UNITED STATES NUCLEAR REGULATORY COMMISSION

BRIEFING ON FIRE PROTECTION LESSONS LEARNED FROM SHEARON HARRIS

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TUESDAY

NOVEMBER 3, 2009

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The Commission convened at 9:30 a.m., the Honorable Gregory B. Jaczko, Chairman, presiding.

NUCLEAR REGULATORY COMMISSION

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KEN CANAVAN, EPRI

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

CHAIRMAN JACZKO: We will begin then, we ask our guests to come to the table. We have today I think -- this is one in a series of meetings that the Commission has held on the issues of fire protection. Last year -- a little over a year ago -- we held a meeting and I think one of the items that came out of that was a recognition and a direction to the staff from the Commission to go back and look at and to start cataloging and get a better understanding of what we were considering to be a baseline for where we are in fire protection and how we would be clear that we were making progress in fulfilling our responsibilities to ensure that plants address this issue in a safe and appropriate way.

I think today we certainly are at a significant point in our efforts to address this issue. There are effectively I think three or four significant issues: the multiple spurious actuations, the use of operator manual actions, the

long term use of interim compensatory measures, and other types of unapproved exemptions. Those are really the challenges I think that we have in the fire protection area.

As we stand today I think we are on the cusp of making significant progress in a variety of those issues. The staff recently issued the Reg Guide on multiple spurious actuations that will begin a six-month clock for licensees to identify or develop their approaches for resolving that issue.

The staff has at this point we should have all the responses on the operator manual actions from licensees. The challenge now will be to verify the issues that have been corrected in that area have been corrected appropriately.

Then of course we have and will hear today discussions about our progress in approving license amendments or reviewing license amendments for the two pilot plants that are transitioning to NFPA 805.

As I've said many times I continue to believe that that's the right solution for everyone and I think today I hope to hear from all of you about what your

thoughts are and whether that's the right approach and what the challenges are and if there are weaknesses with that approach how we can improve it so I look forward to hearing from stakeholders first and then after that we will hear from the staff. Any comments from my fellow Commissioners?

COMMISSIONER KLEIN: I think that the NFPA 805 is probably been challenging both for the industry and for our staff and I'd like to compliment the industry and the staff for both working hard to trying to resolve this.

It turns out it's more technically challenging than we thought when it begin and I think from my perspective this may be an area where one size doesn't fit all.

I think different plants will have different requirements and I look forward to your presentations.

CHAIRMAN JACZKO: Okay, then I think we will begin with Mr. Donahue.

MR. DONAHUE: Hello, my name is Joe Donohue, I'm presently the Vice President of Nuclear

Oversight and I recently changed positions and I am pleased to discuss with the Commissioners the status of the Harris pilot.

What I plan to cover today on my first slide is basically I plan to talk about the Harris fire protection status. I'll talk a little bit about the transition results and then some insights going forward.

I think you'll hear today as the panel from the utilities talk, I think we did underestimate what it was going to take to implement both the fire PRA, the licensing actions, the NFPA 805 and really you've got to lump all of those together and we sort of lump them in discussions we'll call NFPA 805 but it's all of those.

The transition costs from our initial estimates have doubled, in the case of my utility, we estimated it with modifications to be near $40 million and it will be near $80 million when we're done and more important is not so much the money is the pure man-hours that's going in to the transition.

The PRA cost itself -- one of the things when people

think about NFPA 805 we not only piloted the 805 transition we also piloted the Reg Guide 1.200, Fire Reg Guide 6850, Fire PRA, and we also piloted -- well soon to be piloted -- the transition so we'll talk a little bit about that.

Next slide, please.

The Harris NFPA 805 status we have responded to the RIA responses and Supplement 3 was submitted in October 2009. We had over 140 PRAs, we had lots of engagement with the staff, we had lots of engagement with the staff during the pilot period.

Obviously as the Reg Guide 1.205 and other what we exactly we wanted to see in LAR and exactly to see in the PAR documentation did cause us quite a bit of re-work.

We are on track for program implementation in mid-2010. We expect the SER from the staff in first quarter of 2010 we will then implement the process with license conditions to complete modifications sometime in several months after receiving the SER so mid to the summer of 2010.

We are committed on other actions to complete our

modifications at the Harris project by 2010, by the end of 2010.

We are on track and do plan to commit those modifications and then we will be in a 100% compliance of the implementation of the rule, implementation of the LER and the modifications that go with those.

Next slide, please.

Progress of our fleet status, one significant thing we do have to keep in mind as I have said we piloted the development of an LER, the transition, the methodology with both NEI, the industry and the staff, we piloted the submittal process getting the Fire PRA through various peer reviews in the documentation of those.

The last remaining piece that we cannot underestimate is the actual transition of 805 at the site, transition from the staff to the Regions for inspections in ensuring we minimize subjectiveness in the inspection process and then piloting the incorporation of the 805 process into the STP process so that it all comes together and those are

a phase that we need to keep focus on. I do believe we have a pretty good understanding now.

The licensing process we have to drop it all the way through to completion.

We are incorporating lessons learned in our fleet response we have three other plants that are being done in parallel.

We are incorporating the LERs and we're incorporating the Rev 1 to RG 1.205.

It will cost us six to nine months to lay in our next unit.

We are reassessing our schedules as a company, we are committed to the 805 transition.

But we have to reassess our schedules as we pull things together and incorporate the lessons learned into our next non-pilot plants and we'll also incorporate what we find as we move into the inspection process which we realize we are the pilot for that also.

Next slide please.

Quickly the Shearon Harris Fire Protection

improvements over 5,000 or 4,000 scenarios are now evaluated.

This is by far the most complicated computer modeling and fire modeling that I've ever been involved in.

We originally had an internal events 40 scenarios, we're modeling near 4,000 for the detail that we added to our model.

We will reduce the reliance on manual actions. Many of our manual actions go to defense-in-depth, they're still there but we do not need to rely on them anymore so they're in the procedures as defense in-depth and those ones which the few that we do have are part of the LAR and will be approved as part of the SER as we accept that.

The NFPA-805 transition and the modifications have resulted in overall plant risk reduction at Harris and that may be something that is plant unique and condition unique to each of the individual plants. In our case we've upgraded and can adequately take credit for the Hemyc and fire wrap barriers. We've upgraded those, in addition many of our mods

are in that area. More importantly, we're adding incipient fire detection to bring on the onset of a potential fire in cabinets which were not there. That is not something we had at one plant. At Harris we did have the already available, at Robinson or more importantly we're adding a diesel generator alternate seal injection which has huge internal events risk safety as well as fire protection safety.

So again for Harris we have improved safety. 28 total mods have been completed to date, 45 is the total number which will be done by the end of 2010, seven of which need to be tied in during the outage and that's why it's the end of 2010. So 45 is a total mods we're doing.

Next slide, please.

One key point as you actually implement 805 is now the decision-making process during the post- transition and that's again a very important part of 805 is the ability to allow us as times change and as the plants go on that we can have a process to make changes in the fire protection process.

As we do it we will ensure fire defense in depth. This is not a one size, one item just NFPA 805 you really integrate classical fire protection safe shutdown analysis Fire PRA which we always sort of focus around the Fire PRA in other aspects. So we'll also use multiple input sources as we move forward.

Now all of those things bring some potential for subjectivity and that's the part we have to work with as we integrate all three of those but that is an important part of NFPA 805 transition. And risk informed post-transition fire change processes are a very important part, it's part of the code it’s part of the regulations and we have several FAQs in that area and that will be another area that we have to demonstrate jointly between the staff and the utilities as we move forward.

The key here is putting a focus on plant safety based on very specific plant information on ignition source information for that plant.

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There has been some improvements recently over the

last 6 to 8 months as we've worked through the NRC guidance documents, in particular the original versions of Reg Guide 1.205.

We had some concern with the utilities, we are closer to allowing the peer review process of Reg Guide 1.200 there have been improvements in the latest rev of that.

The industry appreciates that.

Still some work has to be done but that's an area we have improved.

We have had improvements in some movement in some of the FAQs, I think you'll hear, they're some areas that we need to continue to look at even some of the open FAQs, some of the FAQs that . are being perceived as being closed which are really more in an interim status.

But in particular the FAQ 0608 which has to do the engineering equivalency evaluations which is the change process post-805, there has been some clarification in those that are beneficial.

There was clarification in the documentation needed for recovery actions.

Basically going from shutdown outside the control room in Appendix R space to the same shutdown outside the control room to NFPA 805 -- how much documentation that you had a show on there so there has been some improvements with those.

Next page please.

Going forward, you know, we really have to continue to strive on the stable regulatory environment and I think you'll hear that from several of my peers. And again as I mentioned before we need to pilot the inspection process, we need to minimize the subjectiveness as we take a look at both the inspections and as we look at 6850 and the change processes as we go forward and how that's all incorporated in other regulatory processes including the SDP process.

We have to also keep in mind that we need to have, and the key there is a consistent application of 6850 as that document evolves as it is today incorporating FAQs in anything that we do. Really its around many of the issues that are in the 6850 arena.

Next page please.

A fire PRA conservatism realism you can call it either of those. I really like the word realism. The key area for us is continuing to focus on fire growth and the heat release rates in electrical cabinets that really is our priority. It is where we're putting incipient fire protection and it is an area that several others will talk about that we need to continue research on that minimizes some of the realism in the model.

And also how we treat internal events which is a very mature over many years of gathering data typifying the way we operate our plants today with the fire PRA which is a little bit less mature and how we integrate those and how we add those to or don't add those to or treat those as fire hazards. With that, I'm available for questions.

CHAIRMAN JACZKO: Well, thank you, we appreciate your perspectives and we'll now hear from Mr. Pace who will talk about a plant that is not currently a pilot plant but is thinking about transitioning to NFPA 805 so we'll hear about his thoughts.

MR. PACE: Thank you Chairman.

I was asked to come in and talk to you a little bit about those that follow the pilot and so my comments today are going to be really as I view some of the generic concerns with those post- pilot plants more than with any unique specific item for one of my plants.

Next slide.

A little bit about who we are FirstEnergy .I have four units, two relatively new as far as our industry goes and two mid- seventies plants, two Beaver Valley units which they are sort of in the order that I'm approaching 805. Davis-Besse and Perry which is a relatively new BWR. Next slide.

So why did we decide to transition to 805? I was sort of the advocate for the post- transition plants and in the job I have now I look at a few items to force my decision. One is I looked at it as an opportunity to improve safety through a risk informed approach.

Having lived through the power PRAs it was clear that we gained some insights that weren't at all

intuitive coming up in a deterministic world that the model showed us that this is something that you need to focus your attention on.

Secondly, I've had a long career in fire protection and I don't like to admit to everybody starting early in my career as a fire engineer in startup and dealing with that.

I was design manager at the first Appendix R pilot. I was a director at the first fire protection and functional inspections in the nineties so I've followed these issues for a long, long time and I looked at it as putting it into an analytical tool maybe gave us our best opportunity to resolve the long-term legacy issues in the fire protection arena.

I looked at it from practical standpoint. The fleet I was working in the fleet now had a very diverse approach to fire protection at each of the sites and I looked at it as an opportunity to bring the fleet into alignment and consistent method of handling fire protection and we didn't have very strong PRA resources at the time.

I know this is an opportunity to leverage to new

people coming into the business and to grow the PRA capability of the company.

So those are sort of the things that said we will embark down this path.

Next slide.

We did an initial feasibility study for each site. It felt like something we could accomplish. I was aware from my perspective that if we approach this in a pragmatic way we ought to be able to do a fire protection code reconciliation including a PRA model for around a million dollars.

NEI had said 3 million which I thought was a ridiculous figure.

But we'll see more to come.

We sent a letter of intent in, in December of 2005 and it implemented a fleet approach.

We said we would pilot the Beaver Valley Unit One followed with Beaver Valley Unit Two, followed then with Davis-Besse and then with Perry.

Based on their age and potential significance of their issues so we would look at the pilot, implement it at Beaver then Besse then Perry.

Next slide.

So at Beaver Valley our initial estimates after we did the project reports and things were about $7 million for two units, so three and a half-million dollars a unit, closer to the NEI estimate, that includes no NRC review fees or modifications, that's just to build the program.

As of this year we're currently estimating a cost of $15.4 million also including no NRC review fees and no modifications.

That's an uncertain number because as you'll see some -- we still believe that there are a lot of unknowns that we have to deal with.

Our unit one screening model was done some time ago and we embarked on fire area modeling trying to stay just behind the pilots. In hindsight that may not have been a wise approach because that's caused a great deal of recycling of resources. As the pilot adjusted we became the tail on the dog that was whipping us around.

As a matter of fact one of my contractors said to me one day, "We'll keep doing this until you guys run out of

time or money", to give you a mental image of what we're going through this, it's recycling.

Unit two we're about 30% complete. We're really trying to watch unit one and the pilots to see where we launch next with unit two, but probably quite capable of pulling Beaver Valley both units across within the projections of the industry.

Next slide.

The Davis-Besse transition started a little later. We had submitted in '05 assuming a three-year transition for each plant so we should have been through with Beaver in early '08. We would have had Besse done in the fall of '09 about this time and be starting on Perry.

As it turns out it's really sort of stalled the Besse activities because we're throwing good money after bad in some cases to see where the pilots land and then what sort of experience we have in transitioning our Beaver Valley unit.

After that Perry will go after Beaver and Besse has been submitted and then as I said it will be in a much better condition from the deterministic fire

protection standpoint.

Next slide.

There are four issues I'd like to discuss with you. One is the methods used in selecting the modeling inputs, we think is a concern; schedule overlap between pilots, and post- pilot transition plants; our solution as an industry and a regulator, I believe, has introduced new challenges to us; and cost-benefit of the 805 transition.

Next slide.

In the methods arena some of the inputs arguably are deterministic based and when you put deterministic inputs into a probabilistic model you get ridiculous results. That's some of the issues you see the staff working back and forth with the industry on, it’s trying to bring some reconciliation to what's the appropriate input and parameters to run in the model.

The model is a fairly straight forward tool. It's a mathematical model but poor inputs in will result in poor outputs.

This would yield unrealistic modeling outputs. It's akin to the engineers when they do calculations and

they come back and tell me the car was going 337 miles an hour when it hit the wall which is an impossibility.

Therefore the results aren’t comparable to the power models.

Since they were built with different inputs comparing the fire models that we're building today with the power models that we're running today is akin to comparing tomatoes to apples, they're not even in the same variety.

And then some of the existing standards that we've used in power models don't translate well to what we're trying to deal with in the fire modeling arena.

Next slide, please.

As far as the scheduling overlap since the pilot plants had such a difficult time in defining the course we're going to follow, their schedule has slipped. As I said earlier we should have been through Beaver in '08, Besse in '09, Perry next year.

We're struggling with Beaver because we're still trying to understand the outputs of the pilots.

Since we laid out a fleet approach you can imagine we've got a bough wave going and now all three plants have fallen on top of each other which is a physical impossibility to manage, so we're we considering those schedules.

It has resulted in substantial rework. These models are very complex and the mental picture I have is building one of these child’s models of dominoes and filling the room with them and just about the time you're through with the Domino kick over model we decide we'd like to put an extra dot on each of those dominoes.

So we have to sweep them all down and redot them and rebuild it, that's akin to the cycling that we're trying to build in these very complex models so we lost the fleet benefit and it's challenging the limited resources which were limited even with the schedule we laid out.

Next slide, please.

As I said I believe the solution has possibly introduced new challenges.

We, the industry, and the regulatory body set out to solve manual operator actions and circuit analysis

issues that you led out with Mr. Chairman at the beginning.

And we're coming to realize we have to solve the circuit analysis issues to solve the fire PRA issues.

So the deterministic solution of those issues has been working in parallel. In addition we've added more complexities in the modeling confusion so we start out with two issues and arguably now have eight or ten to solve as an industry.

Next slide.

So in the cost-benefit arena obviously our original assumptions were no longer valid the deterministic approach is gaining certainty now.

We know more about how to do circuit analysis now which once again I say has to be solved to do the PRA approach.

So we may well have been better served to put the 15, 18, 20 million dollars into doing the deterministic approach and making modifications as necessary to comply rather than building a more complex analytical model.

Analytical models do not build margins at nuclear power plants.

Next slide.

In summary I believe our risk informed approach was good intention, we all set up to try to frame an analytical disagreement into an analytical model we could agree on.

We still need to resolve some of these open technical issues on what modeling inputs we need to assume and make it more akin possibly to the power models.

I think the front end transition plants will complete. Much like Beaver Valley, we're in this poker game and all the chips are in.

The follow-on plants will much more likely have to re-evaluate their position.

Thank you.

CHAIRMAN JACZKO: Thank you I appreciate those insights and I will now turn to Mr. Canavan who will talk a little bit about the research activities and the work that EPRI has been doing in fire PRA and other issues.

MR. CANAVAN: Thank you, Mr. Chairman, Commissioners.

I'm the Manager of the Risk and Safety Program at the Electric Power Research Institute and I want to thank you for the opportunity to brief you and other interested parties on where we are or lessons learned realized during the performance of the PRAs in support of the NFPA 805 transition.

We've been at several briefings and I titled my presentation as lessons learned after Joe Donahue's presentation because I think there's some important lessons that we can learn but before we get to that I thought I would give a brief history and when I say brief I mean brief history on Fire PRA methods.

I'd like to correct my initial bullet I wrote 20 years and then last night as I was thinking about it it's probably not quite 20 years ago where we started the wide use of fire PRA methods maybe even more like ten.

But that was in the performance of the individual plant examinations for external event vulnerabilities or the IPEEE and that was really the first time that

we wide-spread used fire PRA methods.

Since that time those methods have been modified by NRC RES and EPRI and they are published in NUREG CR 6850 and EPRI 1011989 and the EPRI number is too complicated to say so we usually refer to it a 6850 and guess we should re-number our report.

But as we mentioned in other Commission briefings we discussed that the 6850 methods were not fully trialed prior to their implementations in the pilots that our transitioning to 805.

And as expected with any complex methodology we expected and did indeed run into some issues with the methods.

You've heard some of them over the last few Commission briefings.

And over the last 18 months we worked with the staff and other stakeholders including utilities, owners groups, consultants and NEI to improve those methods.

We've had some successes and some setbacks. Today's presentation isn't going to focus on particular issues or their successors or their

failures, but rather try to focus on answering the questions: how can we do this a little better, how can we refine the methods more efficiently and more effectively and I hope my next couple of slides address those questions.

Next slide, please.

Prior to the start of the NFPA 805 pilots and probably in the beginning of those transitions as well at least for a short duration, the PRA methods developments and handling of the issues were performed by a relatively small group of researchers who were the authors of much of the material that is in 6850.

This group addressed those changes in a relatively lengthy response window and as you heard from my colleagues as the pilots progress that lengthy response window changed and became a little bit shorter and also had quite a few additional stakeholders. They included the NRC reviewers, utility project managers, utility PRA personnel, consultants, senior managers all became increasingly involved in the identification and the resolution of the

frequently asked questions or the fire PRA methods issues.

The evolution of the process significantly expanded a number of people directly involved in the development of consensus approaches and they added an element to time pressure as well due to the tight implementation schedules associated with 805.

The group dynamics shifted to a higher stress environment but more importantly than the higher stress was that you had a larger group of stakeholders with different and sometimes divergent goals such as the need to preserve the ease of review or schedule adherence with the desire to get a guaranteed regulatory accepted method and others.

The group dynamics were an extremely inefficient use of the resources accompanied with some unrealistic expectations that these competing goals could be met simultaneously.

And another common result that we had was the compromise method which I'll talk a little bit on the later slide.

Next slide, please.

A second lesson that we learned is that the method shouldn't be developed in abstract and many of our PRA issues came from a single plant.

When developing resolution to the issue inevitably the question "but what if" arises. If I could count the number of times we did the "but what if" it would be a very large number.

The questions usually asked and we have a reasonable solution to a problem and that's proposed and a well-intentioned participant or stakeholder asks in the interest of expanding the applicability of the solution "but what if".

The goal was to be a little bit more comprehensive which is an honorable goal.

But this is our classic snatching defeat from the jaws of victory.

Where the "but what if" turns into a situation where we address the significantly number of hypothetical situations that may or may not have occurred in experience and may or may not be applicable to the next series of fire PRAs we do.

Next slide, please.

All these lessons are related and in less than three the larger group of stakeholders with the best of intentions try to ensure that their goals are met in the resolution and what tends to happen is what I've termed a compromise method.

Compromise methods are usually conservative and bounding inputs because they're trying to bound the goals of all the folks involved in developing that solution.

They also have significant elements of the "but what if" philosophy.

In the past after that conservative method is developed and bounding inputs are applied then significant resources are expended in the form of data collection, engineering analysis to attempt to increase the realism of the models and to date we've had sort of a spectrum of success here and some of the interim methods that are produced still don't comport with data and experience.

Several of the interim solutions produced will need to be revisited or refined as the they're

applied to the wider range of plants.

These are three lessons that I've listed, other lessons could be provided in including some of those that are very positive.

These lessons were chosen because these are the lessons that we can get the most benefit at improving the process so you heard about all the process problems now we're focusing in on what are the things we can do to improve.

There are a number of positive outcomes that weren't discussed in this presentation and given the fact that we probably will proceed with fire PRAs whether or not they're for NFPA 805 or just for risk informed performance-based regulation in other areas, we probably will continue to develop these methods so it's important that we address these lessons learned and mature the methods as quickly as we can

In the area of the future of fire PRAs methods we should use the best available information and analysis.

And in that vein we should look at all the evidence and analysis which would be judged on its merits and

included when it has reasonable basis and provides the best information and we can monitor it.

The methods inputs and results should comport with existing experience and current operating experience to provide assurance that the model is a reasonably accurate representation of the as built, as operated plant.

This in turn leads to increased acceptance of the model which is important if we are going to be applying this in risk informed performance-based regulation. So basically the previous history that we are aware of should comport well with what we see today.

Conservative in the process should be limited to the decision-making guidance and criteria. And the methods and input should be sufficiently dynamic to allow us to improve them over time and encourage good behavior by accurately reflecting safety. improvements in a corresponding risk reduction.

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The fire PRA action plan is our solution to these issues. The fire PRA action plan consists of a matrix of fire PRA method issues including a characterization of the issue, the issue owner, a schedule and resources. Along with the matrix a new approaches is proposed which addresses lessons learned in an

attempt to improve the process.

So the new approach begins with small teams of knowledgeable experts that develop a solution which is then applied to several plants.

The team develops these solutions not necessarily for the method itself to be approved but rather for it to be approved in context in the application.

This isn't to say that the methods can't be reviewed or not available for review or they are not stand alone but this is to say that their best reviewed when they're done in context rather than the abstract as we've seen what can happen with the "but what ifs".

Reviews and refinements of the methods are initially provided by the application plants so when they are being applied we can look at that application and refine the methods if necessary.

They're also then reviewed and input received via independent reviews so there is an independent peer review required. It's part of the fire PRA process.

Another opportunity for review and approval method would be during a request for additional information process and then finally the approval in context

would be provided in the NRC safety evaluation report.

That provides sort of a high level outline of how we could improve the process of addressing these findings.

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I don't intend to review this slide in any detail but I did want to mention that these are the activities that are listed on the current fire PRA action matrix.

The items listed in red are those interim solutions that will need additional analysis for complete closure or to provide applicability to a wider range of plants.

The remaining issues that are items that we have identified but we don't yet have detailed approaches for.

That completes my prepared remarks. Thank you.

CHAIRMAN JACZKO: Thank you, I appreciate the comments. I'm sure the Commissioners will have lots of questions for you and the others.

We'll turn now to our last speaker Mr. Gunter with Beyond Nuclear.

MR. GUNTER: Thank you Commissioner. My name is Paul Gunter Director of Oversight Projects for Beyond Nuclear and we really appreciate the opportunity to participate as public stakeholders.

The Browns Ferry fire in 1975 demonstrated as reality that a significant fire can occur at a nuclear power station and that a fire can significantly challenge the safe shut down capability of the reactor.

The Browns Ferry fire further demonstrated that even an incalculably improbable source of ignition can lead to a significant fire in reactors operating today. The near catastrophic experience proved so harrowing that the Nuclear Regulatory Commission responded by dramatically amending and expanding its fire protection philosophy to include the development of General Design Criteria 3, Branch Technical Position 9.5.1 and the promulgation of law under Code of Federal Regulation for minimum fire protection requirements to conservatively ensure that a level

of compliance exists at all nuclear power plants.

Unfortunately, as witnessed through my personal experience since 1991 before the Commission, one critical analyzed area of these fire safety requirements in nuclear power plants was not properly implemented nor subsequently enforced.

Namely for the large number of Appendix R III G.2 fire areas requiring qualified physical and passive fire protection features for control room power, control and implementation electrical circuits to reasonably assure that the redundancy for reactor safe shutdown equipment cannot be destroyed by a single fire.

Apparently after 29 years of effort, such regulatory assurance appears to be overly burdensome and no longer considered reasonable, attainable by industry nor enforceable by the Federal agency without a large number of exemptions.

Given the widespread level and duration of non-compliance, the infrequency of serious fires at nuclear power plants is at the same time a blessing and a curse.

A blessing in that, to date, more significant fires

have not challenged nuclear power stations safe shutdown operations, a curse in that the lack of such experience leaves many broad areas of uncertainty in an aging industry.

The expanse of this uncertainty includes not only a lack of experiential knowledge base but introduces questions and disputes involving variability, randomness, indeterminacy, judgment, approximation, linguistic imprecision, error, and the unreliability of human behavior and the significance surrounding fire safety issues.

These broad uncertainties play a major role in our discussion and our concerns today regarding the public's confidence in the proposed transition from the ongoing failure to achieve compliance with a prescriptive fire code to the optional NFPA 805 Performance-based Standard for Fire Protection for Light Water Reactor Electric Generating Plants. Because of these uncertainties we remain skeptical of the outcome of the NFPA 805 transition and the implementation process.

I would like to focus my presentation on the issue

of fire modeling.

Verified and validated fire models used to predict the extent of fire damage from a range of fire sources are held up as an integral, indeed essential part of the transition to NFPA 805 in determining the survivability of reactor safe shutdown equipment in lieu of protecting that same equipment through compliance with Appendix R III.G.2 through the qualified fire barriers.

Given the potential high safety consequence arising from a fire that knocks out the control room operation and maintenance of reactor safe shut down, accurately capturing all of the proper fire scenarios becomes crucial to public safety.

We argue that fire modeling remains a significant limitation to NFPA 805 and fire safety analysis and design for power reactors.

Published literature continues to warn that fire modeling is still in its developmental stages with its associated uncertainties.

In our view, that remains a significant stumbling block to a reasonableness assurance and a continued

impasse to effective enforcement policy for future fire safety issues arising in NFPA 805 nuclear power plants.

It remains very difficult to employ a computer generated fire model with a high level of confidence so that it makes a valuable contribution to real-world decision-making as opposed to leading to inaccurate and inappropriate interpretations that can leave power reactors vulnerable to fire. The European experience in fire modeling further suggests that different fire model users can produce very different results even when using the same probabilistic model and applying it in the same case where risk estimates can differ by several orders of magnitude and our crucially based on the users' knowledge and experience or lack thereof.

A number of identified error sources and gray areas in fire modeling include: the lack of reality of the theoretical and numerical assumptions used in fire models. The assumptions used in field models are approximations

to real-world experience from a particular fire; lack of fidelity of various numerical solution procedures; direct errors in computer software where the software will not be an accurate representation of the model and numerical solutions procedures; faults in computer hardware where a fault can exist as a result of the mistakes in microprocessors; significant and undetected mistakes in fire model applications while inputting into the model.

These potential error sources can remain significant challenges to both industry and regulator that cloud, complicate and further prolong the development of a fire safety resolution path and improved enforcement policy.

Given the troubled history of NRC's official policy of non- enforcement which spans decades old fire protection violations it begs the question if a transition to NFPA 805 helps or further hinders the institution of NRC enforcement policy on fire protection.

The failure of the NRC to effectively take

enforcement action on the violation of inspectable prescriptive requirements, widespread abandonment of subsequent corrective action programs and failure to follow through with fire safety confirmatory action orders does not lend to building public confidence that the agency can effectively address violations of an arguably more nebulous and difficult to inspect performance-based standard, potentially involving disputes between staff, industry and public over any number of areas of uncertainty identified.

Finally, there is the concern that malevolent acts are beyond the scope of NFPA 805.

The risks and consequences associated with sabotage cannot be accurately analyzed by probabilities nor can they be modeled.

As we have raised to the staff, we see a significant fire safety disconnect in a shift to performance-based risk informed fire protection regulation that does not address security concerns when coupled with ongoing industry wide noncompliance with prescriptive fire codes for Appendix R

III.G.2 fire areas.

The same nuclear power stations have long been identified by national laboratory study to have been inadequately evaluated in their design and construction for the effects of explosion and fire resulting from the impact of aircraft.

These same nuclear power stations have been further exempted from any further mandatory aircraft impact hazards analysis.

The security veil then falls to obscure from public view how the risks of deliberate destruction of reactor safety systems by fire are or are not being addressed.

As a result the question remains in the public interest community, is the Federal regulator pursuing a compliance strategy to douse the flames of a fire protection controversy or is it at long last prioritizing the establishment and enforcement of fire safety regulations to maximize public safety margins during post- fire safe shutdown.

CHAIRMAN JACZKO: Thank you Mr. Gunter. I appreciate your insights and we will now begin our

questioning with Commissioner Klein.

COMMISSIONER KLEIN: Thanks.

I will start in the order of the presenters so Joe I'll start with you.

What were your most significant plant modifications in Shearon Harris?

MR. DONAHUE: I think I would probably categorize them in three areas.

One is we were able to by actual fire testing on the fire barriers to determine for the exact plant conditions and the exact configurations at Harris what the barriers and how long that plant would last and maintain the barrier. Then we have gone in and made appropriate modifications and then took credit for that real-life, real testing conditions in the fire PRA models, so quite a few of our models dealt with that.

Second, I believe the incipient fire detectors in our cabinets will bring on the onset of any instrumentation and control potential of fires and no matter how we end up in the conservatisms and realism of fire promulgation in the cabinets we will

have implemented those and I think third, probably the one that I am most proud of with the staff, is the diesel generator backup steel injection system which addresses internal events safety while at the same time fire safety for giving makeup capability during a shutdown.

COMMISSIONER KLEIN: Could you tell me again what your cost estimates were when you started and what you've spent to date?

MR. DONAHUE: For the fleet for all four of our plants with modifications was going to be near $40 million and right now were estimating about $82 million.

COMMISSIONER KLEIN: So about doubled from what you said.

When you look at a specific plant and you look at what you spent are you able to quantify the risk reduction?

MR. DONAHUE: In the case of Harris which we've got the peer review fire model the internal events CDF has gone down by 20% predominately by the seal injection fire. Our other units,

the expected modifications we're seeing, I would call them more compliance related, we do not have an actual number for our next plant which is further along is CR3. But CR3 with its additional diesel generator capability that it has is a relatively low profile plant from a risk perspective so I don't expect to see the gain that we got at the Harris project.

COMMISSIONER KLEIN: And what is the status of the piloting the inspection process, where do you and the staff currently lie?

MR. DONAHUE: I think that's probably a question to best -- better ask the staff -- I do not believe we have seen the draft inspection guidelines.

I know there's been discussions going on with the staff and the Regions and I think again that's where as we get the SER we plan to deploy and get into the implementation of 805 and welcome piloting that part of the process, that's the third leg of the stool that needs to be done successfully for the rest of the industry and obviously for ourselves.

COMMISSIONER KLEIN: So you haven't seen a draft plan or anything?

MR. DONAHUE: I do not believe we've seen a draft to date.

COMMISSIONER KLEIN: Dan you talked a little bit about the different types of plants that you had, some that were in the seventies and some in the eighties, fundamentally is there a difference in which ones might lend themselves more or less to NFPA 805 compared to a deterministic approach.

MR. PACE: There is a difference in how much remediation needs to be done to solve the original issues, those circuit analysis in the manual actions required to comply with redundant safe shutdown cabling area is differing on a mid-seventies plant than it is on a late eighties plant and I believe it's different between some of the design AEs, NSSS firms.

I have a great deal of experience on the later boilers and they're quite well-designed on separation and require minimal impact to comply with almost any reasonable deterministic role

on circuit analysis and have little or no manual actions. Where as some of the PWRs in the mid- seventies. they required significant manual actions and had more circuit interaction issues.

Given that you can resolve some of these ambiguities in these inputs and propagation parameters on a fire PRA and make it a practical tool to use, it obviously would lend itself better to a mid- seventies plant than a more modern plant.

COMMISSIONER KLEIN: So it looks like you started about four years to go to transition to NFPA 805, would your decision process be different today versus four years ago?

MR. PACE: I have that decision to face. We've got a basic fire PRA model on our Davis-Besse unit, it would be what we envision a fire PRA model to be four years ago and I get to watch and see how the pilot comes down and what impact that has on my Beaver Valley plant before I embark on Davis-Besse. If we get pragmatic solutions that are comparable to power PRAs out of the firm PRA modeling efforts that are going on now then we'll likely proceed

with the fire PRA model at the other units as well as other risk informed applications.

If we continue to have unrealistic outcomes to this fire PRA modeling exercise then we will have to reevaluate that.

COMMISSIONER KLEIN: If you look at the two pilots being finished, and one earlier in 2010 and then another one may be in the spring of 2010, how much time do you think it would really take utilities once you have that better determination to really do a NFPA 805 decision?

MR. PACE: Well if we were truly operating pilots like we do processes and procedures at our fleet plants we let the pilot run its course and determine the lessons learned and then proceed with certainty on our other plants.

So if this had progressed according to plan the pilot would've completed in '07-'08 and then we had a two to three year implementation because it takes two to three years to implement the fire modeling on a plant.

Where we are today with a plant like Beaver Valley,

once some certainty is brought to the rules, we're probably 10 to 12 months from having a completed product.

COMMISSIONER KLEIN: You had talked about your cost differences have increased from what you initially expected to what they are now.

What would you attribute to primary cost escalation?

MR. PACE: Primarily in recycling the model, we had a as the architects like say a substantially complete model two years ago that we've re-performed with different inputs for initiation frequency, re-preformed with different propagation parameters, re-performed for different fire areas for the last 24 months to the point where on Unit Two and on Besse we have just stopped until some of the uncertainty settles out on these decisions.

COMMISSIONER KLEIN: Well, Ken, you listed on your slide eight several areas that needed additional analysis and development.

What's EPRI doing for those?

MR. CANAVAN: As I mentioned during the presentation and I can expand on it a little bit here.

Those are the items that are in the fire action

matrix. Currently on each one of these items a plan is being developed that includes the owner of the issue which may not be EPRI it may get assigned to owners groups, consultants, vendors. That issue will then be worked by a small team.

In the matrix, it's getting a detailed action plan with resources and schedules for completion and those are going to be realistic schedules on what we think we can do given the resources and the ability of folks to work on those issues given that the same people who support implementation and development of the fire PRAs are the ones who also do a lot of the methods development. .So each one of these issues will then be worked in accordance to that plan. There may be a few that may be added as a result of follow-ups plans as well.

COMMISSIONER KLEIN: So looks like you had eight that were red in color?

MR. CANAVAN: Yes.

COMMISSIONER KLEIN: About how much is EPRI spending a year to address these?

MR. CANAVAN: Costs vary, but we been about in the million and a half to 2 million range over

the last couple of years and we expect in the future to get significantly larger.

COMMISSIONER KLEIN: And of those eight which is the top two?

MR. PACE: The top two are, actually Joe had mentioned them in his presentation, the first one is heat release rates and the second would be the experiential data getting all the fire events database, collecting and analyzing that data.

COMMISSIONER KLEIN: Thanks. Paul you indicated a blessing and a curse regarding the fires.

Do you think that the attention the industry and the NRC is paying to the fire that that might be one of the reasons that there has been a lack of fires, like a Browns Ferry?

MR. GUNTER: Certainly, I think that it's clear that because of the risk and consequence of fires it is a chief concern in the industry and should be for the regulator as well.

So I do understand that and I've toured power plants as well to the extent to see the introduction of combustibles, for example, is attended to in great

detail.

But nevertheless as I said history has demonstrated that these plants are vulnerable and it's the curse of course that we're worried about because the consequences could be unacceptable.

COMMISSIONER KLEIN: Thank you. No further questions.

CHAIRMAN JACZKO: Thank you. Commissioner Svinicki.

COMMISSIONER SVINICKI: Thank you. Thank you for your presentations. Mr. Donahue, I'm going to return to a topic that you raised that I've given much thought to.

There's plenty to think about right now in terms of the pilots but you were kind of looking over your horizon, which I appreciate. You said something along these lines, after driving through the review of the LAR a next area to focus on would be the inspection process and you talked a little bit about that. You talked about minimizing subjectivity. Can you help me understand with a little greater specificity? Why is it that at post transition to NFPA 805 it would be more challenging for an inspector, is it just simply because a deterministic approach is I have a set of very prescriptive things that I inspect to versus the more nuanced understanding that's necessary under the risk informed PRA process is

that kind of the kernel of the issue there?

MR. DONAHUE: Yes that's the kernel if you think of one in the deterministic being very rule based, and in the case of the fire PRA when you get into 6850 you are going to get into what assumptions were made for the fire propagation, what assumptions were made for that particular cabinet, that particular raceway and then you can get into discussions of interpretations of a very prescriptive document 6850 how was that applied in the computer modeling. So it adds a different level of subjectivity.

Then also part of the 805 process is the engineering evaluation change process which allows us going forward in the future to make changes to the plant, use the risk models and say that this particular change we made, meets a threshold that we can go ahead and move forward and make the change without NRC approval.

That could come under scrutiny several years later on a tri-annual when they come back in and said we believe you should not have made that change and we don't believe in the basis. So it adds a little bit of subjectivity that we have to work through and to be able to have some certainty as to how that works and we have to get in some real-life examples of

changes because I can think of quite a few changes which absolutely don’t have any impact. It's going to be can you find some of those in the real-life world that are on that right at the threshold and how do we communicate those rather than wait three years.

COMMISSIONER SVINICKI: And then hearing that, Mr. Gunter would you say that looking at that same issue from a slightly different angle, that the scrutability of this in all of these determinations and interpretation that needs to be done when we've moved away from the deterministic approach that it may make it more challenging for public transparency in the scrutability of looking into that implementation and inspection process, is that accurate or something that you think from the public's perspective of kind of understanding this transition away from Appendix R prescriptive requirements, is that at least one aspect of the challenge for the public?

MR. GUNTER: It certainly is, but I would also raise that issue for inspectors of the agency itself.

There is this concern that were adding a new wing to

the labyrinth here.

COMMISSIONER SVINICKI: Thank you at least two of you, I think, refer to the frequently asked question process and it is not unusual for the staff to use that when working through a development process on construction inspection. I know that we have a very fulsome FAQ process but it came up here and it sounded like it's been a little bit challenging but also a way maybe to expose issues and then move forward to give, I think Mr. Donohue, you mentioned you've got to get some sense of understanding of what the staff's interpretation or maybe it was Mr. Pace, you said acceptable interpretations from the staff is there anything again since a couple of you mentioned the frequently asked questions process.

How is that benefited in NFPA 805 and is there anything about it that's been challenging or do you say it's kind of the use of the FAQ is an absolute good or has it been challenging here at all?

MR. DONAHUE: I'll start again, and again it picks up with what my colleague Ken mentioned.

Being the lead plant many of the FAQs in the aid are a direct offshoot of

the particular circumstances we have Harris and Oconee, so we were able to ask very specific questions of some of the FAQs say around. the fire initiation and cabinets, which are very particular around our case.

Some of that could be research-based, some FAQs are more interpretation of words written down in draft or regulation or the NEI document, those we more or less worked through, some are around, there's a particular number in 6850 that was created as Mr. Canavan mentioned then how does it apply to this particular case.

I think we're a little bit slow as a overall body of the staff working with the industry and addressing some of those ones which may have been a little bit more research-based or number based or realistic based.

COMMISSIONER SVINICKI: Is it also true that for the follow on transition plants, the FAQs may or may not be a very good relevance to their circumstance?

Were they truly tailored to the pilots?

MR. PACE: That's my understanding, but Mr. Canavan has a much more crisp view of the FAQ process

MR. CANAVAN: I think that I can offer two perspectives. One is that the FAQs that I am familiar with from web sites and other locations are traditionally answered in a paragraph or two not 16 or 25 or 50 page dissertation or report that contains additional research, interpretations --

COMMISSIONER SVINICKI: Is that what is happening here?

MR. CANAVAN: The Frequently Asked Questions range from a paragraph response on a single interpretation, where it would appear that an FAQ is very appropriate all the way to the point where they are indeed research activities that in my opinion don't belong in a FAQ process.

And as for culpability, you'll find that probably 80% or maybe higher are applicable to all the plants as we move forward especially to the smaller interpretation ones, but the 10% or 20% that are not applicable are usually the lengthier dissertations on them.

COMMISSIONER SVINICKI: Again I'd know it's a little bit of a side but I'm always curious if we're looking at the best ways to communicate as a agency and FAQs is something that I've been hearing about lately so I just wanted to pull that thread a little bit.

Mr. Pace, it's interesting because on your slide three you talked about your decision framework for transitioning to NFPA 805, I took from that you list four factors but something that appeared to be important was the risk informed enhancements to safety and a standard approach across your fleet. If we get to a point where some who have indicated their intent to transition might be looking at that and I guess I am now getting you to your slide 11 where you talk about some of the original assumptions might have – what you assumed there might not be valid, and not just speaking for yourself but maybe for the larger wave of folks who might transition to NFPA 805, they may relook at their intent to do that. You made a statement and I'll paraphrase although I tried to write it down, "It may have been better to put 15 to 18 million into solving some of the analysis questions and then making the mods to comply", you also talked about or maybe it was Mr. Canavan that a number of applicants -- there will be use of fire PRAs whether or not folks are transitioning to NFPA 805 so I guess from where we sit now

and the pilots aren't done, if a number of folks are relooking or do end up looking at their intention to transition but yet they do a fire PRA and fire modeling and they make modifications I guess I'm not sure in terms of kind of the overall enhancement to fire safety or consistency of approach, what's the difference for an individual applicant? Would you make different physical modifications if you are transitioning to NFPA 805 versus just doing a fire PRA in making some physical mods and how would they differ?

MR. PACE: Well, we'll never know maybe, going back on some of these plants --

COMMISSIONER SVINICKI: That's way I'm asking you to speculate.

MR. PACE: One might say that on a later model BWR, like I am familiar with, we may do the circuit evaluations that are now out in the NEI documents and the NRC research documents that say here are the rules of engagement for circuit analysis, which also has to be applied to the PRA modeling by the way, and say I can solve these four circuit issues by completely re-routing these circuits out of the building even. That may cost me $2 million.

And now I'm in full compliance with the Appendix R under the deterministic rules of engagement and I don't have too, I haven't spent the other 17 on fire modeling.

COMMISSIONER SVINICKI: Okay, Okay.

MR. PACE: Some licensees are committing and building fire models but not engaging in the fire modeling dialogue that's going on with the 805 transition. They are building fire models more along the lines that the power models were built. Once again Mr. Canavan can probably tell you some of the nuances and differences in those techniques and approaches.

COMMISSIONER SVINICKI: You're reminding me in the response to Dr. Klein's question that you did indicate a lot of your investment had gone in the recycling and the iterating on some of the modeling and analysis so it’s sounding like, although I agree with you we'll never know and I'm asking a strange question here, but it may be that under that framework of not transitioning to NFPA 805 an applicant would have less investment, or licensee would have less investment, in the analysis and the modeling and maybe more in mods to

meet the deterministic requirements. That's what might look different about it. .

I would say that you said one of the benefits for you was a fleet wide approach and I would say it would seem like you'd lose that particularly if you transitioned part of a fleet and not the rest of it.

MR. PACE: We may very well, hypothetical, we very well complete the Beaver Valley modeling exercise including NRC reviews and have invested $20 million in a very sophisticated fire PRA model and eliminate the proponents of the manual actions and evaluate all the circuits and no modifications be required. Success, right?

I haven't modified the plant so have I fundamentally changed the plant's ability to respond to a fire event?

No.

What I have done is vindicated those that argued that it was safe under the previous rules of engagement by absolutely proving that through analytical methods using agreed-upon rules of engagement that these were not realistic scenarios

in the beginning.

Does that make sense?

COMMISSIONER SVINICKI: Yes, again you are indulging me. I'm peering a little bit into hypothetical decision frameworks for various folks that might again take the whatever comes out the pilot and relook at whatever they had planed before.

MR. PACE: I'm familiar with this I've done this exercise. So the deterministic approach would be I don't agree with you that the circuit would get involved in flames in this room, I don't believe that there's a fire credible there and even if it was it wouldn't propagate to the cable on this side of the room. But under the old rules I assume the room burns up and I will just move the cable, right?

You win.

I'll move the cable and I'll spend the money on the mod necessary to move the cable and I don't have to argue about whether it's probable that it will be consumed in fire or not.

That's kind of the point I was making.

So, the ones not committing to convert are obviously believing they can take that approach and I believe there are some plants, to Commissioner's Klein question, that are much more capable of taking that approach than others.

A late model boiling water reactor, which I'm familiar with could likely take that approach for very little money.

COMMISSIONER SVINICKI: Thank you. Thank you Mr. Chairman.

CHAIRMAN JACZKO: I think there's a very good discussion on perhaps provide a bit of context for discussion before I ask questions.

I think it's important to remember I think -- I don't have the 29 experience, I have four years of experience -- in dealing with these issues and we do seem to have a challenge with resolving issues.

If I would walk away, I would walk away thinking that it's been extremely trivial to resolve the deterministic challenges that really motivated NFPA 805.

I don't think that's the case, if that were the case we should've been done and we shouldn't have to worry about where we are.

We have the operator manual actions which were never

approved, never authorized, that have existed for a long time and perhaps Mr. Gunter you would say that's an enforcement challenge. I may not disagree with that but that's a little bit of the background so the approach that was taken was for the industry to develop a performance-based risk informed standard in NFPA, hat stands for the National Fire Protection Association. That was an industry developed standard, an industry developed approach.

Then the NRC then when it adopted that and on a voluntary basis allowing the industry to decide and choose whether or not that was the path that they wanted to follow.

Following that, ultimately the PRA standards came out and an ANS/ASME/joint industry standard was developed for the PRA quality. EPRI working with NRC developed 6850.

The bulk of the work and the bulk of the concerns of what I'm hearing about is in the PRA work in the fire modeling by and large most of which is developed and worked through by the industry.

So the frustration that I have and perhaps the staff has and maybe we'll hear about it, is that we have

now concerns and complaints about those issues which are fair and that's not to say that is not the situation we want to be in, Mr. Pace as you indicated we wanted to be done with this a lot sooner. I want to be done a lot sooner. I'm sure Mr. Gunter would prefer that it were done a lot sooner, or perhaps not at all. I should let you all speak for yourselves. But I think the point is the challenges that exist in PRA, the new ANS/ASME standard requires fire PRA as an initiating event. That is something that if the industry wants use PRA models it's going to have to incorporate and include.

So some of these challenges are challenges we are going to have to address one way or another.

NFPA 805 has helped us because it has brought these issues to the forefront and allowed us to address them and allowed us to make what I think actually is progress.

I do fundamentally believe that this is the right route because it makes the plant safer and I think we haven't necessarily talked about that but I think Mr. Pace you hinted at that.

It gives us a better understanding of we right now don't have as good of a tool to say if a fire barrier comes in and as we've learned with Hemyc in

some cases in some applications it cannot meet that one hour rating. We don't have a good analytical method right now to grant an exemption for that.

We do it as you said Mr. Pace we look at it we say think that there are metal combustibles in the room so we think that it may be acceptable to do that.

That's not, I think the best basis, I think the analytical tools within NFPA 805 give us the ability to say that this is a better, much better basis.

That having been said I think it's a little bit -- I think these are very good points and it's important to understand where we are in the challenges we have to moving forward and I think it's important to understand that the other path was not as simple perhaps for many of these plants, and so unfortunately we find ourselves in a difficult situation and trying to work through what is ultimately an important safety issue but also a difficult one to resolve.

Having said that I thought I would explore a little but the issues that we're dealing with in the

uncertainties in the modeling and perhaps trying to better characterize where the models are. I think a big philosophy that the NRC has incorporated with its use of PRA models is that they need to be sophisticated enough, and sufficient fidelity for the application at hand. Would you say right now that the models don't meet that threshold and that standard that the uncertainties are large to the point that they don't allow use of the models in this particular application or anyone who wanted to comment on this point.

MR. CANAVAN: I don't think it's so much the uncertainties.

You brought up a lot of different questions. I guess I think that our challenge is right now we know the uncertainties are bounded, if you were to ask me, or significantly bounded.

CHAIRMAN JACZKO: So we don’t have a concern that there is under conservatism in the modeling, it a concern that there is too much of a conservatism.

MR. CANAVAN: That is the natural progression of the process so when the 6850 and EPRI authors

developed the methodology when they hit a tough issue, one that was difficult to get data or difficult to analyze, the natural tendency of those developers was to say let's use this number because it bounds everything and when the pilots are done we'll refine that number and we'll do that analysis. And that's where we are now. We/re at the tough spots of doing that analysis.

CHAIRMAN JACZKO: So you wouldn't say that there's anything – I wouldn't want people to walk away and think, and Mr. Gunther perhaps you would want to comment on this too, that the models wouldn't provide for adequate safety in this case.

MR. CANAVAN: The current set of models generally over predict when compared to experience. So if we do a model of a turbine building, for example, we do a very detailed model of the turbine building. We will find that the numbers produced are something on the order of several turbine building fires per year when we do the math of multiplying the number of plants. So simple math tells us our models over predict, which was a great first start. Now we need to refine those models to have them comport with experience because in order to have trust in the model to use it for decision making we should at least be able to reflect our previous experience at the appropriate levels.

So this is not to preclude a large fire from occurring or propagating its way through the model but it's to say that for the smaller events they're accurately reflected in a reasonable range of their occurrence and experience.

CHAIRMAN JACZKO: But right now its not under conservative in any way --

MR. CANAVAN -- not in any area that I'm aware of.

MR. DONAHUE: Let me talk a little bit about Harris if I might and I absolutely agree with you.

If I take a look at the areas that are ire PRA model when we go to a level of monitoring every single -- the majority of the cables -- and that's how we got to 4000 scenarios, those scenarios did bring focus on three or four areas that my gut as an operator and a licensed operator would say those are interesting areas so they called those out.

How we deal with those -- the one area that seemed a tad over conservative for us was the propagation of fires in low-voltage I&C cabinets which are adjacent say to our control room which our operators are right there.

Really where the discussion gets into is how much credit, how fast can an operator open the door and go see if there's a fire.

So we're really around how quick mitigation strategy and does the fire happen that the cabinet just burns up in a minute or is it going to get other indications that you can put an operator in there to get it. So it's really around some of the mitigation strategies and really around, I'll call in our case, cabinets.

The other areas, they were of interesting areas, we are addressing those areas directly. What happens is in the order of magnitude in CVF risk which may not, there's where can't add fire plus internals directly.

The numbers are both acceptable but I truly believe the internal events number with the years behind it is a very valid number and I think we're over predicting it to add in fire, so when you add them up if you think of these as hazard groups which is really the way the code does, you're almost giving too much credit for the hazard group of fire

compared to other hazards.

I think the maturity will come there as we address some of these issues and we've addressed them by our modification strategies that we have done at our particular plant but they are not under estimating based on the knowledge, nothing overly surprised me.

CHAIRMAN JACZKO: That's good to hear and I guess I would take your comment to mean giving a choice having to make a modification that would effect an internal event, flooding hazard perhaps, or something like that versus a fire event, the models right now wouldn't necessarily tell you which one is where you would spend your dollars.

But within the fire realm it gives you a relative ranking among the cabinets versus the fire wrap somewhere or something like that.

Mr. GUNTER: Obviously, thank you, one of the concerns that we have is, how do you model accurately reliable human behavior?

And that seems to be certainly one area of uncertainty that I don't think you can underestimate, how people can just simply by error

or by ignorance influence a consequence. I mean I would just challenge that I think that it's a mistake to think that we're -- that these models can be overly conservative when you begin to introduce things like human behavior into it.

CHAIRMAN JACZKO: I have a person on my staff who had some experience in the area of human reliability and the work that's done in the models. It's certainly a very fair point.

I don't know if any of the -- Mr. Canavan -- want to comment on that or anyone on how those issues are incorporated into the PRA models and how that aspect is addressed.

MR. CANAVAN: I don't think I disagree that it's a source of uncertainty.

I think I would disagree that you can't be over conservative in characterizing that performance. The fire scenarios are trained on, they're rehearsed, they're practiced, there is reasonable assurance that they can actually be performed, that there were walkthroughs, it's proceduralized.

This is not just someone deciding one day this is

how they are going to react.

These are actions that are practiced, trained, proceduralized. A note of caution about conservatism is your ability -- if you're conservative in one part of the model your ability to rank within the hazard group or your ability to say that these are my fire issues one through ten can be limited. As a matter of fact one of the outcomes of non-PRA pilots that they're finding out now is that the staff at the plants intuitively know the fire areas that are of concern because they walk and they see all the cables. They say this is the place that we are concerned about.

Then they go off and do a Fire PRA in accordance with the rule set that they currently have and that areas ranked number five.

So there's immediate -- this PRA can't be accurate. What we need to do is if that area is suppose to be number one and its number five because we haven't appropriately credited things or we haven't modeled them correctly, we need to fix the model.

CHAIRMAN JACZKO: I appreciate that and I think this has been a very good discussion and I appreciate you all coming in and sharing your experiences. What we want to have is a process that works and in the end we'll hear from the staff and I'm sure they have some insight to share on their take and how we're going to come to resolution on these issues and this meeting has focused on the NFPA 805 but I think as I said at the outset we are providing alternatives and solution paths in some of these other areas but my experience in the fire area has been that new issues crop up all the time and I think the NFPA 805 provides a framework to deal with those new issues in a way that one off approach doesn't necessarily satisfy in the deterministic areas. I think that's one of the added benefits as we go forward.

I appreciate your being here and would continue to, those who are transitioning, encourage you to continue to transition and those that are thinking about it, encourage you to continue to do that and continue to share your experiences so we can make the process better.

Thank you.

CHAIRMAN JACZKO: I think we had very good input and insight from our stakeholders. Bill I will turn it over to you to start the staff presentation.

MR. BORCHARDT: Thank you, Chairman, good morning. The fire at Brown's Ferry over thirty years ago was a pivotal event.

We heard about it earlier in the presentation this morning. It brought about some fundamental changes to the way the NRC regulated and the industry worked to address the fire issues.

In 1980, the NRC issued Appendix R that back-fit certain requirements. Then in addition the rule provided an exemption process that allowed licensees to seek alternatives to meeting the regulations. That set the stage for creating a wide range of approaches and licensing bases throughout the fleet. As a result of those numerous guidelines, back-fit of regulations and the varying dates of plant operation, each plant licensing basis is unique with

multiple supporting documents and this can make all of our jobs more challenging.

In the 1980's, NFPA initiated work to develop the national consensus for performance-based fire regulation and in 2004 the NRC issued the regulations which was an alternative approach to Appendix R.

Addressing fire protection has been a long, difficult, and resource intensive activity for both the industry and the NRC.

Progress has been made though to improve fire protection and to enhance knowledge about fire hazards.

While there's certainly more work to be done we shouldn't lose sight of the fact that we are in a far better place today than we were 25 years ago.

Slide two, please.

This is the agenda and the presenters for this morning's briefing by the staff and I'll turn the meeting over to Jack.

MR. GROBE: Thank you, Bill.

The majority of our presentation today will be on

the progress we have made and the lessons we've learned in the transition to NFPA 805 the risk informed performance based fir protection requirements. I'll start the presentation with a brief summary of the progress we've made in implementing our closure plans stabilizing the regulatory infrastructure. Next Alex Cline on my right. Alex is the Chief of the Fire Protection branch, NRR and Donnie Harrison on Bill's left. Donnie is the chief of the PRA licensing branch, NRR.

They will present our experiences with the transition to NFPA 805 and then Mark Salley on the far left will summarize.

Mark's the Fire Research Branch Chief in the office of Nuclear Regulatory Research.

He'll give you some insights on our focus area for fire research.

Next slide, please.

In November 2008 the staff prepared a fire protection closure plan.

That plan included eight tasks intended to stabilize

the regulatory infrastructure for fire protection. Just this week we forwarded to the Commission our second semi annual progress report, three of those eight tasks concerning electrical raceway fire protection barriers, regulatory effectiveness assessments and past fire protection identification resolution have been resolved to date. Substantial progress has been made on the remaining five tasks.

Regarding those facilities not transitioning to NFPA 805, the last remaining instability in the infrastructure was resolved on Monday this week. The two most challenging issues for those plants has been operator manual actions and multiple cable faults resulting in spurious operation of equipment.

The regulatory guidance in both of those areas has been clarified in collaboration with industry. Enforcement discretion has told on operator manual actions and the industry has addressed those issues. Enforcement discretion on circuits allow six months from Monday to identify noncompliances, to utilize the guidance in identifying noncompliance situations and then 30 months to resolve those.

At this point I'd like to turn it over to Alex Klein

who will begin our discussion on at NFPA 805 transition issues.

MR. KLEIN: Thank you, Jack. Slide four, please.

What I'd like to do is give you an overview of the NFPA 805 activities.

I'd like to start off with where we are with the infrastructure development for transitioning to NFPA 805.

You've heard a lot of the history in terms of when the rule was issued back in 2004.

A year later, issued a Regulatory Guide 1.205 Rev 0 back in 2005.

Around that same time frame we also received interest from a number of licensees to transition to NFPA 805 and that occurred later on in 2005 and that's how we obtained the two pilot plant Oconee and Harris.

The NFPA 805, I think you heard that also, the standard itself, and I want to stress that, is a national consensus standard and I think that there were some talk previous about the fact that the industry was involved and I wanted to

stress the fact that this was a national consensus standard developed by the NFPA at the request of the staff back in the 1990s timeframe.

There's been a long history in terms of developing the standard and understanding what's in NFPA 805.

At the same time the staff continued its public collaboration process through the pilot plant process from 2005 onward to refine and make adjustments to the Regulatory Guide 1.205. We've done that.

There's draft Revision 1 that the staff has worked on. It's a draft that we will be going to ACRS with within the next two weeks or so.

The ACRS subcommittee we hope to have the revision to Reg Guide 1.205 issued in January 2010. Along with that the staff has also worked to put together a new Standard Review Plan for NFPA 805 plants.

We worked that in parallel with the revision to Reg Guide 1.205.

We've done that in the open collaborative process. We've issued the SRP for public comment earlier this year. We've received comments and incorporated those

comments so that the publication date for the SRP is in parallel with the revision to Reg Guide 1.205.

The staff is also working on a safety evaluation template and that is an effort to put together a document such that we would be consistent and effective in our license amendment request reviews. from the licensees, and of course we're informing ourselves through the pilot plant process when we developed this.

We aim to get this done sometime the second quarter of calendar year 2010.

You heard some talk about inspections also. The staff has been preparing for inspections. As a matter of fact we have a final draft of a post if you will, NFPA 805 plant that the staff has worked on with the Regions.

We've incorporated all the Regional comments. We've incorporated the lessons learned from the pilot plants.

Currently the staff's plans are we're evaluating how we can pilot this inspection, you mentioned that one of the pilot plants indicating an interest so we're

continuing the dialogue with that pilot plant to implement the pilot inspection plan and of course once we've done the pilot inspection plan we will revise the inspection procedure accordingly.

Next slide please.

With respect to the actual pilot plant license amendment request, we received the two pilot plant license amendment requests in May of 2008.

We were informed back then that the license amendment requests were incomplete.

We recognize that it was part of the pilot plant process. This license amendment request, it's a first of a kind, integrated approach with using the risk informed, performance based methodology. The staff has continued to work with these two pilot plants to develop their license amendment request in an open and transparent way.

We've performed on-site regulatory audits at each of the two pilot plants this year.

The Harris plant has completely revised their license amendment request. The staff received the application from the pilot plant about two weeks ago.

We expect the same type of submittal from Oconee near the end of January 2010.

The staff is currently writing safety evaluation report sections for the Harris SER and we expect to issue the Harris SE in the first quarter of 2010 and the Oconee SE in the second quarter of 2010.

Next slide, please.

With respect to some of the lessons learned with NFPA 805, you heard some of the other prior speakers talk about plant modifications, what I want to I guess mention to you is that when licensees transition to NFPA 805 they reanalyze their fire protection programs.

They trace their cables, they look at their procedures, they do a number of activities but, however, it's not just a paper exercise is not just an analytical method that licensees go through. Our experience with the two pilots indicates that the two pilot plants have a better understanding of their risk especially the fire risk in their plants. As a result of that they're making what we believe are substantive safety enhancements in their plants.

They're not just making procedural changes they're actually making hardware modifications in their plant, and I think you heard some examples from one of the pilot earlier this morning.

The other item I want to mention to you and I label it communication, but I want to stress to you what we believe is a success of the frequently asked question process.

We implemented that process several years ago when the pilots were first going through their transition to NFPA 805.

We've addressed technical and regulatory issues throughout this process, we've done it in a very open and collaborative way.

We hold monthly public meetings to discuss these frequently asked questions. Just to give you a flavor we've had somewhere in the order of 47 frequently asked questions and right now there are six that are still open.

We've closed the rest.

You've heard some of the issues associated with NUREG CR 6850.

The staff recognized that some of the issues associated with that, the technical issues that were identified by the pilots and the non- pilot plants, were not achieving timely resolution so we implemented a modified frequently asked question process for the 6850 related technical issues earlier this year.

As of this point right now we have closed out all of the identified 6850 related facts that have been identified by the industry.

There's some follow on paperwork that's still necessary through the issuance of closure memos but the staff is on a path to closure for those.

With respect to planning, what I want to say about that is when licensees transition to NFPA 805 you hear a lot about fire protection that seems to be the operative word but I think as one speaker indicated and rightly so identified that the resources and expertise needed to transition to NFPA 805 is not just limited to classical fire protection. There are many other disciplines involved, for example, fire modeling expertise is

necessary, post- fire safe shutdown expertise, circuit analysis expertise and not to forget expertise in probabilistic risk assessment is necessary.

So an integrated team approach is necessary certainly to transition to NFPA 805.

It's not simply a one discipline approach. The team approach is not only on the licensee side, it's also on the staff side.

Next slide, please.

With respect to the non- pilot plants coming in for the license amendment request as I indicated to you we've had many public interactions and I think something on the order of 50 or more public meetings have been held with the industry over the last several years while the pilots transitioned. I think that the non- pilots have had an opportunity to learn and understand the issues that the non- pilots have been facing and the challenges so we've continued this open and collaborative process.

We believe that the issues are well known that our guidance at this point is well-known.

That our guidance is stable, and that licensees can move forward to NFPA 805.

We believe that some licensees may submit license amendment requests in the early to mid 2010 calendar year time frame with the majority of the license amendment requests expected in the later part of 2010 in the fall.

I now hand it over to my colleague, Donnie Harrison.

MR. HARRISON: Thank you Alex.

Slide eight: I just want to start by saying that we have established the infrastructure for being able to perform quality PRAs, fire PRAs that support decision-making not just for NFPA 805 but for other risk informed applications; that's an important point.

We've done this through an open, collaborative environment. We've had numerous public meetings. We've gone through the various guidance to develop that and create an infrastructure that's also stable so the industry knows what to expect and how to

perform the analysis.

That being said we also recognize that NFPA 805 applications are the first time some of this guidance has been implemented and therefore you are going learn things.

We're feeding those lessons back into revising the guidance, refining the methods and moving forward with again stable guidance for the industry to use.

Next slide.

As Alex mentioned there is this frequently asked question process that we follow to address issues that were raised during the NFPA 805 implementation modeling as issues came up.

At this time of the dozen or so fire PRA related 6850 related FAQs, all of them have been resolved. We have no new issues that have been implemented that are submitted to the process for us to address and again we're just finishing out the paperwork on the last couple of items.

From my perspective that process has worked well to come to a staff position on these issues, so that it enables the industry to move forward.

At the same time, we also recognize that there are some issues, some fire modeling issues that if you want to refine the model you need to do additional research and to support that, Mark Salley is going to talk about more about that in a minute. Again the issue there is if you want to refine the PRA you need to have the technical basis to make those refinements and that's where in some areas we need additional research to collect the data and do the analysis. With that I'll turn it over to Mark to talk about the research.

MR. SALLEY: Thank you Donny, Chairman, Commissioners.

I would like to talk about the Office of Research and the part where we are supporting NRR here. Firstly is how do we do this work. We work off of user need requests. This is where we meet with our colleagues in NRR and they give us their priorities and the things they would like us to do the research on. So that kind of sets our precedence as to how we'll work the research.

The second thing is we like to work in a

collaborative nature, we don't like to go it alone. So where possible we'll look for partners. One you have heard from EPRI this morning where they have similar interests that are of a technical nature where we can pool our resources, we'll work with EPRI and put out joint reports.

We do a number of that.

Second thing is other experts in the government. In the 1960's and 70's there was a fire problem in America that brought a Presidential look at it and the Report "America Burning" came from that. In 1975, the same year we were established, they established a Center for Fire Research out at NIST. So are very tight working with NIST on their fire modeling. They have almost 35 years of fire modeling experience that they help us do our jobs with. We also have a very strong national laboratory program.

Chairman, you and Commissioner Svinicki have both been to Sandia. You have seen the work that we have done and how we are. doing our cable functionality testing out at Sandia. Next slide, please.

Briefly I'd like to just touch on the key areas that we're working in Research right now.

I've heard the term modeling thrown around a lot and its got me confused whether we were talking about fire modeling or PRA modeling, or human reliability, so I want to try to keep it a little tighter into the bounds.

Fire modeling is not unique to NFPA 805 we've been at this for quite a while if you think back into the 1990's when we decided to use the risk information and the STP process was developed we had a change there where we had to teach our inspectors on how to understand fire dynamics if they're going to use the significant determination process. When they had have a finding one of the first things they do is postulate the fire so they need to understand some of the basic fire dynamics.

We ran a three-year program, quarterly workshops with our inspectors and we brought all those lessons together and we issued NRC NUREG 1805 which is our basic fundamentals of fire dynamics for our inspectors. That was in 2004.

We continued on and we had a joint program with EPRI to V&V fire models.

That came together as a report we looked at not one

but five different fire models.

We brought a lot of partners together, EPRI, NIST, NRC and we did five fire models. We followed the national standards, ASTME, 1355.

We looked at 26 different experiments, 13 key parameters.

Basically, it gives you the “War and Peace” of fire model V&V and the fact that its seven volumes long and it's quite in depth.

It addressed a lot of uncertainty.

It went through peer reviews.

It went through ACRS so it was quite a rigorous piece of work.

We followed that up with an expert elicitation where we bought fire modeling experts together and said how good are we and where do we go in the future. What experiments do we need to do and where do we need to work with NIST to improve the fire models. We've completed that.

Currently today a joint team between EPRI and NRC and NIST is putting together a fire models users guide, if you will, a guide to help the plant people and the consultants and our inspectors when they

look at the fire models to make sure that we've adapted to the nuclear environment. That has just finished the peer review.

The guys are finishing the comments up now and hopefully by the end of the year that will be out for public comment.

We have a routine where we do this. We use a lot of peer review and we would like to go for a good sixty day public comments so that we can get everybody's concerns about our product.

That's where fire modeling is and with that I think we'll have a stable base to work on and to go to the next level with fire modeling which we're thinking about now.

The next form of modeling is the fire PRA. You've heard a lot about 6850, it came about in the year 2005 and again it was a joint project between EPRI and the NRC.

The keys were here to get the methods, the tools and the data needed to do a fire PRA.

At the time it was the state-of-the-art so in 2005 it was a very good state-of-the-art document. We're now in 2009.

We now have some experience in using it. We conducted other research and other experiments and the state-of-the-art is moving forward. We're seeing that.

We're seeing that where 6850 is being refined. We've looked at all the different elements of it and the biggest question for me right now is when do we do the revisions because the state of the art will advance. We're seeing that.

That's why we're tracking that right now and we expect to do a revision again hopefully with EPRI as a joint document.

The third activity is experiments. To get the numbers and the data a lot of times it takes an experiment to answer one of the FAQs and experiments don't happen overnight.

Chairman, you just saw some of the work we were doing on cable flame spread and ignition. That's a multiyear program that we're working with NIST and yes, it will answer an FAQ and yes, it will improve the understanding but it will take a little time to do.

The cable functionality testing that's one that we been with a few years and in 2001 NEI and EPRI conducted a series of test and came up with a bunch of numbers and different correlations of how the cables would fail when exposed to fire. We followed that in 2003 with a facilitated workshop. We brought the best minds together and said what have we learned about this and how can we predict this cable response to fire.

From that some unanswered questions came, we followed it up with a cable program. We went to Sandia. In 2008 we completed that and we got the answers to those questions so we have a pretty good handle on the AC response, AC circuit response to fire.

As a byproduct we also developed the improved fire modeling tool where we can do the one dimensional heat transfer to get a better, more accurate prediction to cable failure.

Finally, the third piece is going on right now and that's been a change from an AC circuit to a DC circuit, how does that affect it?

This testing will complete at the end of the year.

Earlier in the year we will come up with a report and then we'll move into another facilitated workshop approach to see how we've advanced.

The final thing is knowledge management, we've got 35 years of information of history we're starting to collect that.

You've seen the Browns Ferry NUREG brochure this year as well as one on fire research.

With that I will turn it back over to Jack.

MR. GROBE: Thanks Mark. Just a brief summary. In the past several decades there has been very significant improvements in fire safety at nuclear power plants.

For the non-805 plants the staff has worked very closely with the industry and our external stakeholders and the regulatory infrastructure for those plants is stable and predictable. Those issues have been resolved.

We've collaborated closely with our external stakeholders to stabilize the infrastructure for 805 transition. The pilots are nearly complete, we believe that that's sufficiently stable to move

forward with 805.

As we move forward for any additional questions that come up we have an effective process, the frequently asked questions process and a robust relationship that Mark just described with the industry to resolve any necessary research issues that are important to answering frequently asked questions.

As with most of our activities since we've implemented the closure plan, we completed one ahead of schedule.

That completes the staff presentation, we're ready to answer any questions.

CHAIRMAN JACZKO: Thank you for sharing your thoughts and insights we'll start with Dr. Klein.

COMMISSIONER KLEIN: I think the staff should be complimented on all of their progress on the fire protection all the way to the research that's always a fun part to do and to the results of doing all the regulations and inspections. I guess, Jack, just to start with you in terms of the technical issues in regarding the deterministic

process, are there any technical issues that need to be resolved for the deterministic approach?

Mr. GROBE: We're not currently aware of any.

The final issue was the multiple cable faults spurious operation issue. That resolution methodology is well understood by both the staff and the industry and has been piloted at one plant. We're not aware of any technical issues with respect to the deterministic approach.

Mark highlighted a very interesting issue with respect to DC circuit failures. We're staying very closely connected with what research is learning in that area. That might be something that precipitates some further action in the deterministic area but as of right now there is none that we're aware of.

COMMISSIONER KLEIN: Thanks. Alex, you heard from the first panel, there is some interest in the inspection program for the NFPA 805 and you talked about that you're working with a plant, how are you communicating that to the

industry; is there good communication channels on how do you intend to inspect; and then how do you take lessons learned?

MR. KLEIN: As I indicated Commissioner, the inspection procedure is draft final, right now, we have not shared it yet, with the public, so therefore the non- pilots are not aware.

We are evaluating what our plan should be what the next step should be with respect to that inspection procedure and piloting it with the pilot plant. We certainly do intend to share it with the public and with the non- pilots.

We will do the this entire process in a very open and collaborative manner with the industry when the staff has made the determination that we can release the inspection procedure to the public.

COMMISSIONER KLEIN: Thanks. Well I had visited Shearon Harris several months ago and was very impressed with the thoroughness of what the staff has done and the industry in regard to the fire protection in their activities to NFPA 805. Are you able to quantify the safety values that they

have achieved in terms of actions they've taken in other words we always look in numbers, as a regulator so when you look at all of the things that they've done, are you able to quantify that?

MR. KLEIN: I'll ask Donnie to chime in, in a minute because I'm more of a classical fire protection engineer if you will and if I could answer from that point of view.

From my understanding from the modifications that the Harris plant has made, one of the ones that I would bring forth that Mr. Donohue did not mention was their work in the application of the material called mega cable which provides a three-hour fire barrier in their plant without using any fire wrap material.

My understanding is that the Harris plant has implemented this modification and put in hundreds of feet of this material if not thousands and my perspective is that when a licensee puts in hardware modifications such as incipient fire detection to me that is a benefit to plant fire safety. In terms of quantification, Donnie could probably better

answer that question.

MR. HARRISON: I'll start by quoting the Harris representative they said they had a 20% reduction in their fire core damage frequency so there's that quantitative amount, but the one thing I would stress is that synergistic benefit like the reactor coolant pump seal injection, the alternate seal injection capability that they're adding. It's not just improving the fire risk it's improving the overall plant risk and that is a big benefit. One last thought would be, you can't quantify the benefit associated with the enhanced knowledge. They've learned a lot about their plant about where the risks are, where there are areas that they need to focus attention on. The one good thing with a fire PRA, it's an integrated tool and it brings that clarity to focus even if you're arguing that it's somewhat conservative it still focuses in on those areas that are important to look at and you can't devalue that knowledge. It's an important aspect that were gaining through NFPA 805.

COMMISSIONER KLEIN: Well this may be a question either for Bill or for Jack there are I

believe over 50 plants that indicated that they wanted to look at transitioning to NFPA 805, do you think they'll all proceed down that path?

MR. BORCHARDT: I wouldn't hazard a guess myself. I think that we are hearing varying degrees of feedback from licensees.

They're still interested in the pilots ultimately play out and I think there's a lot of individual decisions to be made.

COMMISSSIONER KLEIN: Any staffing issues related as we move forward?

MR. BORCHARDT: For NRC?

COMMISSIONER KLEIN: Yes.

MR. BORCHARDT: None that I know of.

MR. GROBE: No, none.

The Commission adopted budgets for 2010-2011 that included additional resources.

One of the reasons that the staff generated the Standard Review Plan and is generating a standardized Safety Evaluation Report is anticipating significant workload in the fall.

We're going to be effectively integrating contractor

resources along with our staff resources to get that work done, so we're in good shape.

COMMISSIONER KLEIN: Are you going to stage the applications that we've received and then the review of those or how are you going to handle the workload?

MR. KLEIN: The SECY Paper that we had submitted to the Commission about a year or so ago Jack mentioned, the additional resources that were given to the staff.

We did mention an approach where we would then take a look at -- if we did receive 15 to 20 of these license amendment requests all within a span of a week or so, or what have you.

There is a process the staff would go through to determine which ones we look at first and we used examples such as where that licensee may stand with respect to the quality of their submittal, where they stand in line with respect of the next tri-annual fire protection inspection and any other issues that the staff may be aware of at that particular licensee.

COMMISSIONER KLEIN: Thanks, well moving

onto the research aspect how much does the NRC typically spend a year on fire research?

MR. SALLEY: That varies, right now we have approximately ten FTE that are in the fire research branch. We have ten individuals that are working all the aspects of the fire modeling, the fire PRA, and the experiments. The budget numbers vary depending on if we have experiments or not.

We typically run in the 4 to 6 million. Obviously, when we're doing a lot of experimental work that costs a lot more money.

COMMISSIONER KLEIN: In terms of the research activities, what would you list as number one on what we need to do in research in the fire protection area?

MR. SALLEY: They're all number one with me, but the fire PRA seems to be the big challenge when you look at the different communities the fire modeling group tends to work pretty well together. There is a fire HRA group that is also going, but the larger fire PRA is the one we need to focus in on right now.

COMMISSIONER KLEIN: Great, thanks, no

further questions.

COMMISSIONER SVINICKI: Thank you I would return to a topic I was looking at the transcript from last year's meeting and I had heard about some training on the broad issue of the human capital challenges in fire PRA and making sure that if there was going to be a concentrated industry focus that they would have folks trained and if the transcript is accurate I was informed that there was a course jointly offered by NRC and EPRI and I think it was for people that were already somewhat expert in PRA and they could do a module on fire PRA. Do we still participate in that and could any of you react on any of the human capital challenges. Have we trained folks and made visible progress from last year's meeting.

MR. KLEIN: If I could respond first and I'll ask Mark to please respond In terms of staff training, the staff does participate in this training. When we receive new staff members into the branch we develop a training plan with them and identify the training needs for that individual based upon prior knowledge and expertise of the individual and we do send those individuals to the training that you speak of Commissioner, with the, under the joint

effort with EPRI and Research and that's why I wanted Mark to perhaps make some remarks about that effort.

MR. SALLEY: Along with EPRI when 6850 was published we recognized that you couldn't just publish it and walk away from it, the training aspect needed to take place.

Under the same EPRI and NRC Research MOU twice a year we hold the training.

We alternate the years, one year EPRI will take the lead, the second year we will take it.

It's held for free because they're working with us so it's kind of a public meeting type of atmosphere. But the training is fairly involved, it's a full week and there's three separate classes one on the PRA HRA aspect, one on the fire and fire dynamics aspect and the third thing is the electrical engineering, the systems aspect.

We just finished up this past year, it was EPRI's turn to host it, they did one in Palo Alto, second one was done in Richmond.

Next year will be the NRC's turn and it will be holding them probably up in this area two times.

It's well received.

We're typically getting over a hundred people both from the regulator and from the industry and we're also seeing international involvement, typically nine to 13 people will come from different countries to attend this.

COMMISSIONER SVINICKI: Thank you for the fuller description. You mentioned my visit to Sandia and I did have the opportunity to see NRC's fire research there with Brian Sheron who heads our Office of Research.

I don't want anyone at the table to take this the wrong way but people who spend their entire careers studying fire have some interesting personalities. What it left me with on a more serious note is, there's a lot of phenomenology and a lot of behavior of fire. If it's not your field I think you kind of take for granted that it's just kind of a chaotic phenomenon and that how much have you studied it for a long time could you really come to a good data set about behavior and actually there is a lot we do know it isn't as if there's

ignition and then it goes wherever it wants to. It was really fascinating to spend that time and understand about flame and flame behavior and just all of the components here but it also leaves me with a deeper understanding of the complexity of these issues so with the previous panel or as you talk about resolving issues. Mark, you'd mentioned something that I had heard about in a few years but I think maybe is sometimes underutilized which is the expert elicitation process. I think it can be really valuable in a field like this in directing research in the most productive -- again you mentioned the user needs process and we do need to be driven by what the needs are we just can't explore issues because of their interest to us as a regulator we need to have an application for what we fund but I think expert elicitation and I think you talk about a facilitated workshop which would be a great environment to come up with the plans and constantly re-examine what are the issues that we need to resolve.

We heard a little bit from EPRI in the last panel.

They had a very extensive list so when I compare that, Mark, against your statement of being responsive in the Office of Research to the user needs process, EPRI has this larger universe of things that need to be resolved and looked at with that.

So I suspect within that there are things that are appropriate for us to cooperate on and other things probably that the industry should more directly fund and might be near-term issues that it would benefit them to resolve.

So I don't really think there's a question in there anywhere but I appreciate, again I spent some time recently on the research aspects of this question and appreciate that you're driven by the processes the user needs process and that it's just a very complex question.

So I don't know if there's anything more generally about moving forward in the future that you would like to add to that, again I saw that cable testing, saw some of the large-scale facilities that they have at the national lab to do fire testing and they of

course do a lot of work to the military as well on related questions.

Is there anything going forward, Dr. Klein asked you about staffing and resourcing in Research but over the longer term, do you think we kind of have the size and scope of program that we need?

MR. SALLEY: The Office of Research pays a lot of attention to the fire research and I think we're where we need to be. .There’s going to be work, there’s going to be refinement. I think the low hanging fruit we've already picked so we now need to get into the more refining of the process and that's where we're focusing now. Case in point is the flame spread. There is a method in 6850 and when people do use it yes the fire does seem to move a little too fast and it's a first order principal type of approach so it is conservative as people would say, we need to study the phenomena of the cable trays burning and get more research done on that so that we can refine that and feel comfortable with it. Those are the kinds of things we're working with now.

Fire modeling, too, we look to advance it, we want to push the state-of-the-art.

Hopefully we will get into a cycle of five year where we're refining this and we'll continue to refine our skills, that's our goal.

COMMISSIONER SVINICKI: Thank you. Thank you, Mr. Chairman.

CHAIRMAN JACZKO: Thank you Commissioner Svinicki.

Jack maybe I'll ask you or Alex either one of you want to answer this, you did send us up earlier today, or yesterday, the update on the closure plan. One of the big changes of course is the movement of the completion date of the two pilots further out in the future and certainly there are a lot of concerns expressed this morning and I think fair points about some of the challenges and uncertainties about the work that we're still doing.

What should make the Commission believe now that the dates that we now see in the closure plan, are going to be met this time?

MR. GROBE: I think the most important thing is that with respect to Harris all the

questions have been answered.

The licensee has incorporated all the effort from the past year and a half's work into a revision of the license amendment request and we're actually writing the safety evaluation report.

It's frequent that in the course of writing safety evaluation report the reviewer will scratch his head and say I still got this one thing that I need to get nailed down.

So it wouldn't surprise me if there's a few additional questions but essentially the work is done.

Now it's just writing a report and that the lengthy process. The licensee would then once we complete the report have 30 days to review it for accuracy and proprietary information then it goes to tech editing so just the issuance of that takes 8 to 12 weeks.

So we're done essentially with Harris except for the paperwork.

The same thing would apply to Oconee but starting roughly in January.

They anticipate finishing the last of the answers and resubmitting a license amendment request that incorporates all the information in one place and then we'll be writing the Safety Evaluation Report. So we're certainly rounding third and heading home.

CHAIRMAN JACZKO: It's good to hear. I think as I said earlier this will be a good enhancement to safety in having these first license amendment requests completed and certainly decisions on those will perhaps give us a the way to document that.

Mark, this is a follow on a little bit of what Commissioner Svinicki was asking and Dr. Klein had asked as well.

EPRI did have a list of items, I think Commissioner Svinicki hinted at this, some of those may be appropriate for Entergy, some of them may be activities to do in collaboration. Do you have a sense of that particular list, is that something that you worked with EPRI before, is it a new set of information or do you have a sense of how our research activities will coordinate with those?

MR. SALLEY: I had not seen that list before that was an EPRI list, to me it looks like a

bunch of opportunities.

CHAIRMAN JACZKO: I should've never ask an open question like that to researcher.

MR. SALLEY: We also have a list, and what we will do under the MOU quarterly or at least biannually is what we're trying to get at, we'll sit down with EPRI and Ken and I, for example, will compare notes and we'll sit down and say what are you doing, what are we doing? Which ones can we do together to get the maximum effect and which ones do you need to do separate and we need to do separate, so there's a lot of communication.

The DC testing was one, for example, that we started alone and we started moving and getting it in process and talking with Ken, NEI, and the industry and say that we'd like to contribute, we'd like to give you some of the cables to test. We'd like to take part of it and we amended the MOU and we brought them on as a partner.

There's also the intellectual part, there's some very good consultants that work for them that we can also bring in.

Doing a joint project is always harder than going it

alone because you have the two groups so it's much more of a challenge but I think at the end of the day for the end-user it's better that we work together when we can and get a single product and not have competing methods where we fight about the third decimal point, we look at the larger safety issue.

CHAIRMAN JACZKO: Thank you. We heard a lot this morning and the title of this meeting was lessons learned from the Harris review and we certainly heard a lot I think this morning from Shearon Harris themselves about some of the lessons and the challenges, where would you say we are at this point in incorporating those lessons, and the staff you talked about the new Standard Review Plan, you talked about Reg Guide 1.205. Is that where the staff would say right now we've documented those lessons learned or is that still have to be processed a little bit?

MR. GROBE: I think there's two locations where the lessons exist today, one is in the results of the FAQs (the frequently asked questions) and the second is the revision to Reg Guide 1.205.

That revision is essentially complete and it's been a collaborative process. Both the industry and NRC well understand the changes in that revision. We're meeting with the chairman of the ACRS subcommittee to make sure that there's no outstanding questions that they have that we're unaware of.

We anticipate -- Alex said January -- I'm still pushing for late December to have that on a street as a final document.

It has gone through extensive industry comment so the two sources of lessons learned are the facts and the Reg Guide..

CHAIRMAN JACZKO: I think the reasons for the lessons learned is to make it more predictable and I think easier for the subsequent applicants to know exactly what information they need to include in their applications as they go forward. As this process improves, how long does the staff think it will take to do perhaps the nth review for a license amendment request in this area, perhaps we're there already, maybe we need a few more iterations of reviews to better understand what the challenges are?

MR. KLEIN: The staff's estimation right now for the initial license amendment requests that are coming in sometime next year is anywhere from one to two years.

Of course as we learn, as we progress, as we refine, as we better understand things we think that by the time we get through the nth plant license amendment request that the timeframe would be something less than one year.

But that's a prediction on my part, looking at my crystal ball but I think given the number of license amendment requests that are coming in initially and given the staffing that we have and the resources available that we'd be able to turn around a license amendment request for the nth plant on something on order of one year or less.

CHAIRMAN JACZKO: I think the last question and this Donnie might be a question that you can answer.

One of these issues that came up earlier is the comparability of the fire PRAs to the power PRAs, the other internal event PRAs we have.

In your sense, when do you think that will get all of those to a common or to a level which within a particular plant that the fire PRAs will be comparable to the other internal event PRAs and be able to be used in a comprehensive way or consistent manner.

MR. HARRISON: I guess I would answer that in two different directions, one would be you have to take the application to the context of what the decision you're making.

We've heard a lot of comments about conservatism and bounding approaches.

It's not like there isn't conservatism in internal events PRAs, there are, however they usually don't drive the decisions therefore you can live with them and so you have to look at the decision you're making and if you can use the guidance that we put out, work collaborative with the industry to develop and you are able to come up with risk results that support making decisions going forward than you can live with those models the way they are.

So that's one part of the answer. The other thing is when we wrote Reg Guide 1174, which is the risk informed decision making guidance document, the acceptance guidelines in there require that you use a total CDF or a total large early release frequency value so it was recognized in the late nineties that you needed to be able to reflect on that.

If you didn't have a PRA you were supposed to have to look to see if your IPEEE had vulnerabilities that would make you question if you were higher in a risk area than you were. With the development of fire PRA methodology refinements and enhancements we'll have actually a clearer answer to that question.

We won't have to rely on a subjective evaluation of the IPEEEs, we'll actually have results that we can look at.

That will actually make the decision making process smoother.

So I guess that's how I would answer your question.

MR. GROBE: Donnie, I'm glad you brought that up.

805 is just another in a long line of enhancements, PRA enhancements, to our regulatory processes.

There's two initiatives on the table today. It's the risk informed applications for allowed outage times in the tec specs as well as the surveillance frequencies.

Under Reg Guide 1.200 Revision 2, that's the Reg Guide for doing PRA, when licensees come in for those they're going to have to have an integrated internal and external events PRA which not only includes internal events and fire but also includes seismic. Fire and seismic are the two biggest challenges today. So those will all have to be melded together and I anticipate in the next year to two years that we're going to be getting a number of applications for those tec spec enhancements which will integrate fire, seismic and internal events.

CHAIRMAN JACZKO: I think it is one of the side effects of the NFPA 805 transition that should help those plants move along more quickly on having their fire PRA.

The last question I have, and again this is for anyone who wants to answer.

This is arguably a more complex way to address fire

protection. I'm always reminded that Appendix R is somewhat simple. I can remember the three basic requirements, the deterministic requirements in the regulations. Every time I read NFPA 805 I learn something new.

How are we going to make sure that we are able to communicate these results to the public? I think that there were comments earlier about that and I think that's a fair point and make sure that the public can understand the decisions that we're making and understand how we're fulfilling our responsibilities there with a much more complicated framework. I don't know if anyone has any thoughts on that.

MR. GROBE: Mr. Gunter raised two very important issues. One is making sure that you don't apply the models outside of their capability and we're very focused on that and the second is the more complex your analytical approach gets the more difficult it is to explain it to the public.

Fire is one of the areas where we have one of the most advanced websites.

There's a multitier website with high level questions and then you can drill down in any

particular area to more detail or more detail. That's been a collaborative effort between, NRR, Research and our Office of Public Affairs to make sure that is a user-friendly approach to the public gaining information about how we do fire protection regulation.

So it's one of, I think, our most successful initiatives from the standpoint of making the most effective use of our web resources.

CHAIRMAN JACZKO: I think that is certainly one tool and I encourage the staff to continue to find ways to make sure that we can communicate this because I think is a very fair point that as these things get more complicated they get harder to explain, and perhaps internally as well.

Any other comments or questions?

COMMISSIONER KLEIN: Again I would like to summarize and compliment the industry and the staff for all the efforts that have been put forth on fire protection.

I think while NFPA 805 was probably more challenging both for the staff and industry than you expected

when you started down the path, I think the bottom line is that the plants are safer, we know more and the public is better protected by the actions that you all have taken.

Thanks for the hard work.

CHAIRMAN JACZKO: Thank you very much that concludes our meeting and we certainly look forward to the staff continuing to make progress and continuing to work on engaging, improving the areas where we have some uncertainties and continue to refine the models and the tools that we have.

I appreciate the staff effort.

Thank you.