6 anticipate and starting do that and have industry meetings as stuff comes up  
7 with the industry so that they can, based on the frequency as problems arise,  
8 so that they can be addressed and put out into the public.

9 So, that's how right now we would address if something came  
10 up unexpectedly.

11 COMMISSIONER BURNS: Okay.

12 And, I, you know, I understand that, you know, the staff has had  
13 public meetings to discuss, you know, optimization of the review application or  
14 the review and the license renewal application process.

15 And, you know, some of the issues -- and I've heard this term  
16 high quality application from both panels. I hope all applications are high  
17 quality for whatever activity that the -- a licensee is seeking either approval from  
18 as well as our review are all of high quality.

19 But, what is it that we need to align? Is there -- are there things  
20 we need to align on with respect to the -- what we consider a quality or a high  
21 quality application?

22 MR. WILSON: Well, we can just go by the experience. The  
23 industry realized when they submit stuff in, if we don't have questions in that  
24 area, that's, you know, what we're looking at.

25 The SRP and the guidance documents provides a baseline of  
26 the stuff that we're looking at. The pre-submittal meetings on stuff that would

1 take a variance of the GALL or would have something that would be a  
2 plant-specific evaluations, we would say we need this, this, and this to go  
3 through it.

4 As long as the licensee and the industry is learning from itself  
5 as we go through the process and we're learning, you know, as each submittal  
6 comes in, we go through the process. They know exactly what we have to  
7 have.

8 License renewals itself has already laid down a good basis.  
9 They know what they have to give us, to provide us to do a full evaluation of the  
10 aging management program.

11 So, we would expect them to take that as a baseline and then  
12 build upon that.

13 COMMISSIONER BURNS: Okay.

14 MR. HISER: And, I think one of the main areas it would be  
15 completeness of information. And, in some areas, we end up having to ask  
16 Requests for Additional Information repetitively, application after application.

17 And, hopefully, with SLR, some of that information will be built  
18 in so we can avoid those RAIs.

19 COMMISSIONER BURNS: Yes, that's a good point. If we're  
20 already able to communicate that. You know, part of it, we're communicating  
21 it by asking the -- if we find we that we have to ask the question repeatedly.  
22 But, I think there probably is, and obviously, we haven't gotten to the point where  
23 we have the applications yet, but they're probably is, if we were sitting here, you  
24 know, maybe five, seven years or so from now, and I think just as I think, and  
25 my recollection as we did with initial license renewal, sort of stepping back and  
26 sort of seeing where, you know, where our areas that, you know, for

1 improvement, that we can say, hey folks, if you're really serious about this  
2 coming in, you really -- we need, you know, to be addressing certain areas.

3 You know, the same token, there may be things we put less  
4 emphasis on.

5 So, I think that's a good --

6 MR. WILSON: The licensees also explained to us that for the  
7 subsequent license renewal they're going to require a peer check process to  
8 where it wouldn't be just Peach Bottom and Exelon submitting something, North  
9 Anna, and Dominion would evaluate Exelon's submittal, then it would be the  
10 same for coming in.

11 So, that peer check should catch stuff if it's incorrect by the  
12 industry on stuff that we had to have additional information --

13 COMMISSIONER BURNS: And make continuous --

14 MR. WILSON: -- and make it a higher quality.

15 COMMISSIONER BURNS: Yes, okay.

16 Thanks.

17 CHAIRMAN SVINICKI: Well, thank you all for your  
18 presentations.

19 I might begin by just making a comment regarding Mr.  
20 Lochbaum's observation that he had advanced some comments in 2012 and  
21 the staff had not responded for some time.

22 I do want to note that the staff, I think, is exemplary in the  
23 amount of public meeting and discussion that it conducts. We do often receive  
24 and, of course, benefit -- our processes benefit in their design and evolution  
25 from the input that we receive.

26 We don't always develop a written response document. It is

1 not always required as part of our processes.

2 What I would hate to see is the staff feel that an expectation is  
3 being created that all comment received orally at public meetings required  
4 written response within a certain time.

5 I think the inevitable result of that would be that the staff would  
6 go out for public dialogue less frequently because there are resource constraints  
7 and, therefore, but I take as a very sound observation that four years is a long  
8 time to wait for a reaction.

9 But, the staff also had the issues in that time under very active  
10 internal deliberation. And, I think perhaps there wasn't a response to give.

11 So, I respect Mr. Lochbaum deeply and I personally have  
12 benefitted from talking with him and his insights on these issues which he's been  
13 following for a long period of time.

14 But, I don't think that I'm inclined to find fault with the staff in  
15 this instance because I think that there's a larger picture here.

16 And so, I don't expect the staff to react to that. But, I do want  
17 to say that, you know, it's the great irony of life sometimes. Your instincts are  
18 so pure that you want to go out and have public dialogue but it may be that that  
19 creates an expectation of, you know, of a formal written response.

20 I think we have a limited subset of our processes that actually  
21 do require us to do that within a certain period of time. And, that discipline is  
22 very beneficial. But, it's not always a part of our public dialogue.

23 So, I just felt a need to say that. Irrespective of Branch Chiefs  
24 transitioning and turning over, I think there was more to that story if the right  
25 NRC person had been here.

26 So, I wanted to advance that on the staff's behalf.

1                   Turning to the subject matter that we were talking about directly  
2                   today, and I think it was Allen, you mentioned that the NRC formed subsequent  
3                   license renewal expert panels. Those were comprised of folks from NRR and  
4                   Research and they began in the initial stages of developing the guidance  
5                   documents for subsequent license renewal.

6                   Since we've talked about the aging management, the  
7                   inspection process, the living nature of that and the feedback loops, how was  
8                   inspection expertise at NRC represented in those panels? Is NRR bringing it?  
9                   Is that the representation of it? Is it through the NRR experts?

10                  MR. HISER: Actually, though both NRR and Research. We  
11                  do have staff that change offices. And so, we have a spectrum of experiences  
12                  and knowledge really in both offices and that's why we form these panels with  
13                  the two groups.

14                  We did have some folks whose expertise is purely inspection.  
15                  So, they were involved. And, also, from dealing with the issues with plants and  
16                  with the industry, I think everybody ends up with a certain level of expertise on  
17                  inspections.

18                  CHAIRMAN SVINICKI: Okay, thank you.

19                  It just, based on the responses to some of the other questions,  
20                  it seemed like that specific expertise was necessary for those panels. So, I  
21                  appreciate your assurance that that was represented in an appropriate form on  
22                  those.

23                  Brian, I was wondering, we've talked a lot about the research  
24                  that's been done, the ongoing research. There is this integrated and  
25                  coordinated effort.

26                  We've had some of the representatives here today. The DOE

1 light water reactors sustainability program, EPRI, the industry has talked a little  
2 bit about it.

3 Could you describe at a high level what it is that NRC does in  
4 its independent confirmatory capacity versus participating in those integrated  
5 research programs?

6 And, please don't take from my question that I advocate that we  
7 would ever be cost-effective for us to go out and replicate all of the physical  
8 research itself.

9 I imagine that we do confirmatory review analyses, our own  
10 kind of computational work.

11 But, could you talk at a philosophical level, how do we create  
12 that measure of independent assurance on these research results?

13 MR. HISER: Yes. Well, we, you know, we work very closely  
14 collaboratively with industry and with EPRI and with DOE.

15 We strive to identify what research is being done and I believe  
16 EPRI -- I believe Sherry spoke about road maps as well as Jason Remer.

17 We develop road maps, we look to see exactly what's needed.  
18 But our focus is on what research is being done, how does it enable us to deal  
19 with the degradation phenomena or the issues that we're focusing on?

20 But we also look to identify what are the gaps in the research  
21 that is not being done?

22 For example, a good example is the irradiated concrete. You  
23 know, Sherry spoke about, and Rich Reister spoke about under the LWR's  
24 programs, but we had a lot of analytical techniques, their modeling of the  
25 concrete and so forth.

26 We felt very strongly that looking at the irradiated damage on



1 the concrete should be addressed. We communicated that. We identified it.

2 And then, the staff itself undertook the effort so we initiated  
3 those efforts to seek out the concrete from Zorita through our work with Oak  
4 Ridge and through the Spanish regulator, obtain that concrete, harvest the  
5 concrete, you know, and focused on characterization of that concrete.

6 And then, also, we discussed that matter with DOE and EPRI  
7 and whereby DOE then undertook efforts to help acquire the concrete and the  
8 plans to ship that concrete to Oak Ridge, store the concrete. DOE would  
9 undertake the economic or the cost associated with that.

10 At which point we will do the reviews of what is being done  
11 analytically. We'll do reviews, re-reviews, if you will, of the modeling and so  
12 forth.

13 But, we will arrive at a point where we'll decide, do we need to  
14 go further based on the information we have in hand?

15 So, there is a hold point, for example, on the irradiated  
16 concrete. Do we need to go further and undertake further testing of concrete  
17 irradiation, recognizing it's a very involved economic factor there.

18 So, speaking of it in terms of an appendance, this was under  
19 our -- under the NRC staff volition that we encouraged the industry to go in that  
20 direction.

21 CHAIRMAN SVINICKI: So, it sounds like from your answer, I  
22 think this is an important reminder, I proposed the question so focused on the  
23 back end and when the results are achieved, what do we do with them?

24 But, I'm widening the aperture based on your response which  
25 is that, it is looking maybe at the design of test plans and other things all along  
26 the way that allows us to perhaps receive results that we think are going to be

1 the most directly relevant to the safety determinations that we need to make  
2 rather than allow that all to happen outside of any input from us as the safety  
3 regulator.

4 And, at the end of the day, throw the results back over the  
5 transom and say, well, you didn't test this in the areas where I think are most  
6 relevant to the determination that I have to make.

7 So, it's really that participation along the way.

8 MR. HISER: Yes, yes.

9 CHAIRMAN SVINICKI: Okay.

10 MR. HISER: It's much of that.

11 CHAIRMAN SVINICKI: Okay, thank you for that.

12 And then, the NEI presenter talked about a draft model SLR  
13 new and significant assessment approach for SAMA that they've submitted to  
14 the NRC, I imagine for endorsement as a guide.

15 And, the intention articulated by NEI would be to improve the  
16 environmental review process.

17 Is there any of the staff here at the table that could talk about  
18 our understanding of the purpose of that? Is it submitted for possible NRC  
19 endorsement? And, if so, what is the general time frame within which NRC  
20 staff would look at and react to that document?

21 Okay. Are we not -- serious people are being called all the  
22 way from the back of the room. I think people are going to start leaving the  
23 room.

24 (LAUGHTER)

25 CHAIRMAN SVINICKI: It did not save you, sir, to sit in the  
26 back row. You're having to come all the way up here to the microphone.

1                   And, if you could please introduce yourself when you -- before  
2                   you give this answer that you're the only person in the room who knew it.

3                   MR. PARILLO: My name is John Parillo. I'm in Division of  
4                   Risk Assessment in NRR and I was involved in some of the SAMA reviews.

5                   I'm actually here filling in for Jerry Dozier who is more involved  
6                   with this particular issue. He did the SAMA -- well the -- he performed the  
7                   review for the Limerick which was based on a review of new and significant  
8                   information.

9                   And, we did have a meeting last week or week before  
10                  discussing this document. I do not know the time frame.

11                  CHAIRMAN SVINICKI: Oh, you're really garnering a lot of  
12                  sympathy, I think, from most of the people in the room.

13                  MR. PARILLO: But --

14                  (LAUGHTER)

15                  MR. PARILLO: What I can tell you about it is that the issue will  
16                  be on providing new and significant information and that discussion is --

17                  CHAIRMAN SVINICKI: Is this to provide maybe for some, if  
18                  agreed to, consistency of approach to the --

19                  MR. PARILLO: Yes.

20                  CHAIRMAN SVINICKI: -- look for new and significant --

21                  MR. PARILLO: As in how --

22                  CHAIRMAN SVINICKI: -- for that --

23                  MR. PARILLO: -- in how that --

24                  CHAIRMAN SVINICKI: -- a consistent assessment  
25                  approach?

26                  MR. PARILLO: Exactly.

1 CHAIRMAN SVINICKI: Okay.

2 MR. MCCREE: Chairman, if I might.

3 CHAIRMAN SVINICKI: I'm glad I'm answering my own  
4 questions now.

5 MR. MCCREE: If you would --

6 CHAIRMAN SVINICKI: But, go ahead.

7 MR. MCCREE: We'd be happy to provide the --

8 CHAIRMAN SVINICKI: Okay.

9 MR. MCCREE: -- you and the Commission --

10 CHAIRMAN SVINICKI: That's fine.

11 MR. MCCREE: -- information to address --

12 CHAIRMAN SVINICKI: And, I think just a note, it does, in all  
13 seriousness, and I do thank you. That shouldn't have --

14 And, whoever called you up, that was mean.

15 (LAUGHTER)

16 CHAIRMAN SVINICKI: Anyway, but thank you for your  
17 answer.

18 I will say that, on a more serious point, you know, we focused  
19 a lot on the technical review. But, if there is a broad expectation or if the NRC  
20 staff has itself articulated that perhaps an 18-month review schedule is going to  
21 be achievable, I think the companion environmental reviews, I would imagine,  
22 would benefit from the same systematic look and updating of various things.

23 So, although the staff didn't cover this particular submittal in its  
24 presentation, it does seem to me to be a complementary type of initiative by the  
25 industry to say, hey, what -- how would NRC react to this as the standardized  
26 template for doing these assessments?

1                   And, it would be important for the environmental processes to  
2 proceed with the same sort of efficient dispatch as everything else.

3                   MR. MCCREE: Thank you for the context and we'll ensure  
4 that we understand what NEI is proposing or requesting and that a schedule for  
5 review doesn't de-compliment the 18-month review schedule which we believe  
6 is achievable.

7                   CHAIRMAN SVINICKI: All right, thank you.

8                   Michele did you want to -- okay, all right.

9                   Just one last thing, and I know we've, on our side of the table,  
10 run over, we were chatting in the back that, at some point, when there's more  
11 people sitting on this side of the table, we're going to have to be a little more  
12 disciplined than we're being these days.

13                  But --

14                  COMMISSIONER BURNS: Just schedule seven minutes.

15                  CHAIRMAN SVINICKI: We'll schedule seven minutes, okay.  
16 Well, that's -- we will take that under advisement.

17                  (LAUGHTER)

18                  CHAIRMAN SVINICKI: Yes, when we've been going to 14  
19 and 15 minutes, we're really going to do seven? Okay, well, we'll see how that  
20 goes.

21                  I wanted to ask about NRR's approach to organizing itself over  
22 the longer term for maybe the winding down of initial license renewal  
23 applications and moving into subsequent license renewal.

24                  The interesting paradigm is that the one is not supposed to be  
25 so different from the other. But, the peak resource loading estimated for initial  
26 license renewal, there was the CAP 12 policy, it was soft policy, but it meant

1 that we budgeted in general to have 12 in house.

2 I think were some peak years where the industry might have  
3 sent in 15 or more.

4 But, in any event, I don't think the numbers are predicted or  
5 forecast to get that high in any given year.

6 But, of course, we've had a division of license renewal because,  
7 you know, to have 12 very active license renewal applications, this is a  
8 significant body of work for a group of reviewers.

9 So, over the longer term, as NRR looks at how its organized,  
10 Michele and then eventual -- the eventual perhaps folding in of the new reactor  
11 work is over the longer term, does license renewal continue to merit a  
12 standalone organization or is that not determined at this point?

13 MS. EVANS: So, good question.

14 We have been analyzing this over the last few years. We were  
15 working toward a restructured NRR which we intend to move forward to put in  
16 place in October.

17 The issue of license renewal and whether there should be a  
18 standalone division has been vetted and there are different camps on it. But,  
19 the -- happy to say, moving forward, where we're headed is a division of  
20 materials and license renewal.

21 And, the -- you know, there was a strong view that we needed  
22 to keep the resources together to project manage to manage the license  
23 renewal, subsequent license renewal effort which will be the case with this new  
24 division.

25 But, at the same time, there was a need to the current license  
26 renewal division does have some technical resources that are placed in that

1 division and those folks clearly work on license renewal technical issues.

2 So, as we're moving forward and in working to be more  
3 efficient, effective, agile with our staff, there was a camp that felt like the  
4 technical resources should all go into the division of engineering, the various  
5 technical side of NRR.

6 So, it turned out that we came up, I think, we've actually -- the  
7 staff, in the process of coming up with the new organization, came up with this  
8 idea where it would be effective to still have a division of license renewal and  
9 predominately the materials engineers, the materials branches support license  
10 renewal significantly.

11 And, operating reactors that we would combine those groups  
12 together and they'll be on the technical side of NRR under Brian McDermott on  
13 his side. And, we would get the both -- the best of both worlds which would be  
14 to still have a division director responsible for license renewal and subsequent  
15 license renewal.

16 And, at the same time, satisfy some of us who, you know, like  
17 the structural, the electrical, the various -- those technical disciplines, those folks  
18 will be back, you know, they'll be in the division of engineering and will be able  
19 to support through like a matrix situation to do the reviews that are necessary.

20 So, it allows us to, you know, use the staff that we do have to  
21 do more work in the technical side than just license renewal. They'll be, you  
22 know, a knowledge management issue where the people who have done it can  
23 educate the folks who haven't had experience in license renewal and then vice  
24 versa and will become more able to handle the workload with, you know, overall,  
25 our staff numbers have decreased quite significantly in the last two years.  
26 We're down by 20 percent, I think, we're, you know, staff-wise.

1                   So, we're trying to structure ourselves to be able to handle the  
2 workload in a better way.

3                   CHAIRMAN SVINICKI: Okay.

4                   MR. WILSON: In addition, the three materials branches were  
5 set up and we had a lot of discussion with NRO to make sure when NRR and  
6 NRO merge, the materials branches are actually set up by discipline. So, it'll  
7 make the merge seamless. And, they're already divided up.

8                   Our expectations is right now, we're doing work for NRO in the  
9 materials group. So, we can, you know, all the branches will be doing 50, 52  
10 and 54, all work simultaneously.

11                  CHAIRMAN SVINICKI: Okay, great.

12                  Well, I thank everyone for the presentation.

13                  Did either of my colleagues have any additional questions?

14                  Commissioner Baran?

15                  COMMISSIONER BARAN: Can I ask one more? Am I  
16 allowed to do that?

17                  CHAIRMAN SVINICKI: Sure.

18                  COMMISSIONER BARAN: This is a little bit, if we don't have  
19 the right folks at the table for this, that's fine, we can talk about it at a different  
20 time, but, when you all were talking a little bit about inspections, I was thinking  
21 about maintenance which seems like it's going to be increasingly important for  
22 plants that are operating past 60 years, if we get to that stage.

23                  Is the staff, and I know right now, our inspectors are indirectly  
24 assessing maintenance activities through post-maintenance testing and  
25 maintenance rule-baseline inspections.

26                  Is the staff looking at all or discussing at all whether, you know,



1 for -- if we have plants operating the 60 to 80-year time frame, whether we would  
2 need any adjustments to our maintenance inspections in that period of time?

3 MR. MCCREE: Commissioner, that's a good question.  
4 Licensees are still required to comply with 10 CFR 50.65 on the maintenance  
5 rule and Appendix B.

6 The aging management programs are required to remain in  
7 place under Part 54. And, in addition to the 71002, the prior to transition to the  
8 license renewal period and the 71003 which is team inspection afterwards,  
9 inspectors will inspect, are inspecting, aging management programs under  
10 various baseline inspection procedures, whether it's the maintenance, heat sink,  
11 flooding, problem identification and resolution.

12 There are over a dozen procedures where there's a division of  
13 inspection and resource support has explicitly included time and samples to  
14 inspect the adequate implementation of aging management programs.

15 So, that's a looking forward activity and it is as important today  
16 and for those 47 some odd licensees operating in their period of extended  
17 operations. It's as relevant today as it will be in the future or even under  
18 subsequent license renewal.

19 Having said that, we will factor in operating experience and  
20 other intelligence to enhance our procedures as we need to - to ensure that  
21 oversight is effective and it's giving us insights that licensees are effectively  
22 managing aging, both in active systems as well as passive systems.

23 COMMISSIONER BARAN: Okay, thank you.

24 CHAIRMAN SVINICKI: Thank you.

25 Did you have anything?

26 All right, again, thank you all for your presentations and we are

1 adjourned.

2 (Whereupon, the above-entitled matter went off the record at

3 12:04 p.m.)