

T E S T I M O N Y

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*Limiting the Accumulation
of Weapon-Usable
Plutonium*

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Limiting the Accumulation of Weapon-Usable Plutonium

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Prepared statement for a hearing on

Stemming the Plutonium Tide:

Limiting the Accumulation of Weapon-Usable Nuclear Material

before the

Subcommittee on International Security, International Organizations and Human Rights

Committee on Foreign Affairs

House of Representatives

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Mr. Chairman and members of the Subcommittee, I appreciate the opportunity to share my views on the spread of plutonium with you. For this testimony, I will focus on three areas. First, what are the problems arising from the spread of plutonium? Second, are the steps being taken by the United States and other countries sufficient to stem the plutonium tide? Third, what other measures need to be implemented by the United States and other countries?

Problems of Separated Plutonium

There are basically two categories of plutonium issues--those associated with plutonium still in the spent fuel and those with plutonium separated from the spent fuel. The concern of the former is that, eventually, the radiation from spent fuel will drop so much that national or subnational groups can reprocess the spent fuel quickly and easily for plutonium. Although such plutonium would likely be only of reactor-grade, it could still be used to make nuclear bombs with yields in the kiloton range or more. This is a long-term issue that the world has to deal with sooner or later. Since this hearing is focused, however, on separated plutonium, I will restrict my comments to that. Separated plutonium is a more immediate and urgent issue, because the most difficult task of extracting plutonium from the intensively radioactive spent fuel has already been performed; the remaining steps of incorporating the material into a nuclear bomb are much easier.

Separated plutonium comes from both nuclear weapon programs and civilian nuclear power. It has been reported that Russia's recent agreement to shut down three nuclear reactors still producing weapon-grade plutonium will make Russia the last of the five declared nuclear states to stop producing fissile materials for warheads.² Even if no more weapon-grade plutonium will be produced, the United States and former Soviet republics (FSRs) each will have about 100 metric tons of surplus plutonium from the dismantled nuclear weapons by the year 2003. Only about five kilograms of such plutonium is needed to make a primitive nuclear weapon in the kiloton range. On the civilian side, 330 metric tons of reactor-grade plutonium will have been separated from spent fuel worldwide and be available for use by the year 2003. About seven kilograms of reactor-grade plutonium is needed for a bomb in the kiloton range. Countries that are currently reprocessing spent fuel for civilian purposes are France, FSRs, the U.K., Japan, India, Israel and N. Korea. Although the last three countries are claiming a civilian intent for their reprocessing activities, some or all of the plutonium they have separated is mostly likely used in their undeclared nuclear weapon programs. It is the difficulty of ascertaining the real purpose that makes civilian reprocessing dangerous as well.

Military plutonium and civilian plutonium face two common problems. First, it is the diversion of plutonium by terrorist groups. An economy involving extensive use of military or civilian plutonium would make it much more difficult for the International Atomic Energy Agency (IAEA) to safeguard so much plutonium, because it would appear

² "Russia Agrees to Close Reactors, End Production of Plutonium," *Los Angeles Times*, March 17, 1994, p. A4.

in so many places with multiple vulnerable nodes--reprocessing plants, fabrication plants, storage facilities, reactor sites and, most troublesome of all, the transportation network on land, at sea and in the air. IAEA safeguards can be effective, but only if the world does not create, in the first place, an impossible environment for the IAEA to operate in. Allowing massive use of plutonium in civilian nuclear power comes close to be such a hostile environment. As to keeping separated plutonium in FSRs, their economic destitution makes nuclear theft an ever present danger.

Second, it is the seizure of plutonium by host countries. The IAEA or any other organization cannot prevent countries from seizing plutonium that is located within their territories. The United States should be concerned about the political instability in the FSRs. If Russia reverts to tyranny, stored nuclear materials, even if they are safeguarded by the IAEA and a bilateral arrangement, might be refashioned into nuclear weapons. I am also worried about even legal transfer of separated plutonium from FSRs to other countries for civilian use. Although the recipients would likely be restricted to industrialized countries such as Japan, it would eventually be difficult for the world to draw an equitable line dividing those countries which can have separated plutonium and those which cannot. Countries with good nonproliferation credentials now could turn bad in the future. Had the United States helped the Shah of Iran develop a civilian plutonium reprocessing capability, as it had done with many other programs, the ayatollah would have had separated plutonium now for its nuclear weapon development program.

Why, then, would countries want to introduce the problematic plutonium into commerce? From the dawn of the nuclear age to the seventies, countries thought that the uranium resources were running out fast and that plutonium would be needed soon. Since the eighties when civilian nuclear power growth has been revised severely downward and additional types and amounts of uranium have been discovered, some countries remain worried that they would not have sufficient time to develop an alternative to plutonium. In RAND's recent study³, we found that plutonium use will be uneconomical for the next 30-50 years or even much longer. Moreover, there will always be enough plutonium in the spent fuel to support even the most optimistic plutonium-based breeder buildup, in the event that breeders are needed unexpectedly. Therefore, countries do not have to plunge into plutonium use prematurely. It is disappointing to see that, while countries are reiterating their commitment to nonproliferation, they are not willing to forego even their uneconomical plutonium activities, which raise grave proliferation concerns.

Current Measures to Deal with Separated Plutonium

From the start, President Clinton has considered limiting nuclear proliferation to be one of the top priority items on his administration's agenda. In his Nonproliferation and Export Control Policy issued last September, he seeks "to eliminate where possible the accumulation of stockpiles of highly-enriched uranium or plutonium," and proposes "a multilateral convention prohibiting the production of highly-enriched uranium or

³ Brian G Chow and Kenneth A Solomon, *Limiting the Spread of Weapon-Usable Fissile Materials*, MR-346-USDP, November 1993.

plutonium for nuclear explosives purposes or outside of international safeguards." These aims are worthy, but additional steps, which I shall soon discuss in the next section, must be taken to meet those aims. Otherwise, the elimination of plutonium accumulation might be understood to mean the prompt use of separated plutonium in commerce so as to reduce the size of the plutonium stockpile; in that event, the policy would result in sanctioning plutonium use. Similarly, halting fissile material production only for weapons would not prevent rogue countries from continuing their nuclear weapon development, because they would simply claim that their production is for civilian nuclear power programs. Already, countries such as N. Korea are using such claim for their weapon programs. Rogue countries could carry on parallel, covert programs to develop, simulate or even test all components of nuclear weapons, except the insertion of the plutonium pit into the weapon and the testing of the completed weapon. Even if the separated plutonium is under full-scope IAEA safeguards, these countries can at will seize the plutonium for weapons use, and the warning time, measured merely in days or weeks, is so short that the international community will not be able to stop the bomb-making process. While many countries will never develop nuclear weapons even if they had the capability to do so, some countries might be tempted by the potential of bringing themselves close to the nuclear threshold covertly or even legitimately.

As to dealing with weapon-grade plutonium from the FSRs' dismantled nuclear weapons, many planners both inside and outside of the government are seriously considering the placement of plutonium in the FSRs under the IAEA and/or bilateral safeguards. I would argue that this arrangement is inadequate, because it does not prevent Russia from using the weapon-grade plutonium to re-establish its massive nuclear arsenal, in the event that the likes of Zhirinovskiy gain power.

Additional Measures to Deal with Separated Plutonium

Any effective counter-plutonium policy must deal with both military and civilian plutonium. Any policy dealing with military plutonium alone is at best inadequate and at worst gives a false sense of security; it would allow proliferators to proceed uncomfortably close to nuclear status with little impediment and even with much outside civilian nuclear assistance, that is readily applicable to their military pursuits. The drafters of the Non-Proliferation Treaty insisted from the start that nuclear weapons and peaceful nuclear devices not be treated differently. We should now insist that facilities associated with nuclear weapon materials and facilities associated with sensitive civilian nuclear materials, including plutonium, also not be treated differently. It would be futile to ban military nuclear facilities but not sensitive civilian nuclear facilities in nonnuclear weapon states.

Therefore, the United States' counter-plutonium policy should have two objectives. First, it should take weapon-grade plutonium out of the FSRs' hands. Second, it should discourage both military and civilian plutonium separation and use worldwide.

The first objective can be accomplished by offering to purchase all of the FSRs' weapon-grade plutonium for, say, \$1 billion, as the United States has agreed to buy the low-enriched uranium blended down from 500 metric tons of the FSRs' highly-enriched uranium. Since I am concerned that the uranium purchase would not be budget-neutral, I would further recommend that the United States ask other countries' help in purchasing such uranium directly from the FSRs or repurchasing it indirectly through the United States. The money we save can be used to lighten the burden of our plutonium purchase.

There is a distinct possibility, however, that Russia would refuse to let its weapon-grade plutonium leave the FSRs, even after our best effort. Another option would be to encourage the FSRs to bury their weapon-grade plutonium after it is mixed with high-level waste. Unfortunately, the FSRs might not have enough high level waste left. Mixing weapon-grade plutonium with spent fuel would require the chopping up of spent fuel and would be expensive. Vitrifying the plutonium alone or with some radioactive isotopes such as cesium-137 would be inadequate, because the FSRs would have the capability to extract the weapon-grade plutonium quickly. Between storing weapon-grade plutonium in FSRs under safeguard and burning it in the FSRs' reactors, the United States should prefer the latter. The former runs the risk of returning such plutonium to nuclear weapons, while the latter at least turns the weapon-grade plutonium into reactor-grade plutonium. While this grade distinction is much less important in nonnuclear weapon states, it is important in the FSRs. The FSRs have already designed, tested and built many delivery platforms for their nuclear weapons. If they had to use reactor-grade plutonium instead for their nuclear rearmament, redesigning and re-testing their nuclear weapons and delivery platforms would be costly and time-consuming for them. The costs and delays could serve as a deterrent to rearmament, even if their political system changes for the worse.

As to the second objective of discouraging plutonium use, the Administration's current position is "not to encourage the civil use of plutonium and accordingly does not itself engage in plutonium reprocessing for either nuclear power or nuclear explosive purposes. The United States, however, will maintain its existing commitments regarding the use of plutonium in civil nuclear programs in Western Europe and Japan." The United States needs to take some further steps to assure other countries that they can maintain energy security without resorting to plutonium activities now and that they can share in the benefits of plutonium-based reactors, if they ever turn economical. These steps include

- Prolonging the world's reliance on existing reactors in the once-through mode. This entails improving the reactors' efficiency and identifying additional uranium resources at current and higher prices.
- Encouraging development of advanced nuclear reactors that would be safer and even more efficient and proliferation-resistant. These advanced reactors do not have to be breeders; near-breeders or highly efficient converters will do. Both uranium- and thorium-based fuel cycles should be considered.
- Confining sensitive civilian nuclear materials and facilities within the five currently declared nuclear weapon states to the extent possible, while agreeing to

share the benefits, if any, of these activities with other nations. I acknowledge that exceptions may have to be made for Japanese and some other countries' facilities that are already in operation. Still, these countries should scale back their plutonium activities.

Concluding Remarks

Since the dawn of the nuclear age, countries had planned to use plutonium in their civilian nuclear programs. Even when countries now recognize that the date for economic use of plutonium will be distant and that the threat of North Korea's plutonium-based nuclear weapon program is serious, halting the momentum toward a plutonium economy is still a daunting task. But, the chance to change the nuclear course is now better than ever. Many countries, including some of the most ardent plutonium supporters such as France, Germany, and the U.K., have scaled back their plutonium activities as a result of political and economic pressure. Even Japan's plutonium program faces delays. Considering that a continuation of the past course would lead to many countries being situated dangerously and ambiguously near the nuclear threshold, we have no alternative but to make a serious attempt to stem the plutonium tide.



