

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BRIEFING BY DOE ON PLUTONIUM DISPOSITION

PUBLIC MEETING

Nuclear Regulatory Commission
Commission Hearing Room
11555 Rockville Pike
Rockville, Maryland

Monday, January 27, 1997

The Commission met in open session, pursuant to notice, at 2:30 p.m., the Honorable SHIRLEY A. JACKSON, Chairman of the Commission, presiding.

COMMISSIONERS PRESENT:

- SHIRLEY A. JACKSON, Chairman of the Commission
- KENNETH C. ROGERS, Member of the Commission
- GRETA J. DICUS, Member of the Commission
- NILS J. DIAZ, Member of the Commission
- EDGAR McGAFFIGAN, JR., Member of the Commission

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STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

- JOHN C. HOYLE, Secretary
- KAREN D. CYR, General Counsel
- HOWARD CANTER, Acting Director, Department of Fissile Materials Disposition, DOE
- DAVE NULTON, DOE

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P R O C E E D I N G S

[2:30 p.m.]

CHAIRMAN JACKSON: Good afternoon, ladies and gentlemen. The Commission would like to welcome Mr. Canter and Mr. Nulton of the U.S. Department of Energy. Mr. Canter, I understand, is Director of the DOE's Office of Fissile Material Disposition.

Good afternoon, gentlemen.

MR. CANTER: Good afternoon.

CHAIRMAN JACKSON: This afternoon, the Commission

will be briefed on, first, DOE's plans to implement a program to provide for safe and secure storage of weapons usable fissile materials, that is plutonium and highly enriched uranium. And, secondly, on DOE's strategy for the disposition of surplus weapons-usable plutonium.

This briefing is timely in that the Department of Energy just last month issued its final programmatic environmental impact statement on the storage and disposition of weapons-usable fissile materials. The Secretary of Energy announced her record of decision of this matter less than two weeks ago on January 14, 1997.

The Commission is extremely interested in the plans and strategies being considered by the Department of Energy on this topic because the program could effect facilities that the NRC has licensing and regulatory

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authority over, such as commercial nuclear power reactors, the high-level radioactive waste geologic repository and possibly other facilities.

The Commission looks forward to hearing about your plans, the Department's plans and strategies and, particularly, how in your view those plans and strategies might effect NRC's licensing responsibilities.

Unless the commissioners have any comments, please, Mr. Canter, proceed.

And I understand Mr. Grumbly was called away.

MR. CANTER: Yes, he was. I want to apologize for that last-minute perturbation.

I would like to cover a number of things. This is a paper copy but we can also arrange for this to be, I believe, on your screen.

CHAIRMAN JACKSON: Yes, that always happens.

MR. CANTER: All right.

I won't spend any time on this. Basically what I want to cover is a little bit of background, what was in our record of decision, how we are approaching the implementation, some future interactions with the NRC that we see and where we think there are some questions about regulatory responsibility.

Next viewgraph.

The basic problem is what to do with the fissile

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material that is surplus to the national security needs. As you know, the President declared about 174 metric tons of highly enriched uranium to be surplus and approximately 50 metric tons of plutonium. Actually what was declared by the President was 38.2 metric tons of plutonium but that was strictly weapons grade and we have another 14 or so of non-weapons grade also that we have declared surplus.

The decisions to be made. These involve the locations for storage of plutonium and highly enriched uranium and the technologies for the plutonium disposition. And these were the basic decisions that were in the record of decision that was approved on the 14th of January.

Next viewgraph.

This map briefly shows the storage decision. I didn't intend to spend a lot of time on this but, basically, through a process of consolidation and disposition of this material, we're going to reduce from seven sites to three where material will be stored. Those three sites that will remain in the long term will be Oak Ridge, that's the Y-12 plant for highly enriched uranium, the Pantex plant for some strategic reserve plutonium and Los Alamos National Laboratory for some of the strategic reserve of plutonium

and for some material used in the research and development programs.

On plutonium disposition, which is a dynamic

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program, not static like storage, the record of decision involved an approach that involved two tracks. One is immobilization for minimum of eight metric tons of surplus plutonium that is basically undesirable for use in mixed oxide fuel. And the other is to fabricate the rest into or part of it into mixed oxide fuel for reactor burning.

The amount that would go into either MOX fuel or into immobilization is depending on a lot of things. One is the technical work which we still have under way, the costs, there are many institutional issues and last, and I want to emphasize this one, is the international situation.

Because what we do is strongly dependent and closely linked to whatever arrangement we work out in bilateral agreement with Russia on what they're going to do because this is not a unilateral decision. Some of it, we may proceed unilaterally with. Some of the material. But the bulk of it would await getting an agreement with the Russians.

COMMISSIONER MCGAFFIGAN: Could I ask a question at that point?

CHAIRMAN JACKSON: Sure.

COMMISSIONER MCGAFFIGAN: I was almost tempted to make that point a couple slides earlier. The problem to solve is how to dispose of our plutonium and the Russian plutonium in some sort of way in parallel; is that correct?

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MR. CANTER: Yes.

What we have done with the Russians is we have conducted a joint study and, in that report, the Russians agreed in the summary portion of it that the objective of the two programs would be to reduce the amount of plutonium to equal levels, to equal levels.

COMMISSIONER MCGAFFIGAN: Do we know the starting point of the Russians?

MR. CANTER: No. No.

COMMISSIONER MCGAFFIGAN: How do you --

MR. CANTER: Well, that's part of the negotiation that will go on. But it's not equal rates. In fact, we believe that the Russians have a great deal more surplus than we have but they have never declared what's surplus.

COMMISSIONER MCGAFFIGAN: I've seen press reports in the 125, 150 ton range but that's totally speculative? It could be higher or lower?

MR. CANTER: Yes.

But if we want to get to equal levels, then it may require one party to run a little faster than the other.

We think that the strongest negotiating position that we are going to have is to proceed now with preparations for implementing both tracks of this dual track strategy. We are not going to study it for another two years and do a down-select. We are going to proceed down

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both tracks.

CHAIRMAN JACKSON: Along the lines of the kinds of negotiations, international, that you mentioned basically with the Russians, have you attached a schedule or milestones to this actual dual track strategy at this point?

MR. CANTER: To this?

CHAIRMAN JACKSON: Yes.

MR. CANTER: Yes, we have an overall schedule for it and I didn't bring it here today.

CHAIRMAN JACKSON: Could you just sort of describe it in words?

MR. CANTER: Well, yes. For the immobilization alternative, the biggest uncertainties are technical and we have an R&D program.

For example, we don't know what impurities can be dissolved in either a glass or a ceramic medium. The experience in the United States, in fact in the world so far is not with immobilization of plutonium but with high-level waste. And the experiments we have done to date are with pure plutonium or plutonium oxide and there are many, many impurities that some of the forms have.

So we have to do a testing program and we've got that started. It will be this year and next year essentially to determine what impurity levels will be tolerated.

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Then there are other experiments that have to be done on the final form. We have to down-select the -- if we use the can-in-canister approach which I will describe in a little while, what's in the cans, whether it is a ceramic or a glass, and then of course we will have to go through a design process to get whatever additional facilities we would need up and running. So it will be the early part of the next decade, sometime around 2003 before we would be ready to start immobilization on a pilot scale. Until then, it will be experimental scale, small scale.

On the MOX fuel alternative, the first thing we have to do is go through a procurement process. There are many utilities, there are many people who claim they know how to fabricate fuel. So we will go through a competitive procurement and we will probably start that in the end of March and solicit contractors and proposals for development of the MOX fuel plant and for utilities to propose using the MOX fuel in their reactors.

That process of down-selecting that and going through final proposals and all that you go through in the government procurement process is scheduled for about 15 months. There are those who say it will take a lot longer, there are those who say you could do it in less. But I think that's a reasonable number.

CHAIRMAN JACKSON: What about the FFTF facility at Hanford and how does that play in?

MR. CANTER: The FFTF is retained as a possible facility for the production of tritium.

CHAIRMAN JACKSON: I see.

MR. CANTER: This has nothing to do --

CHAIRMAN JACKSON: Nothing to do with that?

MR. CANTER: That's correct.

COMMISSIONER MCGAFFIGAN: Doesn't it burn plutonium to produce the tritium?

MR. CANTER: It can make the tritium using uranium fuel.

COMMISSIONER MCGAFFIGAN: But isn't it optimum -- as I understand the Jason Study, optimally you want plutonium fuel in quite high concentrations.

MR. CANTER: There is a problem if we have declared the plutonium surplus to national security needs. The president -- to then use it for making bomb material. And I think that will create a great deal of difficulty in any negotiations with another nation.

CHAIRMAN JACKSON: So this is an integrated strategy here.

MR. CANTER: I am here to talk about plutonium.

[Laughter.]

MR. CANTER: I like to tell people that getting rid of the plutonium is beating swords into ploughshares.

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If you then produce tritium with it, you may be beating the ploughshares back into spears and I don't want to get involved with that at this juncture.

CHAIRMAN JACKSON: Okay.

MR. CANTER: To replace contracts, utilities will have to apply for a license modification. We would have the vendor who is developing the MOX fuel plant apply for a license and I will get into this in a little bit.

It appears that the schedule for all that would be that we would have people under contract in fiscal year -- sometime around the latter part of fiscal year 1998. Probably the license applications would be fiscal year 1999 and it would then whatever time the licensing takes, the critical path is actually getting the MOX fuel plant, assuming that licensing takes about three years, which may be an incorrect assumption, and then construction would be about three years and then startup about a year, we would be ready in about nine years from now to start consuming MOX fuel in commercial reactors.

COMMISSIONER MCGAFFIGAN: Could I go back to the question about the Russians?

We're not going to do this unilaterally, you said. As I understand it, the number of reactors that might be coming in for license applications could range up to 12 to 15, if we only do one -- you know, 30 percent of the core is

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MOX, if you go 100 percent it might be as few as three to five.

In the Russian case, you're talking about if there were 150 tons, almost all of their civilian reactors, wouldn't you -- using MOX fuel, again, depending on whether it's 30 percent or 100 percent MOX in their cores, I'm just trying to -- and if our actions are dependent on Russian actions, isn't there a huge amount of uncertainty as to when indeed this might or might not occur?

MR. CANTER: yes, there is. In fact, in looking at --

COMMISSIONER MCGAFFIGAN: If anything I've just said is wrong, please correct me.

MR. CANTER: No. No, it is. The Russians have -- what we have seriously looked at is the use of the VVR-1000 reactors. They have seven and I am not counting the ones that are allegedly under construction that are promised to be complete this year or next year. But there are seven in existence.

In meetings with the Russians, they finally agreed that there happens to be 11 in the Ukraine. So a year ago they refused to talk about the 11 in the Ukraine. But since they control the fuel supply for them and take back the spent fuel, they have suddenly decided they want to stay in that business, I presume, and they are now very much

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interested in the 11 and they have had a dialogue with the Ukrainians about this. So now you're talking about 18.

Now it starts to become reasonable that in some reasonable number of decades we could do something about the

Russian plutonium. When you dealt with just the seven reactors, you weren't going to get there.

What the Russians would really like is for us to pay to build new reactors.

CHAIRMAN JACKSON: Of course.

MR. CANTER: Which nobody wants to do.

CHAIRMAN JACKSON: How many U.S. reactors are we talking about, potentially, and over what period of time?

MR. CANTER: Since all 50 tons wouldn't go the reactor route anyway, let's say that two-thirds of it goes that route, it would be the better quality material, we're probably talking about somewhere between four and eight.

COMMISSIONER MCGAFFIGAN: What is the percentage core?

MR. CANTER: We would start with about 30 percent core because of the fact that there's no point jumping into a new development program when you've got a lot of experience in Europe.

COMMISSIONER MCGAFFIGAN: With 30 percent only.

MR. CANTER: With the 30 percent. And that will allow us time in parallel to do further testing and lead . 14 test assemblies and whatever else has to be done so that if we need to speed up, we could increase the loading and go to full MOX cores or at least increase that percentage in parallel.

But you might as well start with something that we know how to do and where there is a substantial database of information on performance.

COMMISSIONER MCGAFFIGAN: Would the Russians also start with 30 percent?

MR. CANTER: Yes.

The studies that we have done with them indicate that even to do that, they would have to add control rods to their reactors.

COMMISSIONER MCGAFFIGAN: So if the Russians are doing 30 percent, they have maximum of 18 reactors to utilize, what sort of phasing problems does that involve?

MR. CANTER: They could do in that with 30 percent about four to five tons a year of plutonium.

COMMISSIONER MCGAFFIGAN: So if they had 150 tons, that is 30 to 40 years?

MR. CANTER: It's a long time.

COMMISSIONER MCGAFFIGAN: And would you want to finish our program at the same point they finished their program in 30 to 40 years?

MR. CANTER: I think this is all going to be part . 15 of the negotiations.

The thing that is going to drive what gets done over there is who is going to pay for it. Realistically.

CHAIRMAN JACKSON: Okay.

MR. CANTER: We mentioned the dual track strategy. If you will move to the next --

COMMISSIONER DICUS: Let me ask you a question before you get off of slide six. You anticipate in either case both waste streams going to the same geologic repository?

MR. CANTER: Yes. In fact, I want to address that a little bit.

Since either the immobilized form or the spent fuel from use in reactors would go to the geologic repository, we have had as part of this program an analysis

done of the acceptability of these forms in the repository. Since the repository does not yet exist and a firm standard on what will be acceptable does not yet exist, the analysis is concentrated on several things, one of which is to what extent would these forms fit within the bounds of what you're expecting to go there now, like the defense high-level waste and the spent fuel from commercial reactors, LEU spent fuel. And how far out of the envelope of that material would it be.

In fact, we have made some adjustments. Looking

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at underground criticality, we have had to reduce the amount of plutonium in the immobilized form because of concern for that. There is further analysis being done now of what we call the degraded form phase, what happens in the repository many, many years downstream and if this form degrades.

Because you've got a fairly -- in the immobilized form, let's say we ended up with 5 percent. That's 5 percent fissile material and it doesn't do us much good to wait until the Pu 239 decays because it decays to uranium 235, which doesn't help me much.

So we've got to make sure that there isn't a criticality problem. So we have taken that on board and we have in fact had the repository people themselves do this analysis and any time you are interested in that material, we can make it available to you.

CHAIRMAN JACKSON: And so they are folding that into their work in terms of the suitability of --

MR. CANTER: Of the repository.

CHAIRMAN JACKSON: -- of the repository at this stage?

MR. CANTER: Yes.

COMMISSIONER DICUS: How dependent is your choice of either one of these tracks or the time table for the use of either one of these tracks dependent upon resolving the issues and getting a repository available?

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MR. CANTER: I don't believe the time table is dependent on it at all. If we go with some MOX fuel into existing reactors, we are substituting for LEU spent fuel, so we are not creating more spent fuel. If the utilities have a problem on where to send it, they have the problem today. So we are not aggravating that problem.

With regards to the immobilization, and I will come to that in a minute to describe the process we tend to use, we don't create a lot more canisters of high-level waste; we again substitute. There is some slight increase in the number of the canisters but not the total quantity of waste. So I don't think it is going to be that big an impact.

We are presently vitrifying high-level waste at Savannah River as we speak and, if there is no repository in 20 years, then Savannah River will have to keep those canisters of high-level waste glass for some longer period of time. And it won't make any difference whether there is some plutonium cans in there or not. It may make a difference in some institutional requirements like security and safeguards but not in -- you know, if they have a place to store it, it will be satisfactory.

I've got a sheet in here with just the definition of the spent fuel standard because this is something that I wanted to talk about just briefly. The National Academy of

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Sciences in their report first I guess coined the phrase "spent fuel standard" in early 1994. It is grossly misunderstood. Most people think it is strictly a radiation barrier. It is not. It is a combination of things such as size, weight, chemical dilution of the plutonium, the radiation barrier and, in some cases, isotopic dilution.

In the view of the Russians, their position is it should have isotopic dilution -- or degradation, not dilution. We don't think that's needed and if it were needed as a mandatory requirement, then we couldn't go immobilization at all because, in immobilization, you do not change the isotopic mix of the plutonium.

So it's really sort of a region or a general subjective measure of whether you've achieved this standard.

I want to talk about the plutonium conversion and extraction. The first thing is that the form need for plutonium disposition, whether it is immobilization or to go into fuel for reactors is an oxide. Most plutonium inventory, that's the bulk of the tonnage, is in the pits, the plutonium component of the weapons. And that's metal so it has to be processed.

We have developed a dry chemical process which we are presently building into a prototype at Los Alamos for testing. The construction of this prototype will be done the end of this year and it's full-size equipment and it is . 19 an integrated system.

This process will extract the plutonium from the component by a hydride-dehydride process and then can convert it to an oxide through several steps after that. Since it's not an aqueous process, you don't have a waste stream. There is a little bit of waste in terms of deconning the can that you put the plutonium oxide in, but that's not a big problem. That is why we are interested in this.

Plutonium, one of the disadvantages of plutonium in using it for anything is it does hydride very rapidly and what we are doing is taking advantage of that.

COMMISSIONER MCGAFFIGAN: Is this the point to ask, the New York Times article this morning about the gallium complications?

MR. CANTER: Well, you're free to ask that whenever you want.

[Laughter.]

COMMISSIONER MCGAFFIGAN: I mean, is Los Alamos' process -- they are citing a Los Alamos paper in the article. Is this the process where the gallium will complicate things?

MR. CANTER: No.

COMMISSIONER MCGAFFIGAN: Is it further downstream?

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MR. CANTER: It's downstream. But let me explain the gallium.

See, one of the unique features that we have at our laboratories is that they have a certain degree of academic freedom and they write a lot of papers, so we applaud them for that.

But Gallium was added to some of the plutonium to improve its machinability. Gallium is liquid at a very low temperature and it makes the plutonium much more workable. It is in the neighborhood of about -- approximately about a percent.

By some strange coincidence, the Russians have

gallium in there too. I don't know who was first and I won't comment on that.

So when you use this hydride-dehydride process, whatever impurities are in the plutonium come with it. So it does not purify the metal.

So if the gallium has to be removed, we would have to add some steps to do that and either remove it with a thermal process or chemically.

We have made some fuel with weapons plutonium and we found out that in the fuel fabrication process, including the centering that you do to fuel pellets, the gallium gets reduced from about one percent down to about 20 parts per million. Now that could create another problem because it

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has to go somewhere. So where does it go in the centering furnace and how do you condense it out without having it redeposit on the fuel. And we are concerned, not that it's a big problem, but we want to make sure it isn't a problem, that even that 20 parts per million of gallium that's in the fuel would not cause an interaction like an inter-metallic compound with the cladding. It won't affect anything from a neutronic point of view but it might be a corrosion problem.

So, as a result, we have undertaken a test program and the first part is out-of-pile tests with the proper temperatures to see what happens with gallium in contact with zirc fours or two or whatever the different cladding materials are. And the second part will be in-pile tests so that you get the proper migration of the gallium under the actions that will occur.

If we cannot substantiate that the gallium does not create a problem, we will remove it. In the meantime, in parallel, we have some development work on some thermal processes to remove the gallium. So that's just a matter of adding some steps, some additional glove boxes and spending a little more money. We don't want to create a licensing risk, though, and a safety risk.

Again, we could start off with plutonium that has no gallium because a significant portion of even the pits have plutonium that didn't have gallium added to it. So you

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can start with that and it gives you a lot more time to work out the methods of removing it and do more testing.

What we found in our work is that a substantial portion of the effort is to prepare these materials for use either as fuel or to go in the immobilized form and this we didn't realize until we really took on the technical work of the last two years and I think it was underestimated by the National Academy of Science. In some cases, it's as much as a third or 40 percent of the costs will be the preparation of the materials.

COMMISSIONER McGAFFIGAN: Is there a significant cost advantage potentially to the immobilization as opposed to the MOX, because you have to do less of this purification?

MR. CANTER: We don't know yet. We haven't tried to immobilize any plutonium with impurities yet. And we're just starting that now. So we just won't know.

The next viewgraph is sort of a cartoon of what we call the ARIES process, which is this hydride-dehydride process for removing the plutonium from the component and it goes directly into a welded can which goes inside another welded can. What's not shown here is it just has the words "assay." We have a separate module that does an automated

nondestructive assay of the material in the can and whether it's metal or an oxide and we think we can get it accurately

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enough that that can be the start of international IAEA safeguards.

We will not have a one-to-one correspondence between pits and cans of material. Because that will reveal how much plutonium is in a pit, which is still a classified piece of information. So there will be about four-and-a-half kilograms in each can. And we have shown the IAEA this assay system and they agree that that could be a good starting point because what we intend to do is place the disposition of the surplus plutonium from the time it's out of a classified form under IAEA safeguards, whether it's immobilization or the reactor route.

This requires the IAEA, by the way, to step a little bit out of their normal box where they are used to drawing samples and analyzing them themselves. You've got two very heavy welded cans here and I think the last thing we want is a bunch of people cutting them open and exposing plutonium oxide to the environment. So they have looked at it, they think they can handle this, they think this is a good way to go.

The next two charts, I won't go through in any detail but just to show you that we've got this stuff in a lot of locations and it's in a lot of forms. And these are only the highest level classifications of the forms because oxide isn't necessarily pure oxide. You know, metal isn't

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necessarily pure metal. We've got some alloyed with aluminum, we've got some alloyed with uranium. So it's all over the place.

These are the 38 tons of weapons grade, the 14.3 tons of non-weapons grade. By the way, most of that is what we call fuel grade and runs about 12 percent plutonium 240. It isn't -- we've only got about a ton-and-a-half of real reactor grade, which is up like 20, 25 percent Pu 240. But you will also notice that almost 7 tons is in irradiated fuel and unless that fuel is processed for other reasons, we're not going to take the plutonium out of spent fuel for the sole purpose of processing it so we can put it back into spent fuel. So we will just leave that.

So what that adds up to is we've really got about 45 tons of material. We analyzed 50 tons because it allows for some additional dismantlement which we think will occur and that will be relatively clean stuff in metal.

The next cartoon is a process for preparation for reactors. Depending on what the material is, it would require different processes. I am not trying to go through the whole flow sheet as we talk here but the idea would be to produce a spec plutonium oxide.

Unlike LEU fuel, there is no ASTM spec for the plutonium and there is a series of specifications that are used in Europe. Each vendor claims his specification is

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proprietary so we have developed a generic, by the way, that we've gotten the vendors to take a look at. They say they think that's acceptable.

But the interesting thing is, you know, the experience came from plutonium that was recycled in their reprocessing plants. So you sort of know what kind of impurities you get and what you don't get. We may have a different array of impurities than they are used to and, if that's the case, then it just means we will have to do more

testing to make sure that we got the right spec on that.

I also have a cartoon for the processing for immobilization. In this case, it says impure oxides because we are hoping that the immobilization process will allow us to be -- allow the system to be more robust and tolerate more in the way of impurities.

I would like to talk a little bit about immobilization. The next viewgraph, please, number 13.

What we are talking about is what we call the can-in-canister. At Savannah River and planned for the Hanford site, they immobilize high-level waste and it gets poured into rather large canisters. They are about four meters tall and about two feet in diameter and they are pretty big and it's a homogenized system.

We found out that you can't -- that would require construction of a new facility to use -- to do that with

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plutonium because the melter, for example, at Savannah River was never designed for criticality control, the systems are too large, it would require gutting that facility and putting new smaller equipment in and we don't want to do that.

So we were looking for other ways out. Although in our environmental analysis, we analyzed building a whole new facility to get the worst case and one of the things we came up with is this can-in-canister. And what we would do is immobilize the plutonium in either glass or a ceramic and it would not be mixed with high-level waste so you don't need heavy shielded facilities, strictly glove box, and it would be poured into small cans. They're about two liters.

We would then suspend these small cans, and some number of them, and we have run a test with eight cans and we've run a test with 20, in a framework that goes inside a canister. Then that would be moved into the -- if it's at Savannah River, the Defense High-level Waste Processing Facility and the fission product glass would be poured into the canister and it would surround these cans.

So it is not homogenous anymore and that raised some other questions and we had a vulnerability assessment done by an independent team of technical experts including explosives experts and chemical processing people and a concern came up that with the right explosive arrangement,

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the shock wave would traverse the high-level waste glass, reflect off the cans and it would separate the cans from the glass and when this thing split open and then the perpetrator could go in and pick up some cans and run out with them.

So we are redesigning the can so it's not solid anymore and it would be more friable and it's an easy thing to do and we'll probably do some cold tests of that, just to make sure you can't shatter it and separate it.

COMMISSIONER MCGAFFIGAN: Could I ask, at the Hanford site, is it the intention that that facility also potentially be -- you mentioned it would be useful for this purpose. Or would it only be at Savannah River? Would you envision it both places if you needed to use the immobilization option in both?

MR. CANTER: We have two candidate sites for immobilization. One is Savannah River because they have an immobilization facility and the other is Hanford because they have definitive plans for getting one.

COMMISSIONER MCGAFFIGAN: Right.

MR. CANTER: All the other sites don't have plans at the present time.

If they build -- the present plans for the privatized venture at Hanford is supposed to result in what they call a pilot plant in about the year 2003 or 2004.

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That pilot plant could handle something on the order of 100-and-some-odd canisters a year. It's a pretty good size pilot plant. And if they really are doing that much, that's a possibility there, too.

COMMISSIONER MCGAFFIGAN: If they ever go on to the next step at Hanford beyond the pilot plant --

MR. CANTER: Well, we could live with the pilot plant; it's big enough.

COMMISSIONER MCGAFFIGAN: The pilot plant alone would take care of your --

MR. CANTER: Yes. Yes.

If you would go back to the photograph a minute, number 14. It's a little hard in the reproduced copy. In the nice color one I've got, it shows a picture that was sectioned.

We ran a cold test of this can-in-canister concept to make sure that the glass could pour around the cans and then we sectioned it to make sure there weren't any voids or anything like that and it came out pretty well. This was done before the Defense Waste Processing Facility went hot.

The next chart is a cartoon of a diagram that shows the possible arrangement. And I think that's self-explanatory.

The next viewgraph -- I want to talk about reactors a little bit.

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Oh, one other thing on the immobilization, if for example we put 20 of these cans in one of these canisters, it will displace about 20 percent of the high-level waste glass that would have gone into that canister. So if they're going to get rid of that high-level waste that's in the tanks, it means for the ones that we're involved with, and it may be 100 canisters a year, we would actually have to pour the glass into 120 canisters.

So although they would have to handle 20 additional canisters, it is the same amount of high-level waste glass, the feed. And that's one of the bigger impacts.

The other thing would be that we would have to have safeguards in security applied to these cans and to the canisters at least until such time as the high-level waste glass is poured around it. After that, whether we can give any credit for the radiation barrier is not yet decided.

With reactors, of course, everybody is familiar with what mixed oxide fuel is. You replaced the low enriched uranium with a mixture of in the neighborhood of something like 4 to 7 percent plutonium oxide and the remainder being uranium oxide. In general, we would probably want to use depleted uranium. We have a few hundred thousand tons of that and we will be happy to use a little bit of it up on this.

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It requires a MOX fuel fabrication facility of which there is none in the United States at the present time.

We have an option that we retained of using the Canadian reactors in the event there is a trilateral agreement between Russia, Canada and the United States to do

so.

CHAIRMAN JACKSON: I believe that DOE has indicated that the MOX fuel for the CANDU, if that were to occur, reactors would be fabricated in the DOE facility.

MR. CANTER: Yes.

CHAIRMAN JACKSON: Do you imagine having the same facility fabricate both kinds of MOX fuel or are you really talking separate facilities?

MR. CANTER: I don't think we would start a U.S. light water reactor program and a CANDU program at the same time.

Believe it or not, we are not going to have enough plutonium to do all these things that everybody wants to do so it would just -- it would cost an enormous amount of money and it's just not worth it.

PRESIDING JUDGE: So it's a question of picking which track you would take with respect to which kind of reactor and then building the fabrication facility?

MR. CANTER: Well, our choice is U.S. light water

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reactors. The advantage that the CANDU reactors brings is that the Canadians actually proposed a two-sided program where MOX fuel fabricated in the United States would go to Canada and MOX fuel fabricated in Russia would go to Canada and Canada, being a neutral nation and not a nuclear weapons state, although they were at one time, would be the neutral party that would take care of the material and would consume the fuel in their reactors and would keep the spent fuel, all under safeguards.

Now that is depending -- whether we would play in that arena is dependent upon whether the Russians would. So we are just preserving it as an option in the event the Russians will sign up to that.

COMMISSIONER MCGAFFIGAN: Could I ask a question about the CANDU? I mean, in my reading of the various documents that you all have put out, the CANDU option looks like it has cost problems, nonproliferation problems, I mean, just lots of problems compared to -- transportation problems, obviously -- compared to the light water reactor or immobilization.

Is it because we once made a positive sounding signal to the Canadians when they made this proposal that we are keeping it alive even though we don't believe in it or what is the -- why keep the CANDU option alive given all the disabilities that are enumerated in these various studies?

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MR. CANTER: It has problems but it has one possibility that the U.S. light water reactors -- in my wildest dreams, I can't imagine the Russians ever sending their plutonium to be consumed in U.S. reactors. That's the one thing going for the CANDU option if they can bring the Russian side to it.

The Canadian government is investing a little bit of money in a study that is presently under way in Russia to look at the infrastructure and other things in Russia to handle that side of the triangle. But lacking the Russian side, there is probably no way that the United States would send its plutonium to Canada because we take on, like you said, a great many other problems that aren't necessary when we've got adequate resources to do it in the United States.

It's interesting because, you know, besides the disarmament issue, one of the reasons some of the Canadians are interested in it is it reduces their quantity of spent

fuel. See, they operate on natural uranium and really what you do when you have MOX fuel is you get an enriched fuel and you can about double the burn-up on the fuel, which cuts the spent fuel in half. So we have told us they should really pay us to let them do this.

COMMISSIONER MCGAFFIGAN: Could I ask, just on that point, what is the Canadian high-level waste and spent fuel solution in the long run? Do they have one?

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MR. CANTER: It's a little different in Canada than here. And I'm not an expert on this, but in Canada the spent fuel belongs to the utility forever. And it doesn't, through some law or something, get turned over to the federal government. So that means of the 20, of the 22 reactors, Ontario Hydro owns the spent fuel.

I also realize that in Canada, Ontario Hydro is part of the -- somewhat part of the government of Ontario, so it's hard to distinguish between the government and the private sector but they have been studying repositories but right now, just like we do, they store it at the reactor sites.

COMMISSIONER MCGAFFIGAN: Do they have any candidate repository?

MR. CANTER: I don't know.

CHAIRMAN JACKSON: Not at this stage of the game.

MR. CANTER: There are some conditions on the use of mixed oxide fuel and there has been a lot of controversy over this and one of the things I would like to point out is what the President's policy on the civil use of plutonium really says.

The policy was issued September 27, 1993, the current policy. There have been prior ones to this.

It says the United States does not encourage the civil use of plutonium and therefore does not itself engage

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in reprocessing. And the second phrase of that sentence is extremely important.

So as a result, our commitment is there shall be no reprocessing of this spent fuel. We also feel, so that we don't try to encourage somebody to promote the civil use of plutonium, that the MOX fuel facility that fabricates the MOX fuel will be government-owned and on a government site. And the MOX fuel use will be limited to surplus plutonium disposition. There will be international inspection and verification and it will be shut down when this mission is complete.

In fact, we feel that even in placing a contract with a contractor, that we may put words in the contract that limit so that when that contractor applies for a license, that that contractor must request that the license must be limited to carrying out this mission so that we don't have a situation where either a utility gets a license for use of MOX fuel, they finish with our plutonium and they go by MOX fuel in Europe. We don't want that. And we don't want that opportunity.

We know of nobody who wants to do that, by the way.

COMMISSIONER MCGAFFIGAN: Would you expect us to have that as a license condition, binding license condition?

MR. CANTER: I would expect that the parties

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applying for the license, the applicant, will specify that as a condition and we would hope that you would approve that as a condition.

CHAIRMAN JACKSON: Or conversely have it as a condition.

MR. CANTER: Yes.

The siting of the disposition facilities, I mentioned before, for immobilization, we're just looking at Hanford and Savannah River. For the mixed oxide fuel fabrication, we are looking at four sites, Hanford, Idaho, that's at the INAL site, Pantex and Savannah River and for either approach, the pit disassembly and conversion will either be at Hanford, Idaho, Pantex or Savannah River.

We are doing a supplemental or tiered-off EIS so that we can select the sites for this and we are about to start that. It probably will get started in the next month and probably in March we will announce the notice of intent on that. It is a straightforward EIS just to pick the sites.

With regards to coverage under NEPA, of course, if you look at our programmatic EIS, we handled the reactors generically. That will be a competitive procurement and when the reactor owner or licensee applies for a license modification from the NRC, they will have to update their environmental report and whatever has to be done. I think

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the generic look that we had provides a substantial amount of information on the environmental effects of using MOX fuel versus LEU fuel and, as I recall, the delta caused by the MOX fuel is extremely small.

COMMISSIONER MCGAFFIGAN: Could I ask, on the timing, when you put out your request for proposals, you are going to look for plants that do not require a license renewal in order to be relevant in the time period that you're talking about?

MR. CANTER: Yes.

COMMISSIONER MCGAFFIGAN: What other conditions may you put in your RFP for the sorts of reactors that you would be willing to contemplate?

MR. CANTER: Well, I should have brought a chart that I usually lug around with me but it shows all 109 reactors and when they fall off the table at their end of license.

Even if we eliminate any that would reach end of license during the potential campaign, there are probably still 40 or 50 that we wouldn't have to get into any license extension. So I believe that might be one of the requirements we would examine.

COMMISSIONER MCGAFFIGAN: I just want to -- if the Russian case were to be 150 tons and 40 years, there almost is no reactor that will be -- and you got into some of those

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reactors being shut down for periods of time for safety reasons or whatever, there is -- don't you -- I think I can contemplate a set of circumstances where there -- you are into license renewal almost necessarily depending on how much Russian reactor -- how much Russian excess plutonium there really is.

MR. CANTER: Well, we always have a fallback and now you are describing our strategy. We are going to be immobilizing high-level waste at Hanford for probably 30 or 40 years. Less at Savannah River.

So, if we run out of reactors, clearly we can go the other route.

CHAIRMAN JACKSON: So perhaps another way would be to say it is that you would be looking at reactors that, in

your best estimate, would not require license renewal during the life of the campaign?

MR. CANTER: That's correct.

CHAIRMAN JACKSON: But, should that occur and/or should you decide for other reasons that the reactors that might come to the end of their licenses, their current licenses, might be desirable, that at any rate your fallback position of the immobilization allows you to deal with it.

MR. CANTER: Yes.

CHAIRMAN JACKSON: And you would switch over to that track?

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MR. CANTER: Yes.

I think the decision on whether a reactor license gets renewed and its life extended is a commercial decision for the reactor owner and has to do with electric power production and other things and it should not be dependent upon this. We are not in this effort trying to solve the nation's energy problems.

CHAIRMAN JACKSON: And you aren't necessarily -- you aren't looking to have a built-in pressure or implication of extending the license of any given reactor?

MR. CANTER: Not at all.

The next viewgraph is just a few ideas on some facilities and functions that might potentially involve NRC action. The reactors are very clear. You are the licensor. The reactor operator is the licensee and if they are going to change the fuel to MOX fuel, they would need some kind of license modification.

The MOX fuel facility where it would be fabricated, we would like that to be NRC licensed.

CHAIRMAN JACKSON: Does that require legal change, the law, a change in the law?

MR. CANTER: There is one issue that has to do with that and that's this DOE ownership. If, for example, we contract with a contractor, a fuel fabricator, whoever that may be, to design, license, construct and start up and

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run this facility, it would not be our conventional M&O contract type arrangement. We might -- we would pay for all that to be done, that's the up-front investment cost. And we would own it and we might lease it to the contractor who then fabricates fuel for the contracted utilities under contract from those utilities so the guarantees of fuel performance, of delivery, of quality and of all the other issues that are involved are the same as they are today between the utility and their fuel fabricators.

So rather than have the fuel be government-furnished, what we would furnish is to the fuel fabricator plutonium oxide and uranium oxide if they want it or uranium in some form that they could convert.

If you had a facility like that, where it is operated by a private entity who is the licensee but the United States Government is the owner of it, would we have to be a co-licensee? That's the question. In the case of the gaseous diffusion plants, they're not really licensed; they're certified. So I couldn't use that as an example. So I don't know what the answer to that is.

If DOE would have to be the co-licensee, then I think it would take some legislation to give you the authority to license something that belongs to DOE.

Transportation. We have proposed to some of your staff and have taken the position that we would transport

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the plutonium to the disposition site, whether it's the MOX fuel fabrication plant or the immobilization by safe, secure trailer, the SSTs that we own. We have 52 of these. We are building more to replace some of the older ones. That is a very good infrastructure, its very well recognized and it provides a lot of security and safety and has many, many features that I can't talk about in an open meeting.

One of the questions is, if the MOX fuel fabrication plant were NRC licensed and the reactor is NRC licensed, do you have a link in the middle that is the transport of the MOX fuel that is not NRC licensed because it's under DOE? Or should the NRC also license, at least for this purpose, the safe, secure trailer system?

We feel that it provides a lot of advantages to use that system rather than to try to create an infrastructure for doing this in the private sector.

COMMISSIONER MCGAFFIGAN: Could I -- the trailers that I am a little familiar with were designed for a different purpose. They can take long fuel assemblies and --

MR. CANTER: Yes.

COMMISSIONER MCGAFFIGAN: -- they can, you know, you can pull them out when you get to the reactor and load them in the spent fuel pond and all that?

MR. CANTER: Yes. There happens to be a container

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for MOX fuel and for some unknown reason in the dim distant past, there's one. And when this container was designed, it was designed to go on a flat bed truck. So it provides, the container provides, all the ballistic protection and all the other things. It is enormous and, in fact, you could only put one of these containers with two fuel assemblies in a trailer. So we would need thousands of sorties.

We are designing a container that takes advantage of the protection provided by the trailer so it becomes quite similar to the kind of container that you put LEU fuel in and it will be tested and certified and whatever has to be done. But the SSTs are large enough for this.

CHAIRMAN JACKSON: Okay.

MR. CANTER: It's too bad Tom isn't here. He was the chairman of our Task Force on External Regulation. I was a member of it. And so I'm familiar with some of the things that the Department has recommended but, you know, it is possible if the recommendations that are in the report from that task force and were approved by the Secretary, if they are codified in law by the Congress, some program to give the NRC increased authority over DOE facilities that the NRC would take on the regulatory authority of these other facilities like the pit disassembly and conversion, the immobilization facilities, just about the time that we would be getting started.

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So if the Congress is going to act, and that report had a two-year time frame in the schedule for the Congress to act and then ten years to reach full implementation. If they are acting, if they will act favorably on this, it would be better to bring the NRC in early rather than to try to back into it as a retrofit. Since some of this will be new facilities or new additions to existing facilities, it would be appropriate to bring the NRC in to the review process in the design phase.

I am just pointing this out. I don't know what the answer is. It's a subject that I think none of us have

the answers to.

CHAIRMAN JACKSON: What about the storage of the fissile material?

MR. CANTER: Well, the same might be true with the storage. The storage is very simply this. Right now, the decision consists of moving as reasonably quickly as we can the material out of the Rocky Flats site. There are pits at Rocky Flats. The pits will start this year to be shipped to the Pantex site where we have many thousands of pits now and they have ample storage capability. There will be some upgrading of facilities there over a period of time.

The non-pit material will be shipped but it won't be shipped until several conditions are met but it would go to the Savannah River site. Savannah River is building and .

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they have started design work on what they call the Actinide Packaging and Storage Facility. It is a new storage facility. It is more than just a vault because you have to have the ability to repack and do other things with the material.

What we are going to do is to expand that design. It is modular. Add some modules, several thousand additional positions, so it could take the non-pit materials that are from Rocky Flats.

The material that is presently at Idaho and at Hanford will await our decision on location of the disposition options and it will then be -- rather than have to ship it twice, ship it to the location where the disposition would be done.

But the new facility at Savannah River, if the NRC is given authority over these kinds of facilities, would be the first new storage facility to be created and that's scheduled to be on line about 2002.

CHAIRMAN JACKSON: Let me ask you this question, going back for a second to the MOX fuel facility because you kind of laid out a potential structure that is a little more simple to think about from the commercial perspective.

You indicate an NRC license is desired and you talked about how that might occur, depending upon who owns and what, et cetera. Why, in your mind, is it desirable to .

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have an NRC license? Is it because of this interface with the commercial sector? But what advantage do you --

MR. CANTER: It's several things. One is we think that there is value to the NRC license and we think many in the public feel there is value to the NRC license. That's one point.

The second thing is we are going to contract for it to be run in a manner that is similar to the way fuel fabricators run today. And they are all licensed and there is a contractual relationship between their product quality and so forth and the requirements of the reactor users. So it keeps it in the same arena where we are reasonably comfortable and where I believe the utilities are comfortable and rather than try to create a whole new arena, a new regime, untested, that it just seems to us that this is -- this would be the proper way to do it.

Now, you know, if there are reasons not to, then it is another thing we could take a look at.

I have a sheet here on page 20 that is just a few other issues on where the NRC might be engaged. As you are aware, for a small test up at the NRU reactor at Chalk River, Los Alamos had applied for an export permit to ship this small quantity of fuel and we decided that the prudent

thing would be to wait until our record of decision and so that was withdrawn until preparation of an environmental

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assessment of the shipment to make sure that there is no environmental consequences that are unacceptable.

That is presently in draft form. We are in the process of going to review that shortly and then that will be sent to the affected states and Indian tribes. and then if that's -- whatever comments we receive, it would be modified. And, if it warrants it, we would have a finding of no significant impact.

If we have such a finding, they would then apply for the export permit. But not until such time as we satisfy the environmental consequences.

So that could happen, that application, in two to three months. I mentioned before the initiation of the reactor license modification. Maybe two to three years from now. And the application of the MOX fuel plant, two to three years.

There is another issue that has its own problems and that is the possible use of a European fabrication capability to make leak test assemblies. A lot of this is going to depend and will require significant consultation with your staff. We don't know to what extent LTAs will be required and nobody wants to say one way or the other and I can understand that.

If we have to wait until the MOX fuel plant is complete and producing -- can produce fuel and then first

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make LTAs that could be tested in a reactor, we are extending this schedule. So one way to cut three, maybe four years off the schedule is to ship sufficient amount of plutonium oxide under many, many controls and safeguards and security to the appropriate manufacturer in Europe, have the LTAs fabricated there and ship them back.

Of course, that raises -- solves one problem and creates three or four more. So we are looking for ways -- right now, the only capability to make MOX fuel is a relatively small capability at Los Alamos. That is all we have in the United States.

COMMISSIONER MCGAFFIGAN: Could I ask, the record of decision on this point says, the careful placement of the word "not," "This record of decision does not decide to do this." It doesn't say "we have decided not to do this."

MR. CANTER: That's correct.

COMMISSIONER MCGAFFIGAN: So what would be the mechanism for that decision? There would be a further record of decision required based on the same environmental record already created?

MR. CANTER: Yes.

COMMISSIONER MCGAFFIGAN: And that would not require any further process, public process?

MR. CANTER: Well, there would probably be some public announcement of revised record of decision or a

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subsequent one and you allow usually a small comment period on that, 30 days or something.

But, you know, we understand the problems.

COMMISSIONER MCGAFFIGAN: They are discussed in some detail here.

MR. CANTER: So we are looking for a way out of that, but I don't know what the answer is yet. But we just want to let you know that is something we are looking at.

I have just got a couple of suggestions here. We need to establish a working group, obviously, between the department and the Commission to clarify the regulatory responsibilities because, in some respects, we are doing some things that are a little bit out of the normal.

The reactors, I don't think, are a big problem. The MOX fuel plant is under the aegis of 10 CFR 70 and I know, in talking to your people, they even have a draft standard review plan but I don't know whether you need rulemaking or what's going to be so only you and your staff can determine that.

The question of the definition of high-level waste, it was an interesting -- Commissioner McGaffigan's comment. If these canisters contain plutonium, does the statutory definition of high-level waste still cover it? And I am neither an attorney nor an expert on this subject so I think there are a number of things.

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The transportation I mentioned. The evolving external regulation and oversight of the Department of Energy, however that comes out. And I mentioned the rulemaking for security of fresh fuel reactor sites.

This is the kind of little thing that comes up. For example, and it's solvable but every one of these details has to be worked out.

I believe the licenses that the utilities and others have do not permit them to use deadly force to protect material but only to protect human beings and the health and safety of the public. I don't -- that's my understanding. Because a lot of their authority to use firearms comes from local law enforcement and so forth, the states.

Under DOE rules, the people providing security for nuclear materials can use the deadly force to protect the material. So if we have fresh fuel arriving at a reactor site and it is going to be stored there at least a few days before it goes into the reactor, to what extent can deadly force be used because the difference between MOX fuel and LEU fuel basically is simply that if somebody acquires the MOX fuel, they can chemically separate the plutonium from the uranium matrix. While with LEU fuel, they cannot do it without an enrichment capability, the fissile material.

COMMISSIONER MCGAFFIGAN: Can I also ask that

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this -- I had some discussions with former Commissioner Gilinsky about this. You, up to this point, including with the use of the weapons transports, have maintained a stored weapons standard for the fuel.

Would the nature or size of the guard force also change for that period of time before the fuel is loaded? You mentioned deadly force.

MR. CANTER: At the reactor.

COMMISSIONER MCGAFFIGAN: At the reactor. Because the stored weapons standard is something -- I mean, I'm not sure what that means. Maybe you're not sure what it means either but the stored weapons standard strikes me as what you have at defense facilities today and what you will have had up to that point it is delivered at the reactor.

So do you have a paramilitary force armed to the teeth ready to take on, you know, some threat?

MR. CANTER: This is one of the questions. First of all, much to the surprise of a lot of people, the stored weapons standard does not mean a military escort.

CHAIRMAN JACKSON: Right.

MR. CANTER: It's an armed escort.

COMMISSIONER MCGAFFIGAN: It's a heavily armed escort.

MR. CANTER: Well, I can't talk about how heavy or light, not in this forum. But this is an issue.

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We have allowed for one of the costs in our cost estimate of what it would take to do things at a utility that there would probably be increased security. The utility may require some modification to the location where they store fresh fuel. Some of them, since they are different depending on which reactor you look at, it would depend on which are the ones that win the contract, and if there is added costs we would have to cover that added cost.

COMMISSIONER MCGAFFIGAN: So that is not a contracting selection criterion. It is something that will be an added cost you just pay when you know it?

MR. CANTER: Yes. It -- we wouldn't make that a discriminator in selecting who are the best utilities to carry out whether we have to spend a few dollars here and there for additional guard force.

But this is an interesting point and you get into details, Commissioner, that, you know, if the SST arrives at the gate and there is DOE guards and they're armed, can they take it all the way in to the loading dock? And it is all these little details that get very interesting. And if you think it's interesting on that, just try crossing the border to Canada.

COMMISSIONER MCGAFFIGAN: Right. That was one of the points on Canada.

CHAIRMAN JACKSON: Are there questions?

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Commissioner Rogers?

COMMISSIONER ROGERS: No, I don't have any specific questions.

CHAIRMAN JACKSON: Commissioner Dicus?

COMMISSIONER DICUS: One more question.

Presumably, considering the MOX fuel option and the ultimate use of it in a power reactor, some anticipation that the waste stream, the commercial waste stream, low-level waste stream might change, for example the potential that there would be true waste, commercial true waste.

Any thought about where that might be disposed?

MR. CANTER: Well, you know, our plans are to dispose of true waste at WIPP. That's assuming there is a WIPP.

COMMISSIONER DICUS: So it would probably be able then to go to WIPP?

MR. CANTER: Yes.

COMMISSIONER DICUS: Okay.

MR. CANTER: And if there were any -- you know, in the event you have a leak or something like that, and you had a problem with that, that may be one of the conditions we would have to accept in contracting. But you could have plutonium in low-level waste now with LEU fuel. Why would it be different.

CHAIRMAN JACKSON: Commissioner Dicus?

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COMMISSIONER DICUS: I am surprised, I don't have any questions.

[Laughter.]

CHAIRMAN JACKSON: Commissioner McGaffigan, any further questions?

COMMISSIONER MCGAFFIGAN: I just ask one maybe large question. If I am a utility trying to figure out how to bid when you put this out for bid, there is a huge amount of instability. I think we have only touched the tip of the iceberg here today.

One of the things I understand will be conditioned is that the utility will have to have an LEU supply available rather than the MOX supply, if we get out of phase with the Russians.

A lot of the instability comes from figuring out how to stay in phase with Russians. How does a utility bid? They don't know their security requirements, they don't know when they are going to be asked to put MOX fuel in, they don't know when they will be told, no, don't put MOX fuel in, put LEU fuel in. They are facing a deregulated environment where they are trying to compete.

What am I bidding for if I am a utility?

MR. CANTER: Well, I can't instruct a utility how to bid because it is going to be a competitive process. But I think a lot of these uncertainties can be eliminated with

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the proper legislation and, in fact, what I'd like to see is that the thing that drives this engine is an international treaty between us and the Russians. Even legislation is readily changed by the Congress, the Congress giveth; it can taketh away. But the Congress is very reluctant to modify year to year something required by a treaty once they've ratified that treaty.

So that would be the best of all worlds and would provide tremendous stability. Nobody said they had to maintain an LEU supply. We don't know that. That may be what some claim. There is a way if things speed up or slow down, and this is another reason for the dual track, that we can handle increases in throughput and decreases in throughput without impacting the utilities and that is use the immobilization alternative for that, which is totally within our control.

In other words, we do what utilities always should have done, base load nuclear power plants, don't try to use them for peaking plants and use something else for a peaking plant. That is one of the advantages of the dual track.

COMMISSIONER MCGAFFIGAN: The other fundamental question, again it goes to the Russians, and maybe a lot of this would be solved by a treaty but it takes us a long time to negotiate treaties and sometimes even longer to get them ratified by two-thirds of the Senate. But if you -- as I

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understand, a main motivation, from reading all these documents, for choosing the MOX option as opposed to immobilization alone is to try to influence Russian policy and to get them to behave somewhat similarly to us with regard to first consuming their weapons plutonium, not reprocess, et cetera.

What conditions are we looking at getting out of the Russians as a result of us really, you know, raising questions about our civil plutonium policy, which we have had for two decades?

MR. CANTER: There has been a start of dialogue, which actually had started a couple of years ago in a couple of summits. But it started heating up in April of this past year in the Moscow Nuclear Safety Summit, which addressed this question of plutonium disposition in very broad terms but then called for an experts' meeting in the fall and the experts' meeting occurred in Paris, the end of October. I

was a member of that delegation. Eric Newsome from the State Department was the head of the delegation.

At that meeting, the United States provided several conditions, nonproliferation conditions on its support of a MOX option in Russia. One was that the spent fuel would not be recycled. In fact, the words were "at least until all the separated plutonium is consumed." The other was that any MOX fabrication capability created would

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be used only for this mission and that is getting rid of their military plutonium.

The Russians tried to resist this very strongly.

COMMISSIONER MCGAFFIGAN: With the help of the Europeans, as I understand it.

MR. CANTER: Well, the French supported them. But others were on our side so it came out sort of a compromise that this is a statement written into the record by the United States and we have made it very clear to the other nations that we are standing by this position.

One of the things that we feel very strongly about is that the Russians will -- at best probably will immobilize a small portion of their plutonium and then it would only be the material that is of lesser value, but that they feel very strongly that they have spent their national treasure creating it and they want to get some economic value back.

If we are going to play a role in dictating how that's done, then we are going to have to be in that arena and that's another reason for the dual track strategy.

COMMISSIONER MCGAFFIGAN: The heart of my question was, given that meeting and given the degree to which we were isolated on some of these points, what if we don't get any of those conditions and yet we end up with MOX in our plants in this country? So we end up -- I can see a

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negotiation where we end up with the worst of all possible worlds, where we are on a MOX track at least for part of our program, the Russians are on a major MOX track with no constraints and the Europeans, who have opposed our policy on plutonium and reprocessing and MOX fuel for civilian purposes are cheering from the sidelines and claiming that we have -- am I creating a negotiating possibility that is unlikely?

MR. CANTER: I think what you are missing is the fact that we are not going to have any MOX fuel in our reactors for eight or nine years.

COMMISSIONER MCGAFFIGAN: Right.

MR. CANTER: If we can't get a deal negotiated with the Russians in eight or nine years, then I don't think we are going to do anything with our plutonium but store it. And I am very serious about that.

COMMISSIONER MCGAFFIGAN: Right.

MR. CANTER: Because we will never be able to sell up on the Hill spending a lot of money to do something with ours unilaterally.

CHAIRMAN JACKSON: On that note, I want to thank you very much, Mr. Cantor and Mr. Nulton. This has been a very informative briefing on a subject that clearly has both national and international significance inasmuch as it involves the balance of views, what some would view as a

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change in U.S. civil plutonium policy an balancing that against clear nonproliferation goals.

The Commission recognizes the Administration's view of the importance of this program to this country as well as to other nations around the world and the need to successfully address the broad goals and objectives of the program. And, as such, you know, the issues are complex and the Commission itself is beginning to think about how it should respond and prepare for the potential for change. So that if, in fact, this program proceeds that it succeeds in the sense of progressing the right way.

So the Commission would request, and this is consistent with your own suggestion, that you keep an open line of communication with the NRC staff on these activities and this is necessary because of the technical issues, some of which you have raised, funding issues as well as any legal ones that maybe need to be addressed, including enabling legislation.

And if a joint working group or task force is to be established, it would need to be addressed, we believe, in a memorandum of understanding which folds in aspects of initiatives already under way with DOE with respect to the high-level waste geologic repository, the Hanford tank waste activities as well as any activities we are beginning with DOE regarding external regulation of DOE nuclear facilities.

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So, again, I think that is the track that would make sense. So, again, the Commission would like to thank you for taking the time to come and brief us on what we both obviously agree is a very important subject.

MR. CANTER: Thank you.

CHAIRMAN JACKSON: We are adjourned.

[Whereupon, at 4:07 p.m., the briefing was adjourned.]