Address:
The U.S. Excess Weapons Plutonium Disposition Program — Lessons for Civil Plutonium Disposition?

Laura Holgate, Director, Office of Fissile Materials Disposition, U.S. Department of Energy

David Albright: At this time, I would like to introduce our second keynote speaker of the conference, Ms. Laura Holgate, the Director of the Department of Energy's Office of Fissile Materials Disposition. From this office she is responsible for managing the complicated negotiations and details of programs designed to dispose of excess military plutonium and highly enriched uranium in the United States and Russia.

We are very pleased to welcome Ms. Holgate to our conference. She has a distinguished career in public service dedicated to reducing the threats posed by nuclear weapons and nuclear explosive materials in the post-Cold War era. Prior to joining the Energy Department in August 1998, she served as the Special Coordinator for Cooperative Threat Reduction at the Defense Department. In this position she provided policy oversight to the so-called "Nunn-Lugar" program of providing assistance to Russia and to other former Soviet states to help them eliminate their weapons of mass destruction legacies of the Cold War. Previously, she served as a special assistant to Assistant Secretary of Defense for International Security Policy Ashton Carter, and also spent a brief period at the Arms Control and Disarmament Agency where she worked on the Clinton transition team and as a special assistant to then-Acting Director Tom Graham.

Ms. Holgate's professional career is accompanied by a distinguished academic background. She has received degrees from Princeton University and the Massachusetts Institute of Technology. She also served for a time on the research staff of what is now the Belfer Center for Science and International Affairs at Harvard University, where she authored several articles and book chapters.

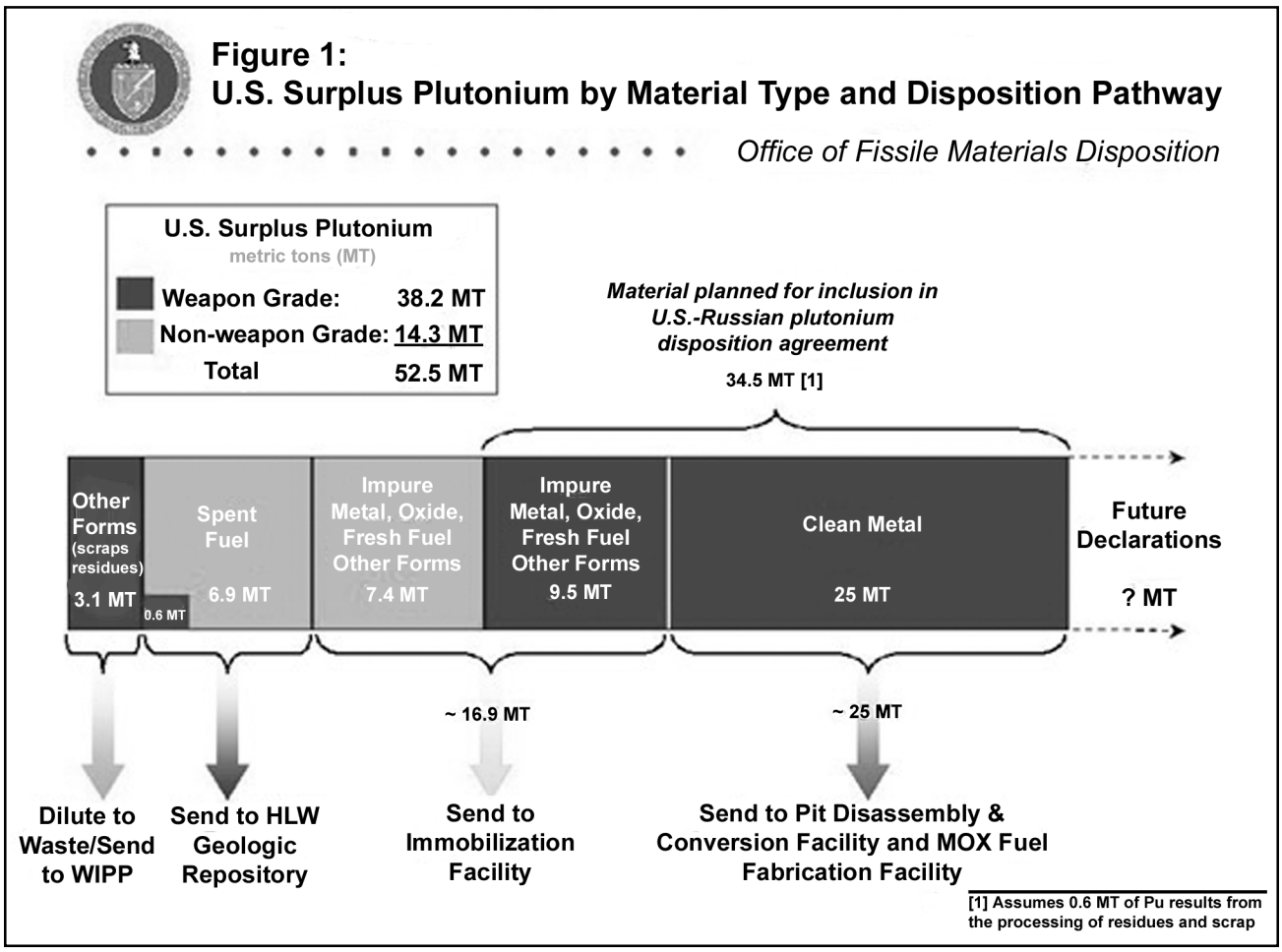
We are very fortunate to welcome Ms. Holgate to our conference. Now, please give her your attention.

Laura Holgate: Thank you David for that introduction. It is one of the more accurate introductions that I've had lately.

I must confess that I accepted speaking at this conference without having paid full attention to its title. So when it was brought to my attention that this was a conference focussing on civil plutonium, I immediately contacted the sponsors, as well as my Energy Department colleague Sandy Spector, and asked if they were sure that they wanted me to speak. I was reassured that, in fact, they did, even though I had nothing to say about civil plutonium. I was told that conference participants might be interested in what I had to say about military plutonium. In particular, it might be helpful to provide an update on the U.S. plutonium disposition program, and then to extrapolate, to the extent possible, on the lessons learned from the military plutonium enterprise that might be useful or applicable in the context of civil plutonium. The latter will be short, I promise you. I will come to that at the end.

I would like to start out with an update of where we stand on the U.S. disposition program. I am not planning to talk about U.S.-Russian cooperation on plutonium disposition, but I will be happy to answer questions about that at the end.

What I thought I would do is bring along a chart for explanatory purposes just so we know what we are talking about when we talk about plutonium disposition in the United States. This chart (figure 1) is available on the Materials Disposition web site and is in several publications, as well.



A few words about the chart: the total you see in the upper corner is 52.5 tonnes. This is based on presidential and secretarial announcements in the early 1990s that identified the amount of plutonium no longer required for defense purposes. This includes both weapon-grade and non-weapon-grade plutonium.

The thing that people tend to forget when we talk about the plutonium disposition program is that about 10 tonnes of that total is already in spent fuel or some other form that requires no further treatment to manage it from a nonproliferation perspective. It will ultimately go to a geologic repository and be disposed of at the Waste Isolation Pilot Plant. So the program that I direct essentially deals with 42.5 tonnes of plutonium that is being managed through what we call the hybrid strategy. With that basic introduction, I will tell you where we stand on that strategy.

I want to point out that, while obviously part of the DOE's mission of management and stewardship of nuclear materials, this is part of the overall government strategy to reduce the global danger from weapons of mass destruction. This is fundamentally a nonproliferation effort that we are undertaking.

We have made significant progress on this program in the last year. We have entered into contracts with the private sector for the design of the two key plutonium disposition facilities. One facility would disassemble and convert surplus plutonium pits to oxide and the second will fabricate MOX fuel.

Most importantly, this past January the Energy Department issued a Record of Decision to construct and operate three new plutonium disposition facilities at the Savannah River Site. As part of this decision, we indicated that we will immobilize approximately 17 tonnes of plutonium and use up to 33 tonnes of plutonium as MOX fuel for irradiation in existing commercial reactors.

The overall fiscal year 2001 (FY01) budget request for both U.S. and Russian programs is roughly $223 million, an increase of $22 million over the comparable FY00 amount.

As I said, the United States has declared approximately 50 tonnes of plutonium as surplus to defense needs. Approximately one-half of this amount is in the form of classified nuclear weapons components called pits. Before this material can be disposed of, it must first be converted from weapon components to an unclassified oxide powder form that is suitable both for disposition and international inspection. We plan to use the Advanced Recovery and Integrated Extraction System, known by its acronym as ARIES, which is a low waste, modular, pyrochemical process, to convert these pits to plutonium oxide.

In November 1998, we began to operate an integrated, prototype system using the ARIES process at the Los Alamos National Laboratory. This facility is to demonstrate the capacity to safely disassemble the various pit types comprising the surplus U.S. inventory. The Energy Department has continually operated the prototype system since 1998, and is expected to continue testing through 2001. At that time the disassembly of all surplus pit types in the U.S. inventory will have been demonstrated. This demonstration will provide important information for designing and operating a full-scale pit disassembly and conversion facility, and also will help to train facility personnel.

In August 1999, the Department issued a contract to Raytheon Engineers and Constructors, Inc. for the design of the full-scale disassembly and conversion facility, to be located at Savannah River. Title I design activities commenced upon the award of the contract and will continue through this year.

What we will be doing in the near future will be to continue the production and testing of the prototype system at Los Alamos. We also will begin Title II design of the pit disassembly and conversion facility, as well as initiate the procurement of some long-lead equipment for the full-scale facility.

The first of the two legs of the hybrid strategy is focussed on MOX fuel irradiation in existing domestic reactors. In March 1999, the Department awarded a contract to a consortium team—Duke Engineering and Services, the French firm of Cogema, and Stone and Webster—to provide MOX fuel fabrication and irradiation services. Subcontractors to the team include Duke Power Company and Virginia Power Company, who will provide reactor facilities in North Carolina, South Carolina and Virginia, to irradiate the MOX fuel. Title I design work on the MOX fuel fabrication plant, as well as the efforts needed to begin reactor modification, commenced upon the contract award. We expect the consortium to complete Title I design of the facility by September 2000, which will enable the submission of a license application to the Nuclear Regulatory Commission for the facility's construction.

The Department has irradiated MOX fuel pins derived from weapons plutonium at the Advanced Test Reactor in Idaho. Periodically, the fuel pins have been removed from the Advanced Test Reactor to undergo post-irradiation experiments at the Oak Ridge National Laboratory. This year we will be designing and qualifying the MOX fuel, supporting reactor license reactor modification activities, procuring lead MOX fuel test-assembly equipment, and modifying facilities for lead MOX fuel test-assembly fabrication at Los Alamos. We also will be initiating Title II design of the MOX fuel fabrication facility.

Turning to the second leg of the hybrid strategy, approximately one-third of the surplus plutonium is in the form of impure metal, oxides, and reactor fuel. These forms are unsuitable for MOX use without extensive purification. To dispose of this material we will be using a can-in-canister approach for immobilization. Under this approach, plutonium would be converted to oxide, immobilized with ceramic material, and placed in sealed stainless steel cans, which are to be arrayed in large canisters. The canisters containing the cans of immobilized plutonium would then be filled with vitrified, high-level waste. The canisters with vitrified high-level waste provide a barrier that increases the proliferation resistance of this weapon-grade material. Subsequently, the canisters will be disposed of in a geologic repository, subject to the Nuclear Waste Policy Act.

While the United States has experience in immobilizing high-level waste, the technological aspects of immobilizing plutonium on an industrial scale have been challenging. The Department of Energy has been developing processes at the Lawrence Livermore Laboratory for converting non-pit plutonium into oxide, and mixing oxide with ceramic material. At Savannah River and at Clemson University, DOE is also developing test configurations for placing cans containing immobilized plutonium into high-level waste canisters.

In August 1999 the Department announced that it would delay the start of the design of this immobilization facility from 2000 to 2001. This schedule adjustment will enable the design and construction of the immobilization facility to proceed in parallel with the revised schedules for providing high-level radioactive waste, to be used as a radiation barrier, from the Defense Waste Processing Facility. Consequently, the initial design of the immobilization facility is now included in the FY01 budget request.

During the next year or so, we will continue the testing and verification of processes for formulating the plutonium into ceramic materials, developing can configurations in the high-level waste canisters, and assessing the impact of impurities in the surplus plutonium forms. As I mentioned, we will also begin Title I design of the immobilization facility. We expect to award a contract to a private sector firm to begin designing this facility in FY01.

Turning now to lessons learned. The first thing I would point out involves coordination. I will say it three times: coordinate, coordinate, coordinate. As people in this room know, most issues involving anything nuclear are complex, solutions are never as easy or as straight-forward as they seem in staff position papers, and they have to involve the full sum of stakeholders and individuals in order to be implemented.

Furthermore, solutions typically involve state and locally elected officials, Native American tribes, citizens, unions, regulators, corporations, emergency response officials, media reporters, lobbyists, etc. All of these people need to be involved, which is one reason why I am happy to speak at an event like this. The Department has held over 100 public meetings in connection with this program, and I will continue to ensure that the word gets out about what we are doing.

However, no matter how successful we are in thinking that we are getting our message out, it is almost always the case, both in individual situations and in general, that some important constituency will fail to receive or understand the message. Those are challenges as well.

Again, as this group knows well, there are both domestic and international components to the same problem. Focussing on one at the expense of the other can cause entire projects to fail. There are linkages of the program dealing with the U.S. material to the Russian program, and I am sure that there are analogues to the civil plutonium area as well.

Third, no matter how simple, logical, and straight forward the solution seems, someone, somewhere, sometime will fail to understand what is trying to be accomplished and will disagree with proposed actions. That is the reality of democracy.

The last point I will leave you with is that, no matter whether you are talking about civil or military plutonium, plutonium disposition is just hard. It is hard technically, whether MOX or immobilization. It is hard politically; our NEPA process took six years from start to finish, and that is just to get the approval to do something concrete about the problem. NRC licensing will be another hurdle.

Plutonium disposition is also expensive. Our current estimate is that it will cost $4 billion to dispose of the excess U.S. material. We are currently working with our Russian counterparts to identify what the cost might be in Russia—as an order of magnitude, $1–2 billion. This is not cheap.

But despite all of these technical, political and financial challenges, plutonium in any form clearly represents a danger and we need to move ahead quickly—certainly in the military area and also in the civil area—to manage and dispose of this challenge.

Thank you.

David Albright: Thank you, Laura. We have time for some questions.

Q: Thank you for your talk, Laura. I will take you up on your offer and ask about the U.S.-Russian negotiations with respect to plutonium disposition. Specifically, could you discuss whether or not the draft will say something about INFCIRC/225?

Laura Holgate: Thank you for your question. Let me give a quick summary of where we stand. As you know, in September 1998, the U.S. and Russian presidents signed a summit statement committing both parties to begin negotiations—to be completed optimistically by the end of that year, realistically very soon—on a bilateral agreement that would explain and codify the general political statements made by both sides to dispose of roughly 50 tonnes of plutonium.

We began negotiations a month later, and over the course of the last year and a half we have made what I would consider to be quite amazing progress. We are quite literally one specific issue away from the conclusion of this agreement. Once this issue is resolved, the biggest problem will be to find a venue where our leaders can get together and sign the agreement. But I am convinced that this can happen before the end of the spring. We are working very hard both within the U.S. government and with our Russian colleagues to achieve that goal.

What's in the agreement? The agreement covers essentially the first 34 tonnes of plutonium as a down payment on the 50 tonnes in stages that has been pledged. This is defined primarily because the

Russians made it clear that they were willing to match the United States "quality for quality" in the context of this agreement, and that the United States has a significant amount of non-weapon-grade plutonium. We simply did not want to put the U.S. taxpayer or the international taxpayer in the position of doing what some might consider simply waste disposal in Russia with a lot of very dilute, non-weapons type of material. So, we said in the negotiations that the United States has 34 tonnes of weapon-grade plutonium that isn't very dilute or already in spent fuel, and Russia will match that. That's what will be covered.

But the agreement clearly considers that additional material that is declared excess by either side in the future can be added to this agreement. And it does not require either side to do that in a reciprocal manner.

Regarding disposition techniques, the agreement confirms that MOX and immobilization are the acceptable forms. The agreement also defines the end-state for these forms in a technical fashion.

With regards to the specific quantities of material to be disposed of in each path, Russia is looking at doing about a tonne via immobilization, while the United States is to immobilize about nine tonnes. The balance in both countries is to be disposed of via MOX fabrication and irradiation.

This agreement sets out milestones of accomplishments that gets both countries to a phase where they begin the actual processing of plutonium for disposition in December 2007. Because this is a bilateral agreement, it can only cover commitments that the United States and Russia can make by themselves. This means that the agreement is limited to dealing with Russian reactors and their capacity for plutonium disposition. There are different assumptions about these reactors, but they all come out to roughly two tonnes a year. It doesn't matter too much if you are talking about seven or four VVER-1000 reactors. It doesn't matter whether you are talking about a BN-600 at either one tonne or one-third of a tonne a year. The different scenarios all come to roughly two tonnes a year.

One of the things that the agreement commits both the United States and Russia to do is to move forward very quickly in the international context—the G-8 and beyond—to identify what I call the "expansion plan." How do you accelerate the rate of Russian disposition? When you focus on weapon-grade plutonium in the U.S. program, we will have the capacity, in terms of our immobilization capability and our reactors, to dispose of roughly four tonnes of plutonium per year. We would like very much to find a way to get the Russians to that capacity as well. We have made it clear all along the way—when it comes to construction, beginning operations and to disposition rates—that the United States will proceed in rough parallel with the Russians, and they with us. So there is a strong selfish interest on the part of the United States in getting the Russian reactor capacity up.

That begs the question of financing. The United States has come to the table with $200 million in its pocket, thanks to the generosity of Senator Pete Domenici and his colleagues in the fall of 1998. That led to a key change in the Russian willingness to negotiate seriously on this issue.

But as I indicated earlier, the effort in Russia could cost $1–2 billion, and $200 million is only a down payment. Subsequent to that appropriation, in President Clinton's Enhanced Threat Reduction Initiative, announced just over a year ago, we identified another $200 million that would be requested in my program budget between 2000 and 2004. So, the United States has essentially $400 million on the table.

What the bilateral agreement provides for is that—if Russia and the United States together cannot provide enough financing to support a MOX and immobilization infrastructure in Russia—then they are excused from their obligations to proceed with disposition. So there is very clear linkage between resources and disposition on the Russian side, and consequently between resources for Russian disposition and the achievement of the U.S. program.

So again, a very high priority of the U.S. government is to identify additional sources of funding for this project. That will be a key part of our lead up to the Okinawa summit. At the Cologne summit last year, our G-8 colleagues committed that serious pledges will be made at this upcoming summit about how the financing for the Russian program would be developed. So we are looking to be sure that all of us make good on these pledges.

Finally, and perhaps most specifically to your question regarding physical protection, the agreement includes provisions for monitoring and inspection activities to confirm that the facilities are being dedicated exclusively to the disposition of excess plutonium, that the disposition rates are being met, and that the disposed plutonium meets certain agreed standards. Both parties intend to work towards allowing certain bilateral inspection and monitoring rights, ultimately to be satisfied by equivalent IAEA verification measures, to the extent practicable. In its current form, the agreement does include a specific reference to INFCIRC/225 as the basis for which both sides would be providing international standards for material protection, control, and accounting for the material under this agreement.

Q: Looking at your chart, it shows that you are depending upon a geologic repository to work for disposition in the long run. Your whole program starts with 52 tonnes of plutonium and ends up with about 94 percent of that going to the repository. And I think that you are therefore depending on that a geologic repository will be available.

Laura Holgate: Yes.

Q: You are also assuming that—and I believe you said this—that you will have three waste forms. There is spent fuel, which I guess includes metallic fuel. It also includes vitrified plutonium, and it includes discharged MOX. Now, you evidently are assuming that those waste forms can really work and will achieve the necessary safety record in geologic disposal. What is the basis for that?

Laura Holgate: The basis for that is extremely close coordination with our colleagues in the radioactive waste program at the Energy Department, and the development of approved quality assurance procedures for our program that have been enacted with the acceptance criteria for the geologic repository.

Q: That sounds great, but quality assurance doesn't necessarily make it work. We need some analysis and experiments. Let's start with metallic reactor fuel. Can you put that in the repository?

Laura Holgate: I'm not aware that our program is responsible for that particular fuel, so I can't start there.

Q: Who is going to worry about the plutonium in this fuel?

Laura Holgate: DOE's radioactive waste program.

Q: All right. I'm taking too much time. What about qualified MOX? Where do I see the analysis as to how that will behave in the geologic repository?

Laura Holgate: I can't refer you to any specific references, but again we are working closely with the radioactive waste staff to be sure that it will.

Q: You see, the trouble is that we don't even know if spent fuel will work.

Laura Holgate: I'm sorry, but I think that your questions are directed better elsewhere.

Q: Thank you very much.

David Albright: Does anyone else have any questions? Yes…

Q: Thank you. Laura, I worked for a long time at the IAEA. As you know, the IAEA already has standard guidelines of criteria for the termination of safeguards, which took many years to develop. In the case of vitrified waste, it seems that the plutonium should be homogenized and put into a lower concentration. But you seem to be saying that the United States is developing its own set of criteria for disposal. Does this mean that the United States is developing criteria completely independent of the IAEA's safeguards criteria?

Also, you said that there is 6.9 tonnes of spent fuel to be sent to the high-level waste facility. IAEA safeguards do not terminate with spent fuel. So, can the United States meet such criteria, or is the U.S. government trying to develop a double standard for the monitoring of disposed spent fuel?

Laura Holgate: First of all, let me reiterate that my program is not responsible for the materials that are to be sent directly to a geologic repository or to WIPP, so I don't have any information about their disposition.

For the material covered by my program, we have committed to bring this material under IAEA inspection as soon as practicable. So we are still working out, first, bilaterally with the Russians, and ultimately with the IAEA, exactly what nature of IAEA inspections will be provided at these facilities. It is not yet clear whether it will be full safeguards or some other verification, in the context of the trilateral agreement that is currently being negotiated.

Q: If I may jump in to help address this question? I also spent a period at the IAEA and I can't resist the ghost of the IAEA inspector in me. Our goal in this program is not the termination of safeguards. So I am concerned that we are talking about different things. The termination of safeguards is not the goal of the disposition program. Really, the goal is the spent-fuel standard, which we all know and love, and which someday I will understand a quantification of. But this standard is to make disposed plutonium as inaccessible and unattractive as plutonium contained in civil spent fuel. I just wanted to point out that distinction.

Q: Some comments again about safeguards. The trilateral initiative is not supposed to implement standard safeguards. The IAEA does not have the resources to cover such large quantities of nuclear material. Implementing safeguards on 50 tonnes of fissile material—using traditional measurements, standards, instruments, etc.—would require something like five inspectors sitting in the facility all the time and verifying the material over and over again. Who would pay for that?

David Albright: That comment is understood to be rhetorical. Are there other questions for Laura?

Q: Can you tell us if the HTGR part of your program is really going forward, or is it a "forced march?"

Laura Holgate: The HTGR program is an element of our cooperation with Russia. I think that the fact that we put $10 million in our budget for 2001 to pursue that, as opposed to waiting for Congress to earmark it for us, is evidence that we have gotten beyond the "forced march" stage. The HTGR comes in the context of the expansion plan that I mentioned earlier.

There is a very small number of ways that you can get beyond the current reactor capacity in Russia. You can extend the capacity of existing reactors; you can use other reactors—in Ukraine, France, Germany, Japan, Canada, or elsewhere—or you can build new reactors. These include LWRs, and the Russian preference is the BN-800 fast reactor. One other possibility is the gas reactor.

The gas reactor offers a number of attractive features, in terms of a more complete burn of plutonium, and in terms of the proliferation resistance of the fuel. The challenge is that the development base is not short. So we are working on a R&D effort to get a preliminary design, and one of the conditions for our $10 million is that we are able to instigate participation from other countries to leverage the U.S. money. You really need an R&D effort of about $40 million per year to get to a preliminary design in the next two years. So that is what we are trying to do. But when you actually start talking about building it, you are talking about something like $1 billion or more for 12 units. So, that is a significant investment, but it is too attractive a technology to leave off the table, given that the rest of the technologies are also expensive, difficult, and politically challenging.

Q: Can you tell us more about the remaining issue that is blocking the bilateral agreement?

Laura Holgate: I'm not the best person to tell you what the issue is. What I can say about it is that it is not at the heart of the agreement. It does not have anything to do with MOX or immobilization, with the quantity of material, or with the transparency issue. It has to do with a peripheral question. Right now, we are working at a very high level with the Russian government to see if there is flexibility on their side; in the absence of that, we may have to reconsider the U.S. position. But we are all moving very quickly to try to get that done.

Q: Well I understood that it is on liability issues…

Laura Holgate: That has been reported in the media, but I don't feel comfortable, as a U.S. government official on the record, telling you that.

Q: But it does go to the safety question related to MOX...

Laura Holgate: The issue is over standard language that is not specific to this agreement or to any other agreement. It is over language that exists elsewhere.

Q: I have a comment. It says on the bottom of your chart that you are to send material to a geologics repository, and that you are to send material to an immobilization facility and to a pit disassembly facility.

Now, you are going to ship around those materials, and I recognize that there are people opposed to these transports. I want to ask those who oppose shipping "civil" materials—like plutonium or vitrified waste—are they also opposed to shipping materials to be disposed of?

David Albright: That's another rhetorical comment. Yes? Do you have a question?

Q: Two questions, if I may? First, the price tag for the U.S. program is now $4 billion. I recall that as little as a year ago the price was $2 billion. Even in DOE terms the rise is pretty astonishing. What is the cause of the increase? Second, I think that it is pretty remarkable that an agreement is being put into place where Russia will actually accept the U.S. immobilizing more material that Russia itself does. One of the core rationales of the U.S. dual-track program is that Russia does not accept immobilized materials as an appropriate form for disposed weapon-grade plutonium. So, doesn't that make the rationale a little weaker? Also, does the agreement provide for a shift of the amount of material from either track, or are we locked in?

Laura Holgate: On the cost issue, the main change is that the initial estimate only looked at those things that will be affected by a decision among sites, technologies and options—in other words, issues that were considered in the NEPA process. It did not look in a very comprehensive way at costs that were the same no matter which site you chose. So those are not comparable numbers. The main purpose of the first cost report was to support the NEPA process, thereby helping to choose among options. The new analysis is based on the knowledge of what the option is and the full cost of that.

To answer your second question, I can tell you that getting the Russians to accept even this amount of immobilization was a huge challenge. It has to do with the identity of material to be immobilized. If we were to try to immobilize any of the more attractive materials, I can guarantee you that the Russians would walk away from the table. In fact, I would say that the negotiations with Russia have only crystallized the wisdom of the dual-track scenario.

While the agreement does provide mechanisms for shifting from one disposition form to another, it requires the other side to approve such shifts. So while we are not locked in, we are pretty firm in that basis.

Q: If I may add a comment on this issue? I'd like to have your opinion on the conclusions of a study by the American professor Per Peterson. He stated that it is 5–10 times cheaper, and much faster, to recover plutonium from a vitrified matrix than to recover the plutonium from spent fuel. Do you consider that it is easy for potential proliferators to recover plutonium from a vitrified matrix?

Laura Holgate: No, I don't think it will be easy for potential proliferators to do so. And to the previous questioner, this is exactly what I am talking about. We have good confidence in the immobilized form that we are looking at. I am not familiar with the analysis that you have referred to, although I am sure that we have it. We have been taking a number of steps to enhance the proliferation resistance of this form. We haven't looked at the cost, because what we are really concerned about is the technological difficulty of getting access to those materials. It is clear to me that the U.S. can-in-canister approach is going to be a very proliferation resistant form.

Q: I'd like to offer a comment on the previous question, relating to the split between immobilization and MOX. I've been involved in the negotiations on this agreement. As you know, there are a lot of aspects of the agreement, many of which have been worked out in parallel. As Dr. Chebeskov said this morning, there has been a provision to allow the Russians to blend a small amount of civil plutonium—about 10–15 percent—with their weapons plutonium. This is to solve the other thorny issue that is also asymmetric between the two sides—that is, the Russian isotopic figures for their weapons

plutonium remains classified. So that is part of the package. It was never directly linked with an acceptance of U.S. immobilization. But these things—timing, financing, which material goes to what path, and how much material goes to each path, the objective of proceeding in parallel—are part of the overall negotiations. I just wanted to add that point. There are many aspects that were difficult a year ago that have been ironed out.

Q: You mentioned the commitment from the G-8. Do you expect any results of the upcoming G-8 summit in that regard? Do you see any options that involve France or Germany burning weapon-grade plutonium as part of this commitment? Second, can you please give us the status of the Parallex program between Russia, the United States and Canada?

Laura Holgate: Regarding the G-8, we don't know yet what form these commitments will be in. I will be surprised if we get commitments at the Okinawa summit for additional reactor capacity. But the multilateral development of an expansion plan is envisioned to take place within one year of signing the bilateral agreement. That would be the context in which I would expect that there would be a discussion and decisions—national and multilateral—about reactor capacity that may be devoted to Russian disposition efforts.

At this point, all I can do is note that virtually all countries, with the exception of Switzerland, have said "no." I'm not sure that I would put it as the number one likely approach. But again, all of the expansion approaches are hard, expensive and politically challenging.

Q: Was this an official "no" from all of these countries? There have been news reports on negotiations between Germany and Russia…

Laura Holgate: I'm not privy to German-Russian negotiations. But currently, whenever it has been raised in Germany, it has gotten a very negative reaction.

On the Parallex project, as you probably know, we were successful in shipping 119 grams of plutonium—manufactured into 7 kilograms of MOX fuel—to Canada in January 2000. The next piece of the project is to ship Russian material from the Bochvar Institute, where the equivalent Russian fuel has been manufactured. We understand from our Canadian colleagues that they expect to do that this summer or thereabouts.

David Albright: We have time for one more questioner.

Q: You mentioned that you were considering joint work with Russia on the HTGR?

Laura Holgate: We are more than considering it. There is a project underway at the moment.

Q: I see. And you said that you can get complete destruction of the plutonium that way?

Laura Holgate: No. I said that it is more complete than LWR and fast reactors.

Q: That is a key distinction, since about 20 percent of it will still be there, and we still need to get into the thorny issue of what to do with that. Do you contemplate sending that to a geologic disposal facility?

Laura Holgate: If we do a gas reactor approach it will be in Russia. How Russia will choose to deal with the waste forms—we haven't gotten to that stage yet.

David Albright: I believe that we have filled all of the time that we have for this session. Thank you for an informative presentation, and thank you also to all conference participants for an interesting discussion. The conference is adjourned for today; we will reconvene tomorrow morning.

Laura Holgate: Thank you very much.