



A Report Card on the Department of Energy's Nonproliferation Programs with Russia

Howard Baker
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January 10, 2001

The Secretary of Energy Advisory Board
United States Department of Energy

Secretary of Energy Advisory Board

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The Russia Task Force would like to thank the Department of Energy for its support over the past nine months. In particular, the Task Force would like to thank the following DOE employees and former DOE employees: Douglas Babcock, Kenneth Baker, Rose Gottemoeller, Sarah Lennon, Cindy Lersten, Eileen Malloy, and Betsy Mullins.

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January 10, 2001

Mr. Andrew Athy
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Dear Mr. Athy:

On behalf of the Task Force on the Evaluation of the Department of Energy's Nonproliferation Programs With Russia, we send you our final conclusions and recommendations.

The Task Force appreciates the opportunity to provide the Department with this report and respectfully submits it for consideration.

With best wishes,

Yours sincerely,

A handwritten signature in black ink, appearing to read "Howard Baker".

Howard Baker
Co-Chair

A handwritten signature in black ink, appearing to read "Lloyd Cutler".

Lloyd Cutler
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Enclosure



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Table of Contents

Executive Summary.....	iii
Introduction.....	1
The Task Force.....	3
The Task Force Methodology.....	5
Why the United States?.....	7
DOE is One Part of the Picture.....	9
Department of Energy Programs.....	11
Task Force Assessment.....	19
Conclusions and Recommendations.....	25
Appendices.....	31
A. Outline of Proposed Spending for Strategic Plan.....	A-1
B. Task Force Members' Biographies.....	B-1
C. Terms of Reference.....	C-1
D. Programmatic Chart and Budget Pie Chart of U.S. Government Nonproliferation Programs in Russia.....	D-1
E. Budget Chart of DOE Nonproliferation Programs with Russia.....	E-1
F. Glossary.....	F-1
G. Bibliography.....	G-1
H. Summary of Audit Reports Concerning DOE Programs.....	H-1



Executive Summary



Introduction

Since the breakup of the Soviet Union, we have witnessed the dissolution of an empire having over 40,000 nuclear weapons, over a thousand metric tons of nuclear materials, vast quantities of chemical and biological weapons materials, and thousands of missiles. This Cold War arsenal is spread across 11 time zones and lacks the Cold War infrastructure that provided the control and financing necessary to assure that chains of command remain intact and nuclear weapons and materials remain securely beyond the reach of terrorists and weapons-proliferating states. This problem is compounded by the existence of thousands of weapons scientists who, not always having the resources necessary to adequately care for their families, may be tempted to sell their expertise to countries of proliferation concern.

In order to assess the Department of Energy's part of current U.S. efforts to deal with this critical situation, in February 2000 Secretary of Energy Bill Richardson asked former Senate Majority Leader Howard Baker and former White House Counsel Lloyd Cutler to co-chair a bipartisan task force to review and assess DOE's nonproliferation programs in Russia and to make recommendations for their improvement. After nine months of careful examination of current DOE programs and consideration of related nonproliferation policies and programs of the U.S. Government, the Task Force reached the following conclusions and recommendations.

1. The most urgent unmet national security threat to the United States today is the danger that weapons of mass destruction or weapons-usable material in Russia could be stolen and sold to terrorists or hostile nation states and used against American troops abroad or citizens at home.

This threat is a clear and present danger to the international community as well as to American lives and liberties.

2. Current nonproliferation programs in the Department of Energy, the Department of Defense, and related agencies have achieved impressive results thus far, but their limited mandate and funding fall short of what is required to address adequately the threat.

The Task Force applauds and commends Secretary Richardson, his predecessors and colleagues for their dedication, commitment and hard work in seeking to address this issue. The cooperation of the Russian Federation has also been a critical and significant factor in the work carried out to date.

But the Task Force concludes that the current budget levels are inadequate and the current management of the U.S. Government's response is too diffuse. The Task Force believes that the existing scope and management of the U.S. programs addressing this threat leave an unacceptable risk of failure and the potential for



catastrophic consequences.

3. The new President and leaders of the 107th Congress face the urgent national security challenge of devising an enhanced response proportionate to the threat.

The enhanced response should include: a net assessment of the threat; a clear achievable mission statement; the development of a strategy with specific goals and measurable objectives; a more centralized command of the financial and human resources required to do the job; and an identification of criteria for measuring the benefits for Russia, the United States, and the entire world.

The Task Force offers one major recommendation to the President and the Congress. **The President, in consultation with Congress and in cooperation with the Russian Federation, should quickly formulate a strategic plan to secure and/or neutralize in the next eight to ten years all nuclear weapons-usable material located in Russia and to prevent the outflow from Russia of scientific expertise that could be used for nuclear or other weapons of mass destruction.** Accomplishing this task will be regarded by future generations as one of the greatest contributions the United States and Russia can make to their long-term security and that of the entire world.

While emphasizing that enhanced efforts are needed from the U.S., the Task Force underscores that enhanced efforts are also required from Russia. Ultimately, Russia will be responsible for securing its remaining nuclear arsenal. If this program is conceived in full cooperation with the Russian Federation, is adequately financed, and is implemented as part of a growing, open and transparent partnership, then the Task Force believes that Russia should be positioned to take over any work remaining at the end of the eight to ten year period. If Russia is not prepared for such a partnership, then full success will not be achieved.

Bearing this in mind, the Task Force report outlines an enhanced national security program as described above. This program could be carried out for less than one percent of the U.S. defense budget, or up to a total of \$30 billion over the next eight to ten years.¹ The Russian Government would, of course, be expected to make a significant contribution commensurate with its own financial ability. The national security benefits to U.S. citizens from securing and/or neutralizing the equivalent of more than 80,000 nuclear weapons and potential nuclear weapons² would constitute

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1. This plan is based on the assumption that both countries will maintain a core nuclear weapons program sufficient to meet defense needs and to provide for naval fuel requirements. A detailed budget for this program would be developed on the basis of the strategic plan called for above. The Task Force believes a budget of approximately \$3 billion annually would be appropriate, recognizing that it would not be possible to ramp up to that level immediately. A suggestive outline is attached as Appendix A.
 2. Assuming approximately 4 kg of plutonium or 20 kg of highly enriched uranium per weapon. David Albright, Frans Berkhout and William Walker. "Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies." SIPRI (Oxford Press: 1997), page 8.



the highest return on investment in any current U.S. national security and defense program. The new President should press other major powers such as the European Union, Japan and Canada to assume a fair share of the costs of these efforts designed also to enhance the security of these countries. Contributions from other countries could significantly reduce U.S. costs.

Background

As two former adversaries adapting to the end of the Cold War, the United States and Russia both have a responsibility to examine and address the dangers posed by the massive nuclear arsenal built up over the past five decades. In Russia, this review must examine the many dangers and challenges posed by the more than 40,000 nuclear weapons produced by the former Soviet Union and the large quantities of highly enriched uranium (HEU) and plutonium that could be used to make more than 40,000 additional nuclear weapons.

Important steps have already been taken with many ambitious milestones being met over the past decade. Former President Bush negotiated and President Clinton implemented what some have called the “contract of the century” with President Yeltsin. Under this agreement, the U.S. is purchasing 500 metric tons of HEU removed from former Soviet nuclear weapons, and this material is being converted to low enriched uranium fuel that is then used in civilian power reactors. To date, more than 110 metric tons of HEU, enough to build some 5,000 nuclear weapons, have been blended down and rendered impotent for nuclear weapons use. In its blended-down form, this material has been delivered to the international market to fuel civilian power reactors. Through close cooperation among the U.S., Russia, and other countries of the former Soviet Union, we have also succeeded in eliminating strategic nuclear arsenals left in Ukraine, Kazakhstan, and Belarus—preventing the potential emergence of three major new nuclear weapon states. The elimination of these arsenals has greatly increased U.S. and international security, particularly since these nuclear weapons were mounted on strategic intercontinental ballistic missiles aimed at the United States.

Since the Nunn-Lugar legislative initiative of 1991,³ the U.S. Government has established an array of threat reduction programs in both the Departments of Defense and Energy to assist in dismantling Russian nuclear and other weapons of mass destruction and to improve significantly the security of such weapons and materials. Together, these programs have helped to protect, secure, and begin disposition of strategic weapons delivery systems as well as hundreds of metric tons of nuclear weapons-usable material—preventing the emergence of a virtual “Home Depot” for would-be proliferators. Additional work, under the aegis of the Department of State, has addressed what is known as the ‘brain drain problem’ both in Russia and other countries of the former Soviet Union through programs such as the International

3. The Soviet Nuclear Threat Reduction Act of 1991 was created under Public Law Number 102-228.



Science and Technology Center (ISTC) Program. This program, together with DOE's Initiatives for Proliferation Prevention and its Nuclear Cities Initiative, has helped to redirect weapons scientists and engineers from defense work to civilian employment.

These U.S. programs have reduced the threat of diversion of nuclear weapons materials. To the best of our knowledge, no nuclear weapons or quantity of nuclear weapons-usable material have been successfully stolen and exported, while many efforts to steal weapons-usable material have been intercepted by Russian and international police operations.

Much more remains to be done, however. The Task Force observes that while we know a good deal about the size and state of the Russian weapons complex, there is still much that we do not know. More than 1,000 metric tons of HEU and at least 150 metric tons of weapons-grade plutonium exist in the Russian weapons complex. Most of the cases involving the successful seizure and recovery of stolen nuclear weapons-usable material have occurred on the western border of Russia. The southern border is less secure. Materials may be diverted through centuries old trade routes along Russia's mountainous border. In addition, many of the Russian nuclear sites remain vulnerable to insiders determined to steal enough existing material to make several nuclear weapons and to transport these materials to Iran, Iraq, or Afghanistan. At some sites, one well-placed insider would be enough. The Task Force was advised that buyers from Iraq, Iran and other countries have actively sought nuclear weapons-usable material from Russian sites.

In a worst-case scenario, a nuclear engineer graduate with a grapefruit-sized lump of HEU or an orange-sized lump of plutonium, together with material otherwise readily available in commercial markets, could fashion a nuclear device that would fit in a van like the one the terrorist Yosif parked in the World Trade Center in 1993. The explosive effects of such a device would destroy every building in the Wall Street financial area and would level lower Manhattan.

In confronting this danger, the Russian Government has recognized that theft of nuclear weapons or nuclear weapons-usable material threatens Moscow or St. Petersburg as surely as it threatens Washington, DC or New York. Chechen terrorists have already threatened to spread radioactive material around Moscow; if they were armed with a nuclear device, the situation would be much worse. Success in countering this threat to both nations rests on a bedrock of shared vital interests.

The Threat Today

Russia today wrestles with a weakened ability to protect and secure its Cold War legacy. A number of factors have come together to present an immediate risk of theft of potential weapons of mass destruction: delays in payments to guards at nuclear facilities; breakdowns in command structures, including units that control weapons or guard weapons-usable material; and inadequate budgets for protection of stockpiles



and laboratories housing thousands of potential nuclear weapons. Such threats are not hypothetical. Consider the following:

- In late 1998, conspirators at a Ministry of Atomic Energy (MinAtom) facility in Chelyabinsk were caught attempting to steal fissile material of a quantity just short of that needed for one nuclear device. The head of MinAtom's nuclear material accounting confirmed the attempted theft and warned that, had the attempt been successful, it would have caused "significant damage to the Russian State."
- Early in 1998, the mayor of Krasnoyarsk-45, a closed Russian "nuclear city" that stores enough HEU for hundreds of nuclear weapons, wrote to Krasnoyarsk Governor Alexander Lebed warning that a social explosion in his city was unavoidable unless urgent action was taken. Nuclear scientists and other workers in the city remained unpaid for several months, and basic medical supplies could not be purchased. General Lebed, a former National Security Advisor to President Yeltsin, had earlier proposed to Moscow that his region take responsibility for the nuclear forces and facilities on its territory, pay salaries for these military officers and atomic workers, and take command of the structures. The Russian Government has never agreed to the proposal.
- In December 1998, an employee at Russia's premier nuclear weapons laboratory in Sarov (formerly Arzamas-16) was arrested for espionage and charged with attempting to sell documents on nuclear weapons designs to agents of Iraq and Afghanistan for \$3 million. The regional head of the Federal Security Bureau, when reporting the case, confirmed that this was not the first case of nuclear theft at Sarov and explained that such thefts were the result of the "very difficult financial position" of workers at such defense enterprises.
- In January 2000, Federal Security Bureau agents arrested four sailors at the nuclear submarine base in Vilyuchinsk-3 on the Kamchatka Peninsula with a stash of precious metals and radioactive material they had stolen from an armored safe in their nuclear submarine. After the sailors' arrest, investigators discovered at their homes additional stashes of stolen radioactive material and submarine components containing gold, platinum, silver, and palladium.

These are a sample of dozens of actual incidents. Imagine if such material were successfully stolen and sold to a terrorist like Osama bin Laden, who reportedly masterminded the bombings of the U.S. embassies in Kenya and Tanzania and is the chief suspect in the recent attack on the U.S. destroyer *Cole*.

Democracies like ours are inherently messy, frequently distracted, and often bogged down in partisanship. Our government historically finds it difficult to mobilize without the catalyst of an actual incident. The new President and leaders of the 107th



Congress face no larger challenge than to mobilize the nation to precautionary action *before* a major disaster strikes.

Assessing Current DOE Nonproliferation Programs

The Task Force had the benefit of briefings by both government and non-government experts and reviews of written materials. Members of the Task Force also visited seven sites in Russia in July 2000, reviewing DOE programs and meeting with 13 organizations over the course of a week. The Task Force was able to visit only a few sites of the vast nuclear complex, and it recognizes that those sites were probably in better economic and physical condition than others in the complex. The dire state of those sites gave the Task Force members cause for grave concern about the overall condition of the Russian nuclear complex.

The Task Force applauds the accomplishments of current DOE programs and related programs of other U.S. Government agencies. The Task Force commends in particular the dedication to duty exhibited by the hundreds of DOE and national laboratory employees involved in these programs. The Task Force was also impressed by the high quality of cooperation extended by most of DOE's Russian counterparts during the course of its visit to Russia. Both MinAtom and the Russian Navy provided access to all of the facilities requested, as well as some additional sites that were thought to be inaccessible. Despite difficulties in the overall implementation of the DOE programs, the Task Force found Russia's cooperation to be a significant and positive factor. The United States and the Soviet Union competed in creating nuclear weapons of mass destruction; now the U.S. and Russia are cooperating to dismantle them. The Task Force believes that the record of progress demonstrates it is far better for the United States to be on the inside working with Russia than on the outside with no capability to affect Russia's actions.

However, the Task Force finds very disturbing the ongoing Russian trade with Iran in dual-use nuclear technology and missile technology and Russia's apparent intention to supply new conventional weapons systems to Iran. Despite the fact that these issues have been raised with Russia at the highest levels of both governments, the problem has not yet been resolved. The Task Force views the failure to resolve these issues as very serious and believes the lack of satisfactory resolution will increase the difficulties inherent in continued cooperation with Russia and in carrying out the Task Force's recommendations. While the Task Force affirms that the DOE nonproliferation programs are unequivocally in the U.S. national security interest, the Task Force is particularly concerned that if Russian cooperation with Iran continues in a way that compromises nuclear nonproliferation norms, it will inevitably have a major adverse effect on continued cooperation in a wide range of other ongoing nonproliferation programs. Among other consequences, there will be little support in Congress and the Executive Branch for the major new initiatives the Task Force is recommending.

Unquestionably, much has been accomplished by the array of programs now being operated by DOE and other U.S. Government agencies. Nonetheless, the Task Force



believes it is time for the U.S. Government to perform a risk assessment based on input from all relevant agencies to estimate the total magnitude of the threat posed to U.S. national security. The Task Force also believes there is a strong need to create greater synergies among the existing nonproliferation programs, hence its call for government-wide coordination of the current programs and direct White House involvement.

The Task Force Specifically Finds...

1. By and large, current DOE programs are having a significant and positive effect. The strategic plan recommended by the Task Force should review the needs of each of these programs and, where appropriate, provide for a substantial increase in funding. Expansions of program scope and increases in funding, however, must take careful account of the pace at which funds can usefully be expended in each individual program.
2. The strategic plan and the associated budgets should identify specific goals and measurable objectives for each program, as well as provide criteria for success and an exit strategy. These should be factored into the five-year budget plan currently being developed for the National Nuclear Security Administration.⁴
3. A major obstacle to further expansion and success of current programs is the continuation of differences between the U.S. and Russia over transparency and access. As a condition for a substantially expanded program, the U.S. and Russia should agree at a high level on the degree of transparency needed to assure that U.S.-funded activity has measurable impacts on program objectives and that U.S. taxpayer dollars are being spent as intended.
4. Given the gravity of the existing situation and the nature of the challenge before us, it is imperative that the President establish a high-level leadership position in the White House with responsibility for policy and budget coordination for threat reduction and nonproliferation programs across the U.S. Government. The President should appoint a person of stature who commands the respect and attention of relevant Cabinet officers and Congressional leaders to lead this program.
5. The U.S. administration of these programs should seek to eliminate any unnecessary and overly restrictive controls that hamper swift and efficient action. To overcome potential impediments that often arise from “business as usual” practices within the Russian and U.S. bureaucracies, DOE and related agencies should take

4. On March 1, 2000, in accordance with Public Law 106-65, the National Nuclear Security Administration was formally established as a semi-autonomous entity within the Department of Energy. The NNSA is comprised of four preexisting component organizations: defense programs, nuclear nonproliferation, fissile materials disposition, and naval reactors. With the establishment of the NNSA, the Office of Nonproliferation and National Security became Defense Nuclear Nonproliferation and incorporated the Office of Fissile Materials Disposition.



practical steps, including further enlargement of the DOE team working with the U.S. Ambassador in Moscow, to ensure the most efficient on-the-ground implementation of the programs in Russia.

6. It is imperative to mobilize the sustained interest and concern of the Congress. The Task Force urges the Congress to consider the creation of a joint committee on weapons of mass destruction, nuclear safety and nonproliferation, modeled after the former Joint Committee on Atomic Energy. Creation of such a committee would ensure that the issues receive adequate high-level attention and that Member and staff expertise is developed and preserved.

Accomplishing the Task

The major recommendation of the Task Force is that one of the first national security initiatives of the new President be the formulation of a comprehensive, integrated strategic plan, done in cooperation with the Russian Federation, to secure and/or neutralize in the next eight to ten years all nuclear weapons-usable material located in Russia and to prevent the outflow from Russia of scientific expertise that could be used for nuclear or other weapons of mass destruction. The Task Force's vision is a world in which all such weapons-usable materials are safe, secure, and accounted for, with transparency sufficient to assure the world that this is the case. The path toward this vision begins by securing all existing nuclear weapons-usable material and eliminating excess stockpiles of uranium and plutonium in Russia.

The Task Force has reviewed many promising proposals but does not claim to have a complete grasp of the universe of good solutions to this set of problems. While it recognizes that the new President will wish to consider other options, the Task Force proposes a strategic plan with specific goals and measurable objectives to eliminate the danger of inadequate controls over weapons of mass destruction and weapons-usable materials. The Task Force recognizes that the quantities of excess material in Russia are so large that they cannot be completely eliminated even within an eight to ten year period. This is especially true of the plutonium stockpile, elimination of which is directly linked to the progress of U.S. efforts to eliminate its own excess plutonium. This plan is designed to bring the material under effective control, to reduce drastically the threat posed by such materials, and to reach a position where Russia can take over any remaining work at the end of the eight to ten year period. Consultation and collaboration with Russia will be critical to success. The proposed strategic plan follows.

1. Secure Russian nuclear weapons and material by:
 - drastically shrinking the number of sites where the material is held;
 - accelerating security upgrades for the remaining buildings in use;



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- assisting the Russians as they identify, tag, and seal all their warheads and materials as part of a reliable accounting system;
 - securing the return of HEU from Soviet-built research reactors, primarily in Eastern Europe, to Russia for downblending and disposition; and
 - developing a plan, after a joint U.S.-Russian examination of the extent of the threat, to be implemented by DOE and DOD, to minimize potential proliferation threats posed by decommissioned Russian general-purpose submarines and their fuel.
2. Eliminate excess Russian HEU by:
- demilitarizing all remaining excess Russian HEU through the development of an expanded capacity for downblending in Russia; and
 - accelerating the purchase of the approximately 400 metric tons of HEU remaining to be downblended under the current HEU agreement, while ensuring that the material not flood and depress the world market. This could require the Russian or U.S. Government to hold the material for an indefinite period of time.
3. Manage excess Russian plutonium, accelerating existing disposition commitments and emphasizing safe and secure storage, by:
- storing up to 100 metric tons of plutonium at Mayak if additional storage wings are built there, or at other highly secure sites;
 - eliminating up to 100 metric tons of excess Russian plutonium by blending fuel as mixed oxide fuel and burning it in civilian reactors, building on what the U.S. and Russia have agreed to do for an initial 34 metric tons;
 - reinvigorating verifiable efforts to halt additional Russian production of plutonium; and
 - preparing an inventory of the total Russian stockpile.
4. Downsize the nuclear complex, building on existing Russian plans and accomplishments, by:
- facilitating Russian efforts to accelerate the shutdown of its weapons facilities, ensuring the identification of the highest-value targets for cooperation;
 - funding “contract research” by Russian nuclear scientists to develop efficient, low-cost environmental technologies of benefit to the U.S., while simulta-



neously preventing the outflow of scientific expertise from Russia that could be used for nuclear or other weapons of mass destruction;

- working with Russia to ensure that nuclear weapons scientists and workers are provided financial incentives for early retirement from the weapons complex;
- overhauling foreign and domestic lending practices to new businesses in the nuclear cities; and
- enhancing communication between the municipalities and the weapons institutes or facilities that are co-located with them to increase efficiency in the expenditure of resources.

5. Plan for Russian financing of sustainable security, by:

- seeking specific commitments from Russia to fund adequate levels of security and accounting for its nuclear material and a slimmed-down nuclear complex;
- exploring, in consultation with Russian officials, an array of concepts for developing new revenue streams for financing projects in an accountable and transparent manner; and
- working with Russian officials to begin detailed planning for the transition away from U.S. financial support.

The Task Force believes it is quite feasible that the Russian Federation and the United States could together carry out an intensive, well-conceived and well-funded strategic plan as outlined above over the next eight to ten years.

Introduction



The national security of the United States is today more threatened by the potential spread of weapons of mass destruction than at any time in our history. As a nation, we face no greater national security challenge than to prevent these weapons and the materials and technology used to create them from falling into the hands of those who would use them against us or our allies.

Unless protected from theft or diversion, the former Soviet arsenal of weapons of mass destruction threatens to become a goldmine for would-be proliferators the world over. Moreover, some scientists who created this massive Cold War arsenal and who were considered the brain trust of the Soviet elite now are losing their jobs or are not being paid and may be tempted to work for nations of proliferation concern.

The U.S. is by no means alone in this predicament. The threat looms over Russia as much as it does over the United States. The Russians live in closer proximity to many potentially proliferant nations and would also be the first to suffer the consequences of an unintended nuclear incident involving their own weapons and technology.

As two former adversaries adapting to the end of the Cold War, both the United States and Russia have a responsibility to examine closely the threat presented by the massive nuclear arsenal built up over the past five decades. In Russia, this examination must include the dangers and challenges posed by the more than 40,000 nuclear weapons produced by the former Soviet Union and the large quantities of highly enriched uranium (HEU) and plutonium that could be used to make

more than 40,000 additional nuclear weapons.

We do not know for sure the amount of nuclear weapons-usable materials produced by the Soviet Union, nor the extent to which additional materials are still being produced. Similarly, we do not know every storage location for this material. More than 1,000 metric tons of HEU and at least 150 metric tons of weapons-grade plutonium exist in the Russian nuclear weapons complex, but even these figures may be less than the true totals because no comprehensive inventory exists.

The U.S. and Russia have built a partnership to address these concerns – albeit a complex process and one where serious difficulties still remain. That partnership is key to the success of the U.S. Government’s nonproliferation programs in Russia. Since the Nunn-Lugar legislative initiative of 1991, the U.S. Government has established an array of threat reduction programs in both the Departments of Defense and Energy to assist in dismantling Russian weapons of mass destruction and to improve significantly the security of such weapons and materials. Likewise, the Department of State, in cooperation with the Departments of Defense and Energy, has led the way in addressing what is known as the ‘brain drain problem.’ Together, these programs have helped to protect, secure, and begin disposition of strategic weapons delivery systems as well as hundreds of metric tons of weapons-usable nuclear material. These programs have also ensured that Russian weapons expertise remains at home, rather than moving to countries of proliferation concern.



The U.S. programs have reduced the threat of diversion of nuclear weapons and materials. To the best of our knowledge, no nuclear weapons or quantity of nuclear weapons-usable material have been successfully stolen and exported, while many efforts to steal weapons-usable material have been intercepted by Russian and international police operations.

Even with the achievements of ongoing U.S.-Russia nonproliferation programs, much more remains to be done. Today, the U.S. and Russia have an urgent need to take a fresh look at these programs and reinvigorate efforts to mitigate the threat posed by the potential proliferation of weapons of mass destruction and weapons-usable materials.

The Task Force



In February 2000 Secretary of Energy Bill Richardson requested former Senate Majority Leader Howard Baker and former White House Counsel Lloyd Cutler to co-chair a bipartisan task force⁵ to review DOE's nonproliferation programs in Russia. The Task Force was asked to "provide appraisals and recommendations to the Secretary of Energy regarding the policy priorities established by DOE to pursue cooperative nonproliferation and nuclear safety programs in Russia, with an eye to identifying crucial program areas that may not have been addressed in the past."⁶ The Task Force aimed from the outset to provide a set of concrete recommendations to help shape DOE's nonproliferation programs in Russia and make the world a safer place in the 21st century.

The Task Force reviewed seven of DOE's cooperative nonproliferation programs that fall into four broad categories: **control** of fissile materials; **reduction** of the amount of material; **redirection** of nuclear complex workers; and **safety** of material and people. The programs selected for review – each designed to address a specific aspect of the overall nonproliferation problem – have the common goals of reducing the danger posed by the proliferation of weapons material and eliminating the danger of scientists selling their weapons of mass destruction expertise to unauthorized third parties. Each program does only part of the job, but together these programs complement each other and

the work of other U.S. agencies. The programs include:

- Material Protection, Control and Accounting Program (MPC&A);
- Highly Enriched Uranium (HEU) Purchase Agreement and Transparency Implementation Program;
- Russian Plutonium Disposition Program;
- Second Line of Defense (SLD) Program;
- Initiatives for Proliferation Prevention (IPP) Program;
- Nuclear Cities Initiative (NCI); and
- Nuclear Safety Cooperation

Control

DOE's MPC&A Program forms the so-called first line of defense. It is focused on preventing the theft or diversion of nuclear weapons material by working with Russia to improve the security of material at the nuclear weapons laboratories and research facilities, reduce the amount of highly attractive material that is stored, and decrease the overall number of storage sites. Complementing the MPC&A Program is the SLD Program, which helps the Russians shore up their borders so that material that might be diverted from a laboratory, facility or nuclear power plant would be detected and seized

5. For a complete list of Task Force members please see Appendix B.

6. To view the Task Force Terms of Reference please see Appendix C.



before it leaves or transits Russian territory.

Reduce

To lessen the risk of material being diverted, DOE is also involved in several programs to reduce the overall amount of available material. The Russian Plutonium Disposition Program, which with the September 2000 signature of the Plutonium Disposition and Management Agreement moves into a new phase, will as a first step, dispose of 34 metric tons of excess weapons plutonium in Russia, rendering it unusable for military purposes. Under the HEU Purchase Agreement and its Transparency Implementation Program, 500 metric tons of HEU will be removed from Russian stockpiles and converted to a low-enriched form for commercial use.

Shrink and Redirect

The human dimension must also be addressed in order to tackle the proliferation problem comprehensively. As Russia's nuclear weapons complex is downsized, the scientists, technical experts, computer specialists, and weapons designers whose jobs are being eliminated face severe economic hardship. To deter such scientists from selling their skills to countries of proliferation concern, DOE developed the IPP Program, which pairs U.S. and Russian weapons scientists and industry to develop commercially viable products and technologies as well as new civilian jobs to support them. In an effort to help the Russians reduce their expansive nuclear complex, DOE and MinAtom

created NCI. Together these programs are helping redirect weapons scientists and engineers by creating the infrastructure needed to sustain commercial, economically viable, and long-term employment in Russia for these scientists. These programs complement the International Science and Technology Center (ISTC) Program, which is under the aegis of the Department of State and provides grants to former weapons scientists for civilian research and development work. Another related effort is the non-governmental Civilian Research and Development Foundation (CRDF), funded in part by the Department of State.

Ensure Safety

Through its international nuclear safety cooperation program, DOE is working to improve the safety of Soviet-designed nuclear reactors through both short-term safety upgrades and longer-term training and development of a safety culture. From training for workers to fire protection, from maintenance to safety engineering, DOE is working with Russia to avert another Chornobyl-scale nuclear accident. DOE's efforts are not designed to extend the life of these reactors, but rather to reduce the risks of operation until such time as the reactors can be shut down. Various safety improvements were made to Chornobyl, for example, during its period of continued operation prior to its recent shutdown on December 15, 2000.

The Task Force Methodology



The Task Force reviewed the DOE nonproliferation programs through a combination of Washington-based briefings and site visits in Russia. The Washington sessions consisted of extensive briefings by DOE program personnel, DOE managers, and specialists and managers from other agencies responsible for threat reduction and nonproliferation programs. The Task Force also received briefings from representatives of non-governmental organizations involved in developing and analyzing the programs, and from commercial entities that either are engaged in, or are planning projects in, the nonproliferation arena. Finally, the Task Force reviewed extensive written materials.⁷

The Task Force traveled to Russia in July 2000. After introductory meetings in Moscow, the Task Force divided into four subgroups and visited seven sites and met with 13 organizations, sampling a wide range of DOE's programs in action. One group visited facilities of MinAtom and the Academy of Sciences in and around the Moscow area. A second group visited Murmansk to see Russian Navy facilities, and then traveled to St. Petersburg to visit MinAtom and Russian Customs Service facilities. The third and fourth groups traveled to the South Urals, reviewing commercial development in Yekaterinburg before

dividing up. The third group went to Snezhinsk to review Nuclear Cities Initiative and Materials Protection, Control and Accounting projects, while the fourth traveled to Ozersk to visit the Mayak Production Facility.

Although it covered a great deal of ground in the one-week trip, the Task Force recognizes that the sites visited were only a limited part of the entire Russian nuclear weapons complex and were probably in better economic and physical condition than other MinAtom or Navy facilities. What the Task Force did see gave the members cause for grave concern about the overall condition of the Russian nuclear complex.

The Task Force was surprised and gratified by the excellent access and cooperation experienced during the July visit. Both MinAtom and the Russian Navy provided thorough briefings and access to all of the sites requested, in some cases showing the Task Force facilities that they had not expected to see. Based on this experience, the Task Force concluded that despite the fact that access to sensitive sites remains a problem in some contexts, the Russian Government has nevertheless opened its nuclear weapons complex to cooperation in a way that could not have been imagined during the Cold War.

7. Refer to Appendix G for a bibliography.



Why the United States?



Some may question why the U.S. Government, and DOE in particular, should help Russia in this undertaking. Quite simply, an unstable Russia—economically, politically or security-wise—is not in the national security interest of the United States. Some criticize U.S. investment in these joint nonproliferation programs, saying that Russia has not made a sufficient commitment to threat reduction. However, the Task Force observes that currently the Russians cannot accomplish these projects without U.S. assistance. Therefore, the availability of U.S. and DOE technical expertise and experience provide an historic opportunity to help Russia tackle the significant task of securing, safeguarding, and disposing of its nuclear complex.

The Task Force recognizes that the situation in Russia is not static. The Russian economy will probably see long-term improvement, especially if energy and other commodity prices remain high in the international market. Therefore, the U.S. Government needs to press Russia to assume additional responsibilities commensurate with its financial ability. In addition, any new nonproliferation projects that generate an income flow for Russia should include a requirement that a significant percentage of that income go toward threat reduction programs of mutual interest to the U.S. and Russia.

With any increase in funding for new or broadened programs comes additional requirements for greater transparency and access. The U.S. must make clear to Russia that, while we are mindful of security and sovereignty concerns and prepared to pursue flexible approaches,

both existing and expanded programs require measures to assure that U.S. taxpayer dollars are being spent as intended. Greater transparency will also contribute to improved security, a better understanding of the overall scope of the problem, a greater ability to discern potential solutions, and a strengthened capacity to measure progress.

The Russians have indicated that, in addition to seeking financial assistance from the U.S., they are interested in learning from U.S. experts. Minister of Atomic Energy Yevgeny Adamov informed the Task Force during its July visit that in shrinking the nuclear weapons complex, Russia needs technical assistance even more than financial assistance. The U.S. experts whose careers were spent designing and producing weapons of mass destruction and now are engaged in civilian fields have important perspectives to offer their Russian counterparts. Additionally, the need to secure, protect and dispose of weapons material continues to be a challenge in the U.S., so shared experience will provide mutual benefits.

Traditional arms control measures, such as negotiated treaties, are important but an insufficient response. New ideas and concepts, not traditionally associated with defense or security, are required to reduce these post-Cold War proliferation threats. The Nunn-Lugar legislation passed by Congress in 1991, and later augmented by Nunn-Lugar-Domenici, was enacted with these changed circumstances in mind. This legislation laid the foundation for innovative programs that create an environment in which the Departments of Defense, Energy and State could develop



cooperative relationships with Russia and the other former Soviet states.

Through 1999, Congress authorized some \$3 billion for these programs. The Clinton Administration's Expanded Threat Reduction Initiative (ETRI) proposes to spend \$4.5 billion more over the 2000-2004 timeframe. This is an insignificant amount of money compared to U.S. spending on nuclear weapons during the Cold War. It is estimated that from 1940 to 1996, the U.S. spent more than \$5.8 trillion (in constant 1996 dollars) on its nuclear weapons program.⁸ For FY 2001, the Defense Department plans to spend roughly \$7.3 billion, more than a 25 percent increase from the previous year, to defend and counter the worldwide proliferation threat posed by weapons of mass destruction.⁹ For a small fraction of that sum, DOE and other U.S.

Government agencies are working to eliminate crucial elements of the global proliferation threat. Accelerating this process to secure all attractive systems and weapons-usable material is a worthy and important goal.

The best defenses against a nuclear, chemical or biological weapons attack on U.S. territory are to control the supply and to prevent terrorists from gaining access to the material needed to create such weapons. Since the dissolution of the Soviet Union a decade ago, the most likely place to acquire such material is in the countries of the former Soviet Union. With the expertise required to make at least a crude nuclear bomb now widely available, it is critical that these materials be secured, neutralized, or eliminated.

8. Schwartz, Stephen, (ed.) "Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons Since 1940." Washington, D.C., 1998.

9. "Report on Activities and Programs for Countering Proliferation and NBC Terrorism," April 2000.

DOE is One Part of the Picture



Critical to the success of the U.S. programs is coordination among the Departments of Energy, Defense, State, Commerce and others. These programs are implemented in accordance with presidential guidance—overseen by the National Security Council—and cover a wide spectrum of issues, many of which fall outside this Task Force’s mandate.¹⁰

The Department of Defense plays a significant part in the cooperative threat reduction effort, funding a range of efforts from dismantling weapons of mass destruction delivery systems (missiles, bombers, and submarines) to securing actual nuclear weapons. The Department of State has a lead role in key negotiations such as the Plutonium Disposition Agreement. It also manages

several programs such as the International Science and Technology Center (ISTC) Program, which addresses brain drain problems in Russia and several countries of the former Soviet Union.¹¹

The Department of Energy focuses on working with Russia to secure, monitor and reduce nuclear material stockpiles, ensure nuclear safety, reduce the size of the Russian weapons complex, and redirect weapons experts to civilian pursuits. Its key role in the nonproliferation effort flows from the fact that DOE and its laboratories are repositories of technical expertise and experience in managing nuclear weapons-usable materials.

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10. Refer to Appendix D for a simple overview of the U.S. Government’s nonproliferation program in Russia. For a more complete overview of the U.S. Government’s security assistance programs, see the Department of State report “U.S. Government Assistance to and Cooperative Activities with the New Independent States of the Former Soviet Union,” prepared by the Office of the Coordinator of U.S. Assistance to the NIS, January 2000.
 11. The ISTC operates in Russia, Kazakhstan, Uzbekistan, Armenia and several other countries. The Science and Technology Center of Ukraine (STCU), also under Department of State management, carries out the identical function for Ukraine.



Department of Energy Programs



Material Protection, Control and Accounting Program

The Material Protection, Control and Accounting (MPC&A) Program is one of the most mature of the U.S.

Government threat reduction programs. Its purpose is to reduce rapidly the threat posed by unsecured Russian nuclear weapons-usable material. This program provides Russian nuclear facilities with modern safeguards, material accounting and physical protection systems; training for nuclear personnel in proper MPC&A techniques; assistance in developing a comprehensive and enduring regulatory basis for nuclear material security in Russia; and assistance in improving the physical protection of nuclear weapons-usable materials in transit.

Even though the MPC&A Program was a primary focus of the Nunn-Lugar initiative, the sensitive issue of secrecy in the weapons complex initially prevented the development of a large-scale cooperative effort. That barrier was not overcome until 1994, when the Russians stopped objecting to cooperative work at sites actually handling plutonium or HEU. A laboratory-to-laboratory initiative was then established to complement the collaborative government work and both efforts moved forward. Initial funding came primarily from the Department of Defense, with MPC&A being fully transferred to DOE in FY 1996. The budget for MPC&A reached \$136 million in FY 1999 and \$145 million in FY 2000. Funding for this program grew to \$173 million in FY 2001.

The MPC&A Program focuses on enhancing the security of materials at current locations, transferring material

from insecure sites, and consolidating that material at sites where enhanced security systems are in place. Initially, MPC&A may apply what are known as 'rapid upgrades,' which provide an immediate increase in security and may include placing bricks in front of windows or installing portal monitors. Comprehensive long-term upgrades are implemented once rapid upgrades are completed. Security improvements have begun for approximately 80 percent of the current estimate of the Russian stockpile of nuclear weapons-usable material not contained in nuclear weapons.

While the security of hundreds of tons of Russian material has been improved under the MPC&A Program, comprehensive security upgrades have covered only a modest fraction of the weapons-usable material. There is no program yet in place to provide the incentives, resources, and organizational arrangements for Russia to sustain high levels of security. In addition, disputes between the U.S. and Russia over access continue to stymie work at some sites with large quantities of material and undermine the broader atmosphere of cooperation. Also, a comprehensive testing and assessment program to ensure that the upgrades have been fully effective still awaits implementation.

Highly Enriched Uranium

Like the MPC&A Program, the Highly Enriched Uranium (HEU) Purchase Agreement is a mature program. The agreement, which authorizes the contract mechanism between the U.S. Enrichment Corporation (USEC) and the Russian Technobexport, was signed during the Moscow Summit of January



1994. It authorizes the U.S. purchase of 500 metric tons of HEU to be removed from former Soviet nuclear weapons and converted to low enriched uranium (LEU) suitable for commercial fuel. At the time of the agreement, its total estimated value was \$12 billion over 20 years. The agreement describes transparency measures that will be implemented to provide the necessary assurances that the U.S. Government's nuclear nonproliferation objectives are being fulfilled. The agreement specifies that the HEU is to be derived from dismantled nuclear weapons; that this same HEU material is to be processed and converted into LEU for delivery to USEC; and that this LEU is to be used to fabricate fuel elements for commercial power reactors. To date, more than 110 metric tons of HEU have been downblended, in accordance with the agreement, and the resultant LEU has been delivered to the international market.¹²

The HEU agreement represents a challenge to the worldwide nuclear fuel market because it brings to market material representing 15 percent of world demand. Tensions between the commercial interests of entities in the nuclear fuel market, and the international security interest in rendering this fissile material impotent as rapidly as practicable, are inevitable.

MinAtom Minister Adamov told the Task Force in July 2000 that Russia sees the HEU Purchase Agreement as an

important and successful "swords into ploughshares project." The HEU agreement provides a financial incentive to dismantle thousands of nuclear warheads, renders the material in those warheads impotent, provides a valuable commercial product to the U.S., and provides hundreds of millions of dollars per year to Russia. These funds can be used to maintain thousands of non-weapons-related jobs for workers, who might otherwise be tempted to sell their expertise, and to provide a source of Russian funding for conversion and cleanup of its vast nuclear complex.

It is the Task Force's judgment, however, that this program still suffers from four key problems. First, the pace of implementation is unstable. Deliveries of LEU have been interrupted for months at a time. Second, the program, even when not interrupted, is too slow and the annual 30 metric tons currently being downblended represent only one-fortieth of the Russian HEU stockpile. The program now utilizes only about half of the estimated blending capacity of Russian facilities. Third, the 500 metric tons under the agreement represents less than half of Russia's total HEU stockpile and was agreed upon long before the recent Russian decision to reduce drastically its nuclear forces. Finally, transparency measures for the program require a greater level of joint technical cooperation to ensure full implementation. Renewed efforts to address these issues, including extending

12. The agreement continues through 2013, by which time the 500 metric tons of HEU that is expected to have been downblended will total the amount of material that would have been found in 25,000 warheads.



the program beyond 500 metric tons, are critical.

Russian Plutonium Disposition Program

The mission of the Russian Plutonium Disposition Program is to reduce the inventory of surplus Russian weapons-usable plutonium in step with the U.S. plutonium disposition program. Since the end of the Cold War, significant quantities of plutonium have become surplus to defense needs, both in the United States and in Russia. Continued implementation of arms reduction agreements is expected to produce further weapons dismantlement and may increase stockpiles of these weapons-usable materials. These materials will continue to pose a security threat as long as they remain in forms that are usable directly in nuclear weapons.

The Russian Plutonium Disposition Program has only recently moved beyond joint technical studies to preparation for a large-scale program to reduce plutonium stockpiles. A framework agreement establishing U.S. and Russian commitments to dispose of 34 metric tons of excess weapons plutonium was signed in September 2000.¹³ The agreement provides a timeline for the design and construction of industrial-scale facilities to convert excess weapons plutonium to oxide, fabricate mixed oxide fuel, and carry out

other functions under the program, including monitoring and inspections.

In July 1998, the United States and Russia signed a Scientific and Technical Cooperation Agreement¹⁴ to conduct tests and demonstrations of proposed plutonium disposition technologies. In FY 1999 the U.S. Congress appropriated \$200 million for the program. An additional \$200 million is being requested from Congress in FY 2000-2004. It is estimated, however, that approximately \$2.1 billion will be required to dispose of this initial 34 metric tons of Russian plutonium, considerably more than current funding levels. Accordingly, the U.S. Government has made a commitment to seek the international financing needed to support plutonium disposition in Russia and to implement plutonium disposition activities in accordance with the bilateral agreement.

The U.S. and Russia are working together to develop disposition methods and technologies that are cost effective and environmentally sound. Further, the U.S. and Russia have developed a plutonium disposition roadmap—or logic flow—and an associated nominal schedule for Russian plutonium disposition. The two countries have a different view of the economic value of plutonium, however, and this has precluded a commercial arrangement similar to the HEU Purchase Agreement.

13. "Agreement between the Government of the United States of America and the Government of the Russia Federation Concerning the Management and Disposition of Plutonium Designated as no Longer Required for Defense Purposes, and Related Cooperation," September 1, 2000.

14. "Agreement between the Government of the United States of America and the Government of the Russia Federation on Scientific and Technical Cooperation in the Management of Plutonium That Has Been Withdrawn From Nuclear Military Programs," July 24, 1998.



In the opinion of the Task Force, the Russian Plutonium Disposition Program suffers from uncertainty regarding financing and the reactor capacity needed to burn the material at the same disposition rate as the U.S. program can achieve. It also lacks a well-established security regime to ensure that the program is carried out without creating new proliferation threats.

Second Line of Defense Program

The Second Line of Defense (SLD) Program, initiated in 1998, is one of the youngest and most modest of the programs related to nuclear materials. Like MPC&A, which is the 'first line of defense,' the SLD Program has established an effective working relationship with its Russian partner, the Russian Federation Customs Service.

The SLD Program is the first U.S.-Russian cooperative program to combat illicit trafficking of nuclear material and nuclear-related equipment across Russia's borders. It reinforces and enhances other U.S. Government programs, operated by the Defense Department, the Customs Service, the Federal Bureau of Investigation, the Department of State, and other agencies. The Department of Defense, for example, focuses on strengthening border controls among the now independent former Soviet countries. The SLD Program aims to reduce the threat of nuclear proliferation and terrorism through cooperative efforts with the Russian Government to strengthen its overall capacity to detect and deter illicit trafficking in nuclear materials at its borders. Nuclear

weapons and the materials needed for their manufacture give off detectable emissions that are hard to conceal or disguise. Passive, non-intrusive monitors can detect the presence of these materials, allowing for innovative, technical solutions adaptable to the challenge of stolen materials.

The SLD Program equips select strategic border crossings and ports of entry with radiation detection equipment facilitating detection, deterrence, and interdiction of smuggling of nuclear material. The program seeks to further minimize the risk of illicit trafficking by deploying radiation detection equipment, establishing search and identification equipment and procedures, and developing response procedures and capabilities to deter future trafficking in nuclear materials.

In the Task Force's judgment, the SLD Program is moving forward too slowly and would benefit from a stable budget. In FY 2000 funding was limited to \$6 million. DOE funding was \$1 million, which was augmented by carryover funds from FY 1999, and an additional \$5 million was provided from the Department of State's Nonproliferation and Disarmament Fund. Additional funds are desirable to support enhanced efforts to fully equip the most strategic Russian border crossings and to provide for a more comprehensive training program.

Initiatives for Proliferation Prevention Program

The Initiatives for Proliferation Prevention (IPP) Program has been in place since 1994 with a goal of bringing U.S. and Russian laboratory scientists



and the U.S. private sector together to move technologies from concepts to sustainable businesses. Dramatic budget reductions at scientific institutes employing weapons scientists and the lack of meaningful alternative employment present a significant proliferation threat. Evidence indicates that nations of concern with active weapons acquisition programs have already solicited technical expertise from the scientists at these facilities. In its work to respond to this threat, the IPP Program complements the Nuclear Cities Initiative, the International Science and Technology Center (ISTC) Program, and the Civilian Research and Development Foundation.¹⁵ The IPP Program seeks to reduce the risk of the proliferation of weapons of mass destruction expertise by identifying and developing sustainable, non-weapons-related work for these scientists, engineers, and technicians to prevent brain drain.

The IPP Program pairs scientists from DOE's national laboratories with their counterparts in Russia to develop projects with commercial potential. Inter-laboratory teams review proposed projects to ensure technical viability and, along with specialists from a variety of U.S. Government agencies, to ensure that they do not contribute to foreign military capabilities. The IPP Program uses a number of measures to ensure accountability of its project funds. IPP projects are performed under firm, fixed-price subcontracts from DOE's national laboratories. Payment is made only

when a deliverable under the subcontract is completed.

The IPP Program has improved its performance in recent years. Following years of inconsistent funding, Congress appropriated \$22.5 million in FY 1999.¹⁶ An increasing number of projects are moving toward full commercialization, where U.S. Government funding will no longer be required. The number of actual weapons experts sustainably re-employed in commercial jobs, however, remains difficult to document. In the Task Force's judgment, it is important to recognize that funding for high-tech research and development, as IPP provides, can be only one element of a successful overall effort to redirect Russia's excess nuclear weapons expertise.

Nuclear Cities Initiative

The Nuclear Cities Initiative (NCI) was established by Secretary Richardson and MinAtom Minister Adamov with the signature of a Government-to-Government Agreement in September 1998. It is both a new way of addressing the problem of brain drain and an effort to work with Russia to shrink the size of the massive Russian nuclear weapons complex.

NCI's goals are two-fold: to assist Russia in its announced intention to reduce the size of its nuclear weapons complex; and to promote nonproliferation goals through redirecting the work of nuclear weapons scientists, engineers, and technicians in the closed nuclear cities to

15. U.S. Government contributions to the latter two programs are managed by the State Department.

16. In FY 2001 the budget grew to \$24.5 million.



alternative, non-military scientific or commercial activities. Unlike the older programs such as IPP and ISTC, which focus on scientists still at work in weapons complex laboratories and facilities, NCI focuses on providing assistance to scientists as they lose their jobs in those very laboratories and facilities. The Russian Government has undertaken a massive downsizing and restructuring of the weapons complex, and requested, through NCI, the advice and assistance of the U.S. to accelerate this effort.

In FY 2000, Congress cut NCI's \$15 million budget in half, asking DOE to demonstrate results before providing additional funding. In response, the program concentrated on concrete efforts in the focus cities of Sarov, Snezhinsk and Zheleznogorsk. In Sarov, for example, a detailed strategic plan was developed that included an Open Computing Center to foster software development work, and a manufacturing park in a section of the Avangard nuclear weapons plant newly opened for conversion and commercial development. This innovative project has facilitated the first cooperative efforts with foreign companies inside a former Russian weapons production facility and promises to accelerate the planned shutdown of weapons assembly and disassembly activities at the plant.

To carry out NCI in the closed cities, DOE has reached out to a number of U.S. Government programs and non-governmental organizations with experience in community building. These include the U.S. Agency for International Development, Department of State, Department of Commerce, W.

Alton Jones Foundation, Soros Foundation, and others. NCI has also worked with the European Bank for Reconstruction and Development (EBRD) to bring a small business loan program to the nuclear cities.

NCI works in partnership with MinAtom, its institutes, and western companies to create opportunities for short-term contract employment and to create the municipal and telecommunications infrastructure necessary to attract and establish longer-term business opportunities. U.S.-Russian laboratory teams continue to develop strategic plans for the three focus cities. These strategic plans define the challenges faced in downsizing, outline infrastructure needs, prioritize potential projects, and identify solutions to be implemented in the near term.

In its second full year of operation, NCI now has moved from planning to implementation. Although measurable results have been modest thus far, it has established contacts and working relationships designed to foster the viable business environment needed to attract and sustain non-military investment in the initial three focus cities. It is a challenge of unprecedented proportions. Multilateral cooperation will continue to be encouraged, and a larger investment by the Russian Government is required. Over the long term, NCI envisions a transition to private commercial investment and Russian Government funding. In the meantime, careful attention should be given to defining criteria for success and developing an exit strategy for this program. Congress has stipulated that \$10 million of the FY 2001 budget may not be spent until



DOE and MinAtom reach an agreement documenting MinAtom's commitment to close some of its nuclear weapons facilities. NCI plans to continue the work begun in the initial three cities and, depending upon the availability of resources and approval from Congress, to expand to all ten closed Russian nuclear cities.

Nuclear Safety Cooperation

The International Nuclear Safety Program predates the breakup of the Soviet Union. The Chernobyl accident in 1986 focused international attention on the safety of Soviet-designed nuclear reactors in the Soviet Union and Eastern Europe. In the early 1990s, U.S., European and Japanese specialists began to search for ways to enhance the safety of these reactors for the remainder of their operational life. It is in the international community's interest that the reactors be operated in the safest manner possible.

The International Nuclear Safety Program assists with the implementation of self-sustaining nuclear safety programs, consistent with international norms. DOE seeks to bolster Russia's responsibility for addressing safety issues, preventing accidents, and increasing Russian national funding for safety programs. DOE's program provides a modest investment in critical technologies that are urgently required to assure the safety of these nuclear power plants. Program activities provide

opportunities not only for U.S. industry to contribute significantly to nuclear safety and nonproliferation efforts but also to engage in the economy of Russia and subsequent business ventures. A series of joint projects between the U.S. and Russian International Nuclear Safety Centers will be completed to assist other countries operating Soviet-designed reactors to develop and implement self-sustaining nuclear safety infrastructure and improvement programs capable of implementing internationally accepted safety practices. To improve the safety of Soviet-designed nuclear power plants, a series of specific safety upgrade projects will be completed at these plants.

This program has been successful in improving the safety of many Soviet-designed reactors. Various safety improvements were made to Chernobyl, for example, during its period of continued operation prior to its recent shutdown on December 15, 2000. There has been little progress, however, in convincing Russia to shut down its oldest and most unsafe reactors. Indeed, the Russian Government is actively considering extending the life of these reactors. There remain important questions concerning what fraction of the safety problem has been successfully addressed, what more needs to be done, and whether efforts to help Russia develop a long-term safety culture and regulatory system will be successful.



Task Force Assessment



The Task Force's work produced a set of six major observations that underpin this report's conclusions and recommendations. These observations relate to both DOE implementation of the programs examined by the Task Force and the broader issues of how the Executive Branch of the U.S. Government approaches the threat of proliferation and how the Russian Government responds to this threat.

Need for National Security Program and Strategic Plan

The Task Force starts with the view that the most serious unmet security problem for our country today is the threat of weapons of mass destruction, weapons material and the know-how to create those weapons and materials escaping from Russia into the hands of terrorists or national regimes inimical to the U.S. The Task Force believes the U.S. Government response to this threat would be considerably improved by **development of an enhanced program that includes clearly defined goals, a measured use of resources, and appropriate exit strategies.** A key part of the recommended program is the formulation of a strategic plan to secure and/or neutralize all nuclear weapons-usable material located in Russia and to prevent the outflow from Russia of scientific expertise that could be used for nuclear or other weapons of mass destruction.

This enhanced national security program should begin with a risk assessment based on information and analyses from all relevant U.S. Government agencies. Once completed, DOE management should define criteria for success for each nonproliferation program against this

risk assessment. The Task Force recognizes the value of Russian input into such a risk assessment but recognizes that concerns about secrecy and security in both governments could prevent a good exchange of information. In this regard, the Task Force stresses that while the DOE, and the U.S. Government as a whole, should strive for a complete risk assessment, uncertainty about the full scope of the threat should not inhibit forward movement in these nonproliferation programs. These programs are having an impact on the problem of weapons of mass destruction and material security and should be pursued aggressively.

Furthermore, the Task Force recognizes that by accumulating practical experience in improving nuclear security in Russia, the programs are developing a greater understanding of the scope of the problem and better measurements of accomplishment. This successful confidence building has led to Russia's willingness to provide access to more facilities.

The program should grow in scope and precision as more is learned and, importantly, as the situation changes in Russia. Even carefully defined exit strategies may be revised and adjusted as developments occur. Improvements in the Russian economy, for example, may enable Russia to increase its financial contributions to these programs, affecting the duration of direct U.S. involvement. If the strategic plan is conceived in full cooperation with the Russian Federation, is adequately financed, and is implemented as part of a growing and transparent partnership, the Task Force believes that Russia should be ready to take over any remaining work at



the end of an eight to ten year period. If the Russian Government is not prepared for such a partnership, then full success will not be achievable.

Need for Increased Funding

The Task Force found that existing DOE nonproliferation programs are an important investment in U.S. national security at a time when that security is at risk from the threat of illicit and uncontrolled use of nuclear and other weapons of mass destruction. Currently, annual U.S. spending on controlling and securing nuclear weapons material in Russia totals approximately \$706 million¹⁷—a mere fraction of the \$5.8 trillion spent during the Cold War to build and maintain the U.S. nuclear arsenal. The Task Force believes that because of their importance to U.S. national security, **the funding levels for these programs should significantly increase.**

Current funding levels are not sufficient to meet the challenge. New resources for the various programs, however, must be modulated consistent with the program's ability to absorb the funds. Programs such as MPC&A are well established and have embarked on new tasks, such as material consolidation work with the Russian Navy and MinAtom. The MPC&A Program, therefore, is in a good position to receive additional funding commensurate with its expanding scope.

By contrast, newer programs such as the Nuclear Cities Initiative, which just completed its first full year of activities, are still developing a mutually acceptable

agenda and strategy. Despite NCI's notable successes, such as the opening of a civilian manufacturing park at the Avangard nuclear weapons plant in Sarov, it would be difficult for NCI to absorb significant amounts of new funding at this time. As the program matures and new projects are proposed with Russian concurrence, judicious funding increases would be in order.

The importance of achieving a close, consensual working relationship with the Russians should not be underestimated. The United States and the Soviet Union created nuclear weapons of mass destruction; now the U.S. and Russia must cooperate to dismantle them. The Russians recognize that the threat of illicit or uncontrolled use of nuclear or other weapons of mass destruction is as great to Russia as it is to the United States.

Russia's cooperation provides a significant and positive factor in these programs, with Russian resources beginning to play an increasing role in financing them. For example, MinAtom Minister Adamov told the Task Force during the visit to Moscow that his Ministry is devoting an increasing share of proceeds from the HEU agreement to nonproliferation and threat reduction projects, such as nuclear submarine dismantlement and nuclear complex downsizing. The Task Force views this as a positive trend and urges that it continue. As the Russian economy improves, the Task Force believes that an increasing share of resources for these programs should come from Russia.

17. Please refer to Appendix E for a breakdown of the percentages of this funding by agency.



Likewise, the Task Force saw a need for more interest and investment in these programs on the part of the international community. Japan, Norway, the United Kingdom and the European Community as a whole have devoted resources and attention to the programs and have been particularly effective at addressing problems related to the nuclear submarine and icebreaker fleets. The international community's work to address the waste problems associated with these platforms, as well as their early work on submarine dismantlement, has been positive. An increase in the resources devoted to all of these programs by other international partners, however, is very important. For the success of the Russian Plutonium Disposition Program, it is absolutely vital.

The Task Force perceives a growing interest from both the international community and private donor organizations in becoming more involved in threat reduction and nonproliferation work in Russia. As the case of nuclear submarine dismantlement has demonstrated, many of the problems are so complex and expensive that multilateral cooperation is essential. Other governments and private organizations should look beyond the existing agenda of cooperation to emerging areas in need of development.

Need to Accelerate Pace

The Task Force believes each DOE program should look for ways to **accelerate the pace of cooperation** as it plans its priorities, goals, and targets. The Plutonium Disposition Program,

for example, is currently planning the construction of fabrication facilities for converting excess Russian weapons plutonium to mixed oxide fuel (MOX), but it will be seven years before these facilities are completed. Likewise, according to the Director of the laboratory at Snezhinsk, at the MPC&A Program's current pace, it would take up to sixty years to improve the security of all the materials at risk at his facilities.

An increase in funding, along with a well-developed overall strategic plan, will enable these programs to accelerate. The programs, however, also need to take better advantage of positive trends already underway. For example, when the Snezhinsk Director complained about the pace of MPC&A work, he offered consolidation of materials as a way to both accelerate the pace and cut back on the overall expenses. If materials are consolidated in a central storage facility, fewer buildings will require physical upgrades, thus helping to husband the MPC&A Program resources. This idea complements the MPC&A Program priority of consolidation and would greatly expedite the completion of upgrades to the security of material at Snezhinsk.

Similarly, the involvement of foreign partners in the Plutonium Disposition Program will greatly accelerate its pace, not only because of the potential funds involved but also because the involvement of additional foreign partners may offer the availability of more commercial reactors in which to burn MOX fuel. The U.S. and Russia have already approached other countries to support the program in this regard



and the Task Force applauds and encourages these efforts.

Need to Improve Transparency and Access

Despite progress in U.S.-Russian cooperation, the Task Force found that problems have developed in implementation, particularly regarding **transparency and access**. Transparency for program management purposes is important not only for the United States, but also for Russia, for it enables the two sides to ensure the quality of the work performed and sustainability of program results. Transparency is also important to comprehending the full scope of the problem. Both countries would benefit from knowing that there is not a “bottomless bucket” of work and expenditures, but instead a program positioned for completion on a manageable time scale and consistent with planned costs.

The transparency and access problems are uneven. As noted above, the Task Force experienced excellent access during its visit to Russia, including access to all the facilities that it had requested and even to additional facilities it did not request. Individual programs have also had important successes in transparency and access. For example, the Nuclear Cities Initiative’s civilian manufacturing park at the Avangard warhead production facility in Sarov will enable foreigners to enter the plant to start up non-defense businesses and production facilities. During his visit to Russia in August 2000 Secretary Richardson became the first high-level foreigner to enter the facility.

At the same time, the Task Force heard from many government and non-government program participants who experienced frustrating and often incomprehensible access problems during the course of doing business. For example, the team implementing transparency measures for the HEU agreement experienced repeated barriers to its efforts to adjust monitoring equipment at the Urals Electrochemical Plant, one of the main facilities blending down HEU to LEU. Only after months of negotiating, including at a high level, was the team allowed to visit the plant in order to make the necessary adjustments.

The nuclear weapons complex in each country is still a highly secret place but both countries recognize that high-level interlocutors cannot routinely be involved in the details of obtaining adequate access if a program is to be successful. The Russians have pointed out, however, that transparency and access matters are still far from routine in the Russian bureaucracy. The security services, who continue to be responsible for maintaining the secrecy and security of the complex, take their job very seriously. There are no procedures for foreigners to have routine access to weapons complex facilities, and individual requests are often treated as unique and burdensome. The result is often delay or denied access, which requires high-level intervention and often serves to interrupt a long-planned implementation trip.

Russian program managers have called for a high-level Russian Government decision establishing procedures to address the current necessity of routine transparency in and access to the nuclear



weapons complex for legitimate foreign participants in these programs. Some have suggested that President Putin himself, given his former ties to the security services, will have to engage in order to resolve the issue. A decision at this level may be necessary.

The Task Force observes that direct physical access to the facilities might not always be necessary. For highly secret facilities, for example, the correct installation of security measures such as fences and closed circuit TV cameras might be confirmed by other means such as still and video photography using sealed and tamper-proof cameras. For large construction projects such as the central storage facilities in the Northern and Far Eastern naval fleets, overhead photography could be a viable option. As the Russians develop more routine procedures for direct access to facilities, such methods should also be developed as legitimate means of providing transparency.

Need to Improve Coordination and Support

At several levels, the Task Force observed that DOE programs need **improved government-wide coordination and support** for successful long-term implementation. In particular, the urgent risk of proliferation of weapons of mass destruction demands the attention of the highest level of the U.S.

Government. The advent of a new Administration provides an opportunity for enhanced focus on this issue in the White House.

Coordination within and among U.S. Government agencies is insufficient and must be improved. Although the Task

Force focused on the DOE nonproliferation programs, the members heard from many interlocutors that the programs would be improved, as would the counterpart programs in other agencies, if there were more coordination at all levels among all the U.S.

Government programs. There is clearly a benefit to greater synergies among agency programs. For example, DOE and DOD have begun planning for possible work on dismantling Russian general-purpose nuclear submarines. Should such a program get underway, DOD could be responsible for handling removal of the reactor core while DOE could take responsibility for disposition of the submarine nuclear fuel—missions that take advantage of the relative expertise in each agency.

The Task Force heard that even within DOE more effective cooperation would be beneficial, both for the nonproliferation programs and for other DOE missions. For example, effective technologies for nuclear waste cleanup and remediation are being developed under DOE nonproliferation programs such as the Nuclear Cities Initiative. Such technologies could also benefit cleanup efforts within the U.S. nuclear weapons complex but thus far links between NCI and other DOE programs have not yet been widely developed. Cooperation should be encouraged in all areas where appropriate.

The Task Force believes a high-level position in the White House is needed to coordinate policy and budget for threat reduction and nonproliferation programs across the U.S. Government. The Task Force discussed several models for such a position, including having an experienced senior person brought in as



a Senior Director of the National Security Council and Special Advisor to the President, reporting through the National Security Advisor to the President. Alternatively, this individual might report directly to the President as a high-level policy 'czar', or to the Vice President, who would assume direct responsibility for the programs on behalf of the President. The Task Force offers no opinion on the preferred approach, but underscores the importance of early attention to this issue in the new Administration.

Beyond the need for high-level coordination, the Task Force observed impediments to DOE program implementation that should be addressed on an urgent basis. Many of these seem to revolve around restrictions on international travel stemming from both DOE internal regulations and procedures in other U.S. government agencies. These restrictions appear to have created unnecessary paperwork and bureaucratic impediments. They hinder DOE's ability to supervise work in the nonproliferation programs, maintain the pace of projects, and ensure that funds are used appropriately.

Need for Public Outreach and Education

Finally, the Task Force observed the need for **outreach to the Congress and the**

general public as well as the need for public education. The Task Force found the public generally unaware of the magnitude and importance of this threat. As nonproliferation problems are technically obscure, this outreach and education is even more critical. High-level attention to the problem, and particularly attention from the President, will go a long way toward raising Congressional and public awareness. Improved coordination in the Executive Branch will also enable a more coherent message to be developed and disseminated to Congress and the public. There is also a need, on an interagency basis, to press other countries not only to seek their financial support, as mentioned above, but also to help make the case for support.

Based on these observations, the Task Force offers three principal conclusions and a set of recommendations concerning the future of DOE's nonproliferation programs. The conclusions and the recommendations are set forth in the next chapter.

Conclusions and Recommendations



The Task Force spent nine months carefully examining the dangers of proliferation posed by the former Soviet nuclear arsenal. It has undertaken a careful review of current DOE programs and considered related nonproliferation policies and programs of the U.S. Government. As a result of this review, the Task Force has reached the following conclusions and recommendations.

Conclusions

- **The most urgent unmet national security threat to the United States today is the danger that weapons of mass destruction or weapons-usable material in Russia could be stolen and sold to terrorists or hostile nation states and used against American troops abroad or citizens at home.**

This threat is a clear and present danger to the international community as well as to American lives and liberties.

- **Current nonproliferation programs in the Department of Energy, the Department of Defense, and related agencies have achieved impressive results thus far, but their limited mandate and funding fall short of what is required to address adequately the threat.**

The Task Force applauds and commends Secretary Richardson, his predecessors and colleagues for their dedication, commitment, and hard work in seeking to address this issue. The cooperation of the Russian Federation has also been a critical and significant factor in the work carried out to date. But the Task Force con-

cludes that the current budget levels are inadequate and the current management of the U.S. Government's response is too diffuse. The Task Force believes that the existing scope and management of the U.S. programs addressing this threat leave an unacceptable risk of failure and the potential for catastrophic consequences.

- **The new President and leaders of the 107th Congress face the urgent national security challenge of devising an enhanced response proportionate to the threat.**

The enhanced response should include: a net assessment of the threat; a clear achievable mission statement; the development of a strategy with specific goals and measurable objectives; a more centralized command of the financial and human resources required to do the job; and an identification of criteria for measuring the benefits for Russia, the United States, and the entire world.

Recommendations

The new President, in consultation with Congress and in cooperation with the Russian Federation, should quickly:

- **Formulate a strategic plan** to secure and/or neutralize in the next eight to ten years all nuclear weapons-usable material located in Russia and to prevent the outflow from Russia of scientific expertise that could be used for nuclear or other weapons of mass destruction;



- **Identify specific goals and measurable objectives** within the strategic plan and associated budgets for each program, as well as provide criteria for success and an exit strategy;
- **Accelerate the pace and increase funding** for specific programs in coordination with the strategic plan;
- Reach agreement with the Russian Federation at the highest level on **acceptable measures for transparency and access**;
- Improve coordination within the U.S. Government by establishing a **high-level leadership position in the White House**; and
- **Focus public and congressional attention** on this critical issue.

The Task Force emphasizes that Russian consultation and collaboration will be key to success in accomplishing these goals.

Proposed Strategic Plan to Accomplish the Task

The major Task Force recommendation to the President and Congress is to **formulate a strategic plan to secure and/or neutralize in the next eight to ten years all nuclear weapons-usable material located in Russia and to prevent the outflow from Russia of scientific expertise that could be used for nuclear or other weapons of mass destruction.** Recognizing that the President will wish to examine many options, this report outlines a proposed strategic plan with goals and measurable objectives to eliminate the danger of

inadequate controls over weapons of mass destruction and weapons usable materials. The Task Force recognizes that the quantities of excess weapons-usable material in Russia are so large that they cannot be completely eliminated even within an eight to ten year period. This is especially true of the plutonium stockpile, elimination of which is directly linked to the progress of U.S. efforts to eliminate its own excess plutonium. This proposed plan is designed to bring all the material under effective control, to reduce drastically the threat posed by such materials, and to reach a position where Russia can take over any remaining work at the end of the eight to ten year period. Consultation and collaboration with Russia will be critical to success. The proposed strategic plan follows.

1. Secure Russian nuclear weapons and material by:

- drastically shrinking the number of buildings where such material is held and consolidating material to secure central storage facilities;
- accelerating security and accounting upgrades for the remaining buildings in use;
- assisting the Russians as they identify, tag, and seal all their warheads and materials to facilitate development of a reliable list of where everything is located, and subsequently following up with the more complex job of measuring all of the material;



-
- developing a high-intensity plan to return HEU from Soviet-built research reactors, primarily in Eastern Europe, to Russia for downblending and disposition; and
 - developing a plan, after a joint U.S.-Russian examination of the extent of the threat, to be implemented by DOE and DOD, to minimize potential proliferation threats posed by decommissioned Russian general-purpose submarines and their fuel.
2. Eliminate excess Russian HEU by:
- demilitarizing all remaining excess Russian HEU through a program of U.S. investment in expanded capacity for downblending in Russia. The resultant LEU, which would not be nuclear weapons usable, could remain in Russia but would be sold onto international markets only with consent of both the United States and Russia.
 - accelerating purchase of the approximately 400 metric tons of HEU remaining to be downblended under the current HEU agreement, while ensuring that the material not flood or depress the world market. This could require the Russian or the U.S. Government to hold the material for an indefinite period of time.
- These two major steps would be augmented if agreements are reached on:
- the total size of the existing Russian stockpile, after an appropriate audit (fashioned on DOE's ongoing audit of past U.S. HEU production and current stockpiles); and
 - the degree of transparency needed to assure that no additional HEU is being produced.
3. Manage excess Russian plutonium, accelerating existing disposition commitments and emphasizing safe and secure storage, by:
- storing up to 50 metric tons of plutonium at Mayak, depending on progress on the nuclear storage facility now under construction with U.S. assistance (the first wing is scheduled to open in 2002);
 - storing the additional material not contained in weapons in either additional wings to be constructed at Mayak or in other highly secure sites (such as facilities fashioned from the empty concrete rooms at Krasnoyarsk-26); and/or
 - eliminating up to 100 metric tons of Russian plutonium by blending fuel as mixed oxide fuel and burning it in civilian reactors or immobilizing it with high-level waste, as the U.S. and Russia have agreed for an initial 34 metric tons. A "swap" of excess military plutonium with Western European countries, in exchange for civilian plutonium already being burned as mixed oxide fuel in these countries,



would accelerate this process. Alternatively, the U.S. could purchase excess plutonium from Russia, with the U.S. either storing the plutonium or paying for it to be immobilized as waste.

In addition, the United States and Russia should reinvigorate their efforts to:

- halt additional plutonium production in a verifiable manner; and
 - inventory the total stockpile (similar to the U.S. inventory completed by DOE some years ago).
4. Downsize the nuclear complex, building on existing Russian plans and accomplishments, by:
- facilitating Russian efforts to accelerate the shutdown of its weapons assembly, component fabrication, and materials production facilities, ensuring that the highest-value targets for cooperation are identified;
 - funding “contract research” using existing DOE research and development funds aimed at spurring new technologies for use in cleaning up the U.S. weapons complex. For example, Russian nuclear scientists could be funded to develop efficient, low-cost environmental technologies;
 - working with Russia to ensure nuclear weapons scientists and workers are provided financial

incentives for early retirement from the weapons complex;

- overhauling foreign and domestic lending practices to new businesses in the nuclear cities, seeking ways to extend credit at rates below the Russian market rate to promising small businesses employing former weapons specialists; and
 - enhancing communication between the municipalities and the weapons institutes or facilities that are co-located with them in order to increase efficiency in the expenditure of resources.
5. Plan for Russian financing of sustainable security by:
- seeking specific commitments from Russia to fund adequate levels of security and accounting for its nuclear material and maintenance of a slimmed-down nuclear complex;
 - exploring, in consultation with Russian officials, an array of concepts for developing new revenue streams for financing nuclear security projects in an accountable and transparent manner; and
 - developing a detailed agenda for the transition, which includes identifying specific goals.

The Task Force believes it is quite feasible for the Russian Federation and the United States to carry out together



an intensive, well-conceived and well-funded strategic plan as outlined above over the next eight to ten years. If the strategic plan is conceived in full cooperation with the Russians, is adequately financed, and carried out as

part of a growing and transparent partnership, the Task Force believes that Russia should be positioned to take over any work remaining at the end of the eight to ten year period.





APPENDICES



Appendix A



Outline of Proposed Spending

This outline, prepared by Dr. Graham Allison, Director of the Belfer Center at Harvard University, suggests an allocation of funding for a program of this magnitude. It is not intended to be of budget quality, nor to imply that the U.S. should be the sole provider of funds for such a program.

Outline of Proposed Spending over 8-10 years	
<i>SECURING EXCESS RUSSIAN PLUTONIUM</i> Purchase and secure monitored storage of up to 100 MT: \$3B Conversion of Plutonium pits to oxide: \$1B Immobilize or irradiate up to 100 MT: \$5B	\$ 9 Billion
<i>SECURING EXCESS RUSSIAN HEU</i> (rates established by HEU agreement i.e. \$20M/MT to purchase) Purchase additional 200 MT HEU: \$4B Downblend remaining excess HEU: \$7B	\$ 11 Billion
<i>IMPROVING SECURITY AND ACCOUNTING FOR NUCLEAR MATERIAL IN RUSSIA</i> MPC&A improvements would include material consolidation; equipment upgrades; training of operators, managers and regulators; computerized inventory systems; upgrading security during transport, etc.	\$ 5 Billion
<i>DOWNSIZING AND RESTRUCTURING OF RUSSIA'S EXCESS NUCLEAR COMPLEX</i> Facility downsizing and preparation for civilian use: \$2B Employ knowledgeable nuclear personnel: \$700M Replace Pu reactors: \$300M	\$ 3 Billion
<i>ASSURE TRANSPARENCY IN RUSSIA AND VERIFY PROGRESS</i>	\$ 2 Billion
<i>ESTIMATED COST TO ACHIEVE GOALS</i> Benchmark: 1 percent current defense budget over this period	\$ 30 Billion



Appendix B



Task Force Members' Biographies

Howard Baker, Co-Chair

Senator Baker is a shareholder with the law firm of Baker, Donelson, Bearman, & Caldwell. In 1966, Senator Baker became the first Republican ever popularly elected to the United States Senate from Tennessee, and won reelection by wide margins in 1972 and 1978. Senator Baker first won national recognition in 1973 as the Vice-Chairman of the Senate Watergate committee. He was the keynote speaker at the Republican National Convention in 1976, and was a candidate for the Republican presidential nomination in 1980. He concluded his Senate career by serving two terms as Minority Leader (1977-1981) and two terms as Majority Leader (1981-1985). In addition, Senator Baker served as President Reagan's White House Chief of Staff from 1987 to 1988.

Senator Baker was a delegate to the United Nations in 1976, and served on the President Foreign Intelligence Advisory Board from 1985 to 1987 and from 1988 to 1990. He is a member of the Council on Foreign Relations. He serves on the board of the Forum for International Policy and is an International Counselor. for the Center for Strategic and International Studies.

Senator Baker serves on numerous boards and commissions in the private and public sector. He has also authored several books. After attending Tulane University and the University of the South, he received his law degree from the University of Tennessee. Senator Baker is a World War II veteran having served in the United States Navy.

Lloyd Cutler, Co-Chair

Mr. Cutler, a founding partner of Wilmer, Cutler & Pickering, maintains an active law practice in several fields, including international arbitration and dispute resolution, constitutional law, appellate advocacy, and public policy advice.

Mr. Cutler served as Counsel to President Clinton and Counsel to President Carter. He also served as Special Counsel to the President on Ratification of the Salt II Treaty (1979-1980); President's Special Representative for Maritime Resource and Boundary Negotiations with Canada (1977-1979); and Senior Consultant, President's Commission on Strategic Forces (The Scowcroft Commission, 1983-1984). He was a member and former Chairman of the Quadrennial Commission on Legislative, Executive and Judicial Salaries, and was a member of the President's Commission on Federal Ethics Law Reform (1989).

Mr. Cutler was a founder and Co-Chairman of the Lawyers Committee on Civil Rights Under Law. He has served as Chairman of the Board of the Salzburg Seminar; Co-Chairman of the Committee on the Constitutional System; a member of the



Council of the American Law Institute; a trustee emeritus of The Brookings Institution and a member of its Executive Committee; and an Honorary Bencher of the Middle Temple. He also has served as a director of a number of national business corporations. In and out of government, he has written frequently and appeared often on television as a commentator and advocate in connection with a wide range of public policy matters. Mr. Cutler received his bachelor's and law degrees from Yale University and was awarded an honorary degree of Doctor of Laws from Yale in 1983.

Andrew Athy **Chairman of the Secretary of Energy Advisory Board**

Mr. Athy is a partner in the Washington D.C. law firm of O'Neill, Athy and Casey. He previously served as counsel to the U.S. House of Representatives Energy and Commerce Subcommittee on Energy and Power (1978-1981). Prior to that he was an attorney in the Office of General Counsel at the Federal Election Commission (1976-1978), and Assistant Attorney General and Deputy Assistant Attorney General, Office of the Attorney General (Criminal Division) Commonwealth of Massachusetts (1973-1975). Mr. Athy received a bachelor's degree from the University of Pennsylvania, and his law degree from the Georgetown University Law Center.

Graham T. Allison

Dr. Allison is the Douglas Dillon Professor of Government at Harvard University and Director of the Belfer Center for Science and International Affairs. In the first Clinton Administration, Dr. Allison served as Assistant Secretary of Defense for Policy and Plans where he coordinated DOD strategy and policy towards Russia, Ukraine, and the other states of the former Soviet Union.

Dr. Allison has been an active advisor and consultant to agencies of government, beginning with the Department of Defense in the 1960s. He was Special Advisor to Secretary of Defense Weinberger from 1985-87 and has been a member of the Secretary of Defense's Defense Policy Board for Secretaries Weinberger, Carlucci, Cheney, Aspin, Perry and Cohen. In 1989-90, he served as Vice Chairman of JCS Chairman Crowe's Planning Committee on Strategy. He has twice been awarded the Defense Department's highest honor for civilians, the *Distinguished Public Service Medal*.

Dr. Allison was a founding member of the Trilateral Commission, a Director of the Council on Foreign Relations, and has been a member of public committees and commissions, among them Massachusetts Governor Weld's Task Force on Defense and Technology and the Carnegie Endowment's Commission on Government Renewal.



Dr. Allison has served as a Director of the Getty Oil Company, Nvest, Taubman Centers, Inc., and Belco Oil and Gas, as well as a member of the Advisory Boards of Chase Bank, Hydro-Quebec, and the International Energy Corporation.

Born and raised in Charlotte, North Carolina, Dr. Allison was educated at Davidson College; Harvard College (B.A., Magna Cum Laude, in History); Oxford University (B.A. and M.A., First Class Honors in Philosophy, Politics, and Economics); and Harvard University (Ph.D. in Political Science). He has received honorary doctorates from Davidson College, Uppsala University (Sweden), and the University of North Carolina (Wilmington). Dr. Allison and his wife Elisabeth live in Belmont, Massachusetts.

J. Brian Atwood

Mr. Atwood is President of Citizens International and Executive Vice President of Citizens Energy Corporation. One of the world's foremost development experts, Atwood served for six years as Administrator of the U.S. Agency for International Development. Mr. Atwood created Citizens International to design and manage private sector investments to meet the social and economic needs of developing nations. The new venture establishes public-private partnerships to help build democratic, market systems working with host countries, multinational corporations, and international aid and lending agencies.

As the Administrator of the U.S. Agency for International Development (USAID) from May 1993 to July 1999, he led the agency toward dramatic management reforms and a clearer development strategy. He also served as the Chairman of the Overseas Private Investment Corporation during his tenure at USAID. Mr. Atwood helped promote a number of highly successful initiatives in the areas of global climate change, democratization, conflict prevention and health. He led presidential delegations to Haiti, El Salvador, Rwanda and East Africa and was President Clinton's Humanitarian Relief Coordinator for the Kosovo crisis.

Mr. Atwood's career in foreign policy began 30 years ago when he joined the Foreign Service and served in Cote d'Ivoire and Spain. He also served on the staff of former Senator Thomas Eagleton (D-Mo.), and as executive director of the Democratic Senatorial Campaign Committee under former Senator Lloyd Bentsen (D-Texas). Atwood has served under several Presidents in key administrative and policy-making posts. During the Carter Administration he was Assistant Secretary of State for Congressional Relations. In the Clinton Administration, he led the transition team at the State Department and was Under Secretary of State for Management prior to his appointment as head of USAID. He was President of the National Democratic Institute for International Affairs from 1986 to 1993 and, before then, was Dean of Professional Studies at the Foreign Service Institute. In December 1998, President Clinton nominated Atwood as Ambassador to Brazil. He withdrew prior to Senate confirmation to accept his current position.



David Boren

Governor Boren, who has served Oklahoma as Governor and U.S. Senator, became the thirteenth president of the University of Oklahoma in November 1994. He is the first person in state history to have served in all three positions.

Governor Boren is widely respected for his academic credentials, his longtime support of education, and for his distinguished political career as a reformer of the American political system. A graduate of Yale University in 1963, Boren majored in American history, graduated in the top one percent of his class and was elected Phi Beta Kappa. He was selected as a Rhodes Scholar and earned a master's degree in politics, philosophy and economics from Oxford University, England, in 1965. In 1968, he received a law degree from the University of Oklahoma College of Law, where he was on the Law Review, elected to the Order of the Coif, and won the Bledsoe Prize as the outstanding graduate by a vote of the faculty.

He is also a former state legislator, and spent nearly three decades in elective politics before becoming the president of the University of Oklahoma. Boren was the youngest governor in the nation when he served from 1974 to 1978. Known as a reformer, Boren campaigned with a broom as his symbol. During his term, he instituted many progressive programs, including conflict-of-interest rules, campaign-financing disclosure, stronger open meeting laws for public bodies, and more competitive bidding on state government contracts.

During his time in the U.S. Senate (1979 to 1994) Boren served on the Senate Finance and Agriculture Committees and was the longest-serving chairman of the Senate Select Committee on Intelligence. From his days as a state legislator and Governor of Oklahoma to Washington, Boren carried a commitment to reform, leading numerous efforts to make government work better for American citizens. As chairman of the Senate Intelligence Committee, he strengthened oversight of secret government programs and reformed the procedures for Presidential notice of such programs to Congress.

Governor Boren is married to Molly Shi Boren and has two children, Carrie Christine and David Daniel. Devoting much of his life to public service, Boren drew from the example of his father, the late Congressman Lyle H. Boren.

Lynn Davis

Dr. Davis is currently a Senior Fellow at RAND Corporation. She is also advising the Commission on National Security/21st Century in its efforts to redesign the U.S. Government's national security policy-making processes. She has served as a member



of the Secretary of State's review boards that investigated the embassy bombings in East Africa and the Overseas Presence Advisory Panel

From 1993-1997, she was Under Secretary of State for Arms Control and International Security Affairs. She played a central role in the negotiations that produced NATO's expansion, the guidelines for the START III Treaty, the non-proliferation agreement with the Russians and Chinese on missile transfers and conventional arms, and the establishment of the Wassenaar Arrangement, a multilateral regime that coordinates conventional arms sales policies.

Prior to joining the State Department, Dr. Davis was Vice President and Director of the Arroyo Center at RAND. She has served on the staffs of the Secretary of Defense, the National Security Council, and the Senate Select Committee on Intelligence. She was Director of Studies at the National War College and Columbia University. She has a Ph.D. in Political Science from Columbia University and has authored numerous articles and monographs on nuclear and conventional arms control.

Butler Derrick

Congressman Derrick is a partner in the law firm Powell, Goldstein, Frazer and Murphy and previously was a partner at Williams & Jensen, P.C. From 1974-1994 he represented the Third District of South Carolina in the United States House of Representatives. During his career in Congress, Mr. Derrick served as Vice Chairman of the House Rules Committee and Chief Deputy Majority Whip. He was a member of the South Carolina House of Representatives from 1969-1974. He was a principal organizer of the South Carolina Water Resources Commission and was Vice Chairman of the South Carolina Nuclear Energy Committee. He received his law degree from the University of Georgia.

Susan Eisenhower

Ms. Eisenhower is President of The Eisenhower Institute. Formerly Chairman and Co-Founder of the Center for Political and Strategic Studies, she joined the Institute as CEO when the two organizations combined programs.

As one time consultant to IBM, American Express and Loral Space Systems, Ms. Eisenhower is best known for the fourteen years she has spent on U.S.-Soviet and then U.S.-Russian relations, while placing special emphasis on the changing political, economic and social developments in the former Soviet Union. As President of the Eisenhower World Affairs Institute, in the mid-1980s, she served as co-chairman of the first open and televised bilateral policy debate in Soviet history in 1986 and traveled extensively in the Soviet Union during the 1980s. For the next several years she designed and implemented the Institute's U.S.-Soviet program. In 1992, Ms.



Eisenhower and several of her colleagues founded the Center for Political and Strategic Studies, only months after the collapse of the Soviet Union.

In 1998, Ms. Eisenhower was elected to the National Academy of Sciences' standing Committee on International Security and Arms Control. During the fall of 1998, she spent the fall semester at Harvard as a Visiting Fellow at the Kennedy School of Government's Institute of Politics. In 1998, she was also appointed to the National Advisory Council of the National Aeronautics and Space Administration (NASA).

In addition to giving regular lectures, Ms. Eisenhower has authored several books and published numerous articles in major publications throughout the United States.

Lee Hamilton

Congressman Hamilton is the Director of the Woodrow Wilson International Center for Scholars. Prior to joining the Wilson Center, he represented the Ninth District of Indiana in the House of Representatives for 17 terms (1965-1999). While a Member of Congress, Mr. Hamilton was recognized as an authority and outspoken advocate of national security issues. He served as Chairman and Ranking Member of the House Committee on International Relations, the Joint Economic Committee, the Permanent Select Committee on Intelligence, Joint Committee on the Organization of Congress, as well as serving as Chairman of the October Surprise Task Force and the Select Committee to Investigate Covert Arms Transactions with Iran.

In addition to his duties with the Wilson Center, Congressman Hamilton serves on numerous panels and commissions including the Secretary of Defense's National Security Study Group and the Director of the Central Intelligence Agency Economic Intelligence Advisory Panel.

Congressman Hamilton attended Goethe University (Frankfurt, Germany) and holds degrees from DePauw University and Indiana University School of Law.

Robert I. Hanfling

Mr. Hanfling is a top-level management executive and consultant based in Washington, D.C. His diversified corporate and public sector experience includes venture capital management, bankruptcy trustee, corporate restructuring, arbitration of energy issues, and negotiation of mergers and acquisitions. Mr. Hanfling has been significantly involved in domestic and international programs for coal, synthetic fuels, nuclear, oil, gas, and electricity policy. He has been a member of the Secretary of Energy Advisory Board since 1995, serving as its Chair from 1995-1997. He has a B.S. in chemical engineering from Rensselaer Polytechnic Institute, an M.S. in nuclear engineering from West Virginia University and an MBA in International Trade from the City University of New York.



Gary Hart*

Since retiring from the United States Senate, Gary Hart has been extensively involved in international law and business, as a strategic advisor to major U.S. corporations, and as an author and lecturer.

He is presently Counsel to Coudert Brothers, a multinational law firm with offices in thirty-two cities located in nineteen countries around the world. He is co-chair of the U.S. Commission on National Security for the 21st Century, having been appointed by President Clinton and Secretary of Defense William S. Cohen. He is President of Global Green, the U.S. affiliate of President Mikhail Gorbachev's environmental foundation, Green Cross International. He is a founding member of the Board of Directors of the U.S. Russia Investment Fund; a member of the Defense Policy Board; and a member of the Council on Foreign Relations.

Gary Hart was Visiting Fellow and McCallum Memorial Lecturer at Oxford University; Global Fund Lecturer at Yale University, and was Regents Lecturer at the University of California. He travels extensively to the former Soviet Union, Europe, the Far East and Latin America. Since 1988, he has been active in negotiating ground-breaking joint venture agreements in the Commonwealth of Independent States and has published a book on the former Soviet Union entitled *Russia Shakes the World: The Second Russian Revolution* (1991).

Gary Hart represented the State of Colorado in the United States Senate from 1975 to 1987. In 1984, he was a candidate for his party's nomination for President.

Senator Hart was first elected to the Senate in 1974, having never before sought public office, and was re-elected in 1980. During his 12 years in the Senate, he served on the Armed Services Committee, where he specialized in nuclear arms control and naval issues, and was an original founder of the military reform caucus. He also served on the Senate Environment Committee, Budget Committee, and Intelligence Oversight Committee.

Gary Hart is a graduate of the Yale Law School, the Yale Divinity School and Southern Nazarene University, and resides with his family in Kittredge, Colorado.

Jim McClure

Senator McClure is co-founder of the government relations firm McClure, Gerard & Neuenschwander, Inc. and is Of Counsel to the law firm of Givens Pursley, Boise,

* Senator Hart has been prevented from full participation in the Task Force's deliberations by other government service.



Idaho. He represented Idaho for six years as a member of the United States House of Representatives and for 18 years in the United States Senate. As a senator, he was Chairman of the Energy and Natural Resources Committee, the Senate Steering Committee and the Senate Republican Conference. Senator McClure is widely recognized for his expertise on environmental, energy and natural resource matters including transportation, nuclear energy, natural gas, oil and electrical utility issues.

Senator McClure played a major role in negotiating an agreement between the State of Idaho, the Department of Energy and the US Navy regarding the shipment and storage of nuclear waste material to the Idaho National Engineering Laboratory.

He also serves on a number of corporate boards, as well as several volunteer boards. Senator McClure is a graduate of the University of Idaho College of Law.

Daniel Mayers

Mr. Mayers is Of Counsel with the Washington, D.C. law firm of Wilmer, Cutler & Pickering. Before becoming Of Counsel, Mayers was a Senior Partner with the firm working on major antitrust and commercial/financial litigation. Before joining Wilmer, Cutler, & Pickering, Mr. Mayers served as Assistant to Under Secretary of State George Ball working primarily on issues surrounding Viet Nam, in coordination with various intelligence agencies. Mr. Mayers also served as Assistant to Assistant Attorney General Louis Oberdorfer and as Law Clerk for United States Supreme Court Justice Felix Frankfurter. He serves on a number of boards and commissions in political, civic, and educational activities. Mr. Mayers is a graduate of Harvard College and a veteran of the United States Army. In addition, he holds a law degree from Harvard Law School where he graduated magna cum laude.

Sam Nunn

Senator Nunn is a senior partner in the Atlanta-based law firm of King & Spalding, where he focuses his practice on international and corporate matters. He served as a United States Senator from Georgia for 24 years (1972-1996).

During his tenure in the U.S. Senate, Senator Nunn served as chairman of the Senate Armed Services Committee and the Permanent Subcommittee on Investigations. He also served on the Intelligence and Small Business Committees. His legislative achievements include the landmark Department of Defense Reorganization Act, drafted with the late Senator Barry Goldwater, and the Cooperative Threat Reduction Program, also known as the Nunn-Lugar program, which provides incentives for the former Soviet republics to dismantle and safely handle their nuclear arsenals. Senators Nunn and Lugar were nominated for the 2000 Nobel Peace Prize for their work in conceiving, legislating and sustaining this important program.



He has continued his service in the public policy arena as a distinguished professor in the Sam Nunn School of International Affairs at the Georgia Institute of Technology, and as chairman of the board of the Center for Strategic and International Studies in Washington, D.C. In addition, Senator Nunn serves as co-chairman of The Concord Coalition, a grass-roots organization formed to educate the public on our nation's fiscal challenges.

Alan Simpson

Senator Simpson joined the Washington-based firm The Tongour Simpson Group in 2000. From 1973 to 1997, Senator Simpson served as United States Senator from Wyoming. While in the Senate, he was Assistant Majority Leader for 10 years. Senator Simpson was also the Chairman of the Committee on Veterans' Affairs. Prior to his time in the Senate, he served for 13 years in Wyoming's legislature. He also served as Assistant Attorney General for the State of Wyoming and is a veteran of the United State Army, Infantry.

Senator Simpson serves on numerous boards and commissions. He also is the author of *Right in the Gazoo: A Lifetime of Scrapping with the Press*.

David Skaggs

Congressman Skaggs is Executive Director of the Democracy & Citizenship Program at the Aspen Institute, and Of Counsel to the Washington, D.C.-based law firm of Hogan & Hartson. In addition, he serves as an adjunct professor at the University of Colorado. Congressman Skaggs represented the Second District of Colorado in the United States House of Representatives for twelve years. Before that, he served three terms in the Colorado House of Representatives, the last two terms as Minority Leader.

Mr. Skaggs served eight years on the House Appropriations Committee. During his last six years in Congress, he was a member of the Permanent Select Committee on Intelligence, where he devoted particular attention to classification and information security issues. Prior to joining the Appropriations Committee, he was a member of the Public Works and Transportation Committee and the Science Space and Technology Committee. Congressman Skaggs was a founding co-chairman of the House Bipartisan Retreat and the Constitutional Forum.

Prior to serving in elected office, Mr. Skaggs practiced law in Boulder, Colorado and as a judge advocate in the United States Marine Corps. He was chief of staff to Congressman Timothy Wirth. In addition to current duties, Mr. Skaggs serves on a number of boards and committees; he recently completed work as a member of the Department of State's Overseas Presence Advisory Panel.



John Tuck

Mr. Tuck is a Senior Public Policy Advisor at Baker, Donelson, Bearman & Caldwell. From 1989 to 1992, Mr. Tuck served as Under Secretary of the United States Department of Energy in President Bush's administration.

Prior to his service with the Department of Energy, Mr. Tuck served in a number of positions at the White House during President Reagan's administration, including Assistant to the President, and Director of the Office of the Chief of Staff. From 1981 to 1986, he worked in the United States Senate as Assistant Secretary for the Majority. He has held a number of positions on Capitol Hill including Chief of the Minority Floor Information Services for the House of Representatives.

John Tuck was commissioned in the United States Navy and served on active duty from 1967 to 1973. Subsequently, he served in the United States Naval Reserve for over 20 years, retiring with the rank of Captain. Mr. Tuck holds a bachelor's degree from Georgetown University School of Foreign Service.



TERMS OF REFERENCE

for the SECRETARY OF ENERGY ADVISORY BOARD (SEAB) TASK FORCE ON EVALUATION OF DOE'S NONPROLIFERATION PROGRAMS WITH RUSSIA

Scope and Objectives:

The objective of this Task Force is to provide appraisals and recommendations to the Secretary of Energy regarding the policy priorities established by DOE to pursue cooperative nonproliferation and nuclear safety programs with Russia, with an eye to identifying crucial program areas that may not have been addressed in the past. The Task Force should provide an assessment of the performance of DOE's programs in achieving national security and nonproliferation missions. The scope of this appraisal will be all nonproliferation projects, including but not limited to the Initiatives for Proliferation Prevention program, the Nuclear Cities Initiative, the Material Protection Control and Accounting program, the Second Line of Defense program, the HEU Purchase Agreement, the International Nuclear Safety program, and the Plutonium Disposition program.

The Task Force will tackle key questions such as: Are we achieving U.S. nonproliferation and national security goals with Russia? Given Russia's current political and economic environment, how can DOE best achieve these goals? What other practicable opportunities might exist to promote these goals? How can DOE maximize programmatic self-sustainability? The Task Force will not examine issues such as security at DOE's national laboratories, nor the overlap between DOE and DOD programs.

Background:

The President and the Secretary of Energy have stated that DOE's Russian nonproliferation programs are among the most important of the U.S. Government's national security initiatives. Now is an opportune time to step back and evaluate what DOE has achieved. Perhaps more importantly, however, the DOE should work to determine in which direction its programs should proceed and what, if any, new priorities should be established.

The DOE has six major program objectives in the national security and nonproliferation arena: (1) secure nuclear materials and expertise; (2) limit the stockpiles of weapons-useable fissile materials; (3) promote transparent and irreversible nuclear reductions; (4) strengthen the nuclear nonproliferation regime; (5) enhance the safety of nuclear facilities; and (6) promote proliferation resistant civil nuclear technologies. In considering these six objectives, the Task Force should limit



itself to examining DOE's bilateral Russian nonproliferation and nuclear safety programs.

Description of the Task Force's Duties:

1. The Task Force should assess the Department's ongoing activities in the nonproliferation field with Russia.
2. The Task Force should provide the Secretary and the SEAB with policy recommendations as to how the Department can be most effective in supporting U.S. national security interests.
3. The Task Force should investigate ways to increase the reach and accessibility of these programs, in an effort to gain the broad private sector support that is crucial to the success of programs such as the Nuclear Cities Initiative.
4. The Task Force should seek to identify ways to draw on the unique capabilities of our National Laboratories while maintaining programmatic focus and coordination within the DOE complex.
5. The Task Force should seek to develop a metric to measure progress and successes of DOE's programs.

Estimated Number and Frequency of Meetings:

This Task Force shall meet as required. In order to enhance members' knowledge and understanding of DOE programs in Russia, the Department will organize a trip to several Russian sites involved in cooperative programs.

Membership:

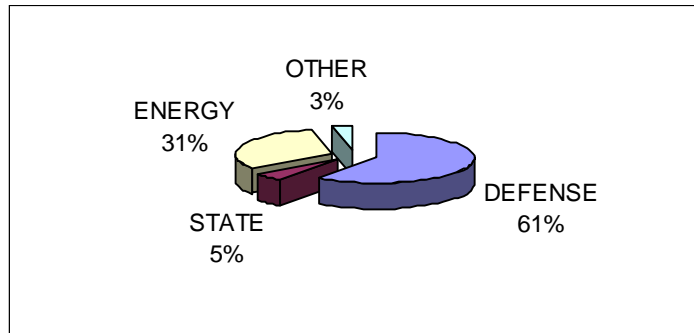
The Task Force shall have at least eight members, including at least two individuals who are also members of the Secretary of Energy Advisory Board. The remaining members shall be appropriate experts in the field of Russia, nonproliferation and/or national security and shall reflect a balance of expertise and viewpoints. The Chairman of the SEAB, in consultation with the Secretary of Energy, shall appoint the Chair (or Co-Chairs), as well as all other members.

Duration and Termination Date: This Task Force shall serve for not more than six months, subject to the extension or dissolution by the Chairman of the SEAB.

Appendix D



Programmatic Chart and Budget Pie Chart of U.S. Government Nonproliferation Programs in Russia¹



	DEFENSE	ENERGY	STATE
DEFENSE	Arctic Military Environmental Cooperation (AMEC) Military Technical Cooperative Efforts	Warhead Safety and Security Exchange (WSSX)	Border Security And Law Enforcement*
ENERGY	Cooperative Threat Reduction (CTR)	MPC & A Export Control Assistance Second Line of Defense Russian Border Security	Plutonium Production Reactor Agreement
STATE	Warsaw Initiative Partnership for Peace International Military Education & Training	Nuclear Cities Initiative* Fissile Materials Disposition Initiatives for Proliferation Prevention HEU Purchase Agreement	International Science and Technology Centers (ISTC) ² Export Control Assistance
OTHER	Counter-proliferation		Scientific Collaboration Biotechnical Activities*

1. This chart was based on figures provided by the Office of the Special Advisor Coordinator of U.S. NIS assistance; the total budget spent on U.S. nonproliferation programs in Russia in FY 2000 is approximately \$706 million.

2. This is an international initiative to deter brain drain. U.S. funding is from the State Department.

* Other Departments are also involved.



Appendix E



Budget Chart of DOE Nonproliferation Programs with Russia

PROGRAM (\$ in millions)	FY 00	FY 01
MPC & A	144.6	173.9
Second Line of Defense	1.2	3.0
Plutonium Disposition	30.0	40.0
Nuclear Cities Initiative	7.5	27.5
Initiatives for Proliferation Prevention	22.5	24.5
HEU Purchase/Transparency	15.7	15.2
Nuclear Safety	15.0	20.0
TOTALS	236.5	304.1





Glossary

brain drain - the emigration of personnel from former Soviet institutes, laboratories and facilities who were involved in weapons of mass destruction work.

downblending - the process of blending highly enriched uranium with low enriched uranium or natural uranium to decrease the overall enrichment level of the uranium in order to make it less attractive from a proliferation perspective, i.e. not as readily useable in a weapon.

highly enriched uranium (HEU) - uranium that is enriched in the uranium-235 isotope to greater than 20 percent. For weapons, generally 90 percent enrichment is used. [Natural uranium, which cannot be used for weapons contains only 0.7 percent uranium-235 and 99.3 percent uranium-238.]

low enriched uranium (LEU) - uranium that is enriched in the uranium-235 isotope to less than 20 percent.

mixed oxide fuel (MOX) - nuclear reactor fuel composed of a mixture of uranium and plutonium in oxide form. The plutonium replaces some of the fissile uranium, thus reducing the need for uranium ore and enrichment. This is a form of the fuel that would be used in plutonium recycle.

rapid upgrades - upgrades that are done initially to provide a rapid increase in security of the nuclear material and may include placing bricks in front of windows and installing equipment that monitors personnel and/or vehicles entering and leaving the facility.

weapons-grade - nuclear material of the type most suitable for nuclear weapons, i.e., uranium enriched to 90 percent or more of uranium-235 or plutonium that is primarily plutonium 239.

weapons-usable - nuclear materials in a form that can readily be fabricated into nuclear weapons, without need for processes that alter the isotopic content. Highly specialized enrichment, separation, and /or chemical processes have already been completed to reach this condition, which leaves the material ready for conventional manufacturing operations (e.g. casting, alloying, drilling, machining, pressing) or conventional chemical processes. Weapons-usable material would include weapons-grade uranium, plutonium, as well as deuterium and tritium.



Appendix G



Bibliography

Overview

Arofikin, Andrei. Credit Suisse First Boston Bank. Moscow, Russia. July 24, 2000.

Barletta, Michael, ed. "Proliferation Challenges and Nonproliferation Opportunities for New Administrations." Monterey Institute of International Studies: Center for Nonproliferation, Monterey Nonproliferation Strategy Group (Occasional Paper No 4). September 2000.

Bunn, Matthew. "Controlling Nuclear Warheads and Materials: New Priorities for a New President." Presentation to the Task Force. Department of Energy Headquarters, Washington DC. September 20, 2000.

Cochran, Thomas. Natural Resources Defense Council. Presentation to the Task Force. Department of Energy Headquarters, Washington, DC. April 25, 2000.

Cooper, Necia Grant, ed. "Russian-American Collaborations to Reduce the Nuclear Danger." Los Alamos Science: Los Alamos Laboratory. November 24, 1996.

"Cooperative Approaches to Halt Russian Nuclear Proliferation and Improve the Openness of Nuclear Disarmament." Congressional Budget Office. May 1999.

Ebel, Robert. Center for Strategic and International Studies, Energy and National Security Program. Presentation to the Task Force. Department of Energy Headquarters, Washington, DC. April 25, 2000.

"Expanded Threat Reduction Initiative (ETRI)." Office of the Coordinator of U.S. Assistance to the New Independent States. Washington DC. November 1999.

Gardner, Gary T. "Nuclear Nonproliferation. A Primer." The Monterey Institute of International Studies: Program for Nonproliferation Studies. Boulder, CO: Lynne Rienner Publishers. 1994.

Jones, Rodney W., Mark G. McDonough, Toby F. Dalton and Gregory D. Koblenz. "Tracking Nuclear Proliferation: A Guide in Maps and Charts, 1998." Washington, DC: Carnegie Endowment for International Studies. 1998.

Koch, Andrew. "U.S DOE Calls for \$100 M To Help Russia Secure Nuclear Material." *Jane's Defense Weekly*. Vol 33, No 7. February 2000.

Luongo, Kenneth. Russian American Nuclear Security Advisory Council (RANSAC). Presentation to the Task Force. Department of Energy Headquarters, Washington, DC. April 25, 2000.



“Managing the Global Nuclear Materials Threat: Policy Recommendations.” The Monterey Institute of International Studies: Center for Strategic and International Studies. January 2000.

Moltz, PhD, Clay. Monterey Institute for International Studies, Center for Nonproliferation Studies. Presentation to the Task Force. Department of Energy Headquarters, Washington, DC. April 25, 2000.

“Nuclear Successor States of the Soviet Union. Status Report on Nuclear Weapons, Fissile Material and Export Controls.” Monterey Institute of International Studies: Center for Nonproliferation, Monterey Nonproliferation Strategy Group. March 1998.

Perry, Todd. Union of Concerned Scientists. Presentation to the Task Force. Department of Energy Headquarters, Washington, DC. April 25, 2000.

Pikaev, Alexander. Carnegie Center Moscow. Presentation to the Task Force. Moscow, Russia. July 24, 2000

Orlov, Vladimir. Policy in Russia Center. Presentation to the Task Force. Moscow, Russia. July 24, 2000

“Proliferation Concerns: Assessing U.S. Effort to Help Contain Nuclear and Other Dangerous Materials and Technologies in the Former Soviet Union.” National Research Council. National Academy Press. Washington DC. 1997.

“The Proliferation Primer: A Majority Report of the Subcommittee on International Security. Proliferation and Federal Services, Committee on Governmental Affairs. Washington, DC: United States Senate. January 1998.

Schwartz, Stephen, ed. “Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons Since 1940.” Washington, D.C.: Brookings Institution Press. 1998.

Shields, John M. and William C. Potter, eds. *Dismantling the Cold War: U.S. and NIS Perspectives on the Nunn-Lugar Cooperative Threat Reduction Program*. CSIA Studies in International Security. Cambridge, MA: The MIT Press. 1997.

“Transforming the Russian Nuclear Weapons Complex: The Role of Non-Governmental Institutions.” Russian American Nuclear Security Advisory Council, (RANSAC). June 2000.

Webster, William H., et al. “The Nuclear Black Market.” A Report of the Global Organized Crime Project Task Force, Nonproliferation Strategy Group. Monterey Institute of International Studies: Center for Strategic and International Studies. 1996.



Wolfsthal, John. Carnegie Endowment for International Peace. Presentation to the Task Force. Department of Energy Headquarters, Washington, DC. April 25, 2000.

Fissile Material

Albright, David, Frans Berkhout and William Walker, "Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies." SIPRI. Oxford Press. 1997.

Allison, Graham T, Owen R. Cote, Jr., Richard Falkenrath, and Steven Miller. "Avoiding Nuclear Anarchy: Containing the Threat of Loose Russian Nuclear Weapons and Fissile Material." Studies in International Security. No 12. Cambridge, MA: The MIT Press. 1996.

Atomic Energy of Canada, Ltd. "Briefing Paper on the CANDU MOX Option for Disposition of Surplus Russian Weapons-Origin Plutonium." Prepared by Verner, Lipfert, Bernhard, McPherson and Hand. December 13, 2000.

Brody, Richard. United Technologies Corporation. Moscow, Russia. July 27, 2000.

Bunn, Matthew, "The Next Wave: Urgently Needed New Steps to Control Warheads and Fissile Material." The Harvard Project on Managing the Atom and the Carnegie Nonproliferation Project. March 2000.

Bukharin, Oleg, Matthew Bunn and Kenneth Luongo. "Renewing the Partnership: Recommendations for Accelerated Action to Secure Nuclear Material in the Former Soviet Union." Russian American Nuclear Security Advisory Council, (RANSAC). August 2000.

Chow, Brian and Kenneth Solomon. "Limiting the Spread of Weapon-Usable Fissile Material." Washington, DC: RAND Corporation. 1993.

Clements, Thomas. Nuclear Control Institute. Presentation to the Task Force. Department of Energy Headquarters, Washington, DC. April 25, 2000.

Ford, James and C. Richard Fuller, "Controlling Threats to Nuclear Security. A Holistic Model," National Defense University, Center for Counterproliferation Research. Washington, DC June 1997.

General Atomics. Reactor Projects. "Recommendations to the SEAB Russia Task Force." October 2000.

Jacobson, Louis. "Ground Zero." *Government Executive*. September 20, 2000. Pages 69-78.



“Management and Disposition of Excess Weapons Plutonium.” National Academy of Sciences, Committee on International Security and Arms Control. Washington, DC: National Academy Press. 1994.

“Proliferation Concerns: Assessing U.S. Efforts to Help Contain Nuclear and Other Dangerous Materials and Technologies in the Former Soviet Union.” National Research Council. Washington, DC: National Academy Press. 1997.

Neff, Dr. Thomas L. "Privatizing U.S. National Security: The U.S.-Russian HEU Deal at Risk." *Arms Control Today*. August/September 1998. Pages 8–14.

Nunn, Sam, “Managing the Global Nuclear Materials Threat: Policy Recommendations.” Center for Strategic International Studies, Project on Global Nuclear Materials Management. January 2000.

Rinne, Robert L. “An Alternative Framework for the Control of Nuclear Materials.” Center for International Security and Cooperation. Stanford University Press. May 1999.

Roberts, Guy B. “Five Minutes Past Midnight: The Clear and Present Danger of Nuclear Weapons Grade Fissile Materials.” Occasional Paper 8. Institute for National Security Studies, US Air Force Academy. February 1996.

Sewell, Phillip. “Russian HEU Contract.” United States Energy Company (USEC). Presentation to the Task Force. Department of Energy Headquarters, Washington, DC. October 2000.

Material Protection, Control and Accounting

Bukharin, Oleg. “Achieving Safeguards Sustainability in Russia.” *The Monitor*. Vol. 4, No. 2-3. University of Georgia. Pages 24-28.

Daughtry, Emily Ewell and Fred L. Wehling. “Cooperative Efforts to Secure Fissile Material in the NIS, *The Nonproliferation Review*. Vol. 7, Number 1. Spring 2000. Pages 97-112.

Doyle, James. “Improving Nuclear Materials Security in the former Soviet Union: Next Steps for the MPC&A Program.” *Arms Control Today*. Volume 28, Number 2. March 1998. Pages 12-19.

Kempf, C. Ruth. “The Russian Nuclear Material Protection, Control and Accounting Program: Analysis and Prospect.” U.S. Department of Energy. September 1998. Pages 329-47



Kempf, C. Ruth, Stephen Mladineo and Todd Perry. "U.S.-Russian MPC&A Lessons Learned." *Journal of Nuclear Materials Management (JNMM)*. Vol. XXVIII, Number 1. Fall 1999.

"MPC&A Strategic Plan." U.S. Department of Energy. January 1998.

Potter, William C. and Fred L. Wehling. "MPC&A Sustainability White Paper." Monterey Institute for International Studies, Center for Nonproliferation Studies. August 10, 1999.

"Protecting Nuclear Materials in Russia." National Research Council. National Academy Press. Washington, DC. 1999.

Pshakin, Gennady. "MPC&A in Russia: Results, Problems and Perspectives." *The Monitor*. Vol. 5, No. 1-2. University of Georgia. Pages 18-21.

Sheely, Kenneth B. and Mary Alice A. Hayward. "A Progress Report on the US Department of Energy Nuclear Materials Protection, Control and Accounting Program." U.S. Department of Energy. September 1998. Pages 1-7.

Nuclear Cities and Proliferation Prevention Initiatives

Bozheeva, Gulbershyn "Former Soviet Biological Weapons Facilities in Kazakhstan: Past, Present, and Future", Center for Nonproliferation Studies. June 1999.

Bukharin, Oleg, and Thomas Cochran and Robert Norris. "New Perspectives on Russian Nuclear Cities." Natural Resources Defense Council. October 1999.

Bukharin, Oleg, Matthew Bunn, Harold Feiveson, William Hoehn, Kenneth Luongo, Frank von Hippel, and Sharon Weiner. "Helping Russia Downsize its Nuclear Complex: A Focus on the Closed Nuclear Cities. Report of an International Conference Held at Princeton University March 14-15, 2000." Program on Nuclear Policy Alternatives, Princeton University. June, 2000.

"Nuclear Cities News." Center for Energy & Environmental Studies, Princeton University and the Russian-American Nuclear Security Advisory Council (RANSAC). Volume 1, December 1999.



Internet Sources

NON GOVERNMENT

Arms Control Association
www.armscontrol.org

The Bulletin of the Atomic Scientists
www.thebulletin.org

The Carnegie Endowment for
International Peace, Nonproliferation
Project
[www.ceip.org/files/projects/npp/
resources](http://www.ceip.org/files/projects/npp/resources)

Center for Defense Information
www.cdi.org

Center for Nonproliferation Project
Monterey Institute of International
Studies
www.cns.miis.edu

Natural Resources Defense Council
www.nrdc.org/nuclear/default.asp

Managing the Atom Project, Harvard
University
[www.ksg.harvard.edu/bcsia/mta.nsf/
www/home](http://www.ksg.harvard.edu/bcsia/mta.nsf/)

Non-Proliferation Trust International
<http://www.nptinternational.com>

Nuclear Control Institute
www.nci.org

Russian American Nuclear Security
Advisory Committee
[www.ransac.org/new-web-site/
index.html](http://www.ransac.org/new-web-site/index.html)

The Stimson Center
www.stimson.org

GOVERNMENT

United States Department of Energy
The Office of Defense Nuclear
Nonproliferation
www.nn.doe.gov

The Office of the Ambassador-at-Large
and Special Advisor to the Secretary for
the New Independent States
www.state.gov/www/regions/nis/

United States Department of State Arms
Control and International Security
[www.state.gov/www/global/arms/
index.html](http://www.state.gov/www/global/arms/index.html)

Department of Defense Threat
Reduction Agency
www.dtra.mil

Appendix H



Audit Report Summary

External Audit Reports on 7 of DOE's Russia Programs

December 2000. *Nuclear Nonproliferation: Implications of the U.S. Purchase of Russian Highly Enriched Uranium*, 12/15/2000, GAO-01-148. Pursuant to a congressional request, GAO reviewed (1) the implementation of the 1993 HEU agreement; (2) USEC Inc.'s performance as the U.S. executive agent; (3) the impact of USEC's privatization; and the HEU agreement on the United States capability to produce fuel for nuclear power plants domestically and; (4) federal oversight of the HEU agreements implementation.

September 2000. *Nuclear Material Protection, Control, and Accounting Program*, 09/16/99, DOE/IG-0425. The objective of the OIG's audit was to assess whether the Department ensured that funds and equipment provided to the Former Soviet Union (FSU) under the Department's Nuclear Material Protection, Control, and Accounting (MPC&A) program were accounted for and used for their intended purposes.

April 2000. *Biological Weapons: Effort to Reduce Former Soviet Threat Offers Benefits, Poses New Risks*. Letter Report, 04/28/2000, GAO/NSIAD-00-138. Pursuant to a congressional request, GAO reviewed efforts to reduce the threat of biological weapons proliferation from the former Soviet Union, focusing on: (1) the potential threats that the former Soviet biological weapons institutes could pose to the United States; (2) current and future U.S. efforts to address these threats; and (3) risks associated with the expanded U.S. effort and Executive Branch plans to mitigate them.

April 2000. *Nuclear Safety: Concerns With the Continuing Operation of Soviet-Designed Nuclear Power Reactors*. Chapter Report, 04/25/2000, GAO/RCED-00-97. Pursuant to a congressional request, GAO provided information on Soviet-designed nuclear power reactors, focusing on: (1) how much money has been spent by the United States and other countries for assistance to improve the safety of Soviet-designed nuclear power reactors--and the types of assistance being provided--as well as planned U.S. expenditures; (2) experts' views on the impact of the assistance; (3) the status of efforts to close high-risk Soviet-designed reactors; and (4) the management of the Department of Energy's (DOE) and the Nuclear Regulatory Commission's (NRC) safety assistance activities.

March 2000. *Nuclear Nonproliferation: Limited Progress in Improving Nuclear Material and Security in Russia and the Newly Independent States*. GAO/RCED/NSIAD-00-82. Pursuant to a request from the Senate Armed Services Committee, GAO reviewed the Department of Energy's Material Protection, Control and



Accounting Program. The GAO recommended that DOE develop and annually update an overall cost estimate and time frame for completing the program.

March 2000. *Survey of Department of Energy Programs in the Former Soviet Union*, March 8, 2000, Letter Report, CR-L-00-04. The OIG performed a survey to determine whether the Department had developed an integrated management approach to achieving its nuclear nonproliferation objectives in the FSU.

March 2000. *Weapons of Mass Destruction: U.S. Efforts to Reduce Threats From the Former Soviet Union*, testimony by Harold J. Johnson, before the Subcommittee on Emerging Threats and Capabilities, Senate Committee on Armed Services. GAO/T-NSIAD/RCED-00-119, Mar. 6 (13 pages). Since 1991, Congress has authorized the Departments of Defense, Energy, and State to help Russia and other newly independent states control and eliminate weapons of mass destruction and to reduce the risks of proliferation. This testimony draws on 20 reports GAO has issued during the past eight years on various aspects of these programs. GAO presents overall observations on the costs and impacts of these programs and suggests issues that Congress may want to consider as it reviews current and future budget requests for these programs.

September 1999. *Nuclear Nonproliferation: Status of Transparency Measures for U.S. Purchase of Russian Highly Enriched Uranium*. Letter Report, 09/22/1999, GAO/RCED-99-194. Pursuant to a congressional request, GAO examined the nuclear nonproliferation status of transparency measures for U.S. purchase of Russian highly enriched uranium (HEU), focusing on: (1) the transparency measures that are in place; (2) whether these measures ensure that the nonproliferation objectives of the agreement are met; and (3) the proposals for additional transparency measures.

August 1999. *Nuclear Safety: Information on the International Nuclear Regulators Association*. Letter Report, 08/06/1999, GAO/RCED-99-243. Pursuant to a congressional request, GAO provided information on the Nuclear Regulatory Commission's (NRC) participation in the International Nuclear Regulators Association, focusing on: (1) the Association's activities since it was created; (2) U.S. costs to support NRC's participation in the Association; (3) the views of NRC's commissioners and others on the benefits of the Association; and (4) other groups and activities that promote nuclear safety and the extent to which these groups duplicate the work of the Association.

May 1999. *Cooperative Approaches to Halt Russian Nuclear Proliferation and Improve the Openness of Nuclear Disarmament*. Congressional Budget Office, United States Congress. Pursuant to a congressional request, the CBO analyzed a broad range of cooperative measures between the United States and Russia aimed to enhance nuclear security; namely (1) preventing the spread of nuclear materials and techni-



cal knowledge from Russia, and improving openness, or transparency, in dismantling warheads and (2) accounting for fissile materials. In keeping with CBO's mandate to provide objective, impartial analysis, this memorandum makes no recommendations.

April 1999. *Weapons of Mass Destruction: Effort to Reduce Russian Arsenals May Cost More, Achieve Less Than Planned.* Letter Report, 04/13/99, GAO/NSIAD-99-76. Pursuant to a congressional request, GAO reviewed the cost and realization of national security objectives at Russia's Mayak nuclear complex and Shchuch'ye chemical weapons storage depot, focusing on whether the: (1) Mayak project will be completed on schedule and within past Department of Defense (DOD) estimates of its total cost to the United States; (2) United States has made progress in ensuring that the completed Mayak facility would achieve U.S. national security objectives by safely and securely storing retired materials taken only from dismantled nuclear weapons; (3) Shchuch'ye project will be completed on schedule and the status of DOD efforts to estimate its total cost to the United States; and (4) completed Shchuch'ye facility will achieve U.S. national security objectives by helping Russia destroy the Shchuch'ye depot's stocks and accelerate elimination of all Russian chemical weapons under the Chemical Weapons Convention.

April 1999. *Federal Research: Information on International Science and Technology Agreements.* Letter Report, 04/22/99, GAO/RCED-99-108. Pursuant to a congressional request, GAO provided information on the U.S. government's international science and technology (S&T) agreements that support and encourage international cooperation in research and development, focusing on the: (1) number of international S&T agreements active during fiscal year 1997; and (2) number of these agreements that resulted in research projects or other activities.

March 1999. *Nuclear Safety: The Convention on Nuclear Safety.* Testimony, 03/17/99, GAO/T-RCED-99-127. Pursuant to a congressional request, GAO discussed the Convention on Nuclear Safety, focusing on the: (1) Convention's scope and objectives; (2) process for reviewing compliance with the Convention; (3) dissemination of information related to the Convention's proceedings; and (4) costs to implement the Convention.

February 1999. *Nuclear Nonproliferation: Concerns With DOE's Efforts to Reduce the Risks Posed by Russia's Unemployed Weapons Scientists.* Chapter Report, 02/19/99, GAO/RCED-99-54. Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) efforts to create jobs for displaced former Soviet Union scientists through its Initiatives for Proliferation Prevention program, focusing on: (1) the costs to implement the program for fiscal years 1994-98, including the amount of funds received by weapons scientists and institutes; (2) the extent to which the program's projects are meeting their nonproliferation and commercialization objectives; and (3) DOE's Nuclear Cities Initiative.



January 1998. *Nuclear Nonproliferation and Safety: Uncertainties About the Implementation of U.S.-Russian Plutonium Disposition Efforts.* Letter Report, 01/14/98, GAO/RCED-98-46. Pursuant to a congressional request, GAO provided information on: (1) the goals of the Department of Energy's (DOE) plutonium disposition program and the impediments facing its implementation; (2) U.S. government officials' views on the importance of a U.S.-Russian agreement on plutonium disposition and the status of efforts to negotiate an agreement; (3) the costs to implement plutonium disposition programs in the United States and Russia; and (4) experts' views about the potential nonproliferation impacts of the U.S. plutonium disposition program; and (5) surplus nuclear weapons that are among the sources of plutonium for DOE's disposition plan.

Report Cover: Pentaerythritoltetranitrate (PETN) is one of the most powerful high explosives, and is used in nuclear weapons applications. Its molecular formula is $C(CH_2ONO_2)_4$. Shown on the cover is a computer simulation of a vibrational mode of the PETN molecule.

