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BRIEFING ON GROUNDWATER TASK FORCE

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TRANSCRIPT OF PROCEEDINGS

Public Meeting

Before the U.S. Nuclear Regulatory Commission:

Gregory B. Jaczko, Chairman

Kristine L. Svinicki, Commissioner

George Apostolakis, Commissioner

William D. Magwood, IV, Commissioner

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APPEARANCES

Panel:

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Maria Korsnick
Chief Nuclear Officer, Constellation Energy

Patrick Mulligan,
Conference of Radiation Control Program Directors

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P R O C E E D I N G S

CHAIRMAN JACZKO: Good morning, everybody. This is I think a meeting that's a culmination of a lot of, a lot of hard work by the staff, by different stakeholders. For a number of years now, the agency has dedicated increased attention to radioactive contamination of groundwater, other water sources near nuclear power plants. These actions, as well as those of our licensees, have been subjected to a very high degree of scrutiny by the public, elected officials, and other stakeholders. And one sign of the high level of public interest is that the most widely viewed, it's an interesting statistic; the most widely viewed archive Webcast on the NRC's Website, at least according to modern records, is, or was, the April 20, 2010 Groundwater Contamination Workshop, and it had over 2,000 viewers.

Now, while the agency has concluded that the leaks to this point have not endangered public health and safety, we have tried to be proactive in identifying potential ways we can improve our efforts in this area. In 2006, the NRC created a special task force to conduct a lessons learned review of leaks at several power plants. That review led to more than two dozen recommendations, many of which have been incorporated into agency guidance today.

In 2009, the NRC followed up with these efforts by establishing a Groundwater Task Force to review the adequacy of the agency's oversight in this area. And that's the subject of today's meeting. So during the meeting, we will be looking, in part, at the NRC's senior management review of the task force recommendations, as well as hearing from a broad range of stakeholders on this issue. So I thank everyone for being here, and thank the staff for the work that

they've done to, I think, do a thorough look at our current status, and the senior review team for their look at this and the possible recommendations for Commission action.

I'd suggest, before we begin, if any of my colleagues would like to make any remarks? OK, well we'll begin, then, with Mr. Meister, who is the Vice President, Operations Support at Exelon Generation Company.

MR. MEISTER: Thank you. Good morning Mr. Chairman, Commissioners. As stated, I am Vice President, Operations Support, for Exelon Nuclear. My position, one of my responsibilities is for environmental organization, and as such I am the executive responsible for our Groundwater Protection Program. Today I will present the industry perspective on the Groundwater Protection Program, and Maria Korsnick will present the industry perspective on the Buried Piping and Tanks Initiative. Next slide, please.

NRC required programs for nuclear power plant licensees to monitor, control, and assess radiological releases, and to monitor the environs around the plants are comprehensive, robust, and transparent. The requirements apply to all releases, including routine effluent releases and any unintended releases, should such releases occur. Every plant issues two public reports each year documenting all the data and results; the annual Radiological Effluent Release Report and the annual Radiological Environmental Monitoring Report. Based on the operating experience from some unintended releases, including one at our Braidwood station, the industry developed our voluntary Groundwater Protection Initiative, which is contained in Nuclear Energy Institute Report NEI 07-07. Next slide, please.

Every nuclear power plant has publicly committed to the

Groundwater Protection Program that is spelled out in NEI 07-07. The initiative builds on existing NRC requirements to enhance the effectiveness of monitoring, assessment, and response to unintended releases. The goals of the initiative are to prevent unintended releases from getting offsite and to enhance the openness and transparency for the public, for local and state officials, and for the NRC.

I've summarized the key objectives of the Groundwater Protection Initiative into three categories; actions to characterize and monitor the site and our equipment, and take action if a release is identified by our monitoring; actions to engage all of our stakeholders; and continuing assessment of the program effectiveness.

An important element of the Groundwater Protection Initiative includes the conduct of self and independent peer assessments every five years to assure ongoing program effectiveness. Next slide, please.

The initiative was adopted unanimously by industry chief nuclear officers in May, 2006 through a written balloting process under the auspices of the Nuclear Energy Institute. Initial industry guidance for the initiative was developed and implemented industry-wide in July, 2006. The guidance was updated in 2007 to reflect lessons learned. The Electric Power Research Institute, EPRI, issued supporting technical guidelines in early 2008. Final implementation was completed in December, 2008. Independent peer reviews of the implementation of the initiative were completed for all plants during 2009 and 2010. Next slide, please.

The Industry Groundwater Protection Initiative has become fully integrated into our plant operations. Like all else we do in that regard, we continue to review operating experience and lessons learned, share best

practices, and update the guidance as appropriate. We continue to use EPRI to develop technical guidelines to help the stations consistently implement the commitments of NEI 07-07. EPRI issued two technical guideline documents in December, 2010; one that contains best practices for evaluating remediation options, and one guideline for modeling the transport and deposition of tritium from licensed airborne effluent releases. In June of this year, we will hold our annual, two and a half day, Industry Groundwater Protection Workshop, and we are scheduled to start our second round of independent peer assessments in July. Next slide, please.

In January of this year, NEI transmitted a summary report of the results of the baseline independent peer assessments conducted for all plants in 2009 and 2010. Beginning later this year, we will initiate a staggered cycle of independent peer assessments, so that we cover approximately 20 percent of the plants each year. The peer assessments utilize the 11 objectives and 43 acceptance criteria from NEI 07-07. The assessments are designed to be challenging, with emphasis on identifying areas for improvement and best practices. All noted gaps or areas for improvement are addressed under the respective site's Corrective Action Program.

On this slide, I have highlighted the four generic areas for improvement identified during the baseline assessments. Note that two of these areas for improvement, those regarding remediation and tritium transport modeling are being addressed by EPRI technical reports that were issued last December. The item on the SSC inspection and testing is being addressed through the Industry Initiative on Underground Piping and Tank Integrity that Maria will discuss. To address the fourth item, best practices on the evaluation

of work practices, will be shared at this year's annual Groundwater Workshop. Next slide, please.

Considering recent and historical operating experience, we conclude that the current regulatory framework does assure adequate protection of public health and safety, and no significant changes are needed. The nuclear energy industry is effectively implementing the Voluntary Groundwater Protection Initiative to address our commitment to environmental stewardship, openness, and transparency. We agree with the NRC staff and senior management that there are substantial opportunities for improving the clarity and consistency of communications on this issue, which is of high interest to our stakeholders, while of little or no safety significance. Next slide, please.

In response to your request, I will provide some information on Groundwater Protection Program activities at our Oyster Creek station. Leaks in underground piping at Oyster Creek were identified in April and August, 2009 through our monitoring under the Groundwater Protection Program. Upon discovery of the leaks -- upon discovery, the leaks were isolated and repaired. We confirmed that there were no significant health risks to our workers or the public. Oyster Creek used various tools to communicate frequently and openly with local stakeholders, and state and federal regulators. I've summarized some of those communication tools we used on slide eight. Next slide, please.

Exelon weighed inputs including the age of the plant and piping, amount of buried piping, site conditions, and stakeholder input, to determine our mitigation approach. Based on our assessment of these factors, we implemented a unique approach at Oyster Creek in 2010. Our approach used a combination of several mitigation techniques, as shown on slide nine, to replace

or protect the piping carrying licensed material at Oyster Creek. This work completed in 2010. Next slide, please.

Exelon is implementing the Industry Initiative for Underground Piping and Tanks at all of our stations. Our condition assessment is in progress at our stations in accordance with schedules established under the Industry Initiative. Asset management of the applicable components will be in accordance with the industry initiative. Thank you for the opportunity to discuss the Groundwater Protection Initiative with you today.

CHAIRMAN JACZKO: We'll now turn to Maria Korsnick, Chief Nuclear Officer, Constellation Energy.

MS. KORSNICK: Thank you very much. I'm going to brief you today on the Industry Initiative for Underground Piping and Tanks Integrity. We can go to the first slide, please.

I want to acknowledge that across the industry, we have had examples of buried piping, and leaks in that buried piping. And we acknowledge as well that that can be an environmental concern, especially leakage of radiological fluid, is clearly a public confidence concern, as well as a concern to us on the site. One of the things that we did as an industry is to step back and say are we, as an industry, sufficiently learning from each other for the leaks that are occurring. And, in fact, we lowered our threshold for reporting of leaks. So in the past, if you had had a leak on a non-safety-related system, and something that had occurred at a plant, it isn't, you would at a plant put that in your Corrective Action Program, but not necessarily something that you would have shared with the industry. So one of the things we wanted to do very much was to make sure that we lowered our threshold for leak reporting across the industry, to

maximize our learning. And we've done that. And the initiative that I'm going to speak to you today highlights that.

To date, we have not had any significant safety or radiological concerns, and so very much, we wanted to put this initiative in place in tandem with the Groundwater Initiative that you just heard about, to make sure that we had, sort of, a proactive piece to it. So we did, as an industry, pull together the chief nuclear officers, and voted to approve an initiative in November, 2009, the Buried Piping Integrity Initiative. The goal of this was to provide reasonable assurance that we had structural and leakage integrity of buried piping, with a special emphasis on piping that contains radioactive fluid. And I'll speak to that, as you see, the initiative has a front-end risk ranking, and something that would contain radioactive materials would have a higher risk ranking, which means it would -- something you would pay attention to first.

It does build on the Groundwater Protection Initiative that you just heard about. It's the proactive assessment and management, helps us share our operating experience. It's also helping us drive inspection and analysis technology. So we're working very much with EPRI, working on inspection technologies that will help us in the future, to inspect the pipes. Next slide, please.

The Buried Piping Integrity Initiative applies to all buried piping that's in direct contact with the soil. Again, from an operating experience, we took a look after we approved this initiative, and found that we had some examples across the industry where, in fact, we had leakage in pipes that were in vaults. We had not considered that when we had first put the initiative together. We had talked about it in direct contact with the soil. And so, we also spoke

about, well, the pipes are generally connected to things. In some cases, they're connected to tanks that are also underground. So we looked and that and said, "Well, if we're looking at the pipes, we should also be concerned with the tanks." So these are some things that we challenged ourselves with after the original initiative was approved, and based on that, we formed a revision to the initiative.

So in the next slide, it talks about the expansion of the initiative's scope, and from that, we've added the underground piping and tanks, whether or not it's in direct contact with soil, if it contained licensed radioactive material, or it was safety-related. Again, this was meant to encompass the piping that might have been in a vault, et cetera, and we wanted to make sure that it was also being given due course and inspection.

So we renamed the initiative the Underground Piping and Tanks Integrity Initiative, because we also added the tanks to that. And so, so what's the point of the initiative? If you go to the next slide, the initiative provided a framework for the industry to put in a comprehensive program. It was a very purposeful approach to first establish that you had the right roles and responsibilities in your organization. We do that through procedures and through oversight of the program.

The next step was to do risk-ranking and prioritization, so that you would make sure that we are putting the right emphasis on the right resources on the piping that would be of most interest, and this is not only the material that's in the piping: it's also what the piping is made out of; it's also what the soil conditions are around the piping, cathodic protection, whether you have it, whether you don't. So there's several different factors that are looked at that you would evaluate. Based on that, you'll put together your condition assessment

plan to provide reasonable assurance, then implement the plan.

This is really meant to be not a one-shot deal. This isn't something that you do once and you say, "Now we're good." It basically rolls into a long-term asset-management plan, so it's basically a way of doing business. You need to build it in to the foundation of the running of your plant. So it's a very purposeful approach to develop these strategic plans, and provide opportunity to build it into your business plan.

The next slide shows, in fact, how we are tracking our progress, so it sounds good that we have an initiative; how do we know? We have, within this initiative, our reporting criteria, so all of the chief nuclear officers have bought into the fact that we have this initiative, and there is a routine report out to this group of chief nuclear officers that talks about the status of this initiative. This graph is a little hard to see the detail behind you, but I'll just explain what it is we're looking at.

Each milestone has two bars, and what the first bar is is what the status of the initiative was six months ago, and then the second bar is what the current status is, so that we can see in progress where you were, and then where you are today. If you see a green color, then that means that all of the plants have in fact complied, so you can see on the first bar that said "OK, have you established the roles and responsibilities and procedures and oversight?" Everybody has met that milestone, and they met it on time. As you progress forward, you can see in some cases a smaller green section colored in. That means some plants have already reported that they've completed that milestone in the future. If it's white-colored, that means all the other plants have reported that they're on track to complete that. If you see anything other than white, and

in one case I think you can see a small amount of yellow, that means a plant has reported that they're challenged to meet that milestone, and that particular case where you can see the small yellow bar; the challenge there is, they're looking for more guidance around reasonable assurance, and that is something that we're working currently with NEI and EPRI to provide more industry guidance on reasonable assurance. So I share this with you, not so much that you need to look at all of the detail on the slide, but to show that in fact, we're very much monitoring the industry progress relative to the completion of this initiative, and it has this level of granularity, and it's getting reported out to the chief nuclear officers.

So in summary, I would say that it's essential that we ensure that resources are directed in a manner consistent with safety significance, and we feel that this initiative allows us to do that. Through the risk-ranking process, we're making sure we're paying attention to the most important stuff first. We do feel that the existing regulatory framework is adequate, and that the Underground Piping and Tanks Integrity Initiative actions in fact go beyond what's necessary for public health and safety, and we have full buy-in across the industry to do so. Thank you very much for being able to address you this morning.

CHAIRMAN JACZKO: Thank you. We'll now turn to Patrick Mulligan, who is with the Conference of Radiation Control Program Directors.

MR. MULLIGAN: Morning. I want to thank you for the opportunity and the invitation to come down here and present you a state perspective on groundwater protection, and I do want to thank you, also, for the resources that you've thrown at this issue in order to investigate and make some changes and provide some better assurances for future issues. In reading the Senior

Management Review Guide and looking at the statement that was made that the NRC is accomplishing its stated mission of protecting public health and safety, I absolutely agree with that, and we realize that there has not been a public health risk and there's been a lot to do, investigation with all of the leaks to ensure that that has not happened.

With regard to protection of the environment, I might have to take a little issue with that, because we know that the, if you go to the next slide please, the NRC release standards are based on dose, and that's out of 10 CFR 20 limits, and applying that method alone, I don't know whether or not there'd be many instances where tritium leaks would be called a concern, because it would never rise to the level of a public-health risk, but from an environmental perspective, the EPA water-quality standards are based on environmental protection, and many of the states have adopted these standards in applying concentrations of hazardous materials in groundwater, so we are using EPA standards in the State of New Jersey and many other states do, so that is not the same standard as the NRC uses for assessing groundwater protection.

And we would ask along with that -- and I think the NRC's been very cooperative in this respect, in that, not to preempt any state actions in taking action with a licensed utility to talk about groundwater standards and drinking-water quality standards and taking action at the state level, based on state regulation and action. So we would ask that that process continue; that you not preempt any state actions in trying to enforce its own regulation for groundwater. Next slide, please.

As far as maintaining barriers, I think at the core of this particular issue, this is where the NRC could make the greatest impact. Obviously, I mean,

I'm a strong believer that prevention is the best way to address this issue, and that more can be done, I believe, in order to ensure that buried piping is safe, and there's a number of suggestions and I think that some of these have already -- are being looked at. Taking a look at more stringent controls on materials coatings and inspections of underground piping, I think that you're already taking a look at some of those things, looking at the ASME code for that. And the point we like to make with the state is, you know, that is non-safety related does not mean it's any less important, and that the same standard should be applied to the non-safety related piping as is related to other safety-related piping, particularly when it's carrying licensed material.

We found, in some instances, that poor record-keeping and improper application of pipe coatings in the past have led to issues, whether we had leaks in some pipings and we think that a little bit more can be done to ensuring that during inspections, we take a look at historical records and coatings to verify that, in fact, we understand what the coatings are that are on the pipes, and the materials that are in the ground; if modifications have been made, to in some way verify that we understand what those modifications mean for the future. And we'd like to, and I know it was already mentioned, but the project that I know intimately about is Oyster Creek, and they did a lot of work at Oyster Creek to evaluate the underground piping, and went through great expense and worked to bring that underground piping either above ground, or put in vaults where it could be, you know, for future that we're pretty much assured that there won't be future leaks at Oyster Creek, and we think that this was a great initiative that Exelon had undertaken for that site. Next slide, please.

The Voluntary Industry Initiative for Groundwater Protection, I think,

has been working very well. It's a great initiative. We'd like to see at the state level, to have that initiative be a little bit more than involuntary and you know, I don't necessarily know whether it needs to be regulatory. That would be good. But an involuntary program can -- or a voluntary program can be abandoned at any time, and we don't want to see that happen, so we would like to see that become a little bit more than a voluntary program. And if the NRC does not wish to make it a rule, then the recommendation from me, or my state or other states may be to enter into a memorandum of agreement with the licensees in order to put a little bit more of an involuntary measure to that. So we may ask that they sign an agreement to continue that process regardless, throughout the license period of operation, and the NRC may help us facilitate those discussions. Next slide, please.

Improving the NRC response, you know, the one thing that I've noticed is the Reactor Oversight Process, because of the non-safety related designation of the underground piping, regardless of what problems you have, because of such a low risk base, it'll never rise to a level higher than a green finding. And I think that's a poor indicator of how serious some of these issues can be. Not a public-health risk -- certainly a public-perception risk, and something that needs to be done, because you've lost -- you've failed to maintain the barrier to licensed material, and I think that the maximum green finding, because it's a non a safety-related system, is probably not a good indicator of performance in that area, and probably needs to be looked at a little bit harder. So I would like the NRC to take a look at making some of those performance indicators, particularly for underground piping and other systems that carry licensed material, a little bit more meaningful under the Reactor Oversight

Process.

The other issue that we've kind of seen is the reporting process for some of these leaks, and you know, there's an industry initiative to kind of raise those reporting requirements a little bit, but I don't know that the reporting requirements are stringent enough. I mean, if there's a release of licensed materials, uncontrolled and unmonitored, to the environment, that probably needs to be reported immediately regardless of the magnitude of that release. Then investigation starts, and then once the investigation is completed, then you make the determination of what actions need to be next, but it should all be reported so that the state and the local agencies and authorities and the public are aware that that is occurring. So I think the reporting process needs to be a little tighter on leaks, and recognize too that there are some states that have requirements in place where the, you know -- in the state of New Jersey, under the Spill Act, any leaks of hazardous material including, you know, tritium, needs to be reported within 15 minutes to our DEP, so that is a requirement of states, so it's getting reported to us, but I don't know if that's consistent, and it would be better if that were consistent reporting.

Some of the other issues that the states like to bring up to improve NRC response is to maybe better understand hydrogeologic flows under power plants. I know that there are some hydrogeologic studies that are done, but we recognize that going into some of the leaks, that they weren't significant enough to really give it an accurate assessment very quickly, and that more data was required. So that doing a hydrogeologic study, so that we really fully understand the groundwater flow under all the sites, in the event that there is a leak, that we know exactly where it's going and how long it'll take to get to other systems

where it might have an impact.

Mitigation -- you know, I believe that mitigation should not be deferred always to decommissioning. I don't believe that natural attenuation is the preferred method for mitigation of contaminated groundwater, and I believe that if it's feasible to mitigate that before decommissioning, or not using natural attenuation, that that should be explored. And at both sites in the state of New Jersey, I know that we've got mitigation actions underway, where we are actually actively taking the tritium out of groundwater and releasing it in a controlled, monitored fashion, so that it can be accurately quantified. In other words, licensees are obligated to report in their annual effluent what the releases are of all licensed materials, and if it's in groundwater and natural attenuation, you cannot make that estimate. At best, the bounding calculations are an estimate, and so we think that whenever there is a leak to groundwater, that should be explored whether or not there are other mitigation or remediation strategies that you can use, other than natural attenuation or waiting until decommissioning.

On the theme of strengthening trust, I think that a little bit more needs to be done in effective communication between state and local governments with the NRC. I think that is growing, that is building, we've done a little bit better job on that, but I think we can do a little bit more. Investigations should start promptly, data should be made publicly available, that's one of the contentions that we've had, you know, a big problem with, is making data publicly available timely. It always becomes available in the annual effluent report, but it could be a considerable amount of time before anyone has access to that data. So publicly available data, timely, would go a long way in help strengthening trust. Open and transparent process, sharing what you have with the public,

giving clear concise explanations, and putting it in terms that the public can understand would go a long way in strengthening that trust. Go to the last slide, please.

And I know that the NRC has developed, and they are involved with a public outreach program, and I think that that can go a long way in helping build that trust again. And I believe that if there's a coordinated effort between the licensees, the state, the local, and the NRC during these outreach programs, if they see all those organizations working together to solve a problem, it would go a long way to strengthening that trust, not only between NRC and the public, but NRC, state, and NRC local governments. If you see all of the represented parties working together to solve an issue, then that would go a long way to strengthening, you know, the trust of the public that we are doing everything that we can to make sure that their public health and safety is protected. Thank you.

CHAIRMAN JACZKO: Thank you. I actually should have noted that you're with the New Jersey Department of Environmental Protection.

MR. MULLIGAN: Yes.

CHAIRMAN JACZKO: Next we'll turn to Phillip, maybe you can say your last name for us, so I can --

MR. MUSEGAAS: Sure. Musegaas.

CHAIRMAN JACZKO: Musegaas. OK. It wasn't what I was going to say, so --

MR. MUSEGAAS: You're fine.

CHAIRMAN JACZKO: -- who is the director of the Hudson River Program at Riverkeeper.

MR. MUSEGAAS: Thank you. I just want to start by saying thank

you to Chairman Jaczko and the Commission for inviting us to speak today, and inviting me to give Riverkeeper's perspective on this issue. Before I turn to the slides, I just have a brief comment to make. The NRC's current approach to addressing the groundwater contamination issue and the groundwater leak issue fails to address prevention of leaks. Instead, the agency seems to be remaining in a purely reactive mode, struggling to respond to the increased instances of plant systems leaking contaminated water into the environment rather than focusing on whether its regulatory approach is adequate to prevent such leakage from occurring in the first place.

The NRC has essentially ceded the high ground on this issue to the industry, and the vagaries of degrading plant systems, which in many cases have not been adequately maintained or inspected prior to leaks occurring. It is the NRC that has the statutory mandate, under the Atomic Energy Act, to protect public health and safety, not the industry, and I refer to the voluntary initiative in this regard. It is also important to note that the NRC has additional statutory responsibilities under other federal laws to assess the environmental impacts of reactor-site operations. This issue of being reactive rather than proactive is something the public can readily understand and I think the public is aware of, and it certainly contributes to this lack of public confidence that we've seen in New York and I think has been seen in other states, where you have these instances of groundwater contamination, and it's, it remains a big stumbling block, I think, to regaining that public confidence. So I'll just move to the slides.

You can go to the second slide, I think. Thank you. Just to give everyone background on what Riverkeeper is, in case you're not aware, which probably many of you are not, Riverkeeper is a nonprofit membership-supported

organization. We've been working on the Hudson River since about 1966, and our mission is to protect the Hudson River, work towards its ecological restoration, and also to protect the New York City drinking water supply, this is the upstate watershed that supplies New York City's drinking water. And actually, part of the watershed is near Indian Point; there's the Croton Watershed is only a few miles from the Indian Point nuclear reactor. And in terms of Indian Point we have been working on Indian Point issues since the 1960s, initially focused on the environmental impacts of the plant's cooling system, and then more recently on a broader range of nuclear regulatory issues. Next slide, please.

I just want to -- my slides are focused on specific responses to the SECY that came out, I think, in the last couple of weeks, and so I'll focus on those in these comments. We'll also be sending you a letter that gives a little more detail on these issues.

Riverkeeper doesn't believe that the Voluntary Industry Initiative is sufficient, and we really think that it should be incorporated as a regulatory requirement in some form. I think we echo the concerns that Mr. Mulligan had, and that the State of New York, I believe, has as well. You know, a voluntary initiative works when you have a company that is proactive about addressing the problem. I think Exelon, by all accounts, has done a lot of good work on this issue at the plants that they have, where they have experienced this, at Braidwood and Oyster Creek.

The plants in the companies that we have operating in New York, and other states in the northeast, to our knowledge, have not been as proactive, and so our concern with having a voluntary initiative is that it works as long as

the companies that commit to it actually carry it out to the fullest extent. If they don't, and if there's a lot of discrepancy there in terms of the degree of commitment to that, then, as long as it's voluntary, there's no way to enforce that. If it's self-enforcing in the industry that's one thing, but we really believe that the regulators should be the ones enforcing these regulations, I'm sorry, enforcing these, these requirements.

And this goes specifically to -- I think, to this question of whether to have expanded onsite groundwater monitoring. Just to, maybe a question for the industry representatives that are here, that perhaps we could get into, is, I think they mentioned in the first presentation, Jim mentioned that they were implementing onsite groundwater monitoring, and I'm just interested to learn if that is actually expanded beyond what's required for the Radiological Environmental Monitoring Program, you know that, you know, there are perimeter wells that are required under the REMP. We would like to see a more expanded implementation of onsite monitoring that actually focuses on prioritizing systems at the plant that are, could be prone to leakage, or are likely to leak, or have leaked in the past, and locate monitoring wells near these systems.

So it's not a matter of blanketing the entire site with monitoring wells everywhere; it's a matter of prioritizing the -- using a risk-informed basis in prioritizing where the systems are that are prone to leak, and putting wells in closer proximity to those, so that if you have a leak, you don't find out when it's already reached the perimeter of the site, or when it's already caused significant contamination.

Just the second point here. I think we echo New Jersey's

sentiments about revising the performance indicators for radiological effluent. I think Mr. Mulligan made a great point about the threshold for having a green finding, having safety significance. If there is a way for the agency to look at, perhaps, integrating some different criteria for environmental impacts that have environmental concerns but don't rise to the level of exceeding the dosage standards and getting to that level of NRC attention, I think that would be particularly beneficial. Especially because I think if we're looking at many plants in the country, first-generation nuclear plants that are, either have been re-licensed or are in the process of being re-licensed, and there's, I know an industry study going on about even additional re-licensing periods.

If you have these plants operating for extended periods of time, it's particularly important, I think, to look at trending indicators. If they don't initially have safety significance, then they may in the future. If they have increased environmental significance as time goes on, that's something that needs to be measured. So, next slide, please.

Just in regards to finding three, we do believe in terms of decommissioning, that power reactor licensees should be required to provide specific financial assurance for remediation of subsurface contamination. And this goes to the 10 CFR 50.75 (f)(3), which is, hope I got the cite right, but I think that's the requirement that five years before license expiration, that the plant has to get an actually site-specific decommissioning cost estimate.

I would cite the example of Indian Point in this case. I think there are many things about Indian Point I know I will not discuss, but I believe decommissioning is, I think we're comfortable with that. Steve, just --

CHAIRMAN JACKZO: As long as Steve nods then we’re OK --

MR. MUSEGAAS: -- give me a shout if, if I'm straying too far. But just to give you an Indian Point example, Indian Point 2, which is, license expires in 2013. In 2008, Entergy did a decommissioning cost estimate specifically for that plant, and their initial estimates -- in their cost estimate they acknowledged that it's very, very difficult to estimate the cost of decommissioning, depending on the time and the labor costs, and everything else that goes into it. But, the basic decommissioning estimate actually turned out to be, I believe over $1 billion, just for one of the reactors, just for Indian Point 2. And I believe that's close to twice as much funding as is currently required under NRC regulations. And so, and I believe the significant increase in the cost was due to subsurface contamination, so I think the decommissioning aspect of this particular issue, groundwater leaks and pipe leaks, should be the focus of a lot of Commission attention, so thank you. Next slide.

Just briefly, again I would agree that, or I would, I think agree with Mr. Mulligan. I recommend that the non-safety related underground piping that carries radioactive fluids should be subject not only to corrosion protection standards, but also improved inspection requirements. This goes to the issue of non-safety related piping, and the question of, under the ASME code, you know, the real concern is structural integrity. You could certainly have ongoing slow leaks that leak into the environment, leak licensed material into the environment for long periods of time before you have a structural integrity issue. So I think that has to be that gap in the, in the codes, and I think that gap in the oversight needs to be addressed. And, next slide, please.

I'm just going to reiterate, I think the basic recommendations that Riverkeeper has made, starting, I think, in the April meeting of last year, and

October last year. You know, because the NRC's, the staff's recommendations in the senior management memo, I think our recommendations' have not changed. First we would recommend that the NRC require onsite groundwater monitoring and reporting at all currently operating reactors, and I'm referring to an expanded onsite monitoring program, not just the perimeter wells. Now if this has been done at some plants, or if I'm, you know, it could be that the voluntary initiative is doing this already, I'm not sure of that.

The second recommendation, require licensees to submit all record pursuant to 10 CFR 50.75(g), et cetera, et cetera. This, I'm referring back to the SECY on page four. I think this is important for a number of reasons. One, the main reason being this is an area where I think you can really rebuild public confidence and strengthen public trust, I think that's the terminology. You know, there's a, there's a lot of information about the current environmental conditions at operating plants that the public just either does not have access to, or is presented in a way that is very technical and difficult to interpret. So, I think that, that, you know, requiring licensees to disclose their 50.75(g) records to the NRC will give the NRC a better idea of what the exact, what the existing conditions are at these plants. It will, you know, I don't think it prejudices the industry in any way, and it's, in terms of planning for decommissioning, it, I would think, would improve communications between the industry and the regulating agency.

And to the extent that information can be made public, I think that would be very valuable, and this goes to a larger recommendation which is not on the slide, but I think that, again, Mr. Mulligan raised a very good point; I think a key to increasing any kind of public confidence, or public trust, is to make as much information publicly available as possible, and to make it digestible to the

general public as much as possible. And these are technical issues. These are, these are scientific sampling results, these are concepts that certainly, you know, you can do your best, but at some point, it's hard to dumb it down to the point that everyone is going to understand it. But I think that there are ways to present scientific information that make it easily understandable to the public, make it simple for the public to understand.

And, you know, I think it's in the industry's best interest, and certainly in the Commission's best interest, to, to get this message out, that if, indeed, there has not been public health risk, which, you know, considering Braidwood, I'm not sure --

CHAIRMAN JACZKO: -- I'm going to ask you, maybe you could wrap up, because we do want to get to questions --

MR. MUSEGAAS: OK.

CHAIRMAN JACZKO: -- I think an opportunity to explore some of these, and --

MR. MUSEGAAS: OK, I thought I had two minutes left, pardon me.

CHAIRMAN JACZKO: You're actually two minutes over.

MR. MUSEGAAS: Sorry, OK, I will wrap up; I'm rattling on, thank you.

[laughter]

CHAIRMAN JACZKO: Yes, the red light means bad, so --

[laughter]

MR. MUSEGAAS: All right, I clearly don't know the etiquette here.

CHAIRMAN JACZKO: That's OK.

MR. MUSEGAAS: OK. I can submit the rest. The last

recommendation is to require licensees with documented leakage incidents to affirmatively prove cessation of leaks and fully evaluate the status and condition of all systems and components that carry radioactive fluids. And I'll be submitting these in written form. I apologize for going over, thank you.

CHAIRMAN JACZKO: No problem at all. OK, well thank you all for your comments, I'm sure we'll have an opportunity with the Commissioners to explore them in more depth, and we'll start with Commissioner Svinicki.

COMMISSIONER SVINICKI: I wanted to thank all of you for your presentations which were very interesting, but I was also sitting here reflecting, and thinking that I'm very appreciative of the very thoughtful tone that I think all of you have adopted on this issue. You know, there's some concern these days in the larger public policy debates that there is a paucity of people really willing to, to kind of come together and look at implementation and solutions to things. So I really appreciated the thoughtfulness with which all of you approached your presentations today. Just a little reflection that I'm having in my mind.

Mr. Musegaas, you may not believe this, but the question that you raised was my first question, at least that subject matter area, was going to explore, either Ms. Korsnick or Mr. Meister -- it's interesting, we talked about public health effects, but we've also talked about public trust and public confidence. And I think, sometimes, that public confidence issues arise around the vague unease over, we don't know what we don't know.

So I was looking closely at some of the lessons learned that came out of the peer reviews, the first cycle of peer reviews of the industry initiative. And one of the areas that I noted, but was going to ask a little more about, had to do with monitoring. And there's a statement in the industry report on this that

says, “Early detection of unintended releases is now in effect at every U.S. nuclear plant. Most typically this is accomplished by installing additional monitoring wells within the plant boundary once the utility hydrologist or geologist has reviewed the characterization of the site's groundwater flow.”

And so that gets to another aspect that I was learning about in the industry initiatives, which is to undertake a better, kind of a hydrogeology assessment. But, beyond this paragraph, there wasn't a whole lot of detail in the report. Could you talk a little bit more about what have been the specific outgrowths of the initiative, in terms of monitoring and then modeling of the subsurface?

MR. MEISTER: Sure, I'd be glad to answer that, Commissioner. Objectives, I think, 1.1, 1.2, and 1.3, get to those areas of NEI 07-07. You know, 1.1 was, I believe, the hydrogeological modeling of the site, so you understand where the water under the surface moves, if, you know, whatever's under the surface moves. The second one, 1.2, then, was to identify the system's structures and components that carry licensed material such that they would be susceptible to potentially having a leak. And then, 1.3 is to establish a monitoring program such that you've focused on those system structures and components carrying licensed material.

So as a result of that, as the licensees work their way through the implementation of the initiative, we did look at those piping systems and/or tanks, understanding the directions that water flows occurred. And if there weren't wells at the prime or opportune locations, we would then add monitoring wells to those sites. And for example, I can speak for Exelon because I'm familiar with what we did. We certainly did add monitoring wells, I believe at every station, but I know a

number of them for certain.

COMMISSIONER SVINICKI: And is it fair to say a difference here might be that monitoring wells that were put in place more recently are more likely to be informed by some of the subsurface monitoring, whereas before this, if you had not, or the subsurface modeling of the hydrogeology, that if you had not had the benefit of the past, of that information in the past, your monitoring wells might not have been placed in the best locations in terms of, you know, precursors and being able to have monitoring of things before, before they become exaggerated?

MR. MEISTER: Well, I think the way I'd answer that is, in a lot of cases we put the wells closer to the components where the licensed materials carry, so that the identification would be earlier, if there were to be a leak.

COMMISSIONER SVINICKI: And this leads to another area of the industry initiative, is the reporting that I think both you and Ms. Korsnick talked about. And it raises a question in my mind, maybe it's more, really, philosophical than anything else. But, again, as public health agencies and regulators think about the notion of informing the public about something, I think we experience this, the Department of Homeland Security went through this a little bit in revising the threat levels. If you're constantly telling the public about something, but yet it's either -- they're told to be vigilant about something all the time, or they're constantly told about a release of a material, and yet they're also assured that it's not a public health threat. Does the industry talk at all about the consequence of, maybe, increased notification to the public, coupled with statements that it is, you know, some significant, small fraction of a regulatory release, and is not of a public health concern?

I mean just, you know, at a conversational level, it strikes me that, is there any kind of inconsistency in that we're going to keep, they're going to, there has been a flurry of more notifications about something, and yet, repeatedly be told it's really nothing to concern themselves about?

MR. MEISTER: Well, it's an interesting comment, and I think it really gets to our comment relative to agreeing with the staff that we need to enhance our communication processes and protocols. I think there's an area where we can do a better job of getting the, both what's going on and the significance of that, to the members of the public.

COMMISSIONER SVINICKI: OK, so there is some acknowledgment there that context and risk significance is an important part of any kind of communication strategy. Because if the number of incidences of notifications goes way up, but it's not accompanied by the kind of basic public education, I think it's, it could have a rather confusing effect on the public.

MS. KORSNICK: Yeah, we definitely agree with that. The basic foundation needs to be an education and informing of the public, outside of a particular incident. Just sort of as an ongoing process. Because, absolutely we can share information, but if they don't really know what to do with it, it's actually not helpful. Right? So we need to do that in a consorted effort.

COMMISSIONER SVINICKI: Thank you. And Mr. Mulligan, that takes me to your presentation. And I, again, on a comment that is maybe more, just kind of regulatory philosophies, but -- and I don't mean to paraphrase you, if I get it wrong, please correct me. But you made a comment about non-safety components in systems. You said, “Just because they're a non-safety doesn't make them less important.” And I think those were your terms, but it does

certainly make them less safety significant, because if it's a non-safety system, I mean, that's the reason for the whole categorization, is to give some sort of risk prioritization as a regulator. And I think you also indicated that, in your view, any release, no matter the magnitude, should have public awareness, and there should be notification and reporting on it.

And it made me, again, think, and I would appreciate you sharing or helping me understand, you know, whether a regulator at a state or a federal level, you certainly have long experience in the field. And so there is that balancing that needs to be done with thresholds, and looking at, you know, certain releases below a certain level simply do not have the safety significance or the public health significance of other releases. And I think all regulators, whether at the state or federal level, have to, of course, be striking a balance.

I remember, early in my career, someone mentioned to me that any kind of factory or facility that produces something is going to have waste products. So it is, any productive endeavor is going to ultimately have waste products. Some will have, therefore, some impact on the environment. And given regulatory resources, NRC has, as an agency, tried to do a very risk-prioritized, risk-informed approach to regulation.

In the State of New Jersey, you know, do you kind of place the balance differently? Is that what I should take from your presentation about, you know, no matter the magnitude, so I guess that gets down to anything that's detectable should be reportable? I don't, could you help me understand that a little bit better?

MR. MULLIGAN: Certainly. And I think I say, regardless of magnitude, is because, particularly when you have a loss of control through a

pipe leak, and you have initial indications that you've got contaminants in the environment, you just don't know what you have yet. I mean, there needs to be an investigation. For example, at Oyster Creek, the initial recognition of tritium in the groundwater was in one of their monitoring wells, that was a certain distance away from the plant. Now, could we take that, and make an assumption, at least initially, that that is the highest concentration that you're going to find in the environment? Of course you can't, you need to investigate. And as you move back towards the source, you find out it's six million.

You know, so, I think that, that once you have recognition that you have an environmental leak going on that is uncontrolled and unmonitored, that you need to report it, so that there is a prompt investigation so that you can ascertain whether or not those levels reach what the threshold limits would be for public health and safety.

So I think that the investigation portion of it needs to be the priority, and the reporting, so the investigation starts promptly, so that you know exactly what you're dealing with before you make public announcements of whether it's safe or whether it's not safe.

COMMISSIONER SVINICKI: OK. So, in, just, in a way, it gets back to the, you don't know what you don't know. So if you -- so I would, I guess, return to the initial comment about the fact that if we can improve our understanding of what's happening in the subsurface, I think that that helps build confidence about, if you get a detection or a result, you'd have better knowledge of what's happening in the subsurface. So thank you, that's very helpful, my time's up, thank you, Mr. Chairman.

CHAIRMAN JACZKO: Commissioner Apostolakis.

COMMISSIONER APOSTOLAKIS: Thank you, Mr. Chairman. First, a question of clarification. Mr. Musegaas, you said the voluntary industry initiative is insufficient to address the problem. Then I look at the chart that Ms. Korsnick showed us, it shows us that the initiative started to be implemented in June of last year, less than a year. How do you conclude they are insufficient? I mean, it's -- they have only been there for eight, nine months, if I understand it correctly. Shouldn't they have some time to show that they are sufficient or insufficient?

MR. MUSEGAAS: I think my statement that they are insufficient goes to my question about whether they were actually implementing expanded onsite groundwater monitoring. Clearly, you're right. I mean, we can't -- if they haven't done that yet, then I think that needs to be done. If that has been done, then certainly it needs several years of trending of groundwater data to see what is happening on the site.

But my point goes to the fact that, I think by its very nature, a voluntary initiative to address this problem is insufficient. And by the way it's been carried out, I think it's insufficient because it has not been clear to me what has actually been implemented at all the sites, all the currently operating sites in the country. We may know what Exelon has implemented, I think the industry as a whole, it's not clear to a stakeholder like Riverkeeper, and I don't think it's clear to the public if all of these initiatives, because they're voluntary, have been implemented at every single plant. Does that answer your question, or not?

COMMISSIONER APOSTOLAKIS: Well, I thought Ms. Korsnick said that all chief nuclear officers have agreed. Would you care to comment?

MS. KORSNICK: Yeah, just to be clear, from an industry initiative

perspective, you know, a vote of 80 percent or greater binds the entire industry to follow the initiative. Both the groundwater and the buried piping have full support of the chief nuclear officers and, in fact, it is binding as an industry.

COMMISSIONER APOSTOLAKIS: So where does that leave us? Is it a short time to decide whether they're -- would you care to comment on that?

MS. KORSNICK: Yeah.

COMMISSIONER APOSTOLAKIS: Do you think that we can declare them now as sufficient or insufficient?

MS. KORSNICK: Yeah, I guess, you know, obviously, my view, I can just tell you that there was, you know, avid discussion amongst the chief nuclear officers, and I would tell you, very quick alignment to say that this is an area that we need to focus on. It, you know, it's clearly a significant resource that the plants are expending to do this, and they've built that into their, into their business plans. They're taking it very seriously. You can see from the milestones that we showed that they're meeting those milestones.

So I, personally, am seeing the behavior within the industry, I'm seeing the sharing of information, which is one of the things that we wanted to accomplish by this, is to make sure that we were leveraging the learning across the industry. So, I see the behaviors that we were trying to create, even in the short period of time that the initiative has existed. And clearly this is something that we're going to have to continue to monitor. Again, this isn't something that's just a one-shot deal.

MR. MUSEGAAS: I would just say, I think I'd be a lot more comfortable with 100 percent of the industry signing on, and I would not want to be living near a plant that's in that 20 percent.

MS. KORSNICK: No, no, let me be clear. No, let me be clear. It is 100 percent. What I said is, when you take a vote on an industry initiative with the CNOs, if it's only 80 percent, it binds the whole industry and everybody has to buy in. In this case, it was 100 percent, 100 percent affirmed that they would do this. But it's binding to the industry.

COMMISSIONER APOSTOLAKIS: Both you, Mr. Musegaas, and Mr. Mulligan, urged the NRC to do more. To do, to have maybe more performance indicators in the Reactor Oversight Process, and do other things. In fact, one of you suggested that maybe the industry initiative should become mandatory, by regulation. Which raises a very old question regarding regulations. This agency was criticized severely a number of years back for being very prescriptive; prescriptive with regulations. So we started moving towards a performance-based regulatory approach. And I haven't heard anybody dispute the finding that all these leaks at the plants do not pose any threat to public health and safety.

But you are urging us now to do more and go, you know, beyond a performance-based approach. And I'm wondering whether that would bring us back to the old ways of doing business, and in fact, as you probably know, there was a directive from the White House recently, urging, or actually, directing federal agencies to seek ways to remove unnecessary regulatory burden, I don't know that they used those words, but essentially that was the message.

So we seem to have a conflict here. I mean, shall we go and again, regulate down to levels that are well below the safety significance of the issue, and then be accused that we're again meddling, and we're very prescriptive? Which way should we go, do you think?

Do you, what do you do in New Jersey, for example? I think Commissioner Svinicki asked a related question, do you have very prescriptive regulations, you go well below the safety levels? Any advice?

MR. MULLIGAN: OK, I think that, with respect to groundwater, there's two different safety levels that we're talking about. There's your 10 CFR 20 release limits, that goes to dose, and then there's environmental protection limits that were set by EPA for groundwater contamination. So, that we do, we do use the EPA's rules. So I, I think it's not, it's, you argue, you're comparing two different things, you're talking about a dose level, public dose risk, versus an environmental risk to drinking water. And so, you know, one is, you know, is a short-term, whole-body dose, and one is a, could be a chronic, you know, long-term exposure to low levels of radioactive material. So the limit should be less. Your doses are based on a one-year release of that material. If it gets in your drinking water supply, you're looking at a 30 to 40 year dose, so the levels should be much lower.

So that's where it comes in, and no, I'm not asking for more regulation. New Jersey, we're not looking for that, actually, my commission is looking to cut back on some of those regulations and look at those things. But I think it goes to, if the, if the voluntary initiative at the industry level is a good thing, and is doing good things to protect the environment and the public, then maybe, you know, I'm saying, then maybe it shouldn't be regulation. Maybe say we have an agreement with the licensees at the state level to continue this process. Maybe it doesn't. But it certainly, it's an issue that is, that is going forward, that is helping protect public health and safety and raising the level of awareness of that particular issue so that they're making agreements from the

chief nuclear officers and the states looking to get agreements, then it's a good thing that should be done. We shouldn't let that fall by the wayside. You know, it's, you know. If it's doing good today, and then people get lax on that in 15 years, maybe they're not doing so well, and now you don't have that again, so, just looking to formalize it.

MR. MUSEGAAS: Sure, no, I think, I think that you raise an excellent point, and I think it's, in some sense, as the agency has a choice to make, either to, to consider additional, you know, potentially expanding your regulatory oversight or, if you decide that's not, either that's too much of a regulatory burden, that's not within your statutory mandate, I think it would be beneficial if the agency, then, clarified where your oversight in your regulatory authority ends and the states' begins.

Because I think that's a big question, it's a gray area, and this is a tough issue, because it covers both -- you know it's, if it's safe, if it doesn't rise to the level of safety related, but there are unknown, let's say, at least initially, we don't know how much of an environmental impact these leaks may have over short-term versus long-term periods, then, you know, it overlaps both areas.

But I think ultimately it's a decision the agency has to make, if you believe it's in your statutory mandate, and I believe parts of this are. I think the performance indicator in particular, I would think the NRC would not want to give too much to the state, because you do want to, you do want to track trends of buried pipe leakage and buried tank leakage, so that you can see if systems are degrading over time. So you don't, you don't want to have a gap, where that's not being addressed, and perhaps that's not the best area for a state to be involved.

But if it's a question of, of considering more as an issue of, that none of these problems thus far have, have resulted in exceeding the public dosage limits, and thus they're kind of outside of your range, then there are environmental concerns that have to be addressed, and perhaps the state is the best to address that.

I will say, I think the NRC has, outside of the Atomic Energy Act again, has other statutory responsibilities under NEPA, in particular to, under certain circumstances, really, licensing actions to consider environmental impacts of operations so that, that's certainly not giving you helpful advice but I think, I think it comes down to that, that middle area has to be clarified. And I think whether the NRC takes it upon itself to, to stake out that territory, that's one way to go, or cede it to the states, and make it clear to the states that the states then have the ability to move into that area.

COMMISSIONER APOSTOLAKIS: Any other comments on this? No? Thank you, Mr. Chairman.

CHAIRMAN JACZKO: Mr. Magwood.

COMMISSIONER MAGWOOD: Thank you, Chairman. And thank you for your statements today, it's been a pretty informative session already. And I also echo Commissioner Svinicki's comment that the quality of your thoughts on this have been, have been very, very good and very helpful. Let me start with you, Mr. Meister. The -- it's been interesting to, I think that while Mr. Mulligan and Mr. Musegaas don't agree with everything that I think you agree with, there certainly seems to be some complimentary words for what you've done at Oyster Creek, what Exelon has done at Oyster Creek.

And I wonder, when I think about the industry voluntary initiative, I

wonder how much of the industry voluntary initiative would prompt what you've done at Oyster Creek, and I wonder if you could talk a little bit about that. Would most utilities in a similar situation as you found at Oyster Creek take the actions that you took at Oyster Creek, based on the voluntary initiative, can you, can you talk about that?

MR. MEISTER: Thank you, Commissioner. You know, I think, as I, as I said in my remarks, that, when you identify a leak or identify the condition of your piping or other commodities, then you have to weigh a number of inputs. You have to weigh the age of the commodities, you have to weigh the subsurface conditions, you have to weigh the life of the plant, both past and future, and you have to weigh the input from all of the various involved stakeholders, both in the company and outside the company. And you have to weigh other considerations as part of making a decision.

As I said, you know, the approach we took at Oyster Creek, I characterized it as a unique approach. It was dependent on a number of factors that were ongoing at the time. I think the initiative does drive us to that understanding of the conditions through both the Groundwater Protection Initiative, understanding the groundwater conditions of what you have, but also now as we're working our way through the Buried Piping and Commodities Initiative, the conditions of those commodities, and then we'll make asset management decisions for each station based on those, you know, guidance and also the EPRI technical information that's being developed.

You know, the decision in each particular instance, I think, will be unique, driven by the conditions with the focus on preventing the migration of any release outside of the system and off the property.

COMMISSIONER MAGWOOD: I appreciate that. Just, sort of, for full disclosure, I have also been complimentary of what you've done at Oyster Creek. I think I visited the site several months ago and was quite impressed with the effort that Exelon has gone through to try to deal with this issue. And I agree that it's not necessarily an action that every utility should take, every utility should, every plant should look at this, it's a specific, site-specific issue. But there was something in the level of effort at Oyster Creek that was somewhat unique. And I wonder if part of the, the question that's posed by the voluntary initiative is whether it would result in actions, not just the monitoring but result in actions that would, you know, address, kind of, the public concerns you were dealing with at Oyster Creek, and certainly other utilities deal with in other places.

And that gets me to another thought. I'll ask any participants to react to this. It seems to me, if they're -- while both of you have talked about the environmental aspect of this, which is a very complicated discussion to get into; there is certainly an imperative that everyone agrees with, to protect public health and safety. There is also something above and beyond public health and safety, I think, that all of you in one way or another have addressed, which is the confidence the public has in the institutions, the Nuclear Regulatory Commission, the states, the utilities themselves.

And to the degree that there are effluents leaving the site that are reported to have so many thousands of something called a picocuries per something called a liter, “Gee that's not something that, you know, that really should be in my kids' drinking water, is that something I should be worried about?” And then you have some nuclear engineer, health physicist from the utility say, “Oh don't worry, it's below the drinking water standard.” Doesn't give

them a lot of comfort.

So you do, you end up in this space above and beyond public health and safety, where it comes to public confidence. You know, “Am I being protected, am I being told what I need to be told?” And I think it's even beyond just the reporting that you were talking about, because it's the issue of what's in the drinking water. And I wonder, maybe I'll give Ms. Korsnick a chance to react to this. I wonder, has the industry talked about that aspect of the issue, as it's dealt with the voluntary initiative. And do you feel that the voluntary initiative in and of itself addresses that aspect of the issue?

MS. KORSNICK: Yes, thank you, Commissioner. I do think that the voluntary initiative addresses that issue. I mean, if you look at the basis behind the voluntary initiative and the fact that it really lowered the threshold for reporting, for basically starting the conversations that you're talking about. And I think the industry has proven to be holding to those, to those lower thresholds, and started those conversations much sooner than previous regulations would have required.

And so I think, I think very much -- I guess the concern I have, the emphasis on, sort of, “voluntary” initiative makes it feel like, well you can follow it, or you can't follow it. And I would just say in general that that connotation is not how the industry has embraced the initiative. You know, it's -- I appreciate when you say voluntary, in that maybe it's not a prescription that you've applied, but it is a prescription that the chief nuclear officers have applied. And in that case, it's not voluntary. And so it's just not that, it's what the industry itself is, if you will, overseeing, and I'll react a bit to, you know, do you think these voluntary initiatives turn into actions.

And again, I can reflect from the comment that Commissioner Svinicki asked, I mean, yes, we went through the groundwater initiative, it caused us to do hydrology studies, it caused us to better understand our site, it caused us to put in additional wells. I mean, these are all clear actions that have been taken, money invested, resources applied, to better understand.

And it's the same thing with buried piping. People have done inspections, found conditions that they didn't want from a long-term perspective. Based on that, they've made investments, they've changed things out. It's not just, we're going to go look, it turns into, there are things that are found that you want to put in better position, and you invest money, and you do that.

So I guess I just want to be clear that the connotation around "voluntary" feels a little, as I hear it here, feels a little bit more, sort of less binding, if you will, than I see it being applied within the industry.

COMMISSIONER MAGWOOD: Mr. Musegaas, did you want to comment on anything you've just heard?

MR. MUSEGAAS: Sure. Sure, thank you. I think you've raised an interesting point about the larger question of public confidence. And I think there is, when you step way back and you look at this, I think there is a perception in some circles, and it may be accurate or not, I actually don't have an opinion on it, but, that the nuclear industry, in this particular problem, is in some sense is given -- is under less strict oversight than other industries that have, just to be specific, have underground storage tanks, or systems that carry toxic substances or store toxic substances. So, industries that are regulated by, by RCRA or by CERCLA, well not CERCLA, but by RCRA toxic substances that are regulated under those types of statutes.

You know, if you're at a gas station, an underground storage station with fuel, it doesn't have to be a massive leak to require immediate cessation of the leak and remediation. You know, there's a perception in those industries that tanks can't leak, and pipes can't leak, and if they do, you have to fix them. And so I think that, that there seems to be a different approach here that there's an acknowledgment that leaks happen. There's certainly an acknowledgment that thus far they haven't caused public safety concerns, public health concerns, but I think to the general public, they have a hard time understanding, “Well why do these leaks keep happening, and why isn't the industry or the agency able to take a preventative approach and look at preventing the leaks before they happen to the best ability, to the best ability possible, to a practicable level?”

Obviously, you can't, I think Commissioner Svinicki, if I've pronounced your name right, mentioned this, you know, we all know, environmentalists certainly know that, when you produce things, when you produce power, when you produce things through industries, you have waste, things that get out into the environment unintentionally, and intentionally.

So, but I think, from a, just to kind of harp on the public confidence aspect of it, I don't know that it matters so much to the public how much tritium is going out. I think it matters that it's out there and it's not supposed to be. That may seem overly simplistic, but I really think that's worth discussion. You know, how do we get at this preventative, and it may just be a matter of communicating, either from the agency or through the industry, communicating more effectively that we are working very hard on prevention. We are working on, you know, Exelon, again, is a good example, we are moving our pipes above ground so that we can detect these things much sooner and we can prevent them from

happening.

So I think from, that's the simplest public perspective response I can give you. Thanks.

COMMISSIONER MAGWOOD: I appreciate that, thank you very much. Thank you, Mr. Chairman.

CHAIRMAN JACZKO: Sure. Commissioner Ostendorff.

COMMISSIONER OSTENDORFF: Thank you, Mr. Chairman. I add my thanks to those of my colleagues for this very informative session this morning. I also applaud the tone and measured approached to discussing some tough issues. I was going to start out with Mr. Musegaas, and I think I probably will, just in response to follow up where Commissioner Magwood was going, and, but I do want to, I'm going to ask you a question and come back to everybody to talk about the public communications piece. Because I find this particular theme that everybody's talking about very helpful to us as Commissioners. And I'll come back to a broader question for each of you, on communications.

But, as you mentioned, Mr. Musegaas, just a few minutes ago to Commissioner Magwood, the example of, which I think is helpful, about a buried gasoline station tank or fuel oil tank someplace, and so forth, and you made a comment about, irrespective about the amount of tritium released, the fact that there's tritium being released causes a public confidence concern. And I agree that that can be the case, if the public is not informed.

But I guess I want to start out with a more pointed question. Recognizing that you may disagree with the current NRC regulations, but given the framework that we have today, the existing regulations of the NRC in this area of groundwater, do you believe that the existing regulations are not

sufficient to protect public health or the environment?

MR. MUSEGAAS: I do not, no.

COMMISSIONER OSTENDORFF: Could you provide a specific?

MR. MUSEGAAS: Well, I, because I think, and this is -- certainly, I'm happy to say there's not a good example of leakage that has caused a public health impact. I think Braidwood was the most, the example that came closest to that, and there's dispute about whether it did or not, and it depends how you define public health impacts or risks. But I think the fact that we haven't had leakage that has caused public health impacts or potentially caused them, doesn't mean we will not have them if we don't have additional measures that are taken.

COMMISSIONER OSTENDORFF: Well, I'm talking about the -- I'm sorry, to clarify. As far as the standards that are in place today, whether it be, you know, NRC, we also have, the EPA has standards associated with groundwater limits and so forth -- looking at the existing standards.

MR. MUSEGAAS: Oh, you, I'm sorry, you're asking if those, if I think those existing standards and limits --

COMMISSIONER OSTENDORFF: Are adequate?

MR. MUSEGAAS: -- are adequate, yes I do, yeah. I apologize.

COMMISSIONER OSTENDORFF: We'll come back to that, thank you. Ms. Korsnick, you made a, I wrote down when you were talking, I think in response to a question that I wanted to use this as a foundation for everybody's question, and this is, I think you wrote, you said, “We need to have a foundation of education for the public, such that outside the context of a particular instant at a plant, there is a basis, a foundation for the public to rely upon,” or something to

that effect. I think that was fairly close to your comment.

And I know, Mr. Meister, on one of your slides you said, on your summary slide, you said, there is substantial opportunity for improving communications. So my question to you, Ms. Korsnick, is where do you see specific examples of opportunities between industry and the public to enhance communications? Whoever wants to answer that, or both of you can.

MS. KORSNICK: Well I guess I would, I would liken this to, to sort of in a broad context, operating a nuclear power plant in anybody's neighborhood, there goes with that a, I'll say requirement, but a reach out on behalf of the company and the plant, to inform the public so that they understand what our business is, what we're about, what our priorities are. And you need to have that as an ongoing conversation before you have any issue to discuss. Because, given that you have a challenge at the plant, et cetera, that's not the first time you want to start your conversation.

So I guess, really, my challenge is that, in those kinds of conversations that we have with the local public, with Rotary Clubs, with local officials, you know, whatever that is, it hasn't been our past practice to talk about picocuries per liter of anything, right, we talk, sort of, more in a broad context. So I guess I would challenge that we need to take on, as an opportunity for our normal outreach, our normal engagements in neighborhoods in which we operate plants, to, you know, a more broad education, if you will, about these kinds of things. Because if you're trying to start that conversation and that education at the time you have an issue to discuss, you know, it's -- you're a day late and a dollar short.

COMMISSIONER OSTENDORFF: OK. Anything, Mr. Meister?

MR. MEISTER: Just, to add a couple of remarks onto that, and you know, as was conveyed in the SECY paper, I think the more user-friendly we make our communication tools, understandable to the general public, the better, then, you know, tied to the context of frequent communication, both by us and by the Commission, to the public around the plants, then, you know, we're in a position where they have as much information as possible to understand how the plant's being operated, and when issues of lower or higher level arise, they're informed and able to understand the information they are being provided.

COMMISSIONER OSTENDORFF: This will be to everybody here. But let's just use tritium and groundwater and the existing 20,000 picocuries per liter as standard, implying a four millirem per year, annual dose, if you drink that water continuously over the course of one year, just throwing that out as the standard that you're all very familiar with, is that something that can be, how do you communicate that to the general public as to what that really means?

I go in and get a dental x-ray once a year, and, you know, get X number of millirem from that x-ray, probably about 30 or 40, and don't really think twice about it. Do we put it in terms relative to other radiation levels that we're receiving? Or, welcome any of your thoughts on that.

MR. MEISTER: Well, you know, you raise an excellent point, because it's difficult to put radiation exposure from a power plant in the context of the everyday, you know, exposure that you have through medical procedures, through air travel, and just from living in the environment we live in. So, you know, I think that gets to the simpler, more effective communications of how the nuclear plant releases of radiation compare to others. And there was a sheet that the staff had put together that I saw last fall, that you know, kind of simply, in

a graphical form, put that in context, and I think it did a very nice job.

COMMISSIONER OSTENDORFF: I'd be interested if Mr. Mulligan or Mr. Musegaas have any thoughts on how can industry or the NRC be more effective in communicating the risk of radiation?

MR. MULLIGAN: Again, interesting point, because I know that for a very long time, we've been trying to do that, and regardless of whether it's tritium or any kind of public exposure that comes from any -- it's always a challenge to put it in the proper perspective as far as, you know, what that means for the individual and the public. I think the more that we do that, the more outreach we do, the more we invite the public to have conversations regarding that, the more information that we get out in the public, that it'll get around.

What I've noticed is we have annual public meetings, and what I've known in reaching out over the years is that more and more of the public are becoming educated. So that when you hear another member of the public stating that the radiation risks are low, that puts you in a better position. So I think it's just a continual process, to keep at it, keep getting the message out, you know, fact sheets, Webpages, other types of things, from multiple agencies, carrying the same message, then the public starts to believe that. And once they start saying it, then you're in a good position, because then the trust starts building, because then they hear it from their peers saying that as well. So I think a consistent message from all organizations involved is key, and I think getting it out there often and every chance and opportunity you get, is key, too. But it's a challenge. We go through it every day.

COMMISSIONER OSTENDORFF: Mr. Musegaas, I've got a minute left here, do you want to comment on that?

MR. MUSEGAAS: Sure, thank you. I think, there are a couple comments I want to make. First, I think this depends in large part, because the communications from the industry are obviously voluntary, there is kind of a range of industry efforts, and again, everything I've heard from folks here is great, and they're making efforts to good communications. Unfortunately the plants that I work with, and that other groups in the northeast work with, that are operated by Entergy, I don't think we can say that we've had the best luck with that. So we think Entergy could certainly do more in the manner of how they communicate these issues.

And so that gets into this question again, of, you know, certainly I'm not asking the NRC to regulate public communications by the industry, but I think that, if -- this goes to this question of what kind of information is shared from the industry to the agency, if information is disclosed to the agency, and then the agency, if there's a plant that has groundwater contamination, then the agency can perhaps make that information more readily available to the public. Then that's a way to get at that.

In terms of your basic question of how do you make that more digestible to the public, I can give you a Riverkeeper example, it'll be very quick. We conduct water quality sampling from our boat, we have a boat on the Hudson River, we test for untreated sewage indicators, we have a little laboratory on the boat that we actually test and report. We put these samples up on our Website within about a week of them being taken. We put a lot of work into making what we think are very user-friendly explanations and graphical presentation of this data. And this is, this certainly, while it may not be as complicated as radiological data and picocuries, it’s cell counts per 100 milliliters, and we've been successful

at translating that to the public. And also explaining, I think it's important to step back and say, “What's the larger context in which this information is presented?” So, talk about what the standard is based on, talk about how you can be exposed to that. With the untreated sewage, most of the questions we get are about, you know, if I go swimming, am I going to be exposed, or if I go kayaking.

So, you know, I'd encourage the Commission, I'm happy to send you our Web link, and I can put that in our comments. I think there are, there are ways to present the information that can improve this communication.

COMMISSIONER OSTENDORFF: That's very helpful. Thank you. Mr. Chairman.

CHAIRMAN JACZKO: Well, I just wanted to start by agreeing with the comments of Commissioners Svinicki and Ostendorff. I think this has been a very, on a very difficult issue, been really a good discussion among all the parties, and I would, I would follow-up, I think, with Commissioner Ostendorff's comments and questions about the public communication. I do think it's a challenge, I have personal biases here, and I think sometimes the mistake we make is we try to relate radiation risks to other radiation risks, and I think, as we communicate we need to find other, other analogies that are comparable, you know. x-rays are brought up quite a bit, and I don't think, I can't remember dental x-rays, what they do in a dental x-ray, but nobody likes to go to the dentist, so that immediately conjures up bad images, I think for everyone.

But certainly in typical x-rays you go to, somebody leaves the room, they put on a lead apron, so it, it creates this image in people's mind of something that is problematic. And so I think we always have a problem, we relate things to chest x-rays, because that, that does have a sense in people's

mind that there's something to be concerned about, otherwise why would you get the lead apron, why would the x-ray technician leave the room and push the button? I always think there's got to be a cheeseburger standard.

You know, where you look at, you know, eating so many cheeseburgers a week, it's going to have the same impact on your longevity as this amount of tritium. I think people can relate to that and understand that. And people are probably not going to give up eating cheeseburgers, I know I won't, and -- what's that?

COMMISSIONER SVINICKI: Unless they're a vegetarian.

CHAIRMAN JACZKO: Unless they're a vegetarian, right, I'm sorry, we will not capture everyone. But --

[laughter]

But I am not, so I tend to think in those terms. But I think it's a, it's a good discussion, and one that I appreciate Commissioner Ostendorff's continued effort to find a way to try and talk about these things.

If I, if I could turn to a slightly different topic. I think, as I've listened to the discussion, I think one of the things that we may not have touched on enough is the -- and I think Mr. Musegaas, you hit on this. I think there is a different perception in this industry, or there is a different approach in this industry, which is that leakage is acceptable. And leakage is acceptable as long as it stays below certain allowable limits. And generally those are determined offsite. So when we make the statement that there is no public health and safety impacts here, what I usually think I'm saying when I say that statement, is that we have not received any offsite measurements in wells or bodies of water that indicate elevated levels of tritium above 20,000 picocuries per liter.

However, if you measure onsite, that's not the case. I mean, clearly onsite we are getting readings and measurements above, above the EPA limits. And I think that's, to some extent, where some of the confusion comes in. Whereas in other, perhaps in other areas, and I'm not familiar enough with the other areas that you talked about, Mr. Musegaas, to really know what, you know, to really, a strong analogy there. But, that onsite elevated level may not be acceptable in the way that it does appear here to be.

You know, we look, certainly, at plants that have had leakage. We deal with it through a slower remediation effort in some cases, in some cases we'll allow natural remediation, effectively the dilution of the plume, the natural decay of tritium and all of those things, to eventually get us to a level that is below limits. And simultaneously, we continue to monitor to ensure that it's not appearing in any particular source of drinking water. And of course, even if it were to appear in a source of drinking water, as long as we're monitoring, we could, through EPA, or local governments, or whatever, restrict the use of that water source.

So there's multiple barriers to ultimately prevent the ingestion, ultimately. And I think, as I look at the issue, the question is, is that the right approach? Is that the way we want to go about doing it? Or should we be doing something more, so that, onsite, those elevated levels no longer are acceptable? And I think that's, as I look at the issue, the question that I have on my mind, as to where we are getting it, and I think, as Commissioner Apostolakis asked, or somebody else asked, about what we would do to change our regulations, I think it would be in that area, that we have tighter controls onsite, and not find acceptable those exceedences of EPA limits, and in some cases, they can be

quite large. You know, again, it depends on -- if you're taking a small volume of water that has, coming from a particular system that has a high activity level, at that source, that measurement is going to be very high. As it goes into the ground, gets diluted, any of your samples will likely show lower levels as time goes on and as the plume interacts with other water and migrates.

So you know, that to me is one of the issues that I see, and I don't know that there's an easy answer to that problem because again, I think there is no real immediate health and safety impact because we're not -- unless it's an industry groundwater well or drinking well that the utility uses, there are no, that I'm aware of, there are no groundwater wells that are drilled on reactor sites that would be used for offsite drinking sources. So yeah, we have that gray area where there is a degree to which these things are allowed to happen, we don't take immediate enforcement action, we don't have a performance indicator that shows any degradation, we don't have a finding that we issue that shows up in the ROP for those kinds of things. I mean, that's been the case with all of the instances we've achieved.

Now, I don't -- I say it more as a comment; I don't know that I have a definitive answer, but I think it is, it's how I look at the issue and really perhaps where I think the challenges are. Because I think there's no doubt that if we were measuring in wells that people were drinking out of, elevated levels of tritium -- 10, 20, 30, 40 times the EPA limits -- we would be taking immediate action to remediate those wells and taking appropriate enforcement action. Because there, we would truly be exceeding our limits or somebody's limits. The problem is in that gray area where we're not really doing that, as I see it and maybe, you know, perhaps the staff can educate me too if that's kind of a wrong way to look

at it.

Just to turn back to a question instead of going on and on and on here, what would you say if the Commission were to tell staff to go out as a direct final rule, a rule that says, “As of January 1, 2012, all --” you know, Part 50 licensees, whatever, blah blah blah -- we’ll get the right words, “are required to implement any ground water initiative, blah blah blah?” End of language, end of the rule. If we did that as a direct final rule, would we get comments, negative comments from the industry?

MS. KORSNICK: I guess I’ll give you my personal comment, and that is that I really think we encourage the industry to be, to collaborate and to be sort of self-driving. And my only personal opinion, by taking the product of the industry and turning it back on the industry in regulation, does not encourage the industry to collaborate in the future in that same way. I’ll just be honest with you. And so, quite frankly, having the avid discussions that we do amongst the chief nuclear officers to, if you will, self-regulate, are very healthy discussions, as I shared with you, this particular initiative clearly drives a significant resource to be expended, so there’s very healthy dialogue and I think, as an industry, it’s better to maintain that framework from a behavior perspective than it is one to say, “Well, let me just wait and see then --”

CHAIRMAN JACZKO: [affirmative]

MS. KORSNICK: “-- because if what I come up with is going to come back at me at regulation, maybe I’ll wait and see what regulation’s going to happen anyway.” I think we would both lose in that scenario.

CHAIRMAN JACZKO: But what would be the concern, let’s say, in this particular case? What would be the practical difference between the NRC

saying that, and the decision that the CNOs have made to adopt this as a practice? I mean, and I appreciate the comment, I mean, I think it's a very good comment and we certainly want to encourage licensees to take efforts that go above and beyond, certainly, what the NRC requires, and I think we wouldn't want to do anything to damage that. And I guess I wonder how in this case, it would, if this is an initiative that you all have undertaken, you feel is appropriate, what would be the problems here?

MS. KORSNICK: In terms of what actions, as an industry, we would do, I don't think those actions would be any different. In other words, as we look at this, this is regulation to us. It's just not regulation you gave us. So in terms of our behavior, I don't think you'd see anything different in our behavior. It would be more the precedent-setting nature of going through the process to end up with that, to end in regulation. Again, it's more of a strategic implication than it is anything specifically related to groundwater.

CHAIRMAN JACZKO: Thanks, appreciate that. Mr. Musegaas, if I may ask a similar question to you, Mr. Mulligan suggested some kind of memorandum of agreement, maybe between the states and utilities, that would somehow put on paper a greater appreciation of this groundwater initiative, or some kind of understanding about the continued use of it, or the continued adherence to it. In your mind, what would be -- would you see problems with that, I guess? Or is that an OK approach?

MR. MUSEGAAS: I think it would depend on what was clarified. And I mean, just to give you the New York example; in New York state all groundwater is considered potable water, whether it's used as that or not, and so under the Environmental Conservation Law and under DC regulations, any

contamination of that is technically a violation of state environmental law, and so that's on the books, but certainly the state has, for a variety of reasons I think, been hesitant to enforce that. And so you know, I think there is to some extent on that specific question, there is some framework there, although you quickly -- because this is such an overlapping area of oversight, you quickly get into potential disputes between state and federal regulators -- but I think if you could clearly delineate -- and perhaps a delineation comes between contamination that's -- someone has to be responsible for doing the reporting and the initial investigation and the characterization, certainly, of the contamination, so you figure out what it is and how much tritium is out there in the environment. And then perhaps one way to divide it is, you know, if it's under public dose limits, then it's not a public-health concern, but it has environmental concerns perhaps, then once you've reached that level of understanding of the leakage, then you, maybe that's reflected in the MOU, that then the state has authority over that.

But it's tricky. I mean, as I say that I realize that that's replete with challenges as well. You know, a simpler way would be to have the state -- if the state technically is regulating all groundwater in the state, then that should include all groundwater on the site. And to the extent the state's expertise and the state's resources reach their limit in addressing that, then the MOU perhaps should reflect where the NRC would then come in and work with the state to make sure that that problem is addressed. And again, I think this -- just to go beyond your question a little bit -- I think this question of "If onsite levels are higher than EPA standards but they're not higher offsite," I think this really goes to this decommissioning question. Because inevitably, this is going to be an issue if you have tritium levels or strontium levels above a certain limit onsite,

once that site ceases operation and has to be decommissioned back to an unrestricted standard or whatever is possible to get the site cleaned up, that groundwater contamination is going to have to be remediated, so why not to the extent practical, do that remediation once the contamination is found? I would think that would give the industry more predictability in terms of their cleanup costs, it would go a long way to addressing public confidence, and certainly there may be situations where that's not possible.

I think at some plants, that because of their hydrogeological conditions, it's very difficult to do a pump-and-treat or a pump-and-dilute if it's tritium. But I think that decommissioning question, that eventual cleanup, always has to be kept in mind, because it's out there and it's certainly, it's a concern to environmental organizations because it's a long time in the future; we don't know what the financial condition of these companies will be or whoever's owning these plants in the future, and we want to make sure that there are resources available and that the contamination on the site and the existing conditions on the site are fully understood at the time the cleanup is done.

CHAIRMAN JACZKO: Thank you. Any other comments or questions? OK, well, once again I want to thank everybody for your very insightful comments on what is a very challenging issue. Thank you. We'll now take a quick break and then hear from staff.

[break]

CHAIRMAN JACZKO: Running the risk of proceeding without Legal Counsel, I would suggest we go forward. We lost both of our Steves. So Marty, why don't we go ahead and get started, and I think we're probably running a little bit behind, but we'll get going anyway.

MR. VIRGILIO: OK, thank you, Chairman, and good morning Chairman and Commissioners. I want to thank you for the opportunity to present on the topic of groundwater protection and communications, and I start with an introduction of the team here. On my far left is Chuck Casto, who is our Deputy Regional Administrator from Region II, but Chuck's here because he led our Groundwater Task Force, and he's going to talk about the activities, the findings, the themes, and the recommendations from the task force. To my immediate left, Dr. Charles, AKA Charlie Miller, is our director of FSME, and he's going to talk about NRC and response to the themes that came out of the Groundwater Task Force. To my right, Eric Leeds, our director of NRR, is going to talk about the other two themes that came out of the Groundwater Task Force report, on the regulatory framework and barrier integrity. And to my far right is our Special Counsel, Steve Crockett, who's going to talk about the authorities of the NRC, EPA, and the states. I also want to acknowledge my other colleagues and members of the Senior Management Review Group who are not here today, but also provided input to the memos and Commission papers you've reviewed, and also recognize the diverse group of stakeholders who helped us and participated in our October 4 public meeting, provided substantial input, and altered our thinking about these issues.

I would say, there were several challenges associated with this assignment on groundwater protection. In my opinion, they boil down to three issues, and we've talked about them; you've talked about them this morning. The first, is our existing regulatory framework adequate for safety? And then the second one, and Commissioner Apostolakis, I think you touched on it first is, is our risk-informed approach to regulation that includes protecting the environment

appropriate for addressing this issue? And then the third was, how best to communicate around low-risk public-interest issues? And today we'll present the staff's conclusions on these matters. And with that, let me turn it over to Chuck Casto.

MR. CASTO: Thank you, Marty. Good morning Chairman, Commissioners. I'm here to today to present you an overview of the task force activity -- next slide, please -- here to present you an overview of the task force activities, overview of our findings, conclusions, and key recommendations. Next slide.

As you're aware, on March 5, 2010, the Executive Director for Operations tasked the Groundwater Task Force to review events that occurred -- leakage events that had occurred after the Braidwood event in 2006. Also to review the 2006 Lesson Learned Task Force report, and to conduct some outreach to stakeholders, to review -- to identify any gaps that might exist in the regulatory framework or the NRC's response to groundwater incidents. The task force reviewed the Reactor Oversight Process response, we reviewed stakeholder comments including Congressional, media, and as the Chairman mentioned, the April 19 and 20 public meetings that we attended that had diverse representatives from states, universities, and public-interest groups. From that, we developed a list of conclusions and recommendations and basically conducted a stream analysis of those conclusions and recommendations, and identified four basic themes. Those four basic themes were supported by 16 specific conclusions, and then we identified four key recommendations that we thought that the Senior Management Review Group should review. Next slide.

The Groundwater Task Force's overall finding is that the NRC is

accomplishing its mission, stated mission of protecting health, safety, and protection of the environment through our responses to leaks and spills. Additionally, in the next slide, the current regulatory structure is correctly characterizing the requirements and properly characterizing the relevant issues. After our review, basically, an effectiveness review and you might call an inspection of our own activities; we could not find any incidents where the NRC did not follow its procedures or processes or policies in reviewing and resolving groundwater events. Next slide.

The themes that were produced from the conclusions -- theme one, reassess NRC's framework for groundwater protection -- there was a lot of confusion and misunderstanding and other comments among the public comments that we received in the meetings that we attended, that pointed to a misunderstanding or a lack of understanding, or questions regarding the framework for the NRC's regulation of groundwater protection. So those conclusions led us to that theme. Theme two, maintain barriers as designed to confine licensed material -- actually, it was probably more internal stakeholders that brought this issue up than external stakeholders, but basically the theme boils down to, don't have leaks, and have requirements to maintain licensed material in the pipes or containers or wherever it's intended to be by the design.

Theme number three -- next slide -- more reliable NRC response. We looked at the NRC response from the events that had occurred since 2006, and we saw some inconsistencies in those responses, and perhaps there are lessons learned in the ROP that we could identify and did identify to strengthen that response. Theme four was strengthen trust, as you can see. Some stakeholders have doubts about our clarity, consistency, and communication on

groundwater issues, and we heard that a number of times.

The next slide, key recommendations for the Senior Management Review Group; we suggested that they look at the policy issues that were identified in the Groundwater Task Force report, and make an assessment of whether there are policy gaps that there might be. And on the next slide, a recommendation to incorporate those policy issues, which might include the NRC's response, disposition of issues, or generation of a performance indicator, into the Reactor Oversight Process.

The next slide, consider development of specific actions to address, so we had 16 specific conclusions and recommendations in the report, and we suggested that the Senior Management Review Group look at those 16 specific conclusions and recommendations and identify specific actions to address those.

Finally, on the next slide, key recommendation. Once all of that is done and the NRC establishes lessons learned and incorporates those lessons learned into the framework, reach out and -- we didn't have time as the -- although we did have state involvement, we didn't have time to reach out to the EPA. We did, as you know, one appendix on international regulators, so we did reach out to international regulators. And that concludes my presentation.

MR. VIRGILIO: Thanks, Chuck. Steve.

MR. CROCKETT: Mr. Chairman, Commissioners, I want to take about five minutes to discuss NRC, EPA, and state authorities, their interrelation. I'll try to say a little bit about where one authority begins and another leaves off; that will prove difficult. I also want to say a little bit about what the word "environmental" means in this context. Next slide, please.

The NRC gets its authority, of course, from the Atomic Energy Act

by way of the Energy Reorganization Act, and under that, the chief standards that we issue are in General Design Criteria 60 and 64, the 100 millirem standard in Part 20, the ALARA 3 millirem guidance in Appendix I to Part 50. Now I would say, generally speaking, that the NRC does in fact have what can be called environmental authority over radionuclides, and by environmental, I mean simply, it has the authority to regulate releases to the environment. This is clear, especially from an OMB memorandum in the early '70s before the NRC came to be, that said it was up to the NRC to set emissions standards for types of facilities; the EPA would set standards for the total amount of radiation in the general environment from all facilities. But it is true to say that our authority is focused on public health and safety, and our exercise of what I'm calling our "environmental authority" has that same focus. But, I would say, that's everybody's focus here today -- the groundwater standards have exactly the same aim, whether they issue from the state, the EPA, or the NRC.

Let me say something brief about each one of the three standards that are listed on the slide 14. The GDCs address design and monitoring, but at a performance-based level. As the Groundwater Task Force says, the regulations are not as prescriptive in telling licensees how to maintain their licensing basis for systems that are not directly associated with protecting the reactor core. The 100 millirem standard is an all-pathway standard set in 1991 on the basis of ICRP recommendations. The ALARA standard is guidance, but licensees must have an ALARA program. Next slide, please.

The NRC's authority -- or the AEC's environmental authority, used to be viewed as the only authority issuing from the Atomic Energy Act. In 1971, there was a federal case that said the AEC had exclusive authority over

radioactive effluence from nuclear power plants. The ink was barely dry on the documents that got the EPA started, just in December of the year before, and yet they're not mentioned in that decision at all. EPA has basically two sources of authority when it comes to groundwater, the Atomic Energy Act, the Safe Drinking Water Act. Under the Atomic Energy Act, the EPA sets the standard but we enforce, and the 25 millirem standard I've listed on the slide is enforced through our Part 20.1301(e).

Now that's not our 100 millirem standard, so as it comes up to the fence, we're talking 100 millirem, as it comes off the fence, EPA is talking 25 millirem. How are these reconciled? They're reconciled, basically, both in theory and practice. Early on, EPA said they regarded the 25 millirem as an ALARA-based standard but that did not represent the limit of what could be done under ALARA. And in fact, the 25 and 100 millirem standards are reconciled in practice because if you meet the three-millirem guide, you meet both the EPA standard and the NRC standard.

The 20,000 picocuries per liter standard is not in our regulations, but a plant that meets the -- that's based on the Safe Drinking Water Act, applied by EPA at the tap to public water systems -- but a plant that meets our three-millirem ALARA guide meets the 20 picocuries, which EPA assumes in its regulation translates into a dose of four millirem.

Last, the states. We've paid much attention to state activity recently, but in fact, all 50 states by the end of the '80s had enacted legislation to protect groundwater. EPA has had an active program since 1991 to work with the states. State authority, at least as viewed by EPA and the states, comes from a variety of sources: state cleanup statutes, the delegations under the Safe

Drinking Water Act, also possibly savings clauses in the same statute. Some states apply the 20,000 picocuries at the source; they even go so far as to require non-degradation, which probably means -- but this would vary from state to state -- no further contamination beyond what's already there. EPA has recognized that some states will do this; it has also recognized the need for some national consistency in state decisions about what is possible. The EPA has not objected to state uses of non-degradation standards.

That's not to say that there aren't some uncertainties about state authorities. They have been noticed in various letters that we've gotten both from states and from NGOs, public-interest groups. The NRC, in response, has rarely pronounced on state and local authority, and we certainly don't, all by ourselves, exercise preemptive authority. It's the Atomic Energy Act that preempts, and the judicial decision is the last call on whether the Atomic Energy Act preempts in any particular case.

Our aim in interacting with states has not been to declare that their activities are preempted or not. We've done that only very rarely. I can think of two instances. Our main aim has been to ensure that state action doesn't have a negative impact on plant operations. We've worked with Illinois in that respect. We've worked over the years with EPA to achieve the same thing with EPA exercises its authorities under other environmental statutes. That's all I have.

MR. VIRGILIO: Thank you. Eric?

MR. LEEDS: Good morning, Commissioners, Mr. Chairman. I plan to address the Senior Management Review Group's assessment of the first two themes from the Groundwater Task Force report. Charlie Miller will address the 3rd and 4th themes. So as you heard from Chuck Casto the first two themes from

the staff's report were to reassess the NRC's regulatory framework for groundwater protection and to maintain barriers as design to confine licensed material. There were four recommendations from the Groundwater Task Force report that contain potential policy issues or discuss associate activities that could impact the regulatory framework. My presentation will discuss each one of those four recommendations.

The Groundwater Task Force recommended that the voluntary industry initiatives associated with groundwater protection be incorporated in the regulatory framework. In the first panel you heard from industry regarding the three industry initiatives that were developed to address groundwater protection. The Senior Management Review Group recognizes that these initiatives provide a consistent structure and expectation across the industry regarding management of underground systems, structures and components and how to address leaks and spills to ensure regulatory limits are not exceeded.

The Senior Management Review Group thought that these three initiatives can, if properly implemented, enhance the prevention, response and remediation of potential threats to groundwater. During the time period of 2008 to 2010, the NRC staff inspected the groundwater programs at the plants and concluded from that effort that licensees' performance had indeed improved. Gaps still existed for some licensees and their full implementation of the voluntary initiative and these gaps will be the subject of review for later baseline inspections. The NRC also received a report summarizing the industry peer assessment of the implementation of the industry initiative and their observations were consistent with our observations.

In addition, recent operating experience reviews by the staff have

concluded that none of the events associated with degradation of buried piping resulted in releases that exceeded even a small fraction of existing limits for members of the public at the site boundary. Based on information gained from these inspections, these independent peer assessments and industry assessments, the Senior Management Review Group found that licensee actions taken in response to spills and leaks have been consistent with NRC's regulatory requirements and no new regulatory requirements need to be considered with respect to groundwater protection at this time.

The Senior Management Review Group also concluded that in view of the progress being made by the industry in protecting groundwater, rulemaking or some other form of regulatory requirement to codify the voluntary initiatives would not result in the substantial increase in the overall protection of the public health and safety. Hence, the Senior Management Review Group did not support the Groundwater Task Force's recommendation.

Now, having said that, I want to be clear, licensees have the responsibility to run their facility safely. And the NRC staff has the responsibility to ensure that licensees do just that. The NRC staff plans to continue our inspection of the licensees' programs implemented for the underground piping and tanks initiative and through our buried piping action plan evaluate the long-term effectiveness of these initiatives in decreasing the frequency and scope of leaks and spills.

To evaluate the effectiveness, the staff will review licensees' root cause analysis, track the frequency of leakage and evaluate industry performance metrics related to leakage and potential groundwater contamination. The staff tracks radionuclide concentrations release from the plants and

publishes them on the NRC public Webpage, which will make this information on these trends available to all interested parties. We plan to reevaluate the need for additional actions based on future industry performance.

The second standard, many examples of degradation and buried piping have been discovered in non-safety related non-class piping which are not currently subject to the jurisdiction of the American Society of Mechanical Engineers boiler and pressure vessel code. The ASME code does not currently address non-safety related piping nor does it address leaks that are not structurally significant. Recognizing that leaks and piping, if undetected for extended periods, could represent precursors to loss of structural integrity; the staff discussed this issue with the appropriate ASME code committees. The Groundwater Task Force recommended that the staff work with consensus standard development organizations to address non-safety, non-class piping that could potentially carry ionized material.

The Senior Management Review Group agrees, in light of NRC's involvement in this issue, and stakeholder attention, and recognizing the benefits to the utilities of proactive maintenance, the pertinent ASME code committees have decided to develop a code case for safety related buried piping and are considering the development of provisions for non-safety related piping as well. The staff plans to continue efforts to work with consensus standards organizations to have certain provisions related to inspections of non-safety related piping incorporated into the ASME code cases. The staff is also working with the task group within NACE International -- NACE was formally the National Association of Corrosion Engineers -- to evaluate the need for corrosion protection standards specific to the configuration of piping at nuclear power

plants. Current NACE standards are optimized for long straight runs of piping, typical of transmission pipe lines and therefore they cannot be considered optimized for use by nuclear power plant operators. The industry is currently using elements of the NACE standards in their initiatives.

In addition, the staff is monitoring industry efforts to develop more effective piping diagnostic methods, an effort being spearheaded by EPRI. EPRI is evaluating the use of guided wave ultrasonic examination technology as well as other techniques.

Now the current radiological effluent performance indicator was developed in March, 2000 as a leading indicator for any challenge to the public dose limit of 10 CFR Part 20. The performance indicator was set to a small fraction of the regulatory limit and licensee's performance regarding affluent releases never approached this small fraction of the regulatory limit. The indicator has always been green.

However, at the same time the frequency of radioactive leaks and spills was increasing. The Groundwater Task Force report concluded that the current radiological effluent performance indicator did not provide meaningful data on groundwater contamination and recommended that the performance indicator be revised to be more predictive of degrading performance in this area. Based on this recommendation, the Senior Management Review Group supports the staff effort to evaluate whether a change should be made to develop a more leading indicator of degraded performance in groundwater protection for the current public radiation safety cornerstone. This recommendation will be evaluated in our regular process for considering such changes. The upcoming annual ROP, Reactor Oversight Program, self-assessment and discussed in the

Commission paper associated with that review. The staff routinely addresses feedback such as this through our self-assessment efforts and considers whether modifications to the reactor oversight program need to be made.

Now, going to the last recommendation, the Groundwater Task Force discussed work associated with a Staff Requirements Memorandum tied to SECY-07-0177, which was the proposed rule for decommissioning planning. In the associated Staff Requirements Memorandum, the Commission directed the staff to make further improvements to the decommissioning planning process by addressing immediate remediation of residual radioactivity during the operational phase, with the objective of avoiding complex decommissioning challenges that can lead to legacy sites. The staff is already in the process of developing a technical basis to address the need for immediate remediation as noted in the Groundwater Task Force report. The staff began information gathering and analysis to support the technical basis this past year and we plan to complete our feasibility evaluation and formulate a recommendation to the Commission by the end of fiscal year 2011. That concludes my remarks.

MR. VIRGILIO: Thank you Eric, Charlie?

DR. MILLER: Good morning. If I could get the next slide, please. Thank you. We received very good feedback at the public meeting that we held in October, 2010. As well as the written comments we received in response to our requests to receive feedback. That feedback reinforced the conclusions of the Groundwater Task Force that we can make significant improvements in how we communicate groundwater incidences both internally and with our external stakeholders. Informed by these comments and the conclusions of the Groundwater Task Force, the Senior Management Review Group directed the

staff to undertake a number of initiatives to strengthen trust and enhance their reliability in the NRC's response to groundwater incidents. Some of the initiatives are directed solely at the incidents of radioactive releases to the groundwater but others are more broadly applicable to other incidents involving unintended radioactive releases. Next slide please.

The staff is addressing actions that can be taken now to more effectively communicate information on incidents involving the unintended release of radioactive material. The NRC Website contains a considerable amount of information on groundwater contamination; however the information available to the public is sometimes fragmented and in some instances is out of date.

In the near term the staff will establish an agency-wide community of practice for groundwater contamination issues. In an effort to improve public confidence in NRC actions, the NRC Communication Council, which has a stakeholder confidence working group as part of it, was established to evaluate how the agency can strengthen stakeholder confidence in NRC's actions around reported incidents where risk is low and there's a high stakeholder interest. It will also determine what improvements to the information available on the NRC Webpage regarding loss of confinement incidents and tritium would help the public better understand the agency's actions with regard to incidents and the eventual outcome. For example improvements to the existing facts sheets associated with groundwater protection and tritium are being made. Next slide, please.

To improve stakeholder trust, the agency will reach out to trusted sources such as public health officials as a method for strengthening credibility.

Environmental samples will be collected and split so the third party organizations can make independent assessments. We will try to do sampling on a more consistent basis. We want to provide easier access to the annual effluent reports. The staff is considering the need for providing prompt accurate information on the nature of unintended releases of radioactive material and what NRC plans to do in response to these incidents. The low risk associated with tritium contamination needs to be placed in a proper context and communicated effectively with our stakeholders.

Yet the staff must appreciate the public has a very high interest in these events that may have low impact on public health and safety. The staff has made improvements to the availability and the user-friendliness of the information provided by licensees in their annual effluent reports. The staff is publishing annual composite reports. The most recent report was for the calendar year 2008 that included graphical depiction of effluent data, explanatory text in normalizing the data to allow for comparison between operating units. This will allow readers not to be overwhelmed with mounds of data in trying to draw conclusions. Next slide, please.

In the longer term, the staff will develop a strategy for strengthening stakeholder confidence in NRC actions involving reported incidents in which the safety risk may be low but stakeholder interest is high. The strategy will be used not only for incidents of unintended radioactive releases into groundwater, but also more broadly for other incidents and events. The staff will develop better strategies to address strengthening stakeholder confidence in the NRC and considering ways that the NRC can develop a relationship with trusted sources, as I previously mentioned, to make sure that there is plain language and

improving the follow up which concerned stakeholders have with regard to leaks that are identified. A significant initiative is the effort to develop a standard protocol for engaging states on unintended releases of radioactive material. This protocol will incorporate the lessons learned from the groundwater incidents thus far and feedback from state representatives.

In addition the staff will consider approaches for engaging states by establishing communication channels through more than one state organization; such as the public health and environmental quality groups and the government appointed state liaison officers as well as the CRCPD. Once established, the standard protocol and these communication channels will be beneficial for other incidents and events in which NRC will need to engage the states.

And finally the staff has initiated a dialogue with our international regulators to better understand their regulatory approaches for dealing with groundwater protection. Focusing on the resolution of issues involving groundwater and underground piping and tanks. The staff is also gathering information on domestic and international activities for modeling movement of radioactive materials through the environment. In addition to keeping informed of the international efforts in this area, the NRC will use this information to strengthen agency communication with domestic stakeholders about groundwater incidents. Marty.

MR. VIRGILIO: Thank you. That completes the staff presentation. We're ready for any questions you may have.

CHAIRMAN JACZKO: OK, thank you. Commissioner Svinicki.

COMMISSIONER SVINICKI: Thank you all for those presentations. I didn't realize until I was reviewing materials for this meeting, it

was the first time I had looked at Mr. Borchardt's memo to the Senior Management Review Group of what he was charging you to do, so since Mr. Borchardt isn't at the table as a recipient, Mr. Virgilio you've received this memo, so I'll ask you about this, it concludes -- Mr. Borchardt's memo concludes with the final deliverable, so that was what you were all expected to do as a Senior Management Review Group; is a Commission paper presenting options for addressing the policy issues and you had a due date associated with that. And I just want to make this statement, is that what the staff provided was an Information Paper that identified potential policy issues, so I did request that that paper be treated as a voting matter for the Commission and I feel, I would say fortified in that choice by the discussion that we've had with the first panel and perhaps we'll have with all of you.

It's my view that there is value in the Commission making its imprint now on some of the work that you've done so far and may be giving you that policy imprint so it may shape some of your movement going forward. In any event that's my task in trying to convince my colleagues that there's value in that when I vote on the paper itself, which I hope to do no later than early next week. So I just wanted to make a statement on why I made that assessment and why I believe that there's value in that but I guess we'll see what we see.

I, and maybe I'm being a little too philosophical today, but there's been a lot of discussion about strengthening trust, that was one of the themes and we've talked about that. And I don't know, I don't like polls, I don't follow polls, so the point I'm about to make is not dependent on your belief in a recent poll, but industry occasionally sponsors polls of public opinion about nuclear power and they released one very recently, so of course in the trade press that

we all receive we read about this and again, I don't endorse this, I don't know if this poll was accurate, I know nothing about the methods of it. But one of the questions that the industry, again, industry sponsored poll was polling on was the public's confidence in nuclear safety. So they asked a lot of questions about desirability of nuclear power but this specific question was, "What is your confidence in the safety of nuclear power in the United States?"

And I'm going to get these numbers and years a little bit wrong but again it's orders of magnitude so it polls today at about 67 percent of people feel that they are confident that nuclear power is safe and in 1983 I believe was the year, it polled, you know, may be in the '30s or the low '40s. So let's, just for a rough order of magnitude say that people are twice as confident today, according to this poll, than in the safety of nuclear power of the United States than they were in 1983. And so when I think about how we should perhaps be revisiting or if we should be revisiting our regulatory approach against barometers of public confidence or public polling and convincing the public, where is their barometer landing today in terms of their confidence in public health and safety of power plants. I think the real danger there and part of the reason that nuclear is regulated by an independent regulatory agency, is, of course, to insulate us from that type of variability in public views and public opinions.

We are charged with putting in place the safety and security regime that is appropriate and then I think that there's some certainty that public opinion would come up and down in relation to that. So I think that the themes along the lines of communications and other things that we've talked about this morning, the staff's efforts to look at how we make available the information that we do have, is all of something that is kind of in the realm of absolute good. But I think

that when we go looking at the ROP and other things as when I began to look very, very closely as what it is that we're contemplating and along those lines, I would like to turn to the area of revising the radiological effluent performance indicator in the ROP. And I want -- Eric, I think you are the one to respond to this.

And so when I read what about the staff is considering so far, it could read as -- and I want you to rebut this and that's what I'm hoping you'll do. It could read as, "The performance indicator was set to a small fraction of the regulatory limit and licensees' performance regarding effluent releases never approached this small fraction. Based on this the staff has concluded that this doesn't give us any type of indication of anything," and now I'm paraphrasing because the first sentence was from your report. But is it fair to say that we set it at a small fraction of the regulatory limit, that was never approached, never exceeded; therefore, we need to revise our approach. I mean, I'm sure you can see how that would look like. Some might question our purpose in doing that. So, could you help me explain why, from the fact that it was set much below the regulatory limit, it wasn't approached; therefore, we need to do something different there to give us an indicator of what's going on. But repeat that back to me in your own words.

MR. LEEDS: Well thank you Commissioner. And let me try to be specific. The Groundwater Task Force were the ones that recommended that we take a look at the performance indicator. It was said very conservatively and it was done very purposefully. The actual performance indicator was set at half the limits of the Appendix I limits in Part 50 for liquid and gaseous releases and that's set much lower than the hundred millirem to any member of the public limit. So

it's a very, very conservatively set so that we would catch anything long before it could possibly harm the public. The good news is, licensees have performed. The performance indicators stayed green. No licensees has released anything that's come close to exceeding any kind of safety limit.

The bad news is it hasn't done anything for public confidence. Not in accordance with what we've heard today. So the Groundwater Task Force recommended that we take a look at that performance indicator. The Senior Management Review Group took a look at that recommendation from the Groundwater Task Force and said, “You know, in the context, the greater context of the Reactor Oversight Program we should take a look at that indicator and we should take a look at all the different mechanisms that we have in the Reactor Oversight Program for getting at this issue.” So we want to evaluate not only our performance indicator but let's take a look at our inspection guidance. Let's look at our significant determination process. And I don't want to prejudge what our evaluation is going to be. It may be to leave the indicator as it is. Maybe we can find another tool that can help us with this measure. To help public confidence and to identify what we need to do.

COMISSIONER SVINICKI: But let me challenge you a little bit on that. I -- is in what you're saying could I take any indication that you think it's appropriate to regulate to public confidence or should public confidence be an outgrowth of a strong, predictable, stable regulatory system? It was kind of a very leading question.

MR. LEEDS: Yes, ma'am. I'll answer your question directly but I also want to --

COMISSIONER SVINICKI: I’ll let your answer, and then I want to

get to another question.

MR. LEEDS: Of course you want public confidence to be outgrowth of a strong program. For any regulator we'd like to have leading indicators to tell us that there's something wrong at a site. So if, and perhaps --

COMISSIONER SVINICKI: You could have a very different standard in different parts of the country then; couldn't you, I mean, in theory, because you'll have some plants that are located in areas where, you know, there's a very, very active local scrutiny of what they're doing and there isn't. And I think that's really the danger of saying that public confidence is how we're going to set our metrics. I don't -- maybe I'm not understanding you but I think that that to my mind, would not fortify a strong consistent national program.

MR. LEEDS: I understand what you are saying, Commissioner. As a regulator, if I have a licensee who has done a good job of implementing this voluntary initiative and we see a decreasing trend, that's what we want to see. If we see another utility that is not doing a good job of implementing and we see an increasing trend of leaks and problems with pipes, that brings a question in my mind as a regulator, these are non-safety related pipes. Well, what are they doing with their safety related pipes? Do I need to spend more attention at this site. So that's how it would be valuable to me as a regulator.

COMISSIONER SVINICKI: Do you understand or think it's likely, at least I think it's likely, that as the industry does more excavation and more testing aren’t you going to be discovering more data points? Is that indicative of the fact that the industry initiative is -- it seems to me that we will, in all likelihood, hear about more instances of degraded underground pipes as they do more excavation and as they do more testing. How are you going to receive that

information? I'm concerned, based on what you just said that you are going to be somewhat of a failure of their initiative.

MR. LEEDS: Well, I agree 100 percent. You know, now that they are looking now that they are putting the wells in the right place, now that they are doing their risk analysis, I think we may actually see an increase of uptake in reports because they'll be finding again. In our buried, piping action plan, our evaluation is set for the year 2015. So we want to trend this over the course of time. Give them a good amount of time, four years or so to figure out what the problems are, to identify it, to fix it, and for us to trend it before we come back to the Commission and say this worked or didn't work or we need something different. So I agree with you.

COMISSIONER SVINICKI: OK, OK, thank you Mr. Chairman.

CHAIRMAN JACZKO: Did you have more?

COMISSIONER SVINICKI: No, I'm sure others will have good questions. Thank you.

CHAIRMAN JACZKO: Commissioner Apostolakis?

COMMISSIONER APOSTOLAKIS: No questions.

CHAIRMAN JACZKO: No questions? OK. Do you want to take his time?

[laughter]

COMISSIONER SVINICKI: I'm sure I could. I have a lot of flags on these documents and a lot of highlighting but I'll pass, thank you.

CHAIRMAN JACZKO: Commissioner Magwood?

COMMISSIONER MAGWOOD: Thank you Chairman. Thank all of you for the work. Thank you Chuck for leading the task force in the first place, it

was the first time I had the chance to talk with you and I've gotten to know you a little bit more since then and thank you for the ride from the airport yesterday. It doesn't mean your question is going to be any easier. Actually let me start with Mr. Crockett because, you touched on something that I was thinking of talking to Mr. Mulligan about -- and Mr. Mulligan, both his letter to us and also his statements today, he indicated -- I don't think he's here to defend himself, but he indicated -- or is he? He is here, so if you have to -- I'll have to give you a chance. But he indicated that perhaps this agency should adopt more of the EPA approach -- or standards for effluence as opposed to what we're doing now. And I was actually kind of confused by that statement because it sort of reflects something you said, which is that according to your statement, the EPA levels are actually less aggressive than what we apply to dose based standards. You know, we're at 3 millirem, EPA's 20,000 picocuries leads to 4 millirem. Can you straighten that out for me, maybe I'm confused.

MR. CROCKETT: On the surface EPA's 25 millirem looks far more stringent than our 100 millirem. Right? They are both all pathways, they are both essentially at the fence line but on opposite sides of the fence line. I think what I said was that our 3 millirem ALARA guide is stricter than EPA's 25 millirem, if you meet the 3 millirem guidance, you meet EPA's 25 millirem and EPA, when Part 20 was being written in its 1990 or 1991 version, EPA had written us a letter saying, we regard -- "We EPA regard our 25 millirem as ALARA-based." That is they've already taken into consideration the kinds of factors that are taken into consideration in reducing something to as low as reasonably achievable.

However, EPA was quick to add you probably could do more under

an ALARA guidance and that's what the 3 millirem standard does. So I'm saying don't focus just on 100 versus 25, look at in fact what happens in practice and then you'll see. I don't think it would be quite precise enough to say that we are more stringent than EPA but in fact the results are more stringent -- are lower than results you would get by simply complying with EPA's 25 millirem standard.

COMMISSIONER MAGWOOD: OK, I see your point, a little bit of apples and oranges.

MR. CROCKETT: Yeah, practice in fact gives results better than either the NRC standard or the EPA standard.

COMMISSIONER MAGWOOD: OK, I appreciate that. So if you were to adopt the EPA standard where would that actually show up?

MR. CROCKETT: I don't think it would mean any -- well we would take on board, I don't recall exactly what Mr. Mulligan said on this point but if he means we should adopt EPA's 20,000 picocuries limit that is certainly something the Commission could consider but the three millirem ALARA standard already comes in under the four millirem -- the three millirem is all pathways including groundwater. That comes in under EPA's four millirems by way of groundwater alone so I'm not sure what the gain would be.

COMMISSIONER MAGWOOD: Since I used your names Mr. Mulligan, if you want to comment any further please feel free. You have to come down to the podium. You'll pass OK. It's not worth the walk.

[laughter]

Let me -- I found the conversation that Commissioner Svinicki had with Eric I thought was one aspect of the conversation I think I was having with the industry panel a bit ago and that is there does seem to be this clear

understanding that public health and safety is being protected right now under our current regulatory framework but people aren't happy.

Therefore, we've got the Groundwater Task Force, we had the senior review group and there are recommendations to look at a variety of measures to enhance our framework further; which I think does beg the question if our framework is fine why are we looking at changing it. Well obviously it's because we're hearing a lot from the public, from stakeholders that there are a lot of questions being asked about whether we really are being protective of overall public health and safety overall environmental health and safety.

This does get a little bit to sort of the public confidence issue. In fact it gets to a lot of public confidence issue. I think we all struggle with how to accommodate that in our regulatory structure. I'm still struggling with it so I don't have a conclusion for you yet. But it seems to me that one aspect of this that I think is important to indicate; I think the Chairman was having a conversation a while back about -- and Commissioner Ostendorff also about how do you communicate the risk associated with tritium emissions versus either chest x-rays or cheeseburgers or whatever else.

But I think one aspect of this that is very important to point out is that you know if you get a chest x-ray you actually went to the doctor's office and signed a piece of paper and got the chest x-ray. If you fly on an airplane and get exposed, you bought the ticket. If you get it from a cheeseburger, you bought the cheeseburger; with tritium maybe not so much. You didn't sign up for that. You didn't volunteer for that.

I think that's why it creates such a different emotional reaction and why it's so hard to communicate in terms of risk because it's the difference

between risk that you've basically signed up for and risk that you didn't sign up for. So that's where I think, that's why I think the public looks to regulatory agencies to deal with it because it's not a risk that they volunteered for.

Now I think that – maybe I'll shift this unless you have something more to add I was going to shift this more to Charlie's piece of the pie unless you wanted to comment.

MR. LEEDS: That's fine.

COMMISSIONER MAGWOOD: You're fine to let that go, because it does get back to this communications thing and I appreciate your comments on this. One of the things that -- I've visited both Oyster Creek and I saw the work that was going there, that was good. I also visited Braidwood some time ago and met with people there and found that there was a lot of remaining I guess I'd say, doubts, about both our agency, about the licensee and I wonder when you look back at that experience, have we absorbed that lesson from Braidwood into what we're doing now or is that something we're now just sort of starting over again now that we've run into this issue back now in 2010, 2011.

DR. MILLER: I would argue that we have absorbed it, in other words it's those encounters where we got that feed back that first allowed the task force and then the Senior Management Review Group to reflect on that and say what initiatives we thought we needed to enhance in recognition of the public's reaction to this. To take a step back and to say we can do a better job of communicating this. I think that's how we drew our conclusions from that.

COMMISSIONER MAGWOOD: Chuck did you want to get to that?

MR. CASTO: Yeah I agree with that completely. There's room to grow in the area of communications and this issue. We've, the strategies that

we've used to communicate reactor issues, if you apply those to public health issues they're less effective about communicating public health and how you communicate public health. I think that's the area where we have to grow as an agency is in the public health communications aspects of it.

COMMISSIONER MAGWOOD: OK I appreciate that. When you look at, when you look at the difficulty in communicating this and you know I sort of had this first hand when I was visiting the Braidwood area. It seems that one of the things that I've appreciated was that there doesn't seem to be a -- and I'm trying to remember which person from the previous panel pointed this out but there doesn't seem to be a good basis of public education out there in the first place to talk about these things.

So it's not just you know now that there's an effluent from a particular plant, here's how you put it in context. Your people seem to hear it for the first time. They've never heard of a picocurie. When we visited Braidwood we actually spent a significant amount of time standing around explaining what a picocurie per liter meant and where that came from and how it affected health and it was actually kind of frustrating for me to discover people were hearing this for the first time after having been through the whole Braidwood situation for so many years. At least that's the way it's portrayed. Who does that? Who educates the public? Who's telling the public what a picocurie is and who's telling the public? Who does this?

MR. VIRGILIO: I think Maria Korsnick touched on it, and she said it's a part of doing -- my words -- it's a part of doing business. If you want to build a nuclear reactor at any given location, if the licensee does take that on, and I think that's an appropriate burden for them to shoulder; that they go out and they

interact with the public. They need to make sure that the public understands the safety and the risks associated with putting a nuclear power plant into their neighborhood.

I think this has caused a renewed interest on the part of the industry to get out and interact with their local stakeholders. I don't know that I've seen any other recent events that have promoted this kind of dialogue other than the new construction. Then around the new construction what you're seeing is the renewal of visitor centers. Something that we had pre 9/11 that 's a result of our security requirements you did see them cut back on that because a lot of them were located inside areas that now needed to be protected.

COMMISSIONER MAGWOOD: My time is up, I'll yield, but I do think this broader issue and you're right it was Ms. Korsnick that brought this up. There does seem to be this lack of good public information about these issues. I actually have to question whether the industry is well equipped to really provide that because they have a vested interest in the outcome. So I wonder if there's other institutions out there that ought to be out there talking about these issues.

CHAIRMAN JACZKO: I think Health Physics Society has actually recently engaged a little bit on this. I think they put together a brochure, a pamphlet. I think to your point they can provide maybe more of a third party neutral framework but I'm pretty sure they've done some work in that area.

COMMISSIONER MAGWOOD: Thank you.

CHAIRMAN JACZKO: Commissioner Ostendorff.

COMMISSIONER OSTENDORFF: Thank you Mr. Chairman. Actually I'm giving a talk to Health Physics Society meeting tonight so I do have their annual radiation frequently asked questions as part of the presentation. It is

a very effective mechanism that will bring today's meeting experience to this dinner discussion this evening.

I guess Commissioner Svinicki followed by others -- everybody has flown down the gauntlet of allowing us to enter into philosophical space here today. So with my colleague's indulgence I'm going to continue that because I think you're getting to the heart of these issues; all of you are in your discussions whether it be cheeseburgers or the legal tort liability, the assumption of the risk piece that Commissioner Magwood was alluding to on buying the plane ticket you assume the risk of airline flight associated with that.

And Charlie you and I in a periodic just yesterday had a chance to talk about this topic of communications before today's meeting. I wanted just to make a comment on the philosophical piece on the communications that I would encourage you to look at in the groups, Marty that are working on the communications piece.

While I'm encouraged there's a stakeholder conference working group and I think that's a great step and I fully support that I would encourage the group to be bold. By being bold I would suggest that it's not just enough to talk about here are the four millirem whole body exposure on an annual basis based on 20,000 picocuries per liter but to look also or to consider a strategy that helps people put this in the context of other risks they face in everyday life from other activities, not just nuclear exposure, not just power plant exposure.

One could take an approach and look at, "Well I'm living downstream of a coal fired electric plant and therefore there's greater carbon emissions coming from that plant than there are a nuclear plant." You could go through and do some calculations associated with the health risks associated

with coal dust making its way into the environment.

Well that's, certainly one could take that approach but I'm talking about even broader than that. You know today's Washington Post or yesterday's talked about crime instance riding the metro. I know the Chairman rides the metro every day and I don't want to alarm you here, Chairman Jaczko.

CHAIRMAN JACZKO: I saw those statistics and I was – it did yeah.

COMMISSIONER OSTENDORFF: It got my attention this morning. So there is the risk of riding the metro with being held up or the victim of some kind of assault. We know from the medical community the likelihood of incurring Alzheimer's disease -- and quite frankly at this point in time some bleak prospects of a cure for Alzheimer's. We understand from the Food and Drug Administration different risks associated with clinical trials results on a new drug that might help cure rheumatoid arthritis.

I could go on and on. You get the point I'm saying. I think it's important the stakeholder group not have narrow blinders of looking just at nuclear power plants or nuclear issues but maybe take a bold step at looking broader at how we discuss risks in society. Quite frankly there's no consensus on how that's done but there's lots of risks from cholera in other countries because of lack of clean drinking water.

Commissioner Svinicki made the point about while there is some waste product associated with industrial processes we benefit from electricity. We're not freezing at night or dying of heat stroke in the summer because we have air conditioning or heating systems. So how do you put that in context?

I'll stop at that point. I'm not really asking a question here but I

think it's such a critical part in trying to communicate in a way to instill a public confidence that we're able to take a broader look not just at the nuclear power plant.

Marty I want to ask you a question on the overall task force. There are some comments in there about some inconsistency of NRC applications of regulations or at least inspections or actions as I understood the report. The Groundwater Task Force said that there is room for improvement in consistency of NRC action. I'd be interested on your comments on what are specific things that might be considered by the NRC in that area.

MR. VIRGILIO: I think -- and Eric did touch on this. For the last two years we've been inspecting under a temporary instruction. I'm not sure that we've been implementing that evenly across the nation. So in response to the feedback we've received we've worked with the Regions and headquarter staff. I think we've got a more even implementation today of that TI and now looking forward as we look into 2011 taking that TI and building it into our Inspection Program. That will certainly I think address the issue of having a baseline inspection and more even application.

COMMISSIONER OSTENDORFF: Eric.

MR. LEEDS: If I could just add on that TI. We're finishing up our final roll up of all those inspection findings and we expect to issue the report here hopefully in March. I think we should get it out this next month that'll show the results of those initial inspections at all the sites.

COMMISSIONER OSTENDORFF: OK, I'm cognizant of the comment made by one of my colleagues, I can't quite remember who it was earlier; either in this panel or a prior panel about you know there's a potential

here if one proceeds down a path to regulate public confidence, which I'm not endorsing here at all. But the squeaky wheel gets the oil and there's a real potential detrimental impact if one has a heightened sense of scrutiny in one state because of the vocal engagement of different groups. Then one goes across the state line and sees a very different perspective applied across the state border elsewhere.

So I just throw it out as a concern I'm having, having listened to today's discussion and I think Mr. Musegaas' presentation of the prior panel was very helpful to me to hear some contrast quite frankly between his perspective on Entergy, I assume at Indian Point, contrasted to Exelon's experience.

So I just throw that caution out there, I think we all need to be very careful that if there is a perception or double or multiple standards being applied based on some reaction to public comment, vocal opposition of certain things, we need to keep in mind we are part of United States Nuclear Regulatory Commission. There has to be a national framework for our regulatory approaches. While we want to listen to I think we do an excellent job as an agency of listening to public stakeholders and individual groups and I think I applaud the agency for doing that, we have to always be able to step back and say we have this national program in mind and we have to be looking at that consistency. So that's kind of part of the driver for my question as well.

MR. VIRGILIO: We would agree and I think that form an inspection and enforcement perspective you would want a consistent approach across the nation for any given situation. But from a stakeholder interaction including the states as well as the public we are going to behave differently in different states in order to address the concerns of the stakeholders.

One of the things Charlie talked about was the protocol that we would be developing for interactions with states. I could see that that would be exercised much more frequently in the northeast where we have a high degree of interest in this than we would see in the south or maybe in the west where this has not been an issue for the states and the members of the public. So there's where I would see the inconsistency and the need I think for us to engage with the stakeholders differently given their interests and concerns about this issue. But again, from the inspection and enforcement perspective we need to have a national program.

COMMISSIONER OSTENDORFF: Charlie did you want to add something there? It looks like you're getting ready to --

DR. MILLER: If I may.

COMMISSIONER OSTENDORFF: Yes.

DR. MILLER: If you look at the title of my office it's got the word state in it so my office spends a lot of time, my staff spends a lot of time in interactions with the states in multiple capacities. I think that that outreach that we do pays a lot of dividends and I don't want to sell short either that we have regional state liaison officers in each of our regions. We have a tendency sometimes to think about states in the Agreement State category but in nuclear power area we basically deal with both states that are Agreement States and states that are not Agreement States.

You sometimes have to reach different places in the state government in order to be able to get that information out so I think it's important to do that. If you'll indulge me to opine on your earlier comment with regard to trying to put things in context. I think we heard a little bit of that theme where the

Chairman's looking for a way to compare radiation and cheeseburgers and Commissioner Magwood you raised the issue concerning people go to the doctor's office and it's an informed decision that they're willing to take the risk of a chest x-ray where here with tritium it might not.

So if I could weave all of that together into one theme I think our goal would be able to communicate. We have a tendency to communicate radiation in the areas of here's what you would get from exposure to radiation from a nuclear power plant and here's how that compares to other sources of radiation that you might receive; either terrestrial or on an airplane flight or x-rays and other things.

It's harder to compare it to other things because society is willing to take risks in certain areas because of that benefit. I think your comment about the fact that we really don't emphasize the benefit of what's going on. That's a tightrope that we walk as regulators because we're not promoting the activity, we're regulating the activity. So if I were to try to weave that all together into a communication I would want to get from what you've all said I would try to you know get the public to really appreciate the fact that any radiation that they might receive from any tritium that got offsite that we consider low level that might have an uptake from a well from a fence posted cow or garden that was watered that got turned into a cheeseburger or a salad for Commissioner Svinicki and the Chairman would be safe to eat.

CHAIRMAN JACZKO: I eat salads too by the way.

[laughter]

DR. MILLER: In all seriousness though that's somewhat of the challenge. It is a little bit of comparing apples and oranges of societal risks.

People get in cars every day and drive on the highways because the benefit that they get from what they want to do with that. People use cell phones every day; it's become a part of our being. But I would argue that the nuclear industry is probably -- you know, it's the most overly scrutinized industry in history of mankind. So that's the challenge that we face and communicating the fact as regulators -- the trust that we want to bring, I think, from regulators is a trust that regulators are doing the right thing. We're communicating openly and we have a scientific basis for why we believe public health and safety is being protected.

COMMISSIONER OSTENDORFF: Thank you, that's very helpful. Thank you Mr. Chairman.

CHAIRMAN JACZKO: Eric I wanted to just go back to the performance indicator. I think it's a lot of interesting questions. Maybe you could talk in a little bit more detail about how you would see -- what would you see the indicator accomplishing and what kinds of measures you would be looking at in terms of providing data into the indicator.

MR. LEEDS: Could you repeat that?

CHAIRMAN JACZKO: For the performance indicator, what would be the data sources? What would be the input that feeds into that indicator and what would you be looking to measure?

MR. LEEDS: Well right now the performance indicator measures releases, monitored releases. As I was trying to explain when I was speaking with Commissioner Svinicki, you take a look at a performance indicator, you know, we do this on a regular basis. The staff does a self assessment every year and we're always looking at our performance indicators critically to make sure that we're getting out of them what we need to get out of them. The staff is

on the search for the holy grail of the perfect indicator that'll tell us when a plant is starting -- performance is starting to degrade as an early warning. And we haven't found that yet but we continue to look. We are pleased with the indicators that we have today. We think that they are directly related to public health and safety. If you take a look at the industry performance over the past 10 years, we think that industry performance has improved.

So we like the indicators that we have but that doesn't mean when we get feedback on indicators and we take a look at things critically we'll always go back. We're a continual learning organization so we're going to take a harder look at the indicator but we're also going to take a look at the other tools that we have within the Regulatory Oversight Program to see how best to accomplish what we want to accomplish or what we think needs to be accomplished. So we're going to look at -- you know, the performance indicator looks at monitored releases and now you have tritium leaks that are unmonitored releases, onsite versus offsite, frequency of leaks. There are a number of different types of parameters that we could take a look at.

CHAIRMAN JACZKO: You're not going to have a number of complaints from the public kind of factor or something like that?

MR. LEEDS: No sir, no. But as a regulator we want to know, it always raises the question, if non-safety piping is leaking well what about the safety related piping? How well is the licensee identifying their issues and correcting their issues? I mean that's the bottom line of the reactor oversight: can the licensees identify the things that need to be fixed and are they implementing effective corrective actions to prevent their recurrence? That's the backdrop. That along with the risk of the activity is the backdrop for what we as

regulators are looking for.

CHAIRMAN JACZKO: So I mean to some extend what I'm hearing at least at a high level is that you basically might be looking to try and capture that unmonitored, accidental release. That would start to get captured in the indicator and so that's one possible way that you might modify the system.

MR. LEEDS: That's a possibility, but as I said I don't want to prejudge where the staff's going to come out but we're working it.

CHAIRMAN JACZKO: Correct. Turning to another topic, a piece of what the staff is going to be looking at is -- are the consensus codes and standard bodies ASME and NACE, I guess it was -- what kinds of things do you think will come out of that change? Will it ultimately be new monitoring protocols for the utilities, new inspection frequencies, those kinds of things? What kinds of things do you think would stem from that?

MR. LEEDS: Well I'm hopeful for a number of things. The ASME code case, we've pursued and we're currently pursuing code cases. For example on high density polyethylene pipe, which licensees are starting to use in their service water systems because it resists corrosion, fouling, we see a lot of benefits. Having a code case provides a certainty for licensees, it provides a standard, a national standard that the agency can endorse, that the government endorses, that the industry can use to assure that the way they're handling their high density polyethylene pipe will withstand the rigors of time and so that the piping will perform its intended function. Well the same thing for the ASME code. What we're hoping for are code cases that will provide additional assurance for licensees for piping that handles licensed material.

CHAIRMAN JACZKO: And that could be both safety and non-

safety.

MR. LEEDS: For safety and for non-safety if we get the ASME code to agree to a code case and I think they're leaning that way. For the NACE, for corrosion standards, there's a number of activities and a number of things that licenses have already implemented with protective coatings, cathodic protection, but are there other things that have occurred, are there other advances that licensees can use to help protect their underground or buried pipe?

CHAIRMAN JACZKO: Right now are all safety related piping systems inspectable?

MR. LEEDS: Are all safety related --

CHAIRMAN JACZKO: Buried or whatever.

MR. LEEDS: No they would -- we can give you an example at Salem where they had auxiliary feed water piping that had corroded and that the licensee had to dig up and repair. It was underground and that portion of the pipe that was underground obviously was not inspectable.

CHAIRMAN JACZKO: So there's -- you could -- I guess I am just speculating here, so there could be value in getting information about non-safety related piping because it might in fact give us some insight in some uninspectable safety related piping systems as well? If there are maintenance practices we identify if we see problems with -- whatever it could give us a way to track some information about those uninspectable safety related piping systems as well.

MR. LEEDS: Certainly the work that EPRI's doing, looking for diagnostics so that you can find pipe thinning or you can find pipe corrosion underground before it's a problem. We're hopeful for those types of

technologies, you know, to add to the repertoire for licensees to be able to find problems and fix them before a release.

CHAIRMAN JACZKO: One of the interesting things and maybe, Chuck, I'll ask this of you, that I think came about as part of this study was a look at internationally where different people are with standards -- or maybe Charlie, whoever wants to answer this. Do you have any insights in why -- I mean I'm just looking, I know there was I think as part of a meeting we had with the Canadian Nuclear Safety Commission they kind of put together a summary table of different tritium limits and they're all over the map quite literally I guess if you look at the map of the countries. I think Canada is at almost -- and of course everybody else uses different units than we do so their numbers aren't quite even numbers but they're basically about 200,000 picocuries per liter. It's almost 10 times what the U.S. standard is; Australia is about 100 times bigger. Do you have any sense of why that wide variation? Are they measuring things -- are they just measuring a different parameter here or what exactly? Is there any explanation for that wide divergence?

MR. CASTO: I don't know the explanations.

DR. MILLER: I could speculate to some degree Chairman. I mean different countries take different approaches to things with regard to it. As I travel and have involved a lot internationally over the years, I think what we find is that its catching up, but historically there's always been a lot more public interest in the United States. Perhaps that's where attention is paid by both the industry and the regulator then there is in many other countries given their government structures and things like that so that leads it to some degree.

Now the other question then becomes how do they set those

standards? I think you know from the IAEA's perspective at least they're trying to get countries to standardize in using this standard of course. The United States itself is an outlier of that to a large degree. I think that that does it and I think in many cases too as time goes on they look to the United States in trying to gather information on that. But in looking at the numbers that you have and generally speaking if you look at our standards they are generally lower than what you'll find around the world.

CHAIRMAN JACZKO: Other than I think Ontario. Ontario is 541. I think they're a little bit lower.

DR. MILLER: It's a province right within a country yeah. But it is, it is and that's why we want to go out and continue to collaborate with them more. What are the underpinnings? What I've told you is anecdotal, that's just Charlie's opinion. It doesn't necessarily mean that it's necessarily right. But in looking at you know, are they using modeling to get to some of those things? How do they draw their conclusions?

CHAIRMAN JACZKO: Well I want to thank all of you for your input. The work of Chuck that you did on the Task Force I think was a very good product and then obviously the review from the senior managers helped provide some insight. Any other comments from my colleagues?

COMMISSIONER MAGWOOD: I'm sorry Mr. Chairman. I do want to ask one other question. Marty hopefully can answer this relatively quickly but I know that the senior group did look at the idea of adopting the industry standards and incorporating them into the regulatory framework and you recommended against it. Was there a conclusion that we could do it, that there was a --?

MR. VIRGILIO: Eric said it was really subtle. We did not do a

formal backfit analysis in accordance with 51.09 but we did not find that there would be a substantial increase in the overall protection of public health and safety. That was just you know our view on this at the end of the day so therefore we just didn't see how we could adopt it into the regulations.

COMMISSIONER MAGWOOD: That's important. Also Mr. Chairman I think I must point out that Mr. Casto is now with Region II not Region IV just for the record.

MR. CASTO: Trying to find a job I can do.

CHAIRMAN JACZKO: Thanks, we're adjourned. Thank you very much.

[Whereupon, the proceedings were concluded]