Speaker Urges: Eliminate Nuclear Weapons and Nuclear Fuel Reprocessing

This is a summary. The complete text may be found on the Web at http://www.lanl.gov/pu2000.html

Beyond trace amounts in uranium ore deposits, plutonium is man-made; its existence and quantities are determined by its production and utilization since the 1940s. Plutonium has two major applications—as a nuclear explosive material and as a nuclear reactor fuel—and one minor application where the isotope ^{238}Pu is highly concentrated as a source material for radioisotope thermoelectric generators and heater units.

Today eight countries possess nuclear weapons—the United States, Russia, the United Kingdom, France, China, Israel, India and Pakistan. The first five have signed the Nuclear Nonproliferation Treaty (NNPT). The parties have an obligation under Article VI of the NNPT:

> "to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international controls"

To meet this obligation they must undertake (1) political steps designed to reduce incentives to acquire and accumulate nuclear weapons and threaten their use, and (2) technical steps to eliminate existing arsenals and increase the time it takes to reconstitute them or acquire new ones. With regard to the technical measures, it is important to recognize that our NNPT obligations are not limited to the elimination of nuclear warheads themselves. If a nation disassembles an arsenal of nuclear warheads and stores the critical components, the effect is only to marginally increase the time it takes to reassemble and use them. A more useful parameter for measuring progress in achieving nuclear disarmament is the availability of deliverable warheads over time.

Thus, the parties must reduce the number of nuclear warheads on launch-ready alert, on generated alert, in the active stockpile, in the inactive stockpile, and awaiting dismantlement. They must reduce the stockpile of weapons-usable fissionable materials in weapon component form (e.g., pits), in strategic reserves, and in separated forms.

The lack of progress made by the U.S. and Russia in achieving meaningful reductions in most of these categories is evidence that neither country is making a good-faith effort to meet its NNPT obligation under Article VI.

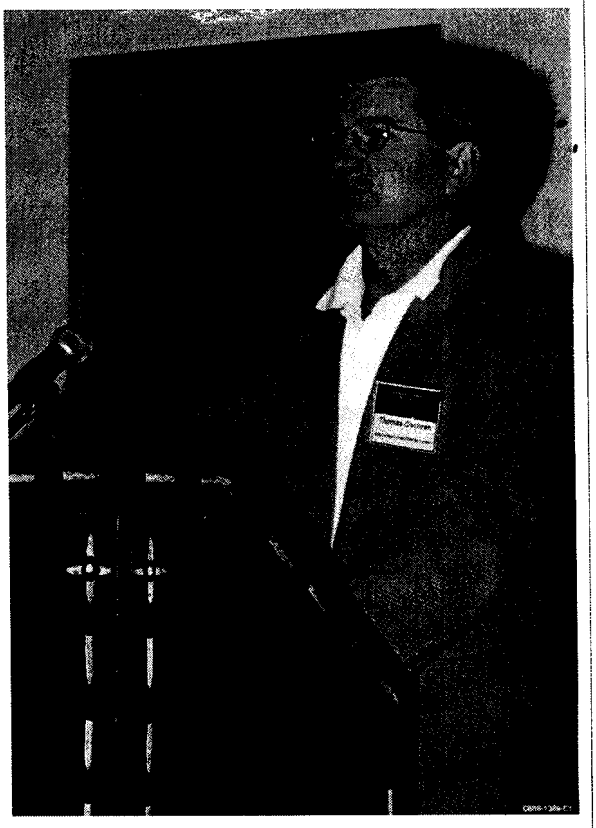
To meet its treaty obligation, the U.S. should take the following steps immediately and unilaterally:

1. **Stop specifically targeting Russia and other countries with nuclear weapons.** Under new guidance the U.S. should not target any country specifically but create the capability to quickly construct contingency war plans if needed.
2. **Take all U.S. land-based ICBMs off alert.**
3. **Ratify the Comprehensive Test Ban Treaty.**
4. **Redirect and scale back the Stockpile Stewardship and Management Program to focus on acquiring the capability to remanufacture existing, well tested designs to original specifications, as required.** The stewardship program should be scaled back and limited to finding ways to maintain a set of well tested nuclear designs, without the emphasis on providing the capability to develop and certify new nuclear weapons without testing.
5. **Permanently close the Nevada Test Site.** Negotiate with Russia the joint permanent closure of NTS and Novaya Zemlya. This would have the added benefit of making the Comprehensive Test Ban Treaty easier to verify and consequently easier to ratify.

In addition, the U.S. should seek the following on a bilateral or multilateral basis:

6. **Much deeper reductions in U.S. and Russian strategic arsenals.**

7. **The elimination of all non-strategic nuclear warheads, all reserve warheads and all strategic reserves of fissile materials.**
8. **Public declarations of all nuclear weapon and weapon-usable fissile material stockpiles and production histories, and cooperative verification measures to confirm data included in these declarations and data exchanges.**
9. **More informal transparency measures. (demonstrate progress and fairness in on going arms reduction processes, build confidence that they are significant and unlikely to be reversed, reduce uncertainties in estimates of weapons and weapons materials).** New security measures proposed or recently imposed further hamper this effort.
10. **Verified dismantlement of warheads and monitored interim storage of their fissile material components.**
11. **Increased security and safe disposition of existing stocks of weapon-usable materials.** The effort to place under International Atomic Energy Agency safe guards fissile material inventories that have been declared to be in excess of national security needs by Russia and the U.S. is moving ahead so slowly that the DOE lab-to-lab program must be counted as a failure.
12. **Verified storage and disposition of highly enriched uranium (HEU) and plutonium declared to be *in excess of* national security needs.** The program to assist Russia in disposing of its excess plutonium is unlikely to be successful because its mission is to assist Russia in converting excess plutonium into MOX to be burned in existing reactors. Russia has no MOX fabrication facility and cannot afford one, and no country has indicated any willingness to pay. The Russian plutonium disposition effort should be refocused on converting plutonium pits to unclassified shapes and placing the effort under bilateral and ultimately international safeguards.



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13. **Assist in downsizing Russia's nuclear weapons complex and provide alternative employment opportunities for workers in Russia's nuclear weapon complex.** A potential source of new additional revenues for several of these initiatives is the NonProliferation Trust, Inc. (NPT, Inc.) proposal, with which I am involved. This nongovernment initiative has the potential to raise $15 billion in revenues, of which over $11.5 billion will be allocated to a variety of worthy projects in Russia. The revenues would be raised providing spent fuel management services in Russian for 10,000 tonnes of foreign (non-Russian and non-U.S.) spent fuel. Western companies would build and operate in Russia an interim, dry-cask spent fuel storage facility licensed by

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GAN, the Russian licensing authority, that would meet the technical licensing criteria of the Nuclear Regulatory Commission.

Under the current NNPT proposal plan $2.3 billion of the revenues is allocated for the construction of a geologic repository for the foreign spent fuel in addition to Russian spent fuel and high-level radioactive waste. An additional $1.5 billion is allocated to fissile material security, $2 billion for alternative employment opportunities for workers in the Russian nuclear weapons complex, $3 billion for environmental cleanup, $0.5 billion for regional economic development, and $2.25 billion for humanitarian causes in Russia.

In the late 1960s the Atomic Energy Commission was predicting that increased use of nuclear power would lead to reductions in power plant costs and scarcity and increased costs of uranium, thus making plutonium recycling and fast breeder reactors economical. These claims have proven to be false. Nevertheless, many countries adopted the closed fuel cycle—plutonium separation and recycling—in preference to direct disposal of spent fuel. As a consequence global inventories of weapon-usable plutonium in civil stockpiles now exceed plutonium inventories in military programs, and the civil stockpiles continue to grow largely as a consequence of commercial reprocessing contracts made years ago.

Today it is abundantly clear that fast breeder reactors and plutonium recycling in thermal reactors is uneconomical and will remain so for the foreseeable future. The commercial use of plutonium in most countries is on the decline.

The concept of accelerator transmutation of waste (ATW) has been promoted as a means of reducing the long-term risks associated with geological disposal of high-level radioactive waste. A recent DOE sponsored "roadmap" of the ATW concept indicates that this technology will be prohibitively expensive. More importantly, no case has been made to date that (1) the potential lives saved by reducing the transuranic and other isotopes going into a geologic repository will exceed the potential lives lost resulting from the implementation of an ATW program, (2) the cost of implementing an ATW program is worth the benefits, (3) greater benefits cannot be achieved at less cost by selecting an alternative repository site and technology, (4) the nonproliferation benefits of an ATW program are positive, or (5) that an ATW program can be implemented by private industry.

So long as the global norm permits nations to separate and stockpile large inventories of weapon-useable fissile materials ostensibly for peaceful purposes, there is little hope that the nuclear weapons states will be willing to move to small nuclear weapon stockpiles. Since plutonium recycling is uneconomical and unnecessary for energy independence or waste management, the preferred course from a nonproliferation prospective is a complete global ban on commercial use of weapon-usable fissile material.

The DOE has supplied 44 radioisotope thermoelectric generators (RTGs), each containing kilogram quantities of ^{238}Pu, and ^{240}Pu radioisotope heater units (RHUs), each containing grain quantities of ^{238}Pu, on 26 space missions since 1961. Unless and until a more benign reliable energy source can be found, it will be necessary to continue to use ^{238}Pu sources for some deep space missions.

We have an obligation to the international community to eliminate nuclear weapons and convert existing stocks of separated plutonium into a form that is no more attractive as a source of weapon material than spent nuclear reactor fuel as a source of plutonium for weapons. There is no economic, environmental, or nonproliferation utility in separating additional plutonium from spent fuel, at least not in the foreseeable future. ^{238}Pu has limited utility in small quantities for deep space missions. In sum, plutonium has a long half-life, but except for deep space missions, it has no future.