

**MANAGEMENT OF SURPLUS FISSILE MATERIAL**

**TESTIMONY**

**OF**

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**NATURAL RESOURCES DEFENSE COUNCIL, INC.**

**BEFORE THE**

**MILITARY APPLICATION OF NUCLEAR ENERGY PANEL**

**OF THE**

**HOUSE ARMED SERVICES COMMITTEE**

**APRIL 19, 1994**



## I. INTRODUCTION.

Mr. Chairman, my name is Thomas B. Cochran. I am a physicist and director of the Nuclear Program of the Natural Resources Defense Council (NRDC). NRDC has been engaged since 1986 in a series of joint demonstration projects, site visits and studies related to the verification of a nuclear test ban, verification of nuclear warhead disposition, and fissile material control. We have worked with various institutions in the Soviet Union and Russia, including the Soviet/Russian Academy of Sciences, Foreign Ministry and Ministry of Atomic Energy. I welcome this opportunity to present NRDC's views on the Administration's policies and programs for the management of surplus fissile materials. Mr. Chairman, I also want to thank you for your personal efforts and leadership in trying to get the Executive Branch to develop and implement a coherent fissile material control policy.

Fissile material<sup>1</sup> control has both a domestic and an international component. International concerns are by far the more important, and to a large extent should drive the domestic policy. Also, since the Administration has handled the international aspects of fissile material control rather poorly and has handled the domestic aspects rather well, my testimony will focus on the international aspects.

## II. INTERNATIONAL FISSILE MATERIAL CONTROL ISSUES.

Let me begin by sketching out a few reasons why we believe the issue of fissile material control in Russia should be among the very highest U.S. national security concerns.

There are tens of thousands of nuclear warheads, hundreds of tons of weapon-usable highly-enriched uranium (HEU) and tens of tons of separated plutonium stored in Russia. Most, if not all, of these inventories are stored under inadequate physical security and material control and accounting.

Organized crime is reported to control a large fraction of the private enterprises in Moscow and St. Petersburg. Reports of illegal activities in Russia associated with nuclear materials--offers to sell and successful and unsuccessful attempts to steal nuclear materials--are appearing in the Russian and European press on the order of one per week. Inflation is rampant. Nuclear weapons scientists have gone without being paid for several months at a time, and when they are paid, it is in inflated rubles. Top nuclear weapon designers are planting potatoes and garden vegetables to provide food for their

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<sup>1</sup> Fissile materials are materials that are fissionable by slow (or zero energy) neutrons and well as by fast (or energetic) neutrons, and are thus capable of sustaining a controlled nuclear chain reaction in thermal reactors as well as the very rapid chain reactions of nuclear explosives. The principal fissile materials of interest from a nonproliferation standpoint are plutonium and highly-enriched uranium.

families. Low-enriched uranium fuel has been stolen. A least one case involving the attempted theft of several hundred grams of HEU has been confirmed by the Russian Ministry of Atomic Energy (Minatom).

Nuclear warhead storage capacity in Russia is inadequate to store the inventory of nuclear warheads that have been returned to Russia from other former Soviet republics. Many nuclear warheads are now being stored in facilities constructed for the storage of conventional munitions under less than adequate physical security. Some Special Operations ("Spetsnaz") units of the Russian military are trained in how to use atomic demolition munitions (ADMs) and have the knowledge, skills, and in some cases access to nuclear weapons storage depots. Current and former Spetsnaz soldiers, either for profit or political reasons, could steal ADMs or other easily transportable tactical nuclear weapons. It would be rather easy to smuggle stolen weapons from a storage depot, e.g., the Kaliningrad naval base area, across the border, e.g., into Poland or Lithuania, and from there via third parties to anywhere in the Middle East.

The Russian central government is highly unstable. There is only limited rule of law. Political authority is often ignored. President Boris Yeltsin is increasingly currying favor with ultra-nationalist factions. Colonel Vladimir Zhirinovsky or another hard-line nationalist may be the next president. In order to retain power the next Russian president may seek a politically hostile relationship with the United States in order to strengthen the military and turn attention away from a failing economy. Nuclear arms reductions may be halted or reversed.

This sorry state of affairs is not a criticism of the efforts of the many dedicated officials within the Russian central government and ministries who are trying to cope with this situation. Rather, it is a reflection of the desperate state of the Russian economy and the instability of the Russian government.

## **II. A COMPREHENSIVE GLOBAL SAFEGUARDS REGIME SHOULD BE A PRIORITY U.S. OBJECTIVES WITH RESPECT TO FISSILE MATERIAL CONTROL AND DISPOSITION.**

The above are among the reasons that improving physical security over nuclear warheads and weapons-usable fissile material, and improving fissile material control and accounting in Russia should be among the very highest U.S. national security priorities.

These, however, are among the most sensitive areas of another sovereign nation. The United States is unlikely to significantly affect these areas by simply demonstrating our own technologies and procedures, limiting financial assistance in this area to a few tens of millions of dollars, and maintaining a preference for funding domestic contractors over Russian institutions. Moreover, this approach provides inadequate transparency to insure the assistance has the intended effect. A U.S. assistance program is likely to be

more saleable in Russia and more effective if it is viewed by Russians as being part of a bilateral effort to construct a comprehensive global safeguards regime. Such a regime should place under bilateral or international controls, to the fullest extent possible consistent with national security needs, all stocks of nuclear weapons, weapons-usable fissile material, and fissile material production and use facilities.

Given the substantial nuclear proliferation risks today, building toward a comprehensive non-discriminatory safeguards regime should be a high priority in its own right. If such a program were initiated promptly, even on a bilateral basis, we would improve our chances of achieving an indefinite extension of the Non-Proliferation Treaty (NPT) at the 1995 NPT Review Conference.

A comprehensive nuclear non-proliferation program would also:

1. Seek deep reductions in the arsenals of all nuclear-weapon states, declared and undeclared.
2. Achieve a universal, global fissile material control regime with the minimum objective of having retired weapons and weapon components subject to some type of monitoring, and other fissile materials stored under international safeguards, such as those of the International Atomic Energy Agency (IAEA).
3. Achieve a global, verified cutoff in the production of fissile materials for weapons purposes with safeguards over fissile material production facilities.
4. Actively discourage and seek a moratorium on programs for the civil production and use of separated plutonium and HEU, with particular emphasis on programs in Japan and Russia. The objective here is a complete ban on civil production, stockpiling and use of weapons-usable fissile materials, with verified declarations and reductions of existing stocks.
5. Seek to cap and draw down the world inventories of weapons-usable fissile materials.
6. Reinforce and strengthen regional and global norms against the proliferation of nuclear weapons.

In the following section I will review the Administration's strategy vis-a-vis the Russians in the following areas: (a) improving material control and accounting and physical security; (b) safeguards or transparency over the warhead dismantlement process; (c) stockpile and fissile material declarations; (d) cutoff in the production of weapon-grade plutonium production; and (e) verifying that the 500 metric tons of Russian HEU is from dismantled warheads. In some cases I will step back a few years to set the stage for where we are today.

### **III. SHORTCOMINGS OF THE ADMINISTRATION'S FISSILE MATERIAL CONTROL STRATEGY.**

#### **A. Material Control and Accounting and Physical Security.**

Following passage of the Soviet Threat Reduction Act of 1991 (P.L. 102-228, also known as the "Nunn-Lugar Act"), the Bush Administration agreed to provide:

a) \$15 million for the design, and \$75 million for the construction, of one or two fissile material storage facilities in Russia; b) \$50 million worth of fissile material storage containers; c) \$5 million for Kevlar armored blankets; d) \$20 million to improve the security of rail cars for nuclear weapons transport; and e) \$10 million to assist Russia in improving material control and accounting and physical security.

Since the United States is paying for a major share of the storage facility, Russia has indicated it would be appropriate for the U.S. to have some yet to be defined level of transparency over the materials stored therein. But this does not address the immediate problem of the adequacy of the storage facilities in use today. Only \$10 million in Nunn-Lugar funds has been allocated for these other fixed facilities.

With respect to what should be the highest priority--safeguarding existing facilities--it took about one year for the Bush Administration to formulate a proposal, which was for the U.S. to assist in the construction of one or two model security systems in Russia that could then be replicated by the Russians, perhaps with additional Russian assistance. The Russians spent about six months studying the U.S. proposal, then responded by offering the low-enriched uranium (LEU) fuel fabricating line at the Machine Building Plant in Electrostal near Moscow. The Russians rejected the idea of using a line at Electrostal that manufactured high-enriched uranium (HEU) fuel for the navy or any other facility that handled HEU or plutonium. The Clinton Administration was unenthusiastic over the Russian response, and to date only \$412 thousand, or four percent of the \$10 million allocated by the Bush administration, has been obligated with nothing to show for it.

The Clinton Administration is now taking a different approach. About six weeks ago the Administration asked the Russians to identify the highest priority deficiencies in order to correct them first. To launch this new initiative the Administration proposed reciprocal site visits to take place this month and next to plutonium storage facilities at Hanford and Chelyabinsk-65 (Mayak) in the Urals. At Mayak the visit would be restricted to the vault containing 25-30 metric tons of plutonium that was separated primarily from civil reactor spent fuel. As of last week there had been no response from the Russians regarding this new initiative.

The Administration also has volunteered unilaterally to place its "excess" fissile material under IAEA safeguards. In September of this year the IAEA will be invited to



inspect some 10 to 30 metric tons of HEU stored in Vault 16 at the Y-12 plant in Oak Ridge. Thirty metric tons is approximately five percent of the total inventory, so this is not yet a serious initiative. The Administration has yet to determine how much weapon-grade plutonium or HEU will be declared excess. A preliminary figure of seven metric tons of weapon-grade plutonium scrap (about six percent of the total weapon-grade plutonium) has been mentioned. Offering this low figure would be such an embarrassment that DOE is currently reevaluating the figure. We are unaware of what, if anything, the Administration has done to encourage the Russians to follow the U.S. lead.

There are readily available inexpensive commercial technologies that can be used to fingerprint,<sup>2</sup> seal, and tag or bar-code warheads and fissile material storage containers. The technologies are essentially the same as those used by the IAEA and commercial firms such as Federal Express. These technologies could be used to immediately begin implementing a bilateral warhead and fissile material accounting regime. This could be a joint effort by the nuclear weapons labs of Russia and the United States. The labs could further refine these procedures and technologies as part of a joint research and development effort. The point is there are no technological obstacles preventing immediate implementation.

In sum, the Administration's approach is too narrowly circumscribed and is too slow in its implementation. The U.S. can expect some level of transparency over the fissile material storage facility it helps to construct, but the immediate challenge of improving the material control and accounting and physical security at existing Russian facilities has been marked by failure. At best perhaps by the end of the year the Russians will provide the Administration with a list of potential upgrades. Moreover, because there is no bilateral aspect to this program, there is little incentive or interest on the part of Minatom to participate in this effort. Also, there will be no way for the U.S. to measure independently the adequacy of material control and accounting and physical security at specific sites, or the success of the U.S. program to improve them. Finally, there is no parallel DOD-Ministry of Defense program for improving physical security at weapon storage sites. The weapon related efforts are limited to two inconsequential programs for providing Kevlar armored blankets and secure rail cars under the DOD administered Safe Secure Dismantlement (SSD) program.

#### **B. Safeguards or Transparency Over the Dismantlement Process.**

When the Ministry of Defense of the former Soviet Union began removing over two thousand tactical nuclear weapons from Ukraine in December 1991, no U.S. or international inspectors were on hand to verify the process, despite the desire of the new

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<sup>2</sup> A three dimensional imprint of the metal surface which by analysis under a microscope provides a unique signature that is impossible to falsify.

Ukrainian government for international inspection to assure elimination of Russian warheads, and the willingness of at least some senior political authorities in the new Russian government to grant it. The main problem, as it turned out, was not in Moscow or Kiev but in Washington, where erstwhile advocates of "effective verification" had suddenly reversed field, arguing that U.S.-Soviet "unilateral" arms reductions did not require any mutual verification measures.

At the very moment of maximum political opportunity--and general technical need--for extensive nuclear inspections throughout Russia and other states of the CIS with nuclear weapons on their territory, the Bush Administration considered, and then chose not to establish, verification arrangements that would assure nuclear warhead elimination and monitoring of the nuclear explosive materials removed from dismantled warheads. The Bush Department of Defense placed a higher priority on insuring that there would be no reciprocal oversight over U.S. weapons and fissile material by Russia. By not advancing a reciprocal control regime the Bush Administration's verification effort was limited to offering to assist Russia in upgrading its own internal fissile material accounting and control procedures, and to accepting whatever transparency Russia was willing to provide at the proposed fissile material storage facility in return for the U.S. paying for the facility with Nunn-Lugar funds.

The Clinton Administration has made marginal improvements over the policy of the Bush Administration. At the Clinton-Yeltsin summit in Moscow on 14 January 1994, the two presidents agreed to establish two working groups--one on transparency and the other on plutonium disposition. Unfortunately, the Administration failed to take immediate action to establish these working groups. A few days ago the Administration proposed to the Russians dates for the first working group meetings. Due to inertia within the Administration even this limited initiative is moving painfully slowly.

In hearings before the House Appropriations Committee about two months ago, the Assistant to the Secretary of Defense for Atomic Energy, Harold Smith, proposed the idea of reciprocal inspections of excess plutonium from weapons. On March 16, during Minatom Minister Mikhailov's visit to Washington, the Minister and Secretary of Energy Hazel O'Leary signed a "Joint Statement on Inspections of Facilities Containing Fissile Materials Removed from Nuclear Weapons," agreeing to: a) reciprocal visits to plutonium pit storage igloos at the Pantex plant in Texas and a Russian plutonium storage facility at Tomsk-7 site in Siberia by the end of 1994, and b) an initial meeting of technical experts to "conclude an agreement on the means of confirming the plutonium and highly enriched uranium inventories from nuclear disarmament." Shortly thereafter the Administration proposed to the Russians that they hold joint technical discussions in Moscow beginning May 9, 1994, to discuss how to implement the agreed pit inspections at Pantex and Tomsk-7.



Thus, the Clinton Administration's initiative is limited to:

- a) making "excess highly-enriched uranium and plutonium subject to the U.S.-IAEA voluntary safeguards agreement;"
- b) hosting reciprocal site visits to Pantex and Tomsk-7 to view pit storage facilities; and
- c) conducting a joint study with the Russians on "the means of confirming the plutonium and highly enriched uranium inventories from nuclear disarmament."

The DOD continues to block any initiative that would monitor on a bilateral basis nuclear warheads.

**i) Information Exchange.** Verification of warhead dismantlement and weapon components present the added difficulties associated with protecting sensitive design information. If the U.S. and Russia were willing to divulge to each other, but to no other party, the mass--but not necessarily the shape--of the plutonium and HEU in warheads, the verification requirements, e.g., those associated with pit storage, can be greatly simplified. Thus, there are situations where it is in the U.S. national security interest to exchange such data without necessarily making the data public. We believe the Executive Branch may already have the legal authority to do so. If Congress or the Administration believes this is not the case, however, we recommend that the Armed Services Committee move quickly to amend Section 142 of the Atomic Energy Act to add the following, or similar language:

"g. Notwithstanding any other law, the President may exchange Restricted Data regarding the nuclear weapons stockpile of the United States with another nuclear weapons state, or reveal it to an international agency, without making it public, if it is part of a reciprocal bilateral or multinational exchange of such data for safeguards purposes, and provided the President makes a determination that the public release of the Restricted Data would not be inimical to the common defense and security of the United States or constitute an unreasonable risk to the public health and safety. It is not the intent of this provision to withhold from the public any information that otherwise could be made public."

The last sentence has been added because of our concern that the Executive Branch might abuse such a provision by seeking agreements with other countries to prevent the release of certain stockpile data unless agreed to by all parties. A similar situation arose when the United States and the Soviet Union exchanged nuclear test yields as part of the agreement on verifying the Threshold Test Ban Treaty.

**ii) Need for Joint Lab-Lab R&D on Verification Technologies.** In May 1991, then Soviet Ministry of Atomic Power and Industry (MAPI) Deputy Minister (now Minatom Minister) Viktor Mikhailov expressed to NRDC an interest in initiating joint technical work directed toward technologies and procedures that would permit verification of nuclear warhead elimination without disclosing sensitive nuclear design information. The DOE rejected the idea of U.S. weapons laboratory personnel participation in such a program. Had DOE responded favorably to this initiative, today we might have the policy and procedures in place to verify the warhead dismantlement process. Now, almost three years later, the U.S. Government has yet to initiate any joint U.S.-Russian lab-to-lab research effort related to verification of the nuclear warhead dismantlement process.

With passage of the Nunn-Lugar Act in late-1991, the Bush Administration launched an initiative to provide alternative employment for Russian nuclear workers. The International Science and Technology Center (ISTC) was created and \$25 million in Nunn-Lugar funds were set aside for the ISTC. Now, two years later nuclear scientists at Arzamas-16 and Chelyabinsk-70 still have not received a nickel of ISTC funds. We understand that the last bureaucratic roadblocks in Russia have been removed and money will start flowing shortly. Russian nuclear laboratory workers tell us privately that there is little incentive for them to participate in ISTC projects. If they do participate the institutes will receive the hard currency and they will continue to be paid at the same rate in inflated rubles. Moreover, if they are removed from mainline lab activities to work on an ISTC funded project, they fear they will lose their jobs after the ISTC project is completed. Consequently, we believe a DOE/Minatom lab-to-lab research and development program on warhead dismantlement verification would be a more effective means of gainfully employing scientists at Russian weapons labs, since it would be viewed as part of their main line research activities. Such a joint program would also provide a badly needed alternative national security mission for our own weapon labs.

**iii) Summary.** In sum, more than one year into the Clinton Administration, the U.S. Government has not yet advanced a coherent program for verifying the elimination of tens of thousands of former Soviet warheads and tracking the ultimate disposition of hundreds of tons of surplus bomb-grade materials in the Russian nuclear stockpile. As in other areas the steps that have been taken are minimal and slow. The DOD continues to block safeguards or transparency measures over warhead storage. Consequently, there have been no Administration efforts and no successes in these areas. Overall the program is a history of missed opportunities.

### **C. Stockpile and Fissile Material Declarations.**

A related issue is that of declaring either on a bilateral or multilateral basis, the inventories of warheads and fissile materials. In October 1991--two and one-half years ago, shortly after Presidents Bush and Gorbachev had each made unilateral commitments

to eliminate thousands of tactical nuclear warheads, and shortly after the failed putsch to oust Gorbachev--an international workshop was held in Washington, D.C. on verified storage and elimination of nuclear warheads. The workshop participants included then deputy MAPI Minister Mikhailov, Evgeniy Avrorin, Scientific Leader of Chelyabinsk-70, and Sergei Kortunov, then Counsellor for Arms Limitations, Foreign Ministry of the USSR. The workshop participants reached general agreement on a number of steps that the two countries should undertake: (a) each should declare at an early stage that the fissile material removed from weapons would not be used for new weapons; (b) each should exchange and make public the total number of warheads in their respective stockpiles, the number of warheads, by class, that are planned to be eliminated, and the total quantity of plutonium and HEU removed from these warheads; (c) the two sides should establish at the earliest possible time bilateral safeguards over warheads to be dismantled; and (d) the two nations should discuss what additional steps should be undertaken at the dismantlement facilities to insure that the warheads in safeguarded storage are actually dismantled and the fissile material recovered from warheads is placed under safeguards.

As a direct consequence of this workshop, two months later--on 12 February 1992 in Geneva--Russian Foreign Minister Andrei Kozyrev formally proposed a reciprocal exchange of data among all nuclear weapon powers on inventories of nuclear weapons and fissile materials, and on nuclear weapons production, storage, and elimination facilities. President Bush did not respond, and President Clinton has not responded, positively to this Russian initiative. Because Foreign Minister Kozyrev often has been accused by Russian hard-liners as being too eager to please the United States, the Foreign Ministry does not believe it can aggressively push a program that could be attacked as giving away secret Russian data to the United States. Therefore, any further initiatives must come from the U.S. side. None have.

This failure did not go unnoticed by the Congress. On July 2, 1992, the Senate Committee on Foreign Relations adopted a condition to the ratification of the START I Treaty--approved by the full Senate in October 1992--known as the "Biden condition." It directs the President to seek an appropriate arrangement, "in connection with any further agreement reducing strategic arms," for monitoring nuclear stockpile weapons and fissile material production facilities, through the use of reciprocal inspections, data exchanges, and cooperative measures. And last November, the Congress included in the conference report of the National Defense Authorization Act for FY 1994 the following language (*Congressional Record*, 10 November 1993, p. H9559):

The conferees do believe that the United States must have the ability to track nuclear materials. Therefore the conferees are disappointed that, despite the inclusion of section 3151(b) in the National Defense Authorization Act for Fiscal Year 1993, there has been no discernable progress between the United States and the states of the former Soviet

Union on an agreement to reciprocally release information on their nuclear stockpiles.

The DOE has taken a small positive step by declassifying the total production of weapon-grade plutonium at the Hanford and Savannah River sites and the current plutonium inventories at these and several other sites. Secretary O'Leary has challenged Minister Mikhailov to do the same. However, the DOE plutonium declaration is misleading to anyone who does not know the real numbers. The total DOE plutonium inventory is much larger than the 89 metric tons of weapon-grade plutonium production. The DOE still keeps secret the amount of fuel and reactor grade plutonium produced, the amount of plutonium exploded in nuclear weapons tests, the amount lost as waste, and the amount purchased or bartered from the United Kingdom, and perhaps other countries. Also to date, no comparable data has been released either bilaterally or unilaterally, with respect to HEU. The HEU inventory may be declassified in June. The Administration has begun to circulate for discussion a proposal for a bilateral exchange of fissile material inventory data, but action on this front is slow at best.

With respect to warheads--operational, active reserve, inactive reserve, retired and awaiting dismantlement, and dismantled--the Clinton Administration has followed the lead of the Bush Administration by actively opposing any effort to exchange data bilaterally or multilaterally.

In sum, the Administration has a narrow view of transparency limited to fissile materials which have been declared "excess," which ties back to the President's commitment to put excess fissile material under safeguards. Apparently, the Executive Branch is unconcerned that this will have a negligible impact on our ability to track the disposition of Russian warheads and most of Russia's fissile material. Under the Administration's current approach, as before, we will be left not knowing how many warheads Russia has within thousands, how many have been dismantled within hundreds, and how much plutonium within tons and highly-enriched uranium within hundreds of tons is in weapons or available for weapons. Instead of a comprehensive approach that would include a bilateral exchange of all nuclear weapons and weapons usable fissile materials, the Administration has attempted to maximize the public relations benefit from the unilateral release of limited and somewhat misleading plutonium inventories. We will be relying on the Russian Government to unilaterally divulge their production data.

#### **D. Cutoff in the Production of Weapon-Grade Plutonium Production.**

In October 1989 the Soviet government announced it was ceasing the production of HEU and made a commitment to shut down all Soviet plutonium production reactors by 2000. This commitment was affirmed by President Yeltsin, who said in his 29 January 1992 disarmament address, "Russia intends to proceed with the program for the cut-off



of weapon-grade plutonium production. Reactors for weapon-grade plutonium production are to be shut down by the year 2000, and some of them as early as 1993. We confirm our proposal to reach agreement with the USA concerning the cut-off of fissionable materials production for weapons.”

Ten of 13 plutonium production reactors have been shut down, but the remaining three--two at Tomsk-7 and one at Krasnoyarsk-26--are dual purpose reactors. These three continue to produce plutonium for new warheads and to provide steam and electricity for the plutonium production sites and nearby cities.

There are two alternative approaches that can be taken to stop the production of weapon-grade plutonium at these three reactors while maintaining the supply of electricity and steam. One alternative, called the reactor conversion (or fuel conversion) option, is to change the fuel design so that the fuel can be left in the reactor for one to three years instead of about two months and then stored indefinitely without reprocessing. These reactors would then operate like civil power reactors and the plutonium produced would be “reactor-grade” instead of “weapon-grade.” At the higher fuel burnup, the amount of spent fuel generated would be substantially less, and it would not be necessary to reprocess the spent fuel to recover the plutonium. Unfortunately, these reactors are similar to the unsafe RBMK reactors, similar to the ones at Chernobyl. The other approach is replace the reactors with alternative sources of power, of which there are several from which to choose.

In July 1992 Minatom Deputy Minister Yegorov proposed a collaboration with Pacific Northwest Laboratory (PNL) to study the reactor conversion option and to improve the safety of the reactors. This proposal was transmitted to DOE the following month. It took the Administration four months to prepare an interagency proposal to spend \$5 million in Nunn-Lugar funds for a joint U.S. Russian feasibility study. The DOD did not concur, desiring to spend the funds for missile dismantlement instead. In effect, the DOD was funding the design and construction of a plutonium storage facility in Russia while opposing an effort to turn off the plutonium spigot.

In March 1993 Russian parliamentarians met with senior DOE officials and proposed a cooperative program on production reactor conversion. In May 1993 DOE proposed to Minatom that DOE send an experts' fact finding mission to the reactor sites as a basis for proceeding with a feasibility study. Minatom promptly accepted the idea and proposed a visit to Krasnoyarsk-26 as early as the following month. In July 1993 DOE accepted Minatom's invitation and proposed a mid-August visit. The U.S. embassy in Moscow delayed the delivery of this response due to staff change at the embassy. In August 1993 Minatom postponed the proposed experts' visit until November.

Frustrated by the slow pace of the Executive Branch and misguided priorities of the DOD, Congressman Edward Markey offered an amendment to the Defense Authorization Bill for Fiscal Year 1994 that made funding of the plutonium storage



facility contingent on a Presidential certification that Russia is 1) committed to halting the chemical separation of weapon-grade plutonium, and 2) taking all practical steps to halt such separation at the earliest possible date.

After passage of the Markey amendment, DOD and Minatom Minister Mikhailov took a more active interest in resolving the plutonium production issue. In September 1993 Minatom Department Head Evgeniy Mikerin toured Hanford facilities. The experts' site visit in Russia continued to be postponed. The U.S. embassy in Moscow rejected the idea of a site visit in December 1993 or January 1994, because it would conflict with visits to Moscow by Vice President Gore and President Clinton. During Vice President Gore's visit in December the Vice President and Prime Minister Chernomyrdin agreed to develop a timetable "for the replacement of the two reactors at Tomsk and the reactor at Krasnoyarsk by modern, efficient power plants." Vice President Gore announced that a working group would meet the following month to develop terms of reference for a study of alternative energy sources, to be completed by March 1994. The Administration had prepared an extensive proposed terms of reference for a joint Russian-American study of alternatives, but the working group meeting was subsequently delayed.

Apparently concerned over the fact that the U.S. had dropped from consideration the reactor conversion option, Prime Minister Chernomyrdin resurrected it in his 14 February 1994 letter to Vice President Gore. Minister Mikhailov also communicated that reactor conversion should be considered in parallel with replacement of the reactors.

A week prior to Minister Mikhailov's visit to Washington in mid-March, the Secretary of Energy rejected the idea of the U.S. assisting the Russians with the reactor conversion option. This was communicated to the Russians during the Mikhailov visit the following week. At that point Minatom cancelled the long planned experts' site visit to the reactors, citing that there was no longer a need since the U.S. would not assist in the fuel conversion.

After meetings in Washington on 16 March 1994 Secretary O'Leary and Minister Mikhailov signed two agreements: 1) "Protocol of Meeting between the United States and the Russian Federation on the Replacement of Russian Production Reactors;" and 2) Joint Statement on Inspection of Facilities Containing Fissile Materials Removed from Nuclear Weapons." Under the production reactor protocol:

"The Russian side proposes that Russia, within one year after creation of an alternative source of energy, would cease production and chemical separation of weapons-grade plutonium."

and

"The Russian side proposed that, upon approval by the Government of the Russian Federation, the heads of the Russian and U.S.

governments enter into a mutual agreement to cease military use of plutonium separated after the date of the agreement."

The production reactor protocol conditions the realization of replacement energy sources on the Russian Federation being able to obtain financing.

The O'Leary-Mikhailov agreement is good in one respect in that it demonstrates a commitment by the United States to assist the Russians in achieving a fissile material cut-off. But by conditioning the shutdown of the reactors on western financing, it weakens the unconditional commitment of President's Gorbachev and Yeltsin to shut the reactor down by the year 2000. The DOE entered into this arrangement even though there was a strong sentiment among the U.S. participants in the negotiation that it would be very difficult for the Russian Federation to obtain financing.

By refusing at the last minute to consider further the reactor conversion option, the DOE walked away from what is likely the quickest means of shutting down Russian weapon-grade plutonium production. The safety of Russian production reactors is a legitimate concern, and converting them to high burnup fuel runs the risk that they will operate longer than they would if only the replacement power alternatives are pursued. But the reactor conversion alternative should have been retained as an alternative until a careful assessment of all alternatives had been completed. If DOE was adamant in dropping the reactor conversion alternative, this step should have been taken 18 months earlier rather than waiting until the eleventh hour, thereby alienating Minatom, which in turn canceled the experts' visit to the reactors.

It is perhaps worth noting that although the Russian plutonium production reactors are unsafe, the reactor at Krasnoyarsk-26 is housed 250-300 meters underground and can be reached only by traveling several kilometers via one of three underground tunnels. The underground complex is protected from a nuclear attack by blast doors and specially equipped ventilation system. In effect, this reactor appears to have the best containment system in the world. In the event of a catastrophic reactor accident at Krasnoyarsk-26, the workers within the underground complex would be at risk, but it is doubtful that there would be any significant risk to the public. The reactor conversion alternative at least should have been considered for Krasnoyarsk-26, if not for Tomsk-7.

The Administration has apparently abandoned the idea of a joint feasibility study of all reasonable alternative energy sources called for by Vice President Gore, and has committed itself to supporting a more limited feasibility study of a proposal by Kurchatov Institute Director Evgeniy Velikhov to replace the reactors at Tomsk-7 with a gas turbine plant and a separate proposal to complete a coal plant near Krasnoyarsk-26. Velikhov proposes that an aircraft turbine factory be retooled to construct turbines for power generation. Building a coal plant at Tomsk appears to be quicker and less expensive, but apparently the Administration interest in the higher risk alternative of converting the

aircraft turbine factory has taken precedent over what was the primary objective of achieving a cutoff in the production of plutonium for weapons.

In sum, the Administration was slow to respond to a Russian request for assistance in converting the production reactors. The Administration did not get serious until Congress conditioned the Nunn-Lugar money for the plutonium storage facility on a serious commitment to halt plutonium production for weapons--the Markey amendment. The DOE began to take charge. Secretary O'Leary and Minister Mikhailov signed an agreement that looks good enough superficially to satisfy the Markey amendment, but the agreement may represent a step backward, rather than forward, in terms of an early shutdown of the remaining Russian plutonium production reactors. The DOE undermined its own initiative by its failure to identify a source of western financing before agreeing to condition the reactor conversion on finding such funding.

#### **E. Verifying That the 500 Metric Tons of Russian HEU is From Dismantled Warheads.**

As noted above the Soviet government announced in 1989 that it was ceasing the production of HEU for weapons. Russia may be continuing to produce HEU for production reactors, and medium-enriched uranium for naval fuel, breeders and research reactors. The United States stopped production of HEU for weapons in 1964. The United States has agreed to purchase 500 metric tons of HEU from Russia which will be blended down into low-enriched uranium in Russia. By failing to engage the Russians in a data exchange, the U.S. Government does not know what fraction of the total Russian HEU inventory it is purchasing.

The HEU purchase agreement includes a recently worked out protocol that was meant to detail how the United States would be assured that the HEU was derived from dismantled Russian weapons. The transparency protocol negotiated by the Administration may permit the U.S. to confirm that the uranium was HEU, but it apparently does not permit the U.S. to confirm that the HEU actually is from dismantled weapons. The HEU metal will be converted to uranium oxide at Tomsk-7 in Siberia, then shipped to Sverdlovsk-44, near Yekaterinburg in the Urals, where it first will be converted into uranium hexafluoride, and then blended with LEU, prior to shipment of LEU product to the United States. Apparently the U.S. gets to see, but not sample, the metal at Tomsk, and sample the oxide, LEU blend, and LEU product at Sverdlovsk-44. The Armed Services Committee should examine the protocol to see if there is real transparency, or just smoke and mirrors. If the U.S. cannot verify that the HEU came from weapons, Congress should not delay further the HEU deal, but should insist that the Administration seek to improve the transparency agreement.

#### IV. Summary Observations.

The Soviet Threat Reduction Act of 1991 ("Nunn-Lugar") had as its fundamental purpose assistance to (1) **destroy nuclear**, chemical and other **weapons** and (2) transport, store, disable, and **safeguard** weapons in connection with **their destruction**, and (3) **establish verifiable safeguards** against the proliferation of such weapons. Now, more than two years later, we see that implementation of Nunn-Lugar by this and the previous Administration has largely failed to accomplish its central purposes, and it is unlikely to do so unless there are fundamental reforms in the Administration's policies and implementation efforts. The Administration's strategy can be characterized as too little, too slow, and most regrettably it may even be too late. This failure is largely a direct consequence of the Executive Branch placing a higher priority on preventing reciprocal oversight over U.S. nuclear weapons and production facilities, than on achieving improvements in the physical security and safeguards over the dismantlement of Russian weapons, and on the establishment of an international control regime covering all nuclear weapons and fissile materials.

Conditions in Russia are now deteriorating. Having failed to develop and implement a comprehensive program to achieve the goals of Nunn-Lugar, the International Plutonium Control Act, the Biden condition and the Markey amendment, the Pentagon has reverted to START I force levels as its basis for nuclear weapon stockpile planning. The negative effect of this is now rippling through the Administration. The DOE is being asked to resume tritium production at an earlier date. The new DOD policy plays into the hands of the likes of Colonel Zhirinovsky, and thus it will have a negative effect internationally. If the Russian Federation also plans for the worse case and uses START I force levels for its nuclear weapons stockpile planning, the disarmament process could come to a grinding halt.

The way to deal with Colonel Zhirinovsky and other hard-line nationalists is to deny them the nuclear weapons they would have if they came to power, rather than leave them with more. The Administration should move quickly to deal directly with the Russian objections to START II, or preferably vault over START II and seek lower levels agreeable to both sides. The Administration should redouble its cooperative disarmament efforts, broaden its scope and move more rapidly.

#### IV. What Should the Congress Do?

It is clear that Congress must stay involved if we are going to have and implement a coherent fissile material control policy that can be effective in a timely manner. Almost all of the initiatives that have been taken to date were in response to Congressional action: Nunn-Lugar, the International Plutonium Control Act, and the Markey amendment.



We do not have all the answers, but we offer the following suggestions for additional congressional action:

1.) First, Mr. Chairman, you might advise President Clinton or his National Security Advisor, Mr. Lake, that the Russian warhead dismantlement and fissile material control issues are receiving inadequate White House direction.

The primary management authority of DOD and DOE should be clarified. DOE should have primary responsibility for policy development and implementation of safeguards over warhead dismantlement and fissile material control--areas of responsibility that traditionally have been the purview of DOE and Minatom. The DOD should have primary responsibilities for safeguards and transparency over operational and reserve warheads and delivery systems--areas of responsibility that traditionally have been the purview of DOD and the Ministry of Defense. DOD should not try to manage under its Safe Secure Dismantlement Program the activities at DOE labs, Pantex, and other DOE facilities.

2) Congress should provide DOE with \$100 million to conduct a much expanded and accelerated effort to implement its international fissile material control responsibilities.

3) If Congress decides it is necessary, it should amend Section 142 of the Atomic Energy Act as recommended in Section III. B. above, to allow the exchange of sensitive stockpile information with Russia without releasing it to the public.

4) The Armed Services Committee should lay down some markers against which you can judge the success of the Administration efforts. For example, these might include:

a) Within 30 days, a response by the Administration to Foreign Minister Andrei Kozyrev's 12 February 1992 proposal for a reciprocal data exchange.

b) Within 30 days, DOE should invite Minatom to engage in joint lab-to-lab research on nuclear warhead dismantlement verification.

c) Within four months, reciprocal site visits to all U.S. and Russian facilities where separated weapon-usable fissile materials are stored. At one or more U.S. site visits the DOE should demonstrate how fissile material storage containers can be fingerprinted, sealed, and tagged or bar-coded with inexpensive commercially available technologies for the purpose of providing quick interim bilateral safeguards.



d) Within four months, reciprocal site visits to all U.S. and Russian storage facilities where non-operational nuclear warheads are stored. Safeguarding technologies similar to those discussed in c) above should be demonstrated.

e) Within six months some type of bilateral safeguards placed on some weapon-usable fissile materials in the U.S. and Russia; and within one year some type of bilateral safeguards placed on 50 percent of the materials.

The Committee should ask the Administration why such a timetable cannot be met.

5) In connection with 4.a) above, the Armed Services Committee should request from the Administration within 60 days a written report with an unclassified summary that presents a detailed benefit-cost analysis of engaging in a comprehensive bilateral data exchange with the Russians. This analysis should cover exchanges of data on warhead inventories, warhead construction and dismantlement rates, and civil and military fissile material inventories. If the requested report does not adequately address the benefits and costs of these issues, Congress should consider fencing additional Nunn-Lugar funds until these issues are responsibly addressed.

6) The Committee should request a report within 30 days on the feasibility and desirability of blending down all non-weapon stocks of HEU in the United States and Russia to an enrichment level of 20% U-235 or less. This report should also address how quickly such HEU blending could be accomplished. We believe this is the most effective measure to quickly safeguard Russian HEU. The small cost of re-enriching HEU for naval fuel needs is worth the benefits of eliminating stocks of HEU in Russia.

7) In connection with 6) above, the Committee should request a report on the feasibility of converting U.S. naval reactors to a lower enriched fuel. While the Navy may not be able to achieve lifetime cores with low-enriched fuel, this should not effect the operational capability of the ships or submarines.

This concludes my testimony. Thank you again, Mr. Chairman, for this opportunity. I hope these remarks will be useful in the deliberations of your Committee.