

Rick Boyle.

Our next speaker is the Assistant Secretary for Nuclear Energy, Peter Lyons. Peter Lyons was confirmed by the U.S. Senate as the Assistant Secretary for Nuclear Energy in 2011. He was appointed to his previous role as principal deputy assistant secretary of the office of nuclear energy in 2009. As assistant secretary, Mr. Lyons is responsible for all programs and activities of the office of nuclear energy. Mr. Lyons served as Commissioner of the U.S. Nuclear Regulatory Commission from 2005 to 2009 where he focused on the safety of operating reactors and on the importance of learning from operating experience. Mr. Lyons worked at the Los Alamos National Laboratory from 1969 to 1996 and during that time he served as director for industrial partnerships, deputy associate director for energy and environment and deputy associate director defense research and applications.

While at Los Alamos he spent more than a decade supporting nuclear test diagnostics and before becoming a Commissioner, Mr. Lyons served as science advisor on the staff of U.S. Senator Pete Domenici and on the Senate Committee on energy and natural resources where he focused on military and civilian uses of nuclear technology, national science policy and nuclear nonproliferation. Mr. Lyons has published more than 100 technical papers, holds three patents related to fiber optics and plasma diagnostics and served as chair

of the NATO nuclear affects task force for five years. Please join me in welcoming Assistant Secretary Lyons.

Peter Lyons.

Thanks for the introduction and it's good to be joining you here in beautiful San Francisco. Certainly the subjects of your conference are most important looking toward the future of nuclear power in this country and indeed around the world. So it is a pleasure to be here.

Let me start from the perspective that we have a president, President Obama who has expressed his support for the important role of nuclear power on many, many occasions. I've given just a few quotes here where he speaks about the obligation to leave our children with a planet that's not polluted or damaged. And in these comments he goes on to talk about his all of the above energy strategy and further recognizes the important role that new nuclear power can play in this country as he recognizes the work going on in Georgia and South Carolina on construction of new nuclear power plants. So very, very strong support for nuclear power at the top of our administration.

Secretary Moniz has recently joined the Department of Energy and he brings a wealth of experience from his previous backgrounds, time at the Department of Energy, time at Office of Science and Technology Policy of the President and of

course many, many years at MIT leading a number of different important activities, many of which were directly related to nuclear power. Even in his short tenure he's found many opportunities already to speak out on the importance of nuclear power as part of a clean energy strategy. He's emphasized his support for small modular reactors and noted on a number of occasions the role that nuclear power really must play if we're to achieve a clean energy mix for the world energy sources.

In terms of the role of the Department of Energy and the role in my office, I view it very much as working toward a sustainable and innovative future for nuclear energy. We do that but within the course of the constraints of the budgets by conducting RD and D in a wide range of different areas. A fair bit of that is devoted to reducing regulatory, technical, financial risks. Trying to improve economics wherever we can. That fourth bullet, managing the used fuel, the high level waste for the country is, of course, the main focus of your conference here and where I'll be spending pretty much the bulk of my time with you today.

But also going down that list, anytime we talk about nuclear power we certainly have to be cognizant of the risks of terrorism and the risks of proliferation, so that certainly folds into our thinking and folds into our close cooperation within the department with the offices specifically devoted to nonproliferation. And I'll close with my very last slide will be a note of how we are looking toward

international collaboration in this particular area of used fuel management. But it's also fair to say that in virtually every area of our interest within the office, we focus very, very carefully on opportunities for international cooperation.

Turning then to used fuel management. Let me start with the blue ribbon commission's recommendations. I'm guessing you're well aware of the history of the so-called BRC which was formed as the administration recognized that the path we're on for Yucca Mountain simply was not workable. We can talk about that as much as you want. I happen to strongly agree that the path we were on with Yucca is simply not workable.

Based on that recognition the blue ribbon commission was formed by Secretary Chu. They reported out in January 2012. The eight recommendations I'm guessing are well known in this audience and I won't go through them in great detail. But they certainly start from the perspective that whatever we do it needs to be based on consent of the communities, states, tribes involved in whatever facilities are being discussed. So consent basing very, very important. Also the recognition and recommendation that there needs to be a new organization outside of the Department of Energy that can provide far more long term focus on this vital and multi-decadal mission of used fuel management. So a new organization was emphasized.

And then the importance of having access to the funds which have been set aside for this purpose and access in a reliable, predictable way which as you're well aware has been anything but the case in the decade since the Nuclear Waste Policy Act was amended in 1987.

Following the blue ribbon commission recommendations in January 2012, the administration then worked to release a so-called strategy in which they focused on their response to the recommendations of the blue ribbon commission and enumerated how the administration would view progress on these same very critical issues. Starting over there on the left side of the slide, the administration also endorsed the need for consent based siting and spoke to the importance of consent basing including community, tribal and state interests as being a critical part of consent basing. As the BRC did we also noted that there are certainly a number of applications around our country and around the world where consent basing has proved to be very successful. So we started from the perspective of consent basing.

System design. The administration strategy recommended that we move first toward a pilot interim storage facility that would focus on the closed or shutdown sites. That would then move into, it could be a separate facility it could be the same facility expanded, into a consolidated interim storage facility. And of course we recognize that in the longer term we must move to a

geologic repository. The administration noted that in all cases these could be co-located facilities or they could be separate and that would all come out as the consent basing process moved ahead.

And then finally over on the right side of the slide on governance and funding, here you had the administration specifically endorsing the need for a new organization outside the Department of Energy. That is a very, very important recognition that in order, as I said earlier, to move ahead with a multi-decadal challenging issue of this magnitude, it is best handled with a dedicated organization. So the administration endorsed the move toward a new organization and also provided a number of suggestions about how we might move ahead to assure funding. In addition the President's budget for FY14 spelled out in considerable detail how he would propose to provide this funding over the 10 year window of that budget.

So, that was the administration's strategy. You're probably well aware that when I refer to shutdown sites we unfortunately have added a few to this chart recently. Added three sites recently. But this just might refresh your memory on where those shutdown sites are with recent additions of Songs, Crystal River and Kewaunee. All unfortunate in their own ways, but nevertheless contributing to the range of shutdown sites.

The strategy also emphasized that in order to move ahead we have to have legislation. We cannot work on the strategy, on the BRC recommendations within the constraints of the Nuclear Waste Policy Act of '82 and amended in '87. The recommendations go well beyond that Act and there would be requirements for legislation in a number of areas.

We viewed the administration strategy as a document to certainly outline the administration's position on this, but also as a framework for negotiations with Congress as hopefully they would be willing to consider moving ahead with a new legislative framework. You're probably well aware that a group of four Senators, bipartisan, representing the two key committees in the Senate have now introduced Senate Bill 1240.

Secretary Moniz testified on that just a very few weeks ago. Some of the points the Secretary made as he spoke to this legislation which was introduced by Wyden, Murkowski, Feinstein and Alexander were the four key Senators who have taken this leadership role. But the Secretary noted that the administration embraces the principle of the Commission's core recommendations. That's certainly a very, very key statement for him to make.

Also again noted that any workable solution on the disposition of used fuel must be based not only on sound science but also on achieving public acceptance.

He stated that the administration believes that a pathway similar to that which the BRC laid out can scale to accommodate the increased needs of the future that includes expanded nuclear power deployment. Again, you're seeing his reference on behalf of the administration to the importance of expanding nuclear power for the nation's best interests.

And then finally his statements that progress on management of used fuel is critical to ensure that the benefits of nuclear power are available both now and to future generations.

It was extremely strong testimony provided by Secretary Moniz on Senate Bill 1240. It remains to be seen how that bill may or may not advance first within the Senate since that's where it was introduced. And then what type of reception it may receive within the House. But at least these stand as the Secretary's and administration's response to S1240.

Within that strategy we spelled out our thoughts on dates for moving ahead with the geologic repository. Trying to take a relatively conservative view from the possibility that we may be dealing on a consent basis with sites that have no characterization up to this point and that rather extensive characterization may be needed. And we came up with this schedule that would allow time for a careful consent basis, a careful review of the characteristics of the repository,

design licensing and operation. Now there certainly have been comments that well, 2048 is 50 years after 1998 which is when supposedly Yucca was going to open. However, let's remember that Yucca Mountain certainly had no reliable date for its operation even in sight when this administration took office. We believe the dates put forth here are realistic and it may be possible to shorten them substantially. Also note that of course it's important that as part of this work there be consideration to the transportation network which of course is the emphasis of some of your considerations here.

I wanted then to give you just a flavor for some of the R&D areas that have been supported within my office trying to look toward this future, of course recognizing that we have to work within the constraints of the existing legislation. So at this point we are doing nothing that would be characterized as site specific or that would be actually moving ahead with specific aspects of consent basing until we have a legislative framework.

But one of the key areas that's been completed recently and I don't know if it's being presented here at your conference, was led by John Wagner at Oak Ridge. It was a technical assessment of the used fuel inventory of the country looking from a number of different perspectives. How that inventory might be characterized or broken down into those elements that are suitable for immediate disposal, those which would be needed for research applications,

and those which might be useful to look toward a future recycle or recovery or reprocessing mode if the country ever chose to go that way.

And in general we were trying here to better understand how the characteristics of the existing stockpile, if you will, of used nuclear fuel might translate into these different categories.

Somewhat surprisingly the results of that study led by John at Oak Ridge showed a very, very large fraction of the inventory as suitable to move immediately toward disposal. Ninety-eight percent. And some of the key points that were made in the Oak Ridge study was that as you look back into the history of the different types of used fuel that we have in this country, there's a wide, wide variation in terms of burnups, enrichments, configurations, all of those would be very, very challenging in terms of requiring different frontends on any sort of a future reprocessing system. And in addition, we're generating two thousand tons of this stuff a year anyway so it's not like we're running out of the opportunity to move toward recycling if that becomes national policy at some point in the future.

So the conclusion of that Oak Ridge study was that the vast majority of the existing inventory should move directly toward disposal.

Another area of research within the office has been looking at different aspects of phenomena that would impact both storage and transportation and particularly trying to look at some of the phenomenon that would come into play with extended storage of used nuclear fuel in dry cask systems. I think it's very clear now while we're already using dry casks to a very, very large extent and that's going to continue and expand going into the future and fuel is going to be in those dry casks for a number of years. So we have been interested in R&D that would help us to better understand what potential degradation mechanisms that could be within those dry casks.

One way in which we are approaching that, this is a so-called IRP, an integrated research program, it is a competitive program that we run with U.S. universities and in this case we asked for proposals from universities to study accelerated aging of used nuclear fuel in storage. Again this was very competitive. The winner was Texas A&M leading a consortium with a number of other outstanding universities that are indicated there. And shown on here are some of the phenomena that Texas A&M and their collaborators will be studying over the three years of this program. But this is an attempt to encourage the university community to contribute very directly to the challenges associated with extended use of dry casks.

And then as part of this need to understand potential degradation mechanisms, we've also looked at a number of other potential ways or actual ways of trying to better understand these phenomenon. Shown here certainly our interest in identifying data gaps, material testing which ties in with the Texas A&M work, and then that last bullet participating with industry on a full scale cask storage demonstration. Now we view this as particularly important especially in recognition of the fact that high burnup fuel really hasn't been in dry casks very long at all. There are some casks that have been around a while, but they're with extremely low burnup fuel. And our feeling that it was quite appropriate that we encourage interactions with industry to ask how we could begin to obtain this data.

Within this program our goals were certainly to benchmark predictive models and some of those predictive models we hope will be coming out of the Texas A&M and other work that we have ongoing. And in general, building confidence in our ability to predict the performance of these systems over very, very long times.

The goal then of this program was extended storage R&D and this went out for competitive procurement. Après and Dominion were a couple of the companies in the consortium that was chosen here, and this represents a very strong collaboration with industry and incidentally the NRC is also involved in this

collaboration since this is obtaining data that is directly of interest to them. But this will involve loading a commercial cask, however, it will be a modified cask in the sense that it will be heavily instrumented to try to understand degradation phenomena and then monitoring that cask over a period many, many years. Eventually opening that cask under suitably dry conditions and again monitoring the fuel. Our hope is that this work together with industry, this is cost-shared with industry, can provide far higher confidence on issues that may be associated with dry cask storage as we look into the future.

And then finally just a couple of comments on our interests in R&D relating directly to disposition, directly to different geologic media. On the one hand we anticipate that the United States has a wide range of geologies that could be appropriate for a repository. Certainly including shale, granite, salt and these have been used to varying extents around the world or explored to varying extents. Within the United States we have quite a database on salt recognizing the work in New Mexico at WHIP, but we have far less data in the U.S. at least on shale and granite. And additionally in that last bullet we note the possibility of exploring borehole disposal as at least one option that might be considered. And might be appropriate for at least some classes of either used fuel or some of the defense high level waste components that will need to be disposed of.

So in general there's a number of different approaches, to geologies that may be considered looking into the future. We're in the process now of developing an R&D plan for borehole disposal and that will go out for public comment as we try to decide how or even if it's appropriate to look seriously at borehole for at least some aspects of the disposition.

Let me just close with this last slide just to note the extent of the international cooperation that we have worked to rejuvenate within the office within the last year or two, recognizing that there is very, very impressive capabilities and knowledge base around the world in a number of different geologic media. I know we've worked to reinvigorate or in some cases create new collaboration mechanisms with the different projects and different countries noted here. And again, this is an attempt to take advantage and share information on a global basis that's either been obtained in other countries or in the case of salt where we have substantial information that can be shared with the international community as well.

So let me stop here. This I hope gives you some flavor for the activities within my office. We are eagerly awaiting Congressional action on legislation which would then enable the new administration, Nuclear Waste Administration if that continues to be its name. That's what it's called in the current draft legislation. Eagerly looking toward that new entity being formed and then working to

support that in appropriate ways and move ahead with this most important endeavor for the nation. So thanks very much.

Rick Boyle.

Questions?

Question.

Kenny Pleasure with Exchange Monitor. I was hoping you could give an update on your efforts related to consolidated storage. I know you said you're waiting for legislation on a number of fronts but I also know that your office has been in contact with communities interested in hosting sites as well as just talk about developing a framework for consent. Have those efforts changed at all? And maybe you can give an update on where you are on that.

Peter Lyons.

I would say more that a number of communities have been in touch with us. We are not in the mode now of soliciting proposals for site specific, but we have had a number of communities that have talked with us, and a number of communities have been very open and public in their interests in moving ahead and competing in this area once there is a legislative framework to do so.

Communities that have been quite vocal here, the Eddy Lee County Alliance in

New Mexico, the county of Loving in Texas, some community groups in Mississippi have been exploring these possibilities.

We have focused primarily on working with some national organizations that have broad coverage across the country of communities, states and tribes that might have a future interest in this. This would be groups like ECA, Energy Communities Alliance, NARUC would be another. In general we're trying to focus on again, non-site specific but trying to prepare educational materials for communities when the time comes that they would be interested in this. For example, we've helped to support ECA in providing some educational materials on what it would mean for communities to host some of these facilities. There's also been some nice work at MIT discussing the economic aspects of hosting some of these facilities.

That's at least some information on items that we're pursuing and I hope that's useful.

Question.

David Blee, U.S. Nuclear Infrastructure Council. Mr. Secretary we really appreciate over there at the Department and your commitment to resolving the backend issue. The court issued a very profound and crystal clear decision last week and I wondered why you have to wait for the NRC to decide what their

action is. Are you doing some contingency planning with respect to resources and others if you are to resume the Yucca Mountain licensing defense?

Peter Lyons.

Thanks for the question, David, and it's also one that I expected to get as George did too. As you already noted, we're not a party to the particular court decision, but our Secretary has certainly stated that we will respond appropriately once we understand what direction the NRC is going to proceed. Of course we as well as the NRC are rather tightly constrained in terms of available funding, at least within what we have now. My office has about \$18 million that is available from past years that could be brought to bear. I shouldn't give NRC's numbers, but there have been numbers that have been put forth for the available funds at the NRC.

As you indicated, we do see that we have to wait, understand that the path that the NRC is going to take and that will really dictate how my office then moves out in whatever ways are appropriate to support as needed the NRC.

But really, regardless of what happens with the Yucca Mountain licensing approach, Yucca Mountain and the Nuclear Waste Policy Act is limited to a certain amount of waste as you're all well aware. We've already exceeded that amount of waste, there's no question that we have to move. In that case we

would still have to move beyond Yucca Mountain. It would certainly be our hope that that would be done through a consent based process. It would still benefit from many aspects of the legislation, creation of a dedicated new entity. And very importantly, creation of a dedicated funding stream specific to this project. Those are all actions that still would be extremely useful and important in moving forward. So it doesn't change our interest in hoping that Congress will continue to look at and consider some of the ideas that have been put forth by the blue ribbon commission and are in many cases embodied within that legislation. But thanks for your question.

Question.

Mato Tohilosa from the Nuclear Fuel Transports Japan. Thank you for the very good presentation to give us a DOE prospect. But can I make a small comment, a local comment on the page 11 of your slide?

Peter Lyons.

I can't restore the slides. Maybe somebody else can. But I can tell you what slide 11 is, that I can do. Okay, I'm looking at slide 11.

Questioner.

On the page 11 on the left hand side you put the transporting spent fuel. That's under the title of disposal, but that's part of our transportation. We are not

transporting for the disposal but for the recycling. Japan's policy is still for the recycling recovery of the spent fuel, is national policy. So please move that from the left side to the right side, please. Thank you.

Peter Lyons.

I think it's fair to say that some extent of transportation is required no matter what you're going to do. I guess I take your comment. And of course there are different options for the transportation, different casks, that's certainly not intended to endorse one in particular.

Question.

If I could just add one question. You've all had a reputation as proponent of education and training in the development. What do you propose or what's your advice that we can look around this room and none of us are getting any younger. And you need to keep a workforce trained for a project that may not start for 20 or 30 years. What advice would you have or what programs are in place to maintain the workforce?

Peter Lyons.

That's a very good question and certainly a very important issue. I don't know if I emphasized in this talk, but I take 20% of all the R&D funding that I receive from Congress and I apply that to a competitive program with U.S. universities to

encourage the development of the next generation of leaders. We've provided something over \$230 million to U.S. universities over the last four years. And it's a program that I feel very strongly about and will continue.

In addition, Congress at least has been very supportive of a scholarship and fellowship program and we have continued to use those resources, the so-called Integrated University Program, it's about \$5 million over the last few years. But certainly questions on whether that will continue.

You're addressing a very important point and I'm aware that my programs, given the particular constraints from a programmatic nature that I have on my funding and my 20%, I focus on the university community. The four year research university and we're looking for research proposals. Now we also support some infrastructure grants, but in general it's the R&D.

When I was at the NRC, and George might speak to this later, but the NRC has somewhat broader authorities than I believe we do at the DOE. And they have supported the community college network. I believe that's extraordinarily important and certainly one needs both the two year and the four year post graduate support within this country. I think though that in many, many cases the utilities are stepping up to the plate and supporting local junior and community colleges and I think that's a very positive trend within the country.

Nevertheless, I do wonder if there's additional support needed. I simply don't have data at the two year level. We're doing what we can at the levels that I can support. But I agree with the thrust of your comment and yes, we're not getting younger. I've noticed.