UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
***
OFFICE OF THE SECRETARY
***
BRIEFING BY DOE ON
PLUTONIUM DISPOSITION PROGRAM AND
MOX FUEL FABRICATION FACILITY LICENSING
***
PUBLIC MEETING

Nuclear Regulatory Commission
One White Flint North Bldg 1, Room 1F-16
11555 Rockville Pike
Rockville, Maryland

Monday, November 27, 2000

The Committee met in open session, pursuant to notice, at 9:35 a.m., the Honorable RICHARD A. MESERVE, Chairman of the Commission, presiding.

COMMISSIONERS PRESENT:

RICHARD A. MESERVE, Chairman of the Commission
NILS J. DIAZ, Member of the Commission
EDWARD McGAFFIGAN, JR., Member of the Commission
JEFFREY S. MERRIFIELD, Member of the Commission



STAFF AND PRESENTERS:

FRANK MIRAGLIA, Deputy EDO
KAREN D. CYR, General Counsel
ANNETTE L. VIETTI-COOK, Assistant Secretary
LAURA HOLGATE, Director, DOE Office of Fissile Materials Deposition (OFMD);Acting Director, Office of Defense Nuclear Nonproliferation
ED SISKIN, DOE Deputy Director, OFMD
DAVID NULTON, DOE Director, Reactors Group, OFMD
JAMIE JOHNSON, DOE/OFMD
PATRICK RHOADS, DOE/OFMD
JON THOMPSON, DOE/OFMD
ED BRABAZON, DCS

P R O C E E D I N G S

[9:05 a.m.]

CHAIRMAN MESERVE: We are here this morning to hear from the United Stated Department of Energy and the National Nuclear Security Administration on the disposition of plutonium and enriched uranium. These materials of course are materials that are subject to DOE's purview as part of its weapons-related activities and as such are not subject to NRC jurisdiction.

As part of the process for disposition, however, there is going to be some involvement of NRC and NRC license facilities, so our briefing this morning is to provide an opportunity for DOE to explain the various activities that it envisions in this area over the coming years.

I am going to turn the meeting over to Laura Holgate, who is the Director of Office of Fissile Materials Disposition, and why don't you introduce your colleagues.

MS. HOLGATE: Very good. Thank you, Mr. Chairman. I appreciate the chance to come and give an update on our program here.

In terms of who you see on this side of the table, you have my Deputy, Ed Siskin and Dave Nulton, who is the Director of our Reactors Group and two members of Dave's staff focusing on our Mox Activities, Pat Rhoads and Jamie Johnson --



CHAIRMAN MESERVE: Good morning.

MS. HOLGATE: We are very glad to be here.

CHAIRMAN MESERVE: Good. Thank you very much.

Why don't we proceed? I know that you have some slides that you have presented and our customary practice is to walk through the slides and then the Commissioners will ask questions after the completion of the presentation.

MS. HOLGATE: Very good.

As I said, I very much appreciate the chance to have -- to bring this group up to date on our activities. This is my first briefing before this august group, but you have been involved in a long history of positive interactions at the Staff level and also in other briefings by my predecessors on this program and so I think there's a long history of good work together on this effort.

One of the key goals that we have in our

interactions with the NRC is to support your authority, both the legal and the moral authority, to regulate these activities safely, at the same time meeting our national security priorities and schedules and I think those are two goals that we can pursue simultaneously in very good connection.

I would like to just say a couple words about some of your Staff who have been very good colleagues in working with us over the last few years, particularly Drew Persinko,



Janis Dambly, Melanie Galloway and Mike Weber are certainly well known to us and have been very productive cohorts in this.

Just a brief outline of our presentation for this morning.

We will talk a little bit about program objectives, touch very briefly on our off-specification highly enriched uranium activities but focus primarily on plutonium, first looking at our bilateral agreement with Russia, giving you a summary of that, and then turning to U.S. plans to implement its commitments under that bilateral agreement. Next slide, please.

Our program objectives have been fairly stable over the last few years and have three basic goals -- first, to dispose of 174 metric tons of surplus U.S. highly enriched uranium coming out of our weapons programs; secondly, to dispose of 50 metric tons of surplus U.S. plutonium -- this is both weapons grade and non-weapons grade -- but that all comes out of the weapons programs; and finally, working with Russia to dispose of their surplus plutonium.

It is really that last piece that keeps our eyes all focused on the fact that this is a national security and a nonproliferation mission here.

Our goal is not that we are so worried about the



safety and security of U.S. materials but to use our activities in connection with the U.S. materials to instigate activities in Russia that will result in a safer and more secure environment for their fissile materials in Russia. Next slide, please.

The NRC is involved in these activities in a number of ways.

First of all, on the highly enriched uranium, most of our highly enriched uranium activities are fairly transparent, that's blended down to low enriched uranium uses, fuel and NRC-regulated reactors all over the country.

There is small amount of off-specification material however that will be used at TVA, where there will

need to be a license modification. We will talk a little bit about that in a minute.

On the plutonium side, there are several elements of the MOX set of activities on fuel fabrication, qualification, utilization, packaging and transportation where the NRC has very strong roles. Next slide, please.

On the international front, the NRC has interactions -- both a very strong role with the IAEA and one of the things we have been particularly grateful for is their participation in a regulatory working group we have established with Russia under the 1998 Scientific and Technical Cooperation Agreement, and many of our main



interlocutors there are with the Gotsadanadzor whose future we are all watching very carefully at this point. That will be an important issue to watch, but that has been one of our ways to interact with them. Your team's participation in that has been very helpful.

Turning to the off-spec projects, off-spec HEU, as you know, there has been several years of cooperation or conversations anyway with the Tennessee Valley Administration to utilize this material as fuel in their reactors. We are just about to conclude an interagency agreement that will cover 34 metric tons of off-spec HEU. This is the majority of off-spec. We may add some additional tons to this as it is characterized in more detail in the future but this gives us the baseline of what we are going to do and this will result in some of the material being processed at Savannah River prior to being transferred to TVA vendors for fuel fabrication and the majority of the material however will be transferred directly to TVA vendors.

You will be hearing directly from TVA on the licensing issues associated with inserting this fuel in their reactors.

COMMISSIONER MERRIFIELD: Mr. Chairman, if I may, could you just define what you mean by "off-specification" just for the benefit of our audience and for me?



MS. HOLGATE: Sure. It has mostly to do with isotopics and let me turn to Dave --

MR. NULTON: Yes. The primary isotopic contaminant in there is U-236, not a lot but enough that it puts it over the specification for commercial reactor fuel, so in our agreement with TVA they have said they can through blending and so forth they can blend that down to a manageable level.

They have to up the enrichment a bit to use it in

their reactors but it is still below 5 percent and they feel that they can use it.

COMMISSIONER MERRIFIELD: And I am sorry to do this, but just so it is clear again for our audience, there's nothing inherently dangerous about the fact that it is off-spec?

MS. HOLGATE: No.

COMMISSIONER MERRIFIELD: That it is off-spec for the purposes of --

MS. HOLGATE: It is off-spec for the purposes of normal fuel fabrication, but it is not off-spec for the purposes of normal fuel fabrication, but it is not off-spec from the basics of safe reactors.

COMMISSIONER MERRIFIELD: Thank you, Mr. Chairman.

MS. HOLGATE: As I mentioned, there will also need to be some new containers that will require NRC



certification.

Turning now to the main topic before us of disposing of plutonium coming out of weapons programs and dealing with the non-proliferation risk associated with that, over the last 18 months -- actually, it is closer to two years now -- the U.S. and Russia have been engaged in very intensive negotiations, kicked off by Summit statements in the fall of '98 that pledged both countries to develop as quickly as possible a bilateral agreement specifying exactly how each country will separately and together eliminate their excess weapons plutonium.

In June's Moscow Summit we were very pleased to be able to announce that that negotiation had been concluded and that it was signed after a few bureaucratic internal maneuverings within Russia, it was ultimately signed and went into effect on September 1st, 2000.

I will just point out that it is being ratified in Russia by the Duma. It will not be ratified by the U.S. Senate, as it is an Executive agreement and not a treaty, but it is going through a ratification process in Russia because of some of the tax protection language that will be insisted upon, but we have a very clear explanation that it is to be provisionally applied pending that ratification and therefore it is in full effect as of this time, even though it is not yet ratified in Russia. We don't expect there to



be any problems with that ratification process. Next slide, please.

The key provisions of this agreement focus on 34 tons of weapons grade plutonium from weapons programs. There are two techniques embedded in the agreement for disposition, irradiation as MOX fuel in reactors and

immobilization with high level radioactive waste. There is provision in the agreement for the two sides to agree to additional techniques if those are developed and agreed upon, but for the moment these are the two approaches that are approved.

The U.S. will be pursuing what we call our hybrid strategy, which I will talk to in more detail in a moment, where 25.6 metric tons out of our 34 will be irradiated as MOX and I looked at this -- I apologize. The chart should say "immobilization" -- MOX is obviously irradiation. Immobilization is 8.4 metric tons.

I should say a word or two about the 34 tons because the Summit statements and various public statements have been made that talk about 50 tons of material.

The U.S. does in fact have 50 tons of excess material when you combine weapons grade and non-weapons grade, when you combine very dilute materials with the plutonium that is already -- that is still in weapons.

The Russians were very clear when we began the



negotiations with them that they would match us quality for quality with our material and if we insisted upon putting all of our non-weapons grade and very dilute low-quality materials under the agreement that they would do the same with theirs and it would essentially become an environmental agreement rather than a nonproliferation agreement, so we agreed to focus on the amount of material that we both had that was actual weapons grade material and that the U.S. had 34 tons of that, and so that is where the 34 tons came from.

We consider this a first step towards the pledges of 50 tons and it gives us a chance to get the infrastructure in place to get the monitoring and inspections provisions in place to begin to eliminate this material and then to add more material later. Next slide, please.

The U.S. and Russian programs are established in this agreement to proceed in rough parallel. There is a series of milestones in leading through the design and construction phase and approval phase of these facilities that commits both sides to begin operating their industrial scale facilities by the end of 2007.

The goal is a disposition rate of two metric tons of plutonium per year and there is a pledge in the agreement that the sides must work together to develop a plan to be able to double that disposition rate, at least double that



disposition rate within a year of signing. Now obviously that is -- the plan needs to be developed within a year of

signing, not the actual disposition doubling.

We are in very intensive negotiations right now with other countries and doing a fair amount of R&D; to identify mechanisms by which that disposition rate can be doubled in Russia. The U.S. program is sized to be able to handle roughly four metric tons annually of weapons material plus an additional amount of non-weapons grade material.

Bilateral monitoring and inspection procedures are obviously a key element of such an agreement. We need to be sure that the Russians are in fact disposing of the material that is of the quality that is intended by the agreement, that they are keeping to the milestones that they have pledged to and that they are using the facilities only for disposition missions or for other missions that don't conflict with the spirit or the progress of disposition.

The agreement that was signed in September includes a set of principles on which those monitoring and inspection agreements will be determined but because the facilities are still early enough in their design, we were not able to get into the kind of detail surrounding how many inspectors would show up on which day and stay for how long and take what kind of measurements and so on. That is set for a separate follow-on negotiation that is to be concluded



within a couple of years, and in fact there is a commitment in the agreement that the U.S. will not provide any funds to help Russia begin construction if we have not concluded that follow-on bilateral monitoring and inspections agreement.

The other thing I should point out about monitoring and inspections is that the agreement definitely plans for an IAEA role and there is agreement between U.S. and Russia that it will not be full up safeguards but probably something short of that but exactly what forum is used to negotiate that agreement and what the level of safeguards will be is yet to be agreed between U.S. and Russia and then agreed with IAEA, so there is a commitment to begin negotiations with the IAEA jointly soon after. Next slide, please.

One of the important aspects of this agreement is to make sure that at the same time that we are eliminating or transforming this material into a form unattractive for weapons use that it is not simultaneously being separated back into forms that are attractive. This was a tough point with the Russians. Obviously they believe in the closed fuel cycle and they perceive plutonium to be an asset and a value not a burden to be managed, and what we were able to do is to obtain their agreement that there would be no separation of any of the plutonium, any of the 34 tons of plutonium that is covered by this agreement during the time

that that 34 tons is being eliminated and any subsequent reprocessing, which would only be on the Russian side obviously of irradiated MOX fuel that stems from this agreement would be subject to mutually agreed monitoring measures, which we have told the Russians will be full up by IAEA safeguards, that they should have no mistake about that.

COMMISSIONER DIAZ: Excuse me, Ms. Holgate. Disposed means until they all have been placed through a reactor?

MS. HOLGATE: Correct and achieved the spent fuel standard.

COMMISSIONER DIAZ: Dispositioned?

MS. HOLGATE: Dispositioned, yes.

I tend to use those words interchangeably. I don't intend any difference in meaning between the two.

The commitment is further that immobilized plutonium may never be separated.

This was another sticking point with the Russians because they have long believed and continued to assert that immobilization is not an effective disposition technique because it does not have any isotopic transformation of the plutonium. It remains weapons grade and that one could -- if one needed to -- re-obtain that material, gather it back from the immobilized form. We have made powerful arguments



to the contrary and in fact have told them there is, for the form the U.S. will be using for immobilization there is no known separation technique and that it would be very challenging and we have certainly no intent to do this.

We were ultimately able to get them to agree to immobilization as an approved technology but only for that material that is not the highest quality -- in other words, material that is in oxide form as opposed to currently being in pit form, but we will not separate that, obviously.

One of the things that the Russians made clear, again coming back to the differences envisioned between the U.S. and the Russians on the value of plutonium and its role in the fuel cycle, is that they would only proceed down this path if they received support from the U.S. and the rest of the Western communities and therefore the agreement includes U.S. assistance to provide near-term financial assistance on the order of $200 million, as described in the agreement. The President made a pledge in January of '99 of a total of $400 million and we are working very closely with European colleagues to identify additional sources of multilateral assistance leading towards an agreement at the next G8

Summit in Genoa of exactly what those pledges will be.

We have been gratified that in addition to the $30 million plus that Japan had pledged in 1999, recently England, the UK, pledged an additional $100 million and



France indicated it will be providing -- ready to consider providing up to $60 million and so we are slowly getting there. Hopefully we will be able to describe our Genoa G8 meeting as a success in approaching about a billion dollars of necessary capital costs to support the Russia program based on current estimates.

COMMISSIONER DIAZ: That is $200 million per year?

MS. HOLGATE: No, sir, $200 million total, with an additional $200 million from a collection of annual appropriations from 2000, fiscal year 2000, through 2004, so we are about half-way through that second $200 million.

The other key point, as we look to the future on this agreement, is that we codified in writing that any additional plutonium added to this agreement need not be on a reciprocal basis. The Russians certainly have not yet accepted this point in reality. They were willing to have it be reflected in the agreement as a statement but they continue to say that they will only come down at the same amount that we're coming down. Given that they started with about 50 percent more than we did, this will obviously lead to unequal levels, if we proceed with equal reductions, so one of our major challenges over the next 15 years as we work through the 34 tons is to identify ways to get them to eliminate more without the U.S. having to go below levels that it may consider what we require for our strategic



needs.

Given the number of changes we have seen over the last 10 years, I am certainly humble enough to suspect that we will have significant changes over the next 15, perhaps even enough to change the Russians' minds about closed fuel cycles and so on, so we may -- that may be more likely in the future than it is today.

So with that summary of the bilateral agreement, that sets the stage for the heart of our discussion today of how is the U.S. going to meet its commitments as embodied in this agreement.

We will be pursuing, as I indicated earlier, a hybrid strategy that has two elements, immobilization, where we immobilize the plutonium oxide with ceramic material surrounded by vitrified high level radioactive waste and the second technique will be through manufacture of MOX and irradiation in reactors as in existing domestic commercial reactors.

The key of both of these technologies is to meet the spent fuel standard, to make the surplus plutonium as inaccessible and unattractive for retrieval in weapons use as the residual plutonium and spent fuel from commercial reactors that it currently resides in in fuel pools throughout the country and in fact throughout the world, so I don't want to mislead anyone into thinking that we are



pursuing an absolute level of disposition. This is a comparative standard by definition and yet it will achieve the nonproliferation and national security goals that we are pursuing. Next slide, please.

The pursuit of this strategy will require three new facilities in the U.S. -- one facility known as the pit disassembly and conversion facility, which is designed to take the plutonium pit or trigger of the nuclear weapon and convert it into an oxide powder using the advanced recovery and integrated extraction system known as the ARIES system. This is a dry system in contrast to previous oxidation techniques involving wet chemistry which resulted in large amounts of aqueous waste. This results in a very small amount of waste and is a very interesting, innovative technology developed at Los Alamos and Livermore National Labs.

The second facility is a MOX fuel fabrication facility to take that plutonium oxide manufactured into mixed oxide fuel and fresh fuel assemblies.

Finally, there will be a plutonium immobilization facility which will focus on the non-pit plutonium, mix it with ceramic material to manufacture pucks, array those pucks in a canister and surround it with molten high level waste coming out of the Defense waste processing facility at Savannah River -- so we are using this -- in the



mobilization case we are trying to make maximum use of existing facilities in the DOE complex. Next slide, please.

Focusing on the mixed oxide fuel aspect of this hybrid strategy as being of primary interest to this audience, a couple of words on the contract, prime contract, that we are using to support this.

It has four elements -- fuel qualification, fabrication, packaging, and irradiation, and the NRC obviously is involved in each stage in terms of identifying the adequacy of the work that is being done and in providing licenses and approvals along the way. Next slide, please.

Our main contractor is Duke, Cogema, Stone & Webster -- referred to as DCS. This contract was signed in March of '99 and it involves a consortium of Duke

engineering and services, Cogema and Stone & Webster. You may be aware that Stone & Webster has been in some corporate excitement over the last few months. It is still not settled but one of the key elements of settling the relationship of the new owner to this contract is that they be prepared to take the same commitments as Stone & Webster had been in this consortium.

We are working very closely with the bankruptcy court on that.

There are a handful of subcontractors underneath this overall contract that are listed, as you can see.



Turning to the fuel fabrication facility, this as you can see is a large and very complex facility but one of our key elements in choosing this group of contractors is that it is based on using proven technology based on the MELOX facility in France, the Cogema facility.

Three interconnected areas within the hardened space and current French technology is one of the key pieces of work that we have underway in the design phase, where we are now, is modifying that existing technology to meet NRC licensing requirements and other activities that we refer to as Americanization of the design -- things as basic as stair height to meet OSHA regs have had to be changed from the French plant.

All the plutonium processing in this facility will be in glove-boxes. Next slide, please.

One of the first activities in an effort of this nature is the creation of lead assemblies. These are required by the reactor operator for confirmation of MOX fuel design and, as you may be aware, that the initial or original plan for manufacturing these lead assemblies has been terminated. That was to do so at the Los Alamos National Laboratory. They were not able to meet our schedule requirements and so we terminated that approach in May and proceeded with an analysis of two alternatives to that.



One would be fabrication in Europe using prototypic processes and equipment and then movement of that material to the U.S., of those fabricated rods to the U.S.

The second approach is fabrication in the MOX fuel fabrication facility as the initial product of that facility.

Our two main goals in this study is prototypicality and schedule.

We expect to make a decision this winter.

On the irradiation services, the four plants involved are four Duke Energy operated PWRs, two McGuire and

two Catawba. This will help us -- these four plants rather will meet the two metric tons per year goal on their own and then the immobilization will give us some additional disposition of about half a ton of weapons grade material a year that will give us some wiggle room in meeting our requirements under the bilateral agreement.

The 25 tons that is scheduled to go through the irradiation process will meet the spent fuel standard by 2019 and this is based on two cycles of irradiation for each element and the spent fuel will be stored onsite pending geologic disposal, very similar to the LEU fuel portions of the reactor loads.

The spent fuel will have to be monitored by the Russians and probably the IAEA once it reaches the spent



fuel standard, so it will probably have to be managed potentially separately but at least in a way that makes it clear which are the MOX elements and which are the LEU elements. Next slide, please.

Just a reminder to all of us that the NRC role here stems from law -- the FY '99 Defense Authorization Act. This is -- the law was required because this is such a unique situation. We are talking about a regulated facility that is on a classified site but with a commercial operator. It is kind of an island within a whole sea of DOE operations and undoubtedly we will find some surprises as we go down this route, some things we have not predicted about the interrelationships of this kind of a situation but there are clearly benefits associated with co-location of this facility with the other disposition facilities and other DOE facilities, so this is in some ways a new enterprise for both DOE and the NRC. Next slide, please.

Now what you will be seeing from us -- actually that is not an accurate statement -- you will be seeing from the licensees.

First focusing on the fuel fabrication facility, I want to indicate my appreciation for the NRC's willingness to be flexible in terms of receiving our environmental report prior to the full construction authorization report. That will help us keep to our schedule and I hope it will be



helpful for your side as well.

The next item will be the construction authorization report. At the moment we had hoped to be able to do that this fall but obviously we have not been able to meet that schedule. We are looking at early next year but we are not going to give you a specific date until we are confident that that can be met.

What I will tell you is that it will be a robust submittal and hopefully identify as many of the obvious questions that would come about from the regulatory perspective as we can and try to provide answers to those in the initial submittal.

Finally, on this facility comes the application for the license and we expect this date to hold of mid-calendar year '02. We don't expect a delay in the CAR to perpetuate that. The next slide shows how these dates all fit together between the design Licensing/NEPA activities and construction of the facilities.

The dates that are reflected here will keep us on track with our bilateral commitments that are embodied in our agreement with Russia and these are obviously based on a certain set of assumptions, we hope accurate assumptions, about NRC licensing dates and durations of activities.

Some of the other submittals that you will be seeing from the licensee will be for fuel qualification and



irradiation as well as for fuel packaging and transportation and we are on schedule for the deliveries of the documents that will be provided in connection with these activities. Next slide, please.

This is not the first time that MOX has been considered in the context of U.S. reactors but certainly a new enterprise in terms of the scale and the motivation for a MOX activity and as such there's certain to be questions and issues and uncertainties that arise.

The good news is that at this point we have not been able to identify any show-stoppers either technically or otherwise in proceeding with this technique of disposition and we have no issues or concerns vis-a-vis the licensing process at the moment.

Our goal over the next few weeks or months, years working with you and working with the licensee will be to maximize the communications to maintain this fairly stable situation.

At the same time, this is the first facility to be licensed under the new 10 CFR 70 rule, as we understand it, and the first time that the two-step process embodied in that rule will be applied to this particular type of facility.

Another novel aspect of this is the performance requirements for the worker exposure and we will be -- this



is obviously in support of the license application and our role here is a little bit unique as well because of the outside of the PIDAS for this facility will be a DOE reservation, as opposed to an open kind of geography, so

that is a little bit different for everyone involved.

One of the things that needs to be clarified also is the process for determining the fuel qualification needs. DCS has provided your Staff with the approach that they intend to take and this is one area where I say that if there is any concerns from the NRC side about that approach the sooner we know that the better, because we will need to be making decisions about this particular aspect in the spring. Next slide, please.

Just a couple of words on interfaces between DOE and NRC. We have been talking about really most of the activities up to this point in the briefing have been between the licensee and the NRC with DOE as obviously an interested party, but there are some direct connections as well.

One is the Memorandum of Understanding on security, especially information security. The ball is in our court on this and we will be providing the next iteration of this back to the NRC side as soon as we complete our internal discussions on this issue.

As you can understand, security issues are pretty



sensitive within the Department right now and we want to be sure we get it right.

The broader and more ongoing issue will be the need for a continuing dialogue in support of our national security missions and the commitments that we have made in our bilateral agreement with Russia.

With that, I will close and open myself and my team here to any questions your Staff may have.

CHAIRMAN MESERVE: Thank you very much for a very helpful and informative briefing.

I have just two matters I wanted to ask about. On Slide 17 you indicated that in discussing the MELOX facility and the French technology that it would have to be modified to meet NRC licensing requirements.

MS. HOLGATE: Yes.

CHAIRMAN MESERVE: And you mentioned a trivial example of that is some OSHA requirements. I presume that there are some others that are more substantive.

MS. HOLGATE: Absolutely.

CHAIRMAN MESERVE: And if you could indicate what sorts of changes we anticipate are going to have to be made to Cogema process in order to be able to have it licensable in the U.S.

MS. HOLGATE: Dave, do you want to -- pardon me. I would like to turn to Ed Brabazon from DCS, who is with us

this morning and ask him to address that question.

CHAIRMAN MESERVE: There is a microphone there at the podium.

MR. BRABAZON: Basically the design of the MOX facility is very similar to the MELOX facility. The process is essentially the same. The capacity is different, so there are a different number of units in the MOX facility compared to MELOX.

The differences are things like United States codes and standards. One main difference obviously is the 50 cycles used in Europe versus 60 cycles in the U.S. but beyond that we will comply with the various IEEE codes and standards, those that are required by the various NRC Regulatory Guides.

We would comply with other mechanical ASME or ASDM codes and standards so it is really in the details of the components where the process is different, but fundamentally there are no significant difference in the design.

CHAIRMAN MESERVE: Thank you very much.

The other question I had was a follow-up on something that isn't part of our regulatory purview but to ask a question of how the Russians are planning to use the MOX.

MS. HOLGATE: The Russians are looking to use their mixed oxide fuel in either the VBR -- well, in a



combination of VBR-1000s and their BN-600. The first is of course a lightwater reactor. The second is a fast reactor.

There is a question of whether they will be using four VBR-1000s loaded at roughly 40 percent MOX cores versus seven loaded more towards a third and maybe all seven at 40 percent. That is one of the aspects of the expansion plan of how do you double that two metric tons. You may start at one-third core and then slightly increase each of those reactors.

The fast reactor will have its initial load at one-third core and depending on the performance during that initial hybrid core consider moving to 100 percent MOX core.

Again, some combination of that expansion could lead to making a significant dent in that doubling requirement for the expansion capacity.

CHAIRMAN MESERVE: Okay. Let me turn to my colleagues.

Commissioner Diaz?

COMMISSIONER DIAZ: Thank you, Mr. Chairman.

The first question, just for my own information, this separation between the 25.6 and 8.4, is that something that is fixed in time or do you see as time progresses that maybe some of this additional plutonium could be classified

as being able to be used for MOX -- or is there a final determination that's being made?



MS. HOLGATE: The numbers that are in the briefing are embodied at this level of precision in the bilateral agreement.

COMMISSIONER DIAZ: Okay.

MS. HOLGATE: That doesn't mean it can't be changed, but it means it would have to obtain Russian agreement to any decision to change.

This is based, the split is based on both a technical understanding of which plutonium is most suitable for MOX and on a wish by the Russians that we maximize the amount of material that we use in MOX because of the concerns I mentioned that they have about the immobilization technology.

COMMISSIONER DIAZ: Right. That is really the reason for the question.

Also, I have a bias, being a reactor engineer.

I would like to put the plutonium that was produced in the reactor back in the reactor and burn it.

MS. HOLGATE: Yes.

COMMISSIONER DIAZ: So I was wondering whether it is 8.4 and if that has been identified it's 95 percent certainty that that is what it is going to be or 10 years from now we might revisit the issue.

MS. HOLGATE: I would say both those things are accurate. It is 95 percent certain today that this is the



split but 10 years from now there is a mechanism to change that if that is agreed with the Russians.

COMMISSIONER DIAZ: Okay, thank you.

In the issue of immobilization, is this, the present option has considered, and you were pretty certain that you considered the alternative that has been selected as being as good -- I want to quote -- as irradiating them in a reactor. Has that determination been made to again an 85 percent confidence level or --

MS. HOLGATE: Yes, it has been.

In both cases we are trying to make it big heavy and radioactive and I think we have very high confidence that the immobilization technology will have that result.

COMMISSIONER DIAZ: Okay. On Slide 14 you talk about the facilities and you talk about three different facilities with different degrees of security, different degrees of involvement.

These are going to be in three different, separate places or some of these facilities like the MOX fabrication

and the PIDAS assembly, they are going to be in the same building?

I am concerned about the interaction that we are going to have in the three different places and how can that be separated.

MS. HOLGATE: That is a concern we have, not just



in the context of the regulatory structure but a whole number of operating and security and monitoring and inspections concerns.

At the moment -- not at the moment -- we have determined that these will be three different facilities. They will all be located in F Area at the Savannah River site and we are still studying the various specific plots of land where they will be located.

Some of them may be contiguous. They may end up being uncontiguous on the site, depending on the geology obviously. That is a key consideration. We are doing geotechnical work right now to identify -- there's about six or seven different plots of land that are candidate locations for these three facilities.

COMMISSIONER DIAZ: They will be physically and regulatorily separated?

MS. HOLGATE: Yes, sir.

COMMISSIONER DIAZ: Thank you, Mr. Chairman.

CHAIRMAN MESERVE: Commissioner McGaffigan.

COMMISSIONER McGAFFIGAN: If I just look at the trade press and some of the discussions about the Russians, I get a little confused as to their ability to keep schedules ever.

You said in one of your comments that the Russians obviously think of plutonium as an asset and may never want



to go beyond what we have here.

Just as a fundamental issue, why did we not -- when Mr. Kantor used to come here we would see in the trade press numbers like 150 tons of excess plutonium on the Russian side, and why did we not insist on proportional reductions rather than one-for-one reductions, because obviously if those trade press reports were right, they are going to be left with vastly more weapons grade plutonium after this than we are, plus they are still producing it at the production reactors that have never been shut down.

MS. HOLGATE: True on all fronts. Absolutely. The estimates of the total Russian amount of material range all over the map but no one thinks it is as low as our total, which is roughly 100 metric tons, as we identified in our Fifty Years of Plutonium document a few years ago.

This was a matter of real discussion and

soul-searching and interagency wangling in the run up to the agreement in terms of what was our posture going to be.

One of the challenges is without knowing the total it is hard to know what the right proportion would be.

COMMISSIONER McGAFFIGAN: People aren't worried about break-out potentials I guess any longer in the arms control space?

MS. HOLGATE: Well, Russians are, rhetorically.

COMMISSIONER McGAFFIGAN: That's why I find that



the Russian attitude about immobilization, you know, akin to the pot calling the kettle black.

They are going to be left with vastly more weapons grade plutonium and they are worrying about somebody in America busting into Yucca Mountain if it is licensed or busting into Savannah River, taking the stuff out of casks, you know, coming up with sophisticated techniques to try to get the last little bit?

You would produce it, as Mr. Kantor said at the previous hearing, you would go and start producing it over again rather than go through that story, but --

MS. HOLGATE: We have certainly shared that perspective with the Russians.

COMMISSIONER McGAFFIGAN: You can share it -- on this Commissioner's behalf I just find the Russian argument nuts, but --

MS. HOLGATE: I would have to agree with you, right.

COMMISSIONER McGAFFIGAN: This is not to hurt the Duma ratification process because they are getting a pretty good deal out of this thing is what I am saying.

I noticed that you didn't mention the Canada stuff any longer, and I know that has never been part of our program really as a central element.

We get in because at one point it was going to



require an export license and all that. Mr. Kantor at one point in one of our discussions called the whole exercise the eternal attraction of the moth to the flame, but it is not economically or financially viable, the "can do" approach, right, so why does political capital continued to get burned over that issue?

MS. HOLGATE: Well, I didn't mention it because this briefing focuses on the U.S. program and certainly once we identified the consortium that included adequate reactor capacity for the U.S. material the "can do" option became not part of the U.S. program.

It is still on the table as far as the Russian

program goes, however, and your comment about un-economicness of it applies to any MOX activity, frankly. We do not consider this to be an economic activity. It won't be an economic activity in Russia.

COMMISSIONER McGAFFIGAN: It is even less economic.

MS. HOLGATE: That may well be, but this is an arms control, nonproliferation mission that we are looking at.

The challenge for the expansion plan in Russia is severe. There is a very short list of expensive, technically-challenging and politically difficult options. We can expand current capacity in Russia, as I mentioned to



the Chairman, in terms of maybe going to 40 percent in the LWRs, maybe going to 100 percent in the fast reactor.

You can irradiate it in Europe. You can irradiate it in Canada. You can irradiate it in Japan. You can build new reactors in Russia. The Russians have their vision. They would love another fast reactor. We are pursuing the gas reactor technology as another possibility. There's some half-built LWRs that might be able to contribute to the activity.

None of these are cheap, easy, or technically obvious and so we are keeping all of them on the table for the moment, and believe me, we are continuing to talk with the Canadians about whether or not they are going to be prepared to add reactor capacity to the Russian mission.

COMMISSIONER McGAFFIGAN: Is the Russian MOX program going to be dependent on the export of this German facility to Russia?

MS. HOLGATE: In terms of schedule, it will be. In terms of ultimate accomplishment, that equipment can --

COMMISSIONER McGAFFIGAN: Right, but the schedule we are currently working on in our process, your process, presumes the German facility will at some point be exported. How soon?

MS. HOLGATE: It does not need to be exported until the 2002-2003 timeframe, which is a benefit in the



sense that there is plenty of time to identify the mechanisms by which it will be provided to Russia, which is an upside, but the downside is that you have to sort of immobilize it if -- you have to put it into a form that it can be maintained and either stored in a safe way so it can be reconstituted in Russia.

There is a difference of opinion about exactly how much of that Hannau equipment is applicable to the most efficient MOX design in Russia. The U.S. view is that it

is, in terms of number of equipment, it is not very great, but it is the type of equipment that has a very long lead-time -- furnaces, mills, the presses and so on.

If these have to be designed, manufactured from scratch, it will take significantly longer than moving that equipment into a Russian facility.

COMMISSIONER McGAFFIGAN: I have been focusing on schedule issues on the Russian side. On our side you in passing -- one of the slides discussing it said your assumptions about our licensing process. I guess one of the assumptions I am making given the public interest and debates that have been held is that there will be hearings.

There will be a hearing on construction authorization. There will be a hearing on the license. There will be a hearing on individual license amendments to use MOX fuel in reactors.



This question really should probably go not to you but to our General Counsel, and this may be the last meeting we have with you because we become the Supreme Court once all those hearing start, but it will be an ex parte I guess public meeting would be okay, but we would have to be worrying about ex parte communications.

Of these hearings, are these all prior hearings that they have to be completed before -- say, the construction authorization, does the construction authorization hearing have to be complete before --

MS. CYR: The construction authorization, yes.

COMMISSIONER McGAFFIGAN: The license to operate, does that have to be completed before?

MS. CYR: I am pretty sure the license authorization has to be, as well, both of them.

COMMISSIONER McGAFFIGAN: And then irradiation in reactor facilities --

MS. CYR: The amendment -- it is not clear -- right.

COMMISSIONER McGAFFIGAN: Okay. This is not to help the Russians, but it is probably the single largest schedule uncertainty I think you face on our side are the two hearings on the MOX facility and then potential hearings, although they may not be prior hearings.

MS. HOLGATE: That has certainly been my view,



which is why I have been, in spite of the comparative uncertainty on the Russia schedule, I have been pushing our team to stay on the schedule to get to that licensing point.

If we have to pause to keep our rough parallelism with the Russian facility, we want to pause with an existing

license design with all of the regulatory pieces in place so that as soon as we -- as soon as the Russians catch up we can move expeditiously to that --

COMMISSIONER McGAFFIGAN: Okay.

MS. HOLGATE: -- and so I am -- hopefully we have captured, we certainly made those assumptions about public hearings and that we have captured timing for that effectively.

If it turns out we haven't, I agree --

COMMISSIONER McGAFFIGAN: I don't think we have successfully conducted a hearing in 12 months in the history of the Agency so you may be being overly optimistic about the construction authorization start.

MS. HOLGATE: I have a reputation for that, I'm afraid.

COMMISSIONER McGAFFIGAN: You know, you should talk to Judge Bollwerk and challenge him, and we just issued an order at the start of the Turkey Point hearing. That was one of the things that we did I think earlier today.

We may well need an order at the start of this



hearing to the Board laying out our expectations on schedule as we did in the Turkey Point order and as we have done in previous orders to give you a fighting chance to come somewhere close to the schedule that you would like.

Thank you, Mr. Chairman.

CHAIRMAN MESERVE: Commissioner Merrifield.

COMMISSIONER MERRIFIELD: To follow up that, I would imagine the Commission if there were to be a hearing would impose the same level of expectation of discipline with our board as we have in other areas recently.

I want to go back to the question that Commissioner Diaz had, because it is still -- just so it is clear to me, on the issue of the various facilities -- this is on Slide 14 --

MS. HOLGATE: Yes.

COMMISSIONER MERRIFIELD: -- and I am also going to be cross-referencing Slide 17 as well.

You have got three different facilities here. The pit disassembly and conversion facility is a facility which I presume is one that the NRC would not have regulatory oversight over?

MS. HOLGATE: Correct.

COMMISSIONER MERRIFIELD: Okay -- so we pick up with the only one for which we do have regulatory oversight under the Act is the fuel fabrication facility.



MS. HOLGATE: That's correct.

COMMISSIONER MERRIFIELD: And that is what is

referenced on page 17?

MS. HOLGATE: Yes, sir.

COMMISSIONER MERRIFIELD: So the 32,000 square foot facility with conventional structures and so forth at hardened space, three affected areas. That reference is only to the MOX fuel fabrication facility and does not include any areas associated with pit disassembly and conversion?

MS. HOLGATE: That is correct.

COMMISSIONER MERRIFIELD: Okay. Thank you.

Going to Slide 19, you have talked about how we are going to be able to meet the two megaton yearly goal with four identified Duke plants, two McGuire plants and two Catawba plants.

You also spoke that you have plans to be able to go to four metric tons.

How would that affect these four units and do you have any early expectations of how you would be able to go about doubling that capacity?

MS. HOLGATE: Well, as far as capacity goes, we will have capacity to deal with four metric tons of weapons grade material within the fuel fabrication facility and the immobilization facility combined, so the fuel fab facility



is being designed to just over three metric tons per year.

The reactors -- these four reactors, as I mentioned, get us to two metric tons per year if additional reactor capacity is identify to allow the Russians to expand their disposition rates we'll be looking potentially for additional reactors to expand the U.S. disposition rates to match that.

We have -- I'm sorry?

COMMISSIONER MERRIFIELD: So were that to occur, let's just play the assumption game, were that to occur, would you expect that you would need to identify four additional units in order to meet that doubling capacity or is it some other number?

MS. HOLGATE: I think it is probably less than that, because we will be dealing with some of the material through the immobilization pathway, so it is probably just another two, maybe three, reactors.

COMMISSIONER MERRIFIELD: Okay. Would the amount of MOX used at these currently identified facilities be changed at all under that doubling? Would they increase the volume of MOX fuel, or is that a steady state capacity?

MS. HOLGATE: Actually it is likely to decrease it because we have only 24.9 or 24.-whatever tons of MOX to do, and so if we are doing it quicker, then we will be doing

less of it in these reactors, total.



We would be doing, you know, about the same annual rate but --

COMMISSIONER MERRIFIELD: Just so my question is clear, what I meant was at the annual rate --

MS. HOLGATE: Yes --

COMMISSIONER MERRIFIELD: -- would the amount be likely to increase at these units, not the total rate over the lifetime, but --

MS. HOLGATE: Understood. We do not expect --

COMMISSIONER MERRIFIELD: The amount of fuel loaded into the reactor, would that increase were there to be any increase in the rate?

MS. HOLGATE: No. We would not expect to increase these reactor capacities in any way.

We would seek additional reactor capacity from new reactors, yes.

COMMISSIONER MERRIFIELD: Okay. On Slide 19 you also reference, maybe it was a little later, you reference that you need to have some different security requirements in terms of monitoring the fuel.

Do you or does Duke at this point have any expectation of what types of changes in our processes would be required in order to track that fuel in a way different than what we do now?

MS. HOLGATE: At the moment we are not -- we



haven't worked out the details of those arrangements, either bilaterally with the Russians or ultimately trilaterally with the IAEA, so we don't have the details of that yet.

We expect it can probably be managed just through serial number monitoring of the fuel assemblies themselves. There's some specific requirements in the bilateral agreement about marking, making sure that we have traceability among the MOX elements.

COMMISSIONER MERRIFIELD: Would you expect that that fuel would have to be isolated in a portion of the spent fuel?

MS. HOLGATE: That is certainly one way to do it. It is not clear that that will be required if there are unique markings for the assemblies but we have not worked out the details of that yet.

COMMISSIONER MERRIFIELD: Okay, but for any other purpose you would expect that that fuel either in its pre-irradiation act or after it has been irradiated and is sent to the spent fuel pool it would be treated like any other --

MS. HOLGATE: That is our expectation.

COMMISSIONER MERRIFIELD: -- any other fuel? Okay.

The last question --

CHAIRMAN MESERVE: Wait a minute. Before



irradiation, you don't have to treat it differently, I assume.

MS. HOLGATE: Well, the security issues will obviously be significantly different.

COMMISSIONER MERRIFIELD: Thank you, Mr. Chairman. That is a good point.

Finally, on Slide 6, and I want to go back to the HEU blend-down, and again this wasn't the primary focus of today's meeting, but I did have some initial questions on that.

If you could just briefly again describe what you mean by off-specification and what in any way you expect that this fuel will have to be treated differently than the traditional LEU fuel that is used in our reactors at this point?

MS. HOLGATE: We don't expect that it will be treated in any -- significantly in any different fashion from the LEU fuel.

COMMISSIONER MERRIFIELD: You did mention something about some higher enrichment. Is that the --

MS. HOLGATE: In terms of manufacturing, yes.

Dave, why don't you --

MR. NULTON: Yes. The isotopics are slightly different for this off-spec material. They are higher than what would be allowable for the commercial fuel spec,



primarily Uranium-236 I think in some instances maybe there's some Uranium-234 that is slightly above the spec -- 236 is an absorber, therefore you would have to up the enrichment of the fuel to overcome the absorption of neutrons by that material, so it is -- but it still stays below the 5 percent limit so we don't expect it to be handled any differently than other fuel.

COMMISSIONER MERRIFIELD: Thank you, Mr. Chairman.

CHAIRMAN MESERVE: Good. I would like to thank you very much.

We very much appreciate your briefing today and particularly appreciate your comments about the NRC Staff. It was very welcome to hear that.

We look forward to continued interaction with you as this project goes forward. It's been very helpful.

MS. HOLGATE: Thank you very much, sir.

CHAIRMAN MESERVE: We are adjourned.

[Whereupon, at 10:07 a.m., the hearing was adjourned.]