

Stepping Back from the Edge of Darkness: Developing Sustainable Cooperative Threat Reduction Programs with Russia

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Introduction:

“Now I am become Death, the destroyer of worlds.” These words, first immortalized in the *Bhagavad Gita*, escaped the lips of J. Robert Oppenheimer after he witnessed the first test explosion of a nuclear weapon in Alamogordo, New Mexico, July 16, 1945. For fifty years following World War II, the world faced constant fear of nuclear holocaust due to conflict between the United States and the Soviet Union; after the fall of the U.S.S.R. in 1991, a new and unique nuclear threat came to the forefront of national security concerns: nuclear terrorism. This threat captured the attention of policymakers because of the diffuse nature of the Soviet nuclear arsenal and nuclear weapons complex. In order to forestall the danger, Congress signed into law the Nunn-Lugar Cooperative Threat Reduction (CTR) programs. [For a complete list of CTR programs, see Appendix I] Following the September 11, 2001 attacks, the threat of nuclear terrorism became even more pervasive, thus leading to a re-energizing of Cooperative Threat Reduction programs.¹

The programs’ *raison d’être* centered on the collapse of the Soviet Union and the resulting loss of control over the nuclear arsenal. Despite the programs’ reputation for success, they continued after the initial crisis passed, indicating the emerging and continuing need for aspects addressing sustainability. Clarification of parameters and definitions is helpful for understanding later arguments. Only those CTR programs that deal exclusively, or mainly, with nuclear weapons and related infrastructure, are included, thus excluding CTR programs pertaining to biological and chemical weapons of mass destruction. Additionally, the notion of “sustainability” holds a central role, and in

¹ The extensive number of hearings held and the large number of new Cooperative Threat Reduction programs that came into existence following the 9/11 attacks emphasize this point.

this context refers to the ability of a CTR program to successfully persist in the recipient country with declining U.S. financial and logistical support, and eventually without any support, of the United States. Likewise, the concept of “nuclear terrorism,” for the purposes of this thesis, will refer to any attempts by individuals or organizations to obtain nuclear weapons or materials with the intent of creating a crude or refined nuclear weapon for use on other nations. Finally, the “human factor” refers to the use of people over technology in safeguarding weapons, material, and infrastructure and includes the attitudes, perceptions, and working conditions of those day-to-day workers who manage CTR programs and upgrades within the recipient country.

Analysis of CTR programs remains incredibly pertinent today because these programs form the basis of development for new and emerging threat reduction activities. Nunn-Lugar’s reach has already spread beyond the former Soviet Union (FSU), so understanding the pitfalls in sustainability and how to avoid them has implications for future financial concerns and partner relationships. This analysis hopes to discover the key factors defining success or failure when considering the sustainability of Cooperative Threat Reduction programs. Furthermore, analysis of individual programs should reveal which aspects of those programs have proven successful or unsuccessful in reaching or closely approaching sustainability goals. Finally, based on the lessons of these past programs, how might the implementers of CTR programs develop new and future programs so as to ensure their sustainability from the start? Policy changes to implementation based on such analysis may help the U.S. step back from the edge of darkness and achieve sustainable programs that do not indefinitely draw on limited U.S. resources.

Background Information & Literature Review:

I. The Former Soviet Union Creates a New Nuclear Threat

Prior to the fall of the Soviet Union, the Soviet nuclear complex comprised of well-guarded nuclear arsenals spread across the Soviet bloc, nuclear test sites like Semipalatinsk in Kazakhstan, and 10 “nuclear cities” where a high degree of security, control, and secrecy characterized daily life.² Although restrictive, the benefits of working in the nuclear sector included prestige, guaranteed living space, and monetary bonuses. With the fall of the Soviet Union came severe economic destabilization, high unemployment rates, and the possibility of black markets, theft, and other abuses.

Few escaped this sudden loss. “When employees of the nuclear complex lost the majority of their material benefits together with their privileged status ... this created significant risks of abuse, neglect, and theft.”³ Because the U.S.S.R. relied heavily on the “human factor” for security, very few technological safeguards existed, thus increasing the probability of insider theft within the nuclear complex. The lack of adequate protection coupled with the sudden and drastic economic downturn and loss of command structure created a serious security vacuum within the nuclear complex.

When the Soviet Union collapsed, a massive military infrastructure geared toward a global confrontation lost its purpose overnight. Huge stockpiles of nuclear weapons and fissile material, poisonous chemical munitions, and illegally produced biological pathogens were no longer needed. As the culture of centralized control withered away in the newly democratic Russia, the security and safeguards for weapons storage facilities and laboratories began to weaken. Weapons scientists, who had devoted their careers to the Soviet state, were left to drift and forced to moonlight to make a living.⁴

² For more information on nuclear cities and the “nuclear archipelago,” see Allison, Graham T., Cote, Owen R. Jr., et al *Avoiding Nuclear Anarchy: Containing the Threat of Loose Russian Nuclear Weapons and Fissile Material*, Cambridge, MA: MIT Press, 1996.

³ For a more detailed analysis of Russian attitudes, see Kovchegin, Dmitry, “A Russian Perspective on Cooperative Threat Reduction,” BCSIA Discussion Paper 2007-04, Kennedy School of Government, Harvard University, April 2007.

⁴ Biden, Hon. Joseph R. Jr., “Prepared Statement, Increasing Our Nonproliferation Efforts in the Former Soviet Union,” Hearing before the Committee on Foreign Relations. U.S. Senate. 2002.

Essentially, the lack of sufficient, non-human safeguards created the opportunity for theft while the fall of the Soviet Union provided incentive.

To further conceptualize the situation, consider the strength of the Soviet nuclear arsenal at the time of the fall. The U.S.S.R. possessed approximately 27,000 tactical and strategic nuclear weapons, about 1,000 tons of highly enriched uranium, and 200 tons of plutonium.⁵ The expansiveness of the complex resulted in three new nuclear powers, Ukraine, Kazakhstan, and Belarus, and several countries with storage and other miscellaneous infrastructure. With the government in disarray, the status of the nuclear arsenal unknown, and the likelihood of desertion increasing, the potential for proliferation to state and non-state actors posed a viable threat to national and international security.

U.S. Congress' approval of military funding to secure and return the nuclear arsenals of its bitter Cold War rival indicates that the risk of nuclear terrorism in 1992 constituted the more dire threat. Deterrence doctrine met the needs of the Cold War era; however, this doctrine did not adequately address the emerging nuclear threat brought on by the characteristics of terrorist groups.⁶ Such a situation gave rise to the Nunn-Lugar programs.

⁵ Ellis, Jason D., "Cooperative Threat Reduction: Complex Decisionmaking and the Politics of Denuclearization," Ph.D. Dissertation, The American University, 1997.

⁶ The literature suggests that deterrence strategy does not work on terrorist organizations due to certain characteristics, such as the lack of a "return address" and their casual regard for human life; for more information on this debate, see Levi, Michael, "Deterring Nuclear Terrorism," *Issues in Science and Technology*, Spring 2004; Sandler, Todd, and Siqueira, Kevin, "Global Terrorism: Deterrence Versus Pre-Emption," *Canadian Journal of Economics*, Vol. 39, No. 4, pp. 1370-1389; Allison 2004.

II. Issues of Nuclear Terrorism

CTR programs attempt to address the “supply side” of nuclear terrorism⁷ since the international community has limited sway on the demand side. Consider the hundreds of reports over the past several decades indicating attempted or successful theft of nuclear weapons and/or materials.⁸ Prior to 9/11, Al Qaeda attempted to obtain nuclear weapons and materials. Apart from the involvement of Pakistani scientists in providing nuclear expertise, much of the plan revolved around the provision of nuclear materials by the Islamic Movement of Uzbekistan, based in its namesake former satellite state.⁹ Although this plot failed due to the enrichment level of the uranium, Al Qaeda has repeatedly turned to former Soviet satellites in its bid for nuclear weapons. For example, in 1998 alone, Al Qaeda reportedly attempted to: purchase a suitcase nuclear device from a Kazakhstani for \$2 million, purchase twenty nuclear warheads from two Chechen warlords for \$30 million and two tons of opium, and purchase tactical nuclear weapons from a Ukrainian scientist visiting Afghanistan.¹⁰ Such reports only reinforce the fears that non-state actors may one day obtain a nuclear weapon or nuclear material to fabricate a nuclear device.

III. A Fluid Conceptualization of CTR Objectives

Initially, CTR programs had specific and defined objectives intended to deal with a very particular and extraordinary crisis situation. As such, the programs designed and implemented under CTR aimed to mitigate a threat that corresponded with a particular

⁷ Allison, Graham T., *Nuclear Terrorism: The Ultimate Preventable Catastrophe*, New York, Times Books. 2004.

⁸ See Ibid; Aloise, Gene, “Homeland Defense: Greater Focus on Analysis of Alternatives and Threats Needed to Improve DOD’s Strategic Nuclear Weapons Security,” G. A. Office. 2009. For a list of reported thefts, refer to the Nuclear Threat Initiative (NTI) website

⁹ Allison, Graham T. *Nuclear Terrorism: The Ultimate Preventable Catastrophe*, New York, Times Books. 2004.

¹⁰ Ibid

program objective. Sam Nunn described his vision of CTR objectives in *Dismantling the Cold War*.¹¹ Below is Table 1, which highlights various Presidential Administration objectives for CTR programs.¹²

| Administration | Objectives |
|---|---|
| Sam Nunn’s Original Conceptualization: George H.W. Bush | <ul style="list-style-type: none"> • The consolidation of weapons of mass destruction in safe areas away from areas of conflict; • The careful inventory and accounting of these weapons; • Safe handling of them at a time of considerable domestic turmoil in the former Soviet Union; • Safe disposition of these weapons, as called for by arms control agreements and also by common sense; • Assistance in gainfully employing literally thousands of former Soviet scientists who know how to make weapons of mass destruction – who know how to build missiles that can carry weapons of mass destruction around the globe but who often do not know where their next paycheck is coming from and are in great demand for employment by rogue nations and terrorist groups.¹³ |
| Bill Clinton | <ul style="list-style-type: none"> • Destroy nuclear, chemical, and other weapons of mass destruction; • Transport, store, disable, and safeguard these weapons in connection with their destruction; • Establish verifiable safeguards against proliferation of these weapons, their components, and weapons-usable material; • Prevent the diversion of scientific expertise that could contribute to weapons programs in other nations |
| George W. Bush | <ul style="list-style-type: none"> • Dismantle FSU WMD and associated infrastructure • Consolidate and secure FSU WMD and related technology and materials • Increase transparency and encourage higher standards of conduct • Support defense and military cooperation with the objective of preventing proliferation |
| Barack Obama | <ul style="list-style-type: none"> ▪ Dismantles strategic weapons delivery systems and infrastructure ▪ Enhances security and safety of WMD and fissile material during transportation and storage ▪ Consolidates and stores dangerous pathogens at risk for theft, |

¹¹ Nunn, Sam, “Foreword: Changing Threats in the Post-Cold War World.” *Dismantling the Cold War: U.S. and NIS Perspectives on the Nunn-Lugar Cooperative Threat Reduction Program*. W. Potter and J. Shields. Cambridge, MA, The MIT Press: ix-1. 1997.

¹³ Woolf, Amy F., “Nonproliferation and Threat Reduction Assistance: U.S. Programs in the Former Soviet Union,” Washington D.C., Congressional Research Service, 2010.

¹³ Nunn, Sam, “Foreword: Changing Threats in the Post-Cold War World.” *Dismantling the Cold War: U.S. and NIS Perspectives on the Nunn-Lugar Cooperative Threat Reduction Program*, W. Potter and J. Shields. Cambridge, MA, The MIT Press: ix-1. 1997.

| | |
|--|--|
| | <div data-bbox="548 197 1349 449" data-label="List-Group"> <ul style="list-style-type: none"> diversion, accidental release, or use by terrorists ▪ Enhances partner states capacity to develop an early warning system for bioterror attacks and potential pandemics ▪ Facilitates strategic partnerships ▪ Helps prevent proliferation of WMD and related materials ▪ Facilitates defense and military contacts to encourage military reform </div> |
|--|--|

Table 1.

The first few years of CTR implementation corresponded with a broadening definition of the objectives. “Assistance expanded to include efforts to secure materials that might be used in nuclear or chemical weapons, to prevent the diversion of scientific expertise from the former Soviet Union, to expand military-to-military contacts between offices in the United States and the former Soviet Union, and to facilitate the demilitarization of defense industries.”¹⁴ The inclusion of Defense and Military Contacts demonstrates a fundamental shift because it incurs a long-term commitment to develop and maintain contacts with the FSU militaries. Thus the scope of CTR came to include nuclear infrastructure and the human factor, rather than maintaining focus on nuclear warheads alone.

After the Clinton Administration took office, they decided to revise the CTR program objectives. [See Table 1 above]. Few dramatic changes arose from this re-evaluation; most notably they included verifiability in safeguarding nuclear weapons and materials. Senator Nunn’s initial goals included *careful* inventories and accounting, yet this has a very different meaning than *verifiable* inventories and accounting. Senator Nunn’s version implies that the U.S. will have completed the objective once the systems for inventory and accounting exist. Verifiability, on the other hand, implies continued

¹⁴ Woolf 2010.

monitoring of the systems after installation. This one word broadens the scope of CTR programs to projects with infinite timelines because of the ongoing nature of verification.

The Bush Administration completely overhauled CTR objectives after conducting a thorough revision of the programs. Despite expressing its satisfaction with the programs, the Administration drastically shifted the focus of CTR objectives such that some saw it as a “retreat from the long-standing core objectives of the CTR program.”¹⁵ [See Table 1 above]. The usual specificity disappears, replaced by the incredibly general acronym for weapons of mass destruction (WMD). Furthermore, the objectives make no allusion to the destruction of nuclear weapons and infrastructure. More importantly, the objectives specifically emphasize Russian openness, cooperation, and compliance. “The Bush administration indicated that it will place a higher priority on Russian openness, cooperation, and compliance with arms control agreements.”¹⁶

President Obama also revised the CTR objectives when he came into office. [See Table 1 above]. The objectives bear a marked resemblance to pre-Bush Administration objectives, including more specific purposes, but they still demonstrate a degree of generalization that does not apply to earlier versions. Following a trend initiated in the Clinton era, these objectives “...evolved to pursue broader nonproliferation and anti-terrorism objectives.”¹⁷ While the target area of the programs has shifted outside the FSU, the belief remains that, “CTR activities help deny rogue states and terrorists access to WMD and related materials, technologies, and expertise,”¹⁸ thus staying true to the initial intent of the programs. Finally, the only new aspect takes the form of enhancing

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ Ibid.

¹⁸ Ibid.

partnerships, increasing transparency, and working with the international community within the framework of CTR programs.

IV. Proponents' Views of CTR

Cooperative Threat Reduction enjoys overwhelming support throughout much of the literature. Some of the older literature lauds the program for trailblazing in the arena of prevention and criticizes those in the administration and Congress who do not fully back these initiatives.¹⁹ In fact, many books and articles refer to Nunn-Lugar as the most important initiative in preventing nuclear terrorism.²⁰ Various works present CTR programs in a range of ways. While some characterize Nunn-Lugar as a means to focus governments' attention on the issue of "loose nukes," others choose to frame Nunn-Lugar in terms of prevailing Cold War attitudes. Essentially, at the height of the Cold War, how much would the U.S. government and public have willingly paid to dismantle Soviet nuclear warheads, destroy delivery mechanisms, and transfer Soviet nuclear scientists to civilian endeavors?²¹ Senator Richard Lugar himself believes, "the real importance of the Nunn-Lugar Act lies in the fact that it has served to focus the attention officials in the newly independent states on U.S. goals and objectives, particularly with regard to nuclear weapons, defense conversion, and non-proliferation."²² Additionally, many consider CTR as particularly farsighted in terms of scope and applicability to future national security concerns. While this thesis will only consider Cooperative Threat Reduction in

¹⁹ See Duffy, Gloria, "Cooperative Threat Reduction in Perspective;" Gottemoeller, Rose, "Presidential Priorities in Nuclear Policy;" and Nunn 1997.

²⁰ See Allison 2004; Hecker, Siegfried S., "Toward a Comprehensive Safeguards System: Keeping Fissile Materials out of Terrorists' Hands." *Annals of the American Academy of Political and Social Science* 607: 121-132. 2006; Krepon, Michael, "Prisms and Paradigms." *The Nonproliferation Review* 9(1). 2002; and Lugar, Richard G., "Revving Up the Cooperative Nonproliferation Engine," *The Nonproliferation Review*, Vol. 15, No. 2, 2008.

²¹ Nunn 1997.

²² Remarks by Senator Lugar, Hearing before the Committee on Foreign Relations, U.S. Senate, 102 Congress, 2nd Session, Washington, 27 July, 1992

the Russia, many writers believe the U.S. should expand CTR to the Middle East and South Asia,²³ thus establishing a basis for the future relevance of Nunn-Lugar programs.

According to Senator Lugar, Nunn-Lugar programs would remain the only method of verification and transparency should START II and the Moscow Treaty fail.²⁴ Considering the serious threat posed by nuclear terrorism, this statement has various implications. Some authors choose to ignore the politics surrounding Nunn-Lugar programs altogether, instead describing the security threats posed by loose nuclear weapons and materials and intimating that Nunn-Lugar programs play an important role in diminishing those risks.²⁵ The European perspective of CTR, as of 2004, seemed “favourable” and optimistic as to the future and adaptability of Nunn-Lugar programs to changing security needs.²⁶

V. Criticisms of CTR

Although many agree on the usefulness of these programs, criticisms also exist. For example, many experts and politicians disparage²⁷ CTR programs because of the bureaucratic quagmire through which Nunn-Lugar programs wade. Not only must initiators of these programs overcome the U.S. government’s 13-step confirmation process to implement a program, they must deal with the requests and bureaucracy of the recipient country. Senator Sam Nunn, in his Foreword to *Dismantling the Cold War*, also

²³ This has already happened, with programs in places such as Libya

²⁴ Lugar 2008.

²⁵ Woolf, Amy F., “Nuclear Weapons in Russia: Safety, Security, and Control Issues,” Congressional Research Service. 2004.

²⁶ Anthony, Ian, “Reducing Threats at the Source: A European Perspective on Cooperative Threat Reduction,” Oxford University Press. Stockholm International Peace Research Institute. 2004.

²⁷ Allison 2004; Gottemoeller 1997; Gottemoeller, Rose, “Cooperative Threat Reduction Beyond Russia,” *The Washington Quarterly*, Vol. 28, No. 2, Spring 2005, pp. 145-158; Lugar 2008

refers to the “not invented here” syndrome²⁸ with which the Bush Administration treated Nunn-Lugar programs. This attitude resulted in slow starts to obligating funds, thus providing another source of criticism. Cooperative Threat Reduction also constitutes a “phenomenon of reprogramming,”²⁹ as its funding did not originate in a fiscal year budget proposal, nor did it result in the cancelation of another program. As such, the Department of Defense had to find other sources of funding for the program, causing delays and difficulties in allocating funds.

Multiple sources point at “fungibility” as a reason to halt CTR funding. This argument maintains that every dollar the U.S. government spends on Nunn-Lugar programs in Russia, or any former Soviet satellite, frees up dollars that the foreign government can channel elsewhere.³⁰ Such viewpoints have implications for U.S. and Russian quality of life as some contend that CTR actually constitutes Foreign Aid and not national security measures. If viewed as Foreign Aid, opponents of Nunn-Lugar can make a strong argument for spending that money on domestic initiatives, thus improving American quality of life rather than Russian quality of life.³¹ Despite this perception, the governments of some recipient countries viewed, and possibly still view, Nunn-Lugar programs as imperialistic and contrary to the best interests of the recipient nation:

²⁸ This term refers to the tendency of administrations to dislike new initiatives that arise in Congress because the administration did not think of it first

²⁹ Nunn 1997.

³⁰ See Aloise, G. “Nuclear Nonproliferation: Progress Made in Improving Security at Russian Nuclear Sites, but the Long-Term Sustainability of U.S.-Funded Security Upgrades is Uncertain.” G.A. Office. 2007; Duffy, G. “Cooperative Threat Reduction in Perspective.” Dismantling the Cold War: U.S. and NIS Perspectives on the Nunn-Lugar Cooperative Threat Reduction Program. W. Potter and J. Shields. Cambridge, MA, The MIT Press: 23-40. 1997; and Woolf, A. F. “Nuclear Weapons in Russia: Safety, Security, and Control Issues,” Congressional Research Service. 2004.

³¹ Various sources, such as Allison 2004 and Gottemoeller 2005 reference this issue. It is better to think of this in terms of political rhetoric. While it may not have actually been the case, and indeed it may have had more to do with fear of the Russians resulting from years of Cold War conflict, politicians made use of this argument because of its affect on constituencies.

Unofficial and sometimes official complaints have criticized the slow and bureaucratic implementation of projects by U.S. agencies, the lack of timely and consistent information as to the status of various projects, and the imposition of intrusive and sometimes bizarre accounting rules, work plans, and schedules by U.S. contractors and U.S.-supplied equipment to perform CTR tasks, often at higher cost and with longer delays than equally qualified NIS contractors and suppliers, thousands of whom remain out of work.³²

The disparity between U.S. and foreign opinions regarding the implementation of Nunn-Lugar programs complicates relations and increases the difficulty of accomplishing Nunn-Lugar goals.

Dissident factions of Congress also frame Nunn-Lugar programs as subsidies for Russian nuclear and conventional weapons.³³ Their arguments stem from the idea that while the U.S. provides funding to dismantle and convert nuclear weapons and infrastructure, the Russians could spend money on updating their arsenals and building underground military facilities.³⁴ This objection holds significantly less sway in today's Congress; however, it still presents a legitimate concern in assessing the costs and benefits associated with Nunn-Lugar programs. In order to address these concerns, the U.S. government has required multiple measures from both the Russian government and Executive Administration relating to transparency and accountability.³⁵ The counterargument rests in the fact that the U.S. contracts with private firms to supply technology, materials, and services to furnish CTR programs and does not provide the

³² Potter, W. and J. Shields. "Introduction: Assessing the Dismantlement Process." Dismantling the Cold War: U.S. and NIS Perspectives on the Nunn-Lugar Cooperative Threat Reduction Program. W. Potter and J. Shields. Cambridge, MA, The MIT Press: 1-22. 1997.

³³ See Duffy 1997; Gottemoeller 1997; and Woolf, Amy, "Nunn-Lugar Cooperative Threat Reduction Programs: Issues for Congress." Washington D.C., Congressional Research Service, 2002.

³⁴ Bukharin, Oleg, "Minatom and Nuclear Threat Reduction Activities," *Dismantling the Cold War: U.S. and NIS Perspectives on the Nunn-Lugar Cooperative Threat Reduction Program*, W. Potter and J. Shields. Cambridge, MA, The MIT Press: 211-230. 1997.

³⁵ See Aloise, Gene, "Nuclear Nonproliferation: Progress Made in Improving Security at Russian Nuclear Sites, but the Long-Term Sustainability of U.S.-Funded Security Upgrades is Uncertain." G.A. Office. 2007; Woolf 2002; and Woolf 2004.

Russian government with cash. In addition to these complaints, Congress, the Government Accountability Office, and various Congressional Research Service reports cite the slow pace of implementation and lack of Russian Ministry of Atomic Energy (MINATOM) cooperation in some areas as particularly troubling and counter to the original goals of CTR programs.³⁶ A 1995 GAO report on U.S.-Russian Bilateral programs calls Cooperative Threat Reduction programs' progress "promising" but that, "the overall direct material impact – as contrasted with the diplomatic or negotiating impact – of CTR assistance provided as of June 1995 had been limited and the programs still had numerous challenges and problems to realize its long-term objectives."³⁷

³⁶ See Ibid, Duffy, G. "Cooperative Threat Reduction in Perspective." *Dismantling the Cold War: U.S. and NIS Perspectives on the Nunn-Lugar Cooperative Threat Reduction Program*. W. Potter and J. Shields. Cambridge, MA, The MIT Press: 23-40. 1997; and Woolf 2010.

³⁷ See Statement of Harold J. Johnson before the Committee on International Relations, General Accounting Office, "Former Soviet Union: Assessment of U.S. Bilateral Programs" 1995.

Methodology

I. Overview

Repetition in the literature regarding issues blocking the success of Nunn-Lugar programs provides important insight into the sustainability of CTR programs. This list encompasses legal framework, U.S. and Russian bureaucracies, economic feasibility, proper infrastructure, and the partnership relationship between the U.S. and Russia, all of which overlap in some manner. As time passed, the connection between why re-invigorated CTR programs, as well as new programs aimed at ensuring their longevity and protecting the U.S.'s substantial financial investment, emerged.

After establishing the criteria and applying it to the various cases, elite interviews with experts regarding the criteria, their applicability, and their significance will flesh out, as well as add to, the analysis. Throughout this process, I kept in mind the possibility of “triggering events” that may confound “sustainability” as the reason for the development and implementation of new CTR programs.

II. Document Analysis

The information found in documents served as the basis of my research. Analysis of Congressional hearings, government reports, and declassified and unclassified military documents provided information about the various programs, their budget information, domestic sustainability issues of those programs, and changes made in order to offset such problems. These documents also contributed insight into the overall impression held by Congress regarding the future of Nunn-Lugar programs and potential new methods of implementing them. NGO and conference reports presented a less biased

view of the programs, their issues, and how best to resolve those issues, as, generally speaking, such sources draw from an international pool of experts and thus feel less pressure to present facts in a certain light.

A. Document Sources

House and Senate Armed Services Committee Hearings, the Department of Energy's MPC&A programmatic guidelines, program management documents, and project work plans,³⁸ Department of Defense Annual Reports to the President and Congress,³⁹ and Department of Defense Cooperative Threat Reduction program guidelines⁴⁰ provided information on various aspects of sustainability.

Furthermore, the DOD's Cooperative Threat Reduction division and hearings to the House and Senate Armed Services Committees regarding the safety of Russian nuclear materials, sites, and weapons⁴¹ provided information on programs not administered by the DOE. Less biased reports on the safety and security of these programs came from reports by the national laboratories⁴² and the National Intelligence Council – Annual Report to Congress on the Safety and Security of Russian Nuclear Facilities and Military Forces.⁴³ This information helped determine how efficiently implementers conducted programs and shed light on problems and setbacks that arose. DOD Inspector General Audits also aided in identifying and analyzing problems.

For strictly “sustainability” oriented documents, Congress charged the Department of Energy with developing sustainability guidelines for the Russian Ministry

³⁸ Aloise 2007.

³⁹ Woolf 2002; Woolf 2004.

⁴⁰ Aloise 2007.

⁴¹ Ibid; Woolf 2002; Woolf 2004; and Goldman, S. “Russian Political, Economic, and Security Issues and U.S. Interests,” Washington D.C., Congressional Research Service, 2009.

⁴² Woolf 2004.

⁴³ Ibid.

of Defense, including the MPC&A ONIS sustainability framework.⁴⁴ I also referred to DOE MPC&A program directives. To address the relationship between the relevant U.S. departments and Russian agencies, I reviewed documents and testimony from the Government Accountability Office.

Finally, performance testing and operational monitoring reports regarding upgraded sites will provide information about the adequacy of those upgrades.⁴⁵ This information came from the DOE's national nuclear laboratories, such as the Los Alamos National Lab, Sandia National Laboratories, and Oak Ridge,⁴⁶ that participate in lab-to-lab programs with Russian nuclear sites. Such reports provided a basis from which to compare the security cultures of the U.S. and Russia as well as a standard to compare U.S. implementation and maintenance of programs that will be as sustainable as those administered at the U.S. national laboratories.

B. Criteria for Sustainability

1. Legal Framework

Another serious issue stems from the legal framework surrounding CTR programs. For the purposes of this thesis, only the legal framework addressing the partnership of these countries will factor in since specific legalities within Russia do not concern the main issue of the thesis.⁴⁷ While the U.S. and its partner countries in the former Soviet Union have already signed an over-arching "Umbrella Agreement" regarding the implementation of the Nunn-Lugar programs, each new program requires

⁴⁴ Aloise 2007.

⁴⁵ Ibid; Allison 2004.

⁴⁶ Aloise 2007.

⁴⁷ For more information on the legal framework of Russian nuclear safeguards and reasoning, see pages 42-46 of Kovchegin, Dmitry, "Russian Perspective on Cooperative Threat Reduction," BCSIA Discussion Paper 2007-04, Kennedy School of Government, Harvard University, April 2007.

an implementing agreement as well as Presidential verification that the partner country has complied with all the requirements set forth in the umbrella agreement.⁴⁸ Delays or inefficiencies, such as highly restricted access or low levels of verification and transparency, indicate negative interactions while the opposite indicates positive interactions. Additionally, failure to agree on a legal framework, and subsequent substantial delays, constitute extremely negative indicators and severely affect the implementation of the relevant program. Table 2 summarizes this criterion.

| Criterion | Positive Indicators | Negative Indicators |
|------------------|---|---|
| Legal Framework: | <ul style="list-style-type: none"> • High levels of transparency and verification • No delay to implementation as a result of legal issues • Few or no access problems • Quick and efficient agreement on legal framework | <ul style="list-style-type: none"> • Low levels of transparency and verification • Delays in implementation as a result of legal issues • Restricted access • Substantive delays as a result of disagreement on legal framework |

Table 2.

2. Bureaucracy

Implementation of Nunn-Lugar programs requires Congress and the relevant authorities to agree on the procedures and timeline, and coordinate with the administering Russian and U.S. agencies. While this sounds similar to issues surrounding the Russian/U.S. Partnership, the bureaucratic problems have a life of their own.⁴⁹ Multiple instances of intervention by bureaucracies not originally involved with a resulting delay in implementation represent a negative indicator for this criterion. Significant extra-bureaucratic involvement with little or no delay, or no extra-bureaucratic intervention at all, constitutes positive indicators. This criterion deals with intra-government issues, rather than inter-government ones, and focuses on U.S. Department-Department

⁴⁸ For more information about the various verification requirements, see Appendix I of the Hearing before the Committee on Foreign Relations, United States Senate, 102 Congress, Second Session, 27 July 1992.

⁴⁹ Kovchegin 2007.

interactions and Russian Agency-Agency interactions. Therefore, the levels of cooperation within these bodies also factors in, with low levels of cooperation characterized by in-fighting and disagreement, indicating negative effects, and the opposite indicating positive effects. The positive and negative indicators described above apply uniformly across bureaucratic relationships. Table 3 summarizes this criterion.

| Criterion | Positive Indicators | Negative Indicators |
|--------------|--|---|
| Bureaucracy: | <ul style="list-style-type: none"> • Little or no meddling by agencies not involved • High degree of cooperation between U.S. departments • High degree of cooperation between Russian agencies • Few or no delays resulting from intervention | <ul style="list-style-type: none"> • Extensive meddling by agencies not involved • Low levels of cooperation between U.S. departments • Low levels of cooperation between Russian agencies • Various and significant delays resulting from intervention |

Table 3.

3. Economic Feasibility

The question of economic feasibility presents the most daunting challenge for CTR programs – can the Russian and/or the upgraded sites financially support themselves in the absence of U.S. funding? Since 1998, the Russian economy has experienced growth, seen the emergence of a middle class, and witnessed doubling of real disposable incomes. It suffered losses in the recent recession due to dependency on oil and natural gas exports; however, as of mid-2009, the crisis seems to have bottomed out and the economy once again shows signs of slow growth.⁵⁰ Despite such setbacks, the Russian economy seems in a better position to shoulder the financial burden of CTR.⁵¹ The volatile nature of the Russian economy and the lack of transparency on budget issues

⁵⁰ For a more comprehensive look at the Russian economic situation, refer to the CIA World Factbook on Russia, from which all this economic information came: Access date 9-26-2010 <https://www.cia.gov/library/publications/the-world-factbook/geos/rs.html>

⁵¹ For further reading on the ability of the Russian economy to take over CTR funding (although keep in mind the date of the work) see pages 46-50 in Kovchegin 2007.

present difficulties for measuring, the fact that some programs were successfully implemented despite the poor economy. Thus the indicators will stem from a judgment of sufficiency. Essentially, this criterion measures the sufficiency of the budget to accomplish the program’s goals within the program’s scope. An expansive scope incurs more burden, negative, than a minimal scope, while other factors include the presence, positive, of Nth part funders or absence, negative, of said funders. Table 4 summarizes.

| Criterion | Positive Indicators | Negative Indicators |
|-----------------------|---|--|
| Economic Feasibility: | <ul style="list-style-type: none"> • Sufficient funding to achieve the goals of the program • Access to funding sources outside the U.S. government • Minimal scope or finances sufficient to cover the scope of the program | <ul style="list-style-type: none"> • Insufficient funding to achieve the goals of the program • No funding received outside the U.S. government • Expansive and burdensome scope, or insufficient funds for the program’s scope |

Table 4.

4. Infrastructure

Sustainability of programs cannot occur without proper infrastructure. In a speech to the Russian Security Council in 2003, President Vladimir Putin indicated that, despite certain requisite infrastructure such as export controls, “Russia does not have a comprehensive system necessary to meet” sustainability challenges.⁵² The infrastructure required to support CTR activities encompasses regulations, inspection capabilities, positive and negative incentive systems, technical support facilities to service the upgrades, evaluation measures, and information networks.⁵³ The first type of infrastructure exists on a conceptual level and involves the development of an intellectual framework from which to base future security and upgrade initiatives. The second type,

⁵² Opening address at Security Council Meeting, December 3, 2003; adapted from Dmitry Kovchegin, “Russian Perspective on Cooperative Threat Reduction,” BCSIA Discussion Paper 2007-04, Kennedy School of Government, Harvard University, April 2007.

⁵³ Potter, William C. and Wehling, Fred L. “Sustainability: A vital component for nuclear material security in Russia,” *The Nonproliferation Review*, Vol. 7, No. 1, 180-188, 2000.

which includes regulations, inspection capabilities, and positive and negative incentive systems, exists on a managerial level. In other words, it refers to a network of offices that coordinate the administration, upkeep, and trouble-shooting of these programs. The presence or absence of such offices will indicate whether the factor is positive or negative, respectively.

The next type of infrastructure involves maintaining security upgrades, ensuring compliance with regulations, evaluating measures for potential and existing upgrades, and training and engaging new members of the nuclear work force. It exists on an implementational level whereby officials enforce the orders and standards of the managerial offices and the upgrades themselves receive technical support.⁵⁴ Again, the presence or absence of these indicators will gauge whether the criteria has a positive or negative impact on the sustainability of a program. Furthermore, if the relevant infrastructure already exists in Russia, it constitutes a higher degree of positivity than a scenario in which the U.S. must pay for and build up the infrastructure.

The final level of infrastructure consists of a communication network to provide assistance, discussion on better methods, and general support.⁵⁵ Such networks exist in various other industries and provide workers with education, information, and a social network to rely on. Again, the presence or absence of this type of network in different programs, as well as the relative success of those networks, signifies positive or negative indicators. Table 5 provides a summary.

⁵⁴ Ibid.

⁵⁵ Ibid.

| Criterion | Positive Indicators | Negative Indicators |
|-----------------|--|--|
| Infrastructure: | <ul style="list-style-type: none"> • Initial evaluation measures for potential upgrades • Existence of an underpinning intellectual framework • Regulation, inspection, and incentive capabilities in place • Presence of technical support and maintenance facilities • Personnel training programs in place • Existence of a communication network | <ul style="list-style-type: none"> • Lack of initial evaluation measures for potential upgrades • No intellectual framework • Absence of regulation, inspection, and incentive systems • No technical or maintenance facilities • No personnel training program • Absence of a communication network |

Table 5.

5. Partnership

Building a true partnership between the U.S. and Russia faces various challenges stemming from the Cold War era. The pervasive mistrust arising from years of conflict did not simply evaporate after the fall of the Berlin Wall and therefore played a role in the relationships and framing of the programs.

Even if prevailing Cold War attitudes have disappeared, “both parties must still maintain their respective national security interests, such as the need to maintain both a reliable nuclear deterrence and commercially applicable technologies developed in the weapons industry.”⁵⁶ This criterion occurs on two levels: political and implementational. The political indicators include presidential interactions and whether they are constructive – positive – or obstructive – negative.⁵⁷ The second level occurs in the actual implementation of programs, and includes adherence to program guidelines,

⁵⁶ Kovchegin 2007.

⁵⁷ An example of negative political interaction would be if a president/official met with a Russian counterpart and either failed to reach an agreement or enacted policy obstructive to the implementation of CTR.

specific installation details, and attitudes of Russian workers and officials. Table 6 summarizes.

| Criterion | Positive Indicators | Negative Indicators |
|-------------------------|--|---|
| Political Relationship | Constructive – do not result in delays or removal of a program | Obstructive – the partners can’t agree, resulting in delays or removal of a program |
| Adherence to Guidelines | Achieves the goals established in the guidelines | Fails to achieve the goals set forth in the guidelines |
| Installation Details | Installation occurs smoothly | Installation is problematic and faces various difficulties, such as technical |
| Russian Attitudes | Demonstrable buy-in and adherence to rules | Careless attitudes and actions |

Table 6.

C. Case Studies

1. Three Types of Programs?

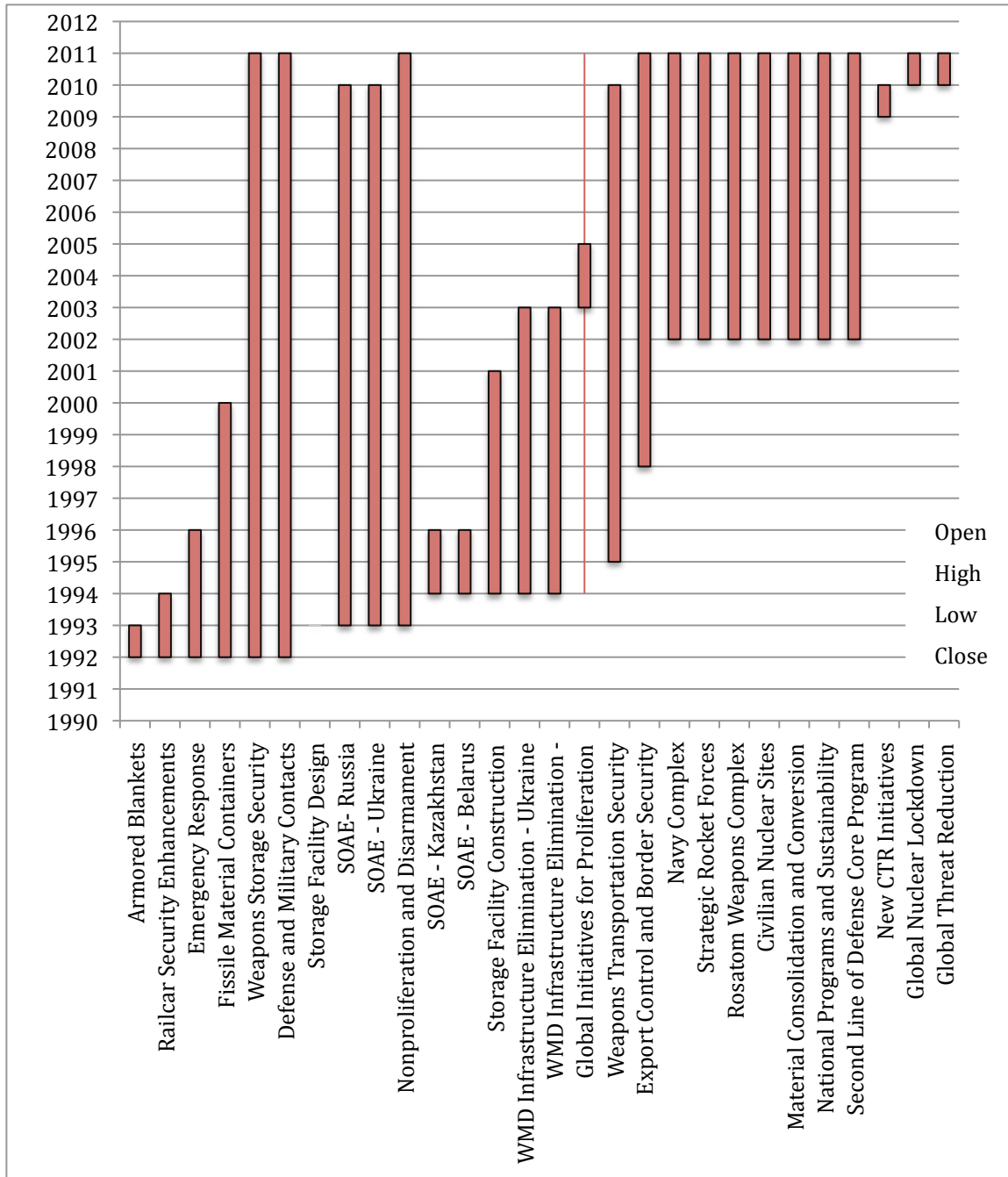
After looking at the programs and their characteristics, I tried to establish three categories into which all the programs would fit: “tangible” projects, “mixed” projects, and “sustainability” projects. The “tangible” programs, occurring within five years of CTR’s implementation, would focus on specific threats and projects with traits such as specificity, the provision of technology and other security upgrades, and the dismantlement of nuclear infrastructure. The second category of programs, generally appearing within ten years, would tend to exhibit a “mixture” of early characteristics and sustainability-oriented traits, including an undefined timeframe and budget, a specific and well-defined project, “sustainability” activities, and verification requirements. The final category of programs, developing later on, aimed to address sustainability issues.

Program characteristics include the lack of a finite budget or timeframe, a significant educational component, a focus on the “human factor,” and a more global aim. Graph 1

below presents a timeline for budgeted CTR programs, and seems to fit with these categories.

Although seemingly an acceptable framework, after analyzing case studies it became apparent that this categorization did not work. Too many outliers exist and the programs often meld into one another, making it difficult to draw such specific boundaries. However, the existence of one significant division between programs holds true: “big ticket” projects, and ongoing ones. “Big-ticket” items, as termed by Ambassador Bonnie Jenkins⁵⁸, the United States Department of State Ambassador for Threat Reduction, had a finite budget and time frame, after which the program, ideally, would cease to be necessary. This division appears throughout CTR programs, but does not allow for a specific separation and categorization of programs.

⁵⁸ On July 29, 2010, Ambassador Jenkins spoke at Columbia University on Cooperative Threat Reduction programs, where she characterized many of the finished programs as “big-ticket” items that no longer needed U.S. funding because they had been completed. This group of programs includes such facilities as the Mayak Fissile Material Storage Facility, among others.



2. Case Study Choices and Reasoning

The original plan called for one case study per type of program; however, since these categories failed as a theory, I worked with the programs already chosen and selected Weapons Transportation Security to replace National Programs and Sustainability because of its inter-relatedness with Railcar Security Enhancements. Due

to space constraints and the desire to delve deeply into each program, I chose a representative sample of programs to analyze, with the option of changing programs available. I chose the Railcar Security Enhancements (RSE) program because it has the highest probability of interaction between U.S. and Russian personnel. Also, various railways had to undergo upgrades, thus providing more room for error than other programs, which simply supplied upgraded technology, materials, and emergency vehicles. Railcar Security Enhancements encompasses all that and includes a transportation component, which most acknowledge as the most vulnerable aspect of nuclear safeguarding.

I also chose Weapons Storage Security (WSS) for very simple reasons. It constitutes one of the most problematic programs in the CTR arsenal on most levels, including bureaucracy, legal framework, and partnership, meaning that there will be a great deal of information available for analysis – almost more so than any other program except perhaps Export Controls and Border Security. Finally, Weapons Transportation Security (WTS) replaced National Programs and Sustainability because the objectives of Railcar Security Enhancements melded into WTS and because the information I already had indicated that it would represent an intermediate program, in terms of success, to the other two.

III. Elite Interviews

My goals include gathering professional opinions about CTR, uncovering information that may not appear in documents, and gaining a more personalized perspective on Nunn-Lugar sustainability issues. I interviewed experts with a stake in CTR, such as Graham Allison, and expanded my list of interviewees through suggestions

made by initial interviewees. In order to obtain a well rounded picture of the Nunn-Lugar programs, I interviewed those who actually administered the programs and therefore have firsthand knowledge of the issues and steps being taken to overcome those issues. This list also expanded based on contacts suggested by the original interviewees. Emails provided the primary means of contact for interviewees.

I conducted interviews in a semi-structured manner, developing broad questions to initiate and facilitate the discussion and allowing the conversation to flow as interviewees expressed their opinions and follow-up questions arose. In order to promote a more efficient discussion, I researched each interviewee prior to meeting with them. I have yet to encounter resistance to voice recording; however, should an interviewee feel uncomfortable with recording conversations, I will offer the option of handwritten notes. [See Appendix III for an outline of questions] In preparing for the interviews, I referred to literature provided throughout the Honors Seminar.

IV. Intangibles & Problems to Address

Any thorough policy analysis should acknowledge the shifts in political atmosphere from the inception of the program until the present. The change in leadership from Putin to Medvedev could have had an impact on the implementation of Nunn-Lugar programs due to leader preferences and differing levels of transparency. This is something I will attempt to address through interviews. Over the years, the programs have evolved to meet the changing needs of the situation. As such, questions regarding the “sustainability” of programs that began in different years may also change. Should it become obvious through the course of analysis that this has happened, I will change my questions accordingly and be sure to address it as part of my discussion.

Certain problems arose as I conducted my research, including the ability to access all the information I needed, as some documents remain classified, unavailable, or non-existent. For example, despite the aid of two university library specialists on Russian and Slavic studies and two Library of Congress librarians specializing in Russian and Slavic studies and Russian Law, I could not find Russian counterparts to American documents regarding the initial program guidelines, audits, and directives. I have yet to encounter problems in obtaining access to interviewees, but recognize that this might still occur.

Case Study Analysis:

I. Railcar Security Enhancements

1. Program Description

Railcar Security Enhancements' (RSE) conceptual framework emerged in 1992 when the Russians and U.S. administration agreed on seven areas of cooperation.⁵⁹ The Russian railcar fleet was ill-equipped to safeguard the influx of nuclear cargo returning to Russia from Kazakhstan, Belarus, and Ukraine, thus creating a serious security concern. Additionally, "within each state, the weapons were dispersed among hundreds of deployment and storage areas."⁶⁰ Thus the diffuse nature of the Soviet arsenal exacerbated the security concern. FY1992-FY1994 contained RSE funding allocations, totaling \$21.5 million.⁶¹ Although originally designed by DOD, RSE implementation occurred under the direction of DOE and Sandia National Laboratories, "which [was] the integrating contractor for the project."⁶²

RSE's purpose lies in upgrading railcars to facilitate the safe transportation of nuclear weapons and materials. This goal aligns with Presidents Gorbachev and Yeltsin's agreements to remove tactical nuclear weapons from Non-Russian states, as well as pledges by those FSU states in accordance with the Lisbon Protocol to the START I Treaty.⁶³

⁵⁹ Statement of Maj. Gen. William F Burns, US Army, Retired, Special Envoy on the Safety, Security, and Dismantlement of Nuclear Weapons, Department of State; Hearing before the Committee on Foreign Relations United States Senate 102 Congress, 2nd Session, Washington, 27 July 1992.

⁶⁰ Woolf 2010.

⁶¹ Bunn, Matthew, et al. "Controlling Nuclear Warheads and Materials: A Report Card and Action Plan," Project on Managing the Atom. March 2003.

⁶² Nuclear Threat Initiative (NTI) – Transportation Security/Railcar Security Enhancements; <<http://www.nti.org/db/nisprofs/russia/forasst/ctr/wpca>>

⁶³ For a description of the nuclear weapons based in non-Russian republics in 1991, see Woolf 2002, 2004.

2. Legal Framework

The underpinning legal framework for RSE includes the Umbrella Agreement and an implementing agreement identifying the specific parameters unique to RSE. This second framework took longer to reach than other, comparable, programs.⁶⁴ Despite this, U.S. CTR implementers believed that the two parties would quickly conclude RSE's implementing agreement. "The Russians earlier identified a need to upgrade railcars which they use for transportation of nuclear material. We hope to have a package to offer them at a meeting in Moscow next month which would identify ways of improving the railcars in terms of safety and security."⁶⁵ This implies that the partners would quickly reach an agreement.

The Umbrella Agreement allowed CTR cooperation in transportation security, "The Parties may cooperate in the following areas...the improvement of systems of MPC&A, including those related to the transportation of nuclear materials."⁶⁶ This statement both acknowledges the importance of transportation security as well as provides a legal basis for cooperation in this matter. If the Umbrella Agreement had failed to incorporate transportation security, the parties would have needed more time to establish a relevant legal framework, resulting in delays. Thus RSE's legal framework appears relatively streamlined and unproblematic.

The Umbrella Agreement also outlined who may participate in CTR activities: "the Executive Agents may involve other ministries or agencies, laboratories, facilities

⁶⁴ Statement of Maj. Gen. William F Burns, US Army, Retired, Special Envoy on the Safety, Security, and Dismantlement of Nuclear Weapons, Department of State; Hearing before the Committee on Foreign Relations United States Senate 102 Congress, 2nd Session, Washington, 27 July 1992

⁶⁵ Ibid

⁶⁶ Agreement between the Government of the United States of America and the Government of the Russian Federation Regarding Cooperation in the Area of Nuclear Material Physical Protection, Control and Accounting, Article I, Paragraph 2, Part b. June 17, 1992.

and organizations in the joint cooperation to implement this agreement.”⁶⁷ This allowed DOD to recruit both DOE and Sandia as key implementers in RSE. Such an agreement forestalled further bureaucratic problems arising from meddling of two departments rather than working directly with Russian counterparts.

3. Bureaucratic Politics

Implementers probably avoided delays caused by bureaucratic politics when they allowed Sandia to work directly with the Russians. Despite such pessimistic views of the bureaucratic situation, Major General William Burns characterizes cooperation among DOE, DOD, and State thus, “I must say that I have been very pleasantly surprised with the degree of cooperative effort I have seen.”⁶⁸ This indicates a high level of coordination and resultantly few delays. On the other hand, General Burns describes the Russian bureaucratic situation as facing several problems, indicating that, after the Soviet fall, Russian bureaucracies had yet to fully materialize and operationalize, resulting in challenges related to the implementation of CTR programs.

The timeline reveals delays resulting from technical difficulties. “Difficulties in adapting surplus U.S. railcars for carrying nuclear warheads on Russian railways led to a 2-year effort to develop hardware for enhancing Russian railcars.”⁶⁹ Thus, although delays occurred, they did not reflect poor bureaucratic relationship, but rather difficulties in adapting technology to the Russian railcars. Additionally, despite initial delays, installation of kits occurred rapidly, “as of February 15, 1994, 10 conversion kits had been shipped to Russia. Delivery of another 105 kits is scheduled to be completed by

⁶⁷ Ibid: Article III, Paragraph 2. June 17, 1992.

⁶⁸ Statement by General Burns in response to a question posed by Senator Richard Lugar; Hearing before the Committee on Foreign Relations United States Senate 102 Congress, 2nd Session, July 27, 1992.

⁶⁹ U.S. GAO “Weapons of Mass Destruction: Reducing the Threat from the Former Soviet Union,” Report to Congressional Requesters, October 1994.

October 1994.”⁷⁰ The Tver Railcar Plant installed the last kit in 1996,⁷¹ indicating fairly rapid installation with no further delays recorded in the documents.

4. Economic Feasibility

U.S. and Russian analysts determined that the number of railcars enhanced through RSE comprised a sufficient number of upgrades, given the expressed needs for transporting SNM. Both DOD and State hold this view, with State saying, “The Russian request for 115 kits is based on their assessment of their requirement for rail transport to support dismantlement,”⁷² and DOD asserting, “the DOD met all the Russian requirements and requests, and the U.S. analysis of the original Russian request concluded the 115 modification kits was the right amount.”⁷³ However, the U.S. Government Accountability Office disagrees, and thus implicitly rejects the sufficiency of this project, by indicating that despite agreement between U.S. and Russian analysts, “the railcar modification kits will not remedy all shortcomings. The Russians had asked for no more than 115 kits ... because such equipment increased the weight of their railcars.”⁷⁴ This assumes that the Russians would have requested more kits had they not proven prohibitively heavy.

At the time of the program’s implementation, developing program technology in the U.S. proved more cost effective. “We were able to demonstrate to them that a much

⁷⁰ U.S. GAO “Weapons of Mass Destruction: Reducing the Threat from the Former Soviet Union,” Report to Congressional Requesters, October 1994.

⁷¹ Bukharin, Oleg. “Nuclear Safeguards and Security in the Former Soviet Union,” *Survival*, Winter 1994-1995, p.63-64; Department of Defense, “CTR Update: Russia,” 19 September, 1996; Source: NTI <<http://www.nti.org/db/nisprofs/russia/forasst/ctr/wpca>>

⁷² Letter from Carolyn S. Lowengart, Director, Management Policy, State Department, to Frank C. Conahan, Assistant Comptroller General, National Security and International Affairs Division, U.S. GAO, in response to inquiries about CTR programs, 2 June, 1994.

⁷³ Letter from Gloria Duffy, Deputy Assistant Secretary of Defense and Special Coordinator for Cooperative Threat Reduction, Department of Defense, to Joseph E. Kelley, Director, National Security and International Affairs Issues, U.S. GAO, in response to inquiries about CTR programming, 25 August, 1994.

⁷⁴ U.S. GAO “Weapons of Mass Destruction: Reducing the Threat from the Former Soviet Union,” Report to Congressional Requesters, October 1994.

more cost-effective way would be to build [insert project need here] in accordance with our plans in the United States.”⁷⁵ Thus, from the beginning, implementers looked for the most cost-effective way to carry out RSE. Furthermore, RSE program guidelines as described by Sandia National Laboratories indicate the original expectations for life-span of railcars: “the project has set requirements for upgrading railcars that have a minimum ten years of useful life and that are in good mechanical condition.”⁷⁶ The railcars to receive upgrades, while still having a decade or more usable lifespan, clearly would require upgrades in the future, and this statement of lifespan implicitly acknowledges that.

Finally, Great Britain did provide some financial support by allocating, “about 30 million pounds which they have committed.”⁷⁷ The additional funding towards safeguarding nuclear materials in transit helped alleviate the U.S. financial burden at the time, but did little to improve the long-term sustainability of the program since the funds went towards purchasing supplies and equipment that would eventually require replacement.

⁷⁵ Statement of Maj. Gen. William F Burns, US Army, Retired, Special Envoy on the Safety, Security, and Dismantlement of Nuclear Weapons, Department of State; Hearing before the Committee on Foreign Relations United States Senate 102 Congress, 2nd Session, July 27, 1992.

⁷⁶ Garcia, Michael R., Gronager, John E., and Shemigron, Nikolai N. “Security Improvements for Rail Movements of SNM,” Sandia National Laboratories, Department of Energy, United States of America, 1998; Source: NTI

<<http://www.osti.gov/bridge/purl.cover.jsp;jsessionid=ADB04656C7C5FA82572180D316659BED?purl=/629456-KEN9eG/webviewable/>>

⁷⁷ Statement by General Burns in response to a question posed by Chairman Claiborne Pell; Hearing before the Committee on Foreign Relations United States Senate 102 Congress, 2nd Session, July 27, 1992, Washington

5. Infrastructure

Consider the questions and concerns addressed at the time – few contemplated the long-term viability of this program, beyond the supposed ten-year life span of the railcars. Therefore, the development of infrastructure did not occur throughout the implementation of this program.

6. Partnership

The political partnership appeared strong and highly cooperative. At the outset, Russian and U.S. presidents endorsed these programs and rarely obstructed their progress. The Umbrella Agreement stipulates that the U.S. Presidential Administration must annually certify the partner state as having fulfilled certain obligations before the distribution of financial and logistical aid occurs.⁷⁸ The Administration certified Russia throughout RSE implementation; therefore, this clause did not cause problems or delays.⁷⁹

The second level of the U.S.-Russian partnership occurs on an implementational level and encompasses several variables, such as the installation process. According to Oleg Bukharin, Russian companies completed the upgrades, “installed in railcars in Tver, Russia...by the Tver Railcar Plant, which had been selected as a contractor.”⁸⁰ Implementation of RSE occurred in two phases: first, Sandia designed the upgrades; second, Tver Railcar Plant installed those upgrades. While the Americans and Russians did work together on aspect of RSE, Sandia carried out the first phase in the U.S.,

⁷⁸ Agreement between the Government of the United States of America and the Government of the Russian Federation Regarding Cooperation in the Area of Nuclear Material Physical Protection, Control and Accounting, June 17, 1992.

⁷⁹ For more information, see “Executive Branch Certifications” in the Appendix to the Hearing before the Committee on Foreign Relations, United States Senate, 102 Congress, Second Session, 27 July, 1992

⁸⁰ Bukharin, Oleg. “Nuclear Safeguards and Security in the Former Soviet Union,” *Survival*, Winter 1994-1995, p.63-64; Department of Defense, “CTR Update: Russia,” 19 September, 1996; Source: NTI <<http://www.nti.org/db/nisprofs/russia/forasst/ctr/wpca>>

requiring little interaction; and Tver completed the second half, with U.S. involvement as an inspector.

Sandia indicated that, “the goal of this MPC&A project⁸¹ is to significantly increase the security of Russian MINATOM highly enriched [Special Nuclear Material] SNM rail shipments.”⁸² “Significant” improvements encompass two possible interpretations: installation of security upgrades reflecting Western standards; or security upgrades that significantly improved on the abysmal previous situation. The State Department perspective reflects the latter interpretation, indicating that the original goal was not to make the railcars safe by Western standards.⁸³ DOD agrees with State, saying that, “while those kits will not enhance every nuclear warhead transport railcar in Russia’s inventory, and will not make the Russian weapons transportation system safe by Western standards, that was not the intent.”⁸⁴ The consensus points to adherence with levels of security deemed mutually satisfactory to the partners.

Attitudes of Russian workers also present challenges and sources of tension in implementing CTR programs. However, a separation exists between the attitudes of officials and those of day-to-day workers. For officials, General Burns describes the situation thus: “Naturally they have their own interests. Naturally they have their own security concerns. Naturally they are suspicious of our motives sometimes, as we are of

⁸¹ NOTE: Railcar Security Enhancement, while budgeted as its own project, fell under the authority of the Department of Energy who entitled any project that aimed to secure Russian Special Nuclear Materials (SNM) as part of the DOE’s Material Protection, Control, & Accounting (MPC&A) Program.

⁸² Garcia, et al, 1998.

⁸³ Letter from Carolyn S. Lowengart, Director, Management Policy, State Department, to Frank C. Conahan, Assistant Comptroller General, National Security and International Affairs Division, U.S. GAO, in response to inquiries about CTR programs, 2 June, 1994.

⁸⁴ Letter from Gloria Duffy, Deputy Assistant Secretary of Defense and Special Coordinator for Cooperative Threat Reduction, Department of Defense, to Joseph E. Kelley, Director, National Security and International Affairs Issues, U.S. GAO, in response to inquiries about CTR programming, 25 August, 1994.

theirs, but I would say in the normal course of events, this is not comparable at all to the kinds of discussions I had with Soviet officials 10 years ago.”⁸⁵ Dr. John Birely also weighs in on this situation: “I think in those areas where communication has not been as speedy as we would have liked, some of the factors arise, the ones that General Burns mentioned, namely suspicion. We are dealing with things that have been state secrets for many years, things they were very reluctant to bring to the inspection of the outside.”⁸⁶ Thus, suspicion often characterized interaction between U.S. and Russian officials.

For Russian workers, the situation revolved less around suspicion and more around working relationships. “While we can urge and cajole and suggest, and even demand at times, we cannot make them do things and we cannot make them move against what they consider to be their best interests and their best judgments. So part of the process and part of our problem is that some parts of the process are moving faster than the others.”⁸⁷ Thus the process may have taken longer than in programs implemented later on simply because of insecurities in both parties about the nature of the relationship. Sandia weighs in on this relationship, indicating that, “A significant part of the project is to promote teamwork, cooperation, and consensus.”⁸⁸ Building workable partnerships from the beginning fosters understanding, respect, and cooperation; thus the acknowledgement of this aspect suggests better relationships between the partners than

⁸⁵ Statement by General Burns in response to a question posed by Senator Alan Cranston; Hearing before the Committee on Foreign Relations United States Senate 102 Congress, 2nd Session, July 27, 1992.

⁸⁶ Statement by Dr. Birely in response to a question posed by Senator Alan Cranston; Hearing before the Committee on Foreign Relations United States Senate 102 Congress, 2nd Session, July 27, 1992.

⁸⁷ Statement by General Burns in response to a question posed by Senator Richard Lugar; Hearing before the Committee on Foreign Relations United States Senate 102 Congress, 2nd Session, July 27, 1992.

⁸⁸ Hazel R. O’Leary, Secretary of Energy, United States of America, and Viktor N. Mikhailov, Minister for Atomic Energy of the Russian Federation, “Joint Statement on Nuclear Material Protection, Control, and Accounting during Transportation,” 16 July, 1996; Source: NTI <<http://www.nti.org/db/nisprofs/russia/fulltext/gcc/gcc24.htm>>

would be possible if Sandia had simply ignored this factor. Table 7 sums up the evaluation of RSE’s criteria.

| Criterion | Positive | Negative | Overall |
|----------------------|---|--|---------|
| Legal Framework | No delays resulting | X | ++ |
| Bureaucracy | No interference Good Communication | Russians faced challenges | + |
| Economic Feasibility | Sufficient 10 years expected life | Did not consider beyond the 10 years expected | ++ |
| Infrastructure | N/A | N/A | N/A |
| Partnership | Quickly and successfully implemented | Delays due to technology Suspicion | + |

Table 7.

II. Weapons Transportation Security

1. Program Description:

Weapons Transportation Security (WTS) handles all aspects of transporting nuclear weapons and materials. In accordance with this mandate, WTS, “assists in the secure transport of 1,000-1,500 warheads per year.”⁸⁹ WTS also provides technical and material upgrades such as railcar upgrades and storage containers,⁹⁰ as well as emergency response vehicles and personnel training.⁹¹ As stated by Sandia National Laboratories, “the goal of this MPC&A project is to significantly increase the security of Russian MINATOM highly enriched SNM rail shipments.”⁹² Initial budgeting for this project occurred in FY1995 and continues today with President Obama requesting FY2011 funding. Program expenditures to date total \$336.9 million.

2. Legal Framework

The legal framework for WTS includes the Umbrella Agreement and an implementing agreement identifying specific parameters for WTS. The Umbrella

⁸⁹ For a description of the nuclear weapons based in non-Russian republics in 1991, see Woolf, Amy F. *Nuclear Weapons in Russia: Safety, Security, and Control Issues*, Congressional Research Service.

⁹⁰ Woolf 2010.

⁹¹ Ibid.

⁹² Garcia, et al 1998.

Agreement allows for CTR cooperation on transportation security, “the Parties may cooperate in the following areas...the transportation of nuclear materials.”⁹³ Including transportation security in the initial agreement provides the basic legal basis for cooperation in this arena. Exclusion of this element would have resulted in delays for the program while the parties established a foundational legal framework for transportation security.

Umbrella Agreement establishment of DOD’s ability to delegate agent authority also impacts WTS. “The Executive Agents may involve other ministries or agencies, laboratories, facilities and organizations in the joint cooperation to implement this agreement.”⁹⁴ Such a statement has key importance because it allowed DOD to enlist DOE and Sandia as lead implementers. Without this piece of the agreement, provision of upgrade materials to Russian partners may have face detrimental delays arising from a bureaucratic system complicated by the need to pass everything through DOD.

The Umbrella Agreement’s clause requiring annual presidential verification caused problems for WTS between 2002-2003 when the Bush Administration did not certify Russia as having met its humanitarian requirements.⁹⁵ All CTR funding and logistical aid ceased While Russia and the U.S. worked to rectify the situation.⁹⁶ Therefore, the legal framework presented problems for WTS in the form of lengthy delays.

⁹³ Agreement between the Government of the United States of America and the Government of the Russian Federation Regarding Cooperation in the Area of Nuclear Material Physical Protection, Control and Accounting, Article I, Paragraph 2, Part b. June 17, 1992.

⁹⁴ Agreement between the Government of the United States of America and the Government of the Russian Federation Regarding Cooperation in the Area of Nuclear Material Physical Protection, Control and Accounting, Article III, Paragraph 2. June 17, 1992.

⁹⁵ Woolf 2004

⁹⁶ Woolf 2010.

3. Bureaucracy:

According to Sandia National Laboratories, “The task of providing railcar transportation security is complicated by the involvement of many Russian organizations, including MINATOM, MINATOM shipping/receiving sites, MINATOM design certification enterprises and institutes, the Ministry of Railways, the Ministry of Emergency Situations, the Ministry of Internal Affairs (MVD), and other.”⁹⁷ This statement clearly indicates difficulties in the Russian interagency relationship and resultant complications for the program. Additionally, although problems arising from initially attempting to create an agency died down, the Russian agencies have consistently restructured over the past several years, introducing delays.⁹⁸

The GAO criticized the U.S. bureaucratic partnership as lacking in cooperation and communication, particularly between DOE and DOD.⁹⁹ As a result, the two departments established a Joint Committee to improve coordination and thereby smooth implementation. Despite such measures, bureaucratic politics will always play a role in the implementation of these programs, resulting in delays. According to Mr. Hartanov, although such delays still occur, the time lapse in implementation has significantly reduced from 2-3 years in 1992, to only a few months in the present situation.¹⁰⁰

The documents indicate reveals few delays in timeline. Beginning in 1996, Russian requests reflected further need regarding the safe transportation of nuclear weapons and materials. Thus implementers began conceptualizing of new upgrades, relevant infrastructure, and a security concept. In 1998, the Russian MOD requested

⁹⁷ Garcia, et al 1998.

⁹⁸ Gottemoeller 2005.

⁹⁹ “Weapons of Mass Destruction: Nonproliferation Programs Need Better Integration,” U.S. GAO, January 2005.

¹⁰⁰ Mr. Hartanov expressed this view on Thursday, December 2, 2010 during a conversation I had with him. Mr. Hartanov worked as a staffer for Senator Lugar before moving to the DTRA and has spent significant amounts of time in the U.S. and abroad working on CTR programs.

maintenance and certification assistance for its railcars, plus 100 additional cargo railcars. In April of 1999, DTRA provided assistance, through Sandia, to MOD for maintenance and certification of 215 railcars – the 115 original plus the 100 additional railcars. Additionally, during this same month,¹⁰¹ MOD requested DOD assistance in acquiring 115 new railcars to replace a portion of railcar inventory that is “obsolete, beyond economical repair, and reaching the end of Russian Ministry of Railways-mandated service life.”¹⁰² This request was approved for FY2000, although the contract lagged two years, with awarding occurring in 2002.

4. Economic Feasibility:

From the beginning Great Britain provided funding for WTS, “there are larger containers, so-called supercontainers, that are used to transport several of these in a railcar... The British Government has agreed to provide a number of these containers for Russia... this totals about 30 million pounds which they have committed.”¹⁰³ This 30 million pounds also provided armored trucks and other emergency equipment.¹⁰⁴ Thus the U.S. did not shoulder the financial burden alone. The scope of the original guidelines encompasses, “on-train security of single train shipments, [and] system security issues that includes the tracking and monitoring of all trains shipping SNM cargoes.”¹⁰⁵ The program’s geographical spread includes all transportation sites, and thousands of miles of railway.

In FY2007, Congress authorized an additional \$30 million beyond what the administration requested; in FY2008, the administration requested and Congress

¹⁰¹ Timeline gleaned from Ellis 2002; Garcia, et al 1998; and Woolf 2010.

¹⁰² Garcia, et al 1998.

¹⁰³ Statement by General Burns in response to a question posed by Chairman Claiborne Pell; Hearing before the Committee on Foreign Relations United States Senate 102 Congress, 2nd Session, July 27, 1992. Washington

¹⁰⁴ Ibid

¹⁰⁵ Ibid

authorized \$37.7 million. FY2009 saw an increase in funding requests, with DOD asking for \$40.8 million. Another increase came in FY2010 when President Obama requested \$46.4 million. Funding levels stayed essentially the same in FY2011 with the administration requesting \$45 million.¹⁰⁶ Annually changing funding levels reflect the consideration given by DOD and the administration to evolving needs. Additionally, Congress allocates additional funds if necessary. The increase in funding in FY2007 reflected increased transparency and access as result of renegotiated agreements with Russia. Thus, a sufficiency argument could be made in that Congress reacted to demonstrated need with understanding and not refusal.

Russian contribution has largely been in kind¹⁰⁷ with the G8 Partnership contributing at least \$2 billion per year since 2003. However, this money goes towards all CTR programming around the world, not just Russia; in fact the Russian Ministry of Foreign Affairs should send all this funding to Russia.¹⁰⁸

5. Infrastructure:

Starting in 1996, implementers began conceptualizing and realizing infrastructural needs. First, Sandia worked closely with Russian counterparts¹⁰⁹ to establish an “intellectual” infrastructure that “has formed the basis for all of the work being accomplished as part of this project.”¹¹⁰ Known as the Russian [Transportation Security System] ATSS, this system encompasses three main subsystems that use satellite positioning and communications capabilities.¹¹¹ The three subsystems appear in Table 8:

¹⁰⁶ Budgeting information came from Woolf 2010; for more specific information see the Nuclear Threat Initiative website’s budget page, as well as Matthew Bunn’s series, “Securing the Bomb.”

¹⁰⁷ Gottemoeller 2005.

¹⁰⁸ Ibid.

¹⁰⁹ Special Scientific & Production State Enterprise (SNPO) ELERON, based in Moscow

¹¹⁰ Garcia, et al 1998.

¹¹¹ Garcia, et la 1998.

| Subsystem | Location | Description |
|---------------------------------------|-----------------------------------|--|
| Automated System for Transport | Functions within the railcar | Alarm detection and annunciation, system intrusion delay, communications |
| Automated System for Command Post | Command post locations | Monitoring and tracking shipments, manages and supports response activities in the event of an intrusion |
| Automated System for Receiver/Shipper | Shipping and receiving facilities | Automated transfer of SNM, transparency of shipping and receiving |

Table 8: From Garcia, Gronager, and Shemigron

This system considers various aspects of the shipping process, security concerns, as well as verifiability and transparency issues. Finally, although fully conceptualized and given high priority, this system was not operational at the time of this document’s writing, in 1998. (Find Out if it is now in effect). Additionally, while some of the capabilities, such as the satellites, already existed in Russia, much of the technology would require U.S. funding for installation, thus diminishing the positive impacts of this intellectual infrastructure.

Prior to installations, upgrades and materials underwent evaluation, “evaluation of this data¹¹² has validated the feasibility of the Russian prototypes for the security system components and has led to the project’s subsequent deployment activities for pilot operation, rapid upgrades, and security overpacks.” The results of these tests indicate high levels of success and functionality, with only a few errors. The Pilot Railcar Deployment, occurring between January and March of 1998, measured, “rapid upgrade elements in real operational circumstances prior to finalizing the design for production

¹¹² Refers to data collected during the test trip by both on-car personnel and machines as well as personnel and machines in the Command and Control Center; both U.S. and Russian personnel collected data and the only times when data was not collected occurred during the three communication failures previously mentioned.

implementation to the rest of the MINATOM fleet railcars”¹¹³ During the trial period, “users recorded evaluation data that lead to recommended improvements to the suite of rapid upgrade elements. As a result, design enhancements were made to improve security, implementation methods, and ease of use for the operators.”¹¹⁴ Unsatisfactory elements were changed or eliminated, thus improving the overall effectiveness of the system.

Testing capabilities also represents a component of the relevant infrastructure. In November of 1997, the partners tested Rapid Upgrades, On-Train Security System, Command and Control Center, satellite communications with Russian control centers and a widely-used satellite communication system software.¹¹⁵ Russian and U.S. implementers considered these components “feasible” and “officially endorsed by the Russian user community.”¹¹⁶ “Evaluation of test results of these rapid upgrade elements by Russian and U.S. personnel was positive.”¹¹⁷ The documents indicate that the On-Train Security system operated successfully and that few problems occurred with the Command and Control center. “Minor on-train problems associated with loose cable connections and inadequate buffer sizes in software were responsible for three communication losses with the command and control center.”¹¹⁸ Because the evaluation mechanisms existed, workers discovered and fixed these problems. Furthermore, SNPO Eleron and the Russian Technical Bureau for Automotive Transportation Equipment

¹¹³ Garcia, et al 1998.

¹¹⁴ Garcia, et al 1998.

¹¹⁵ Garcia, et al 1998.

¹¹⁶ Garcia, et al 1998.

¹¹⁷ Garcia, et al 1998.

¹¹⁸ Garcia, et al 1998.

received the contracts to produce the approved upgrade designs in 1997-1998,¹¹⁹ exemplifying the use and development of available resources within Russia.

To connect transportation units with command and control centers, implementers used satellite communications capabilities. “Satellite communications enable the system integration of data and provide for timely communication of events for responsive command and control activities.”¹²⁰ Thus transportation efforts received support from an integrated, efficient communication and response system. As of 1998, these systems were prioritized for installment, but were not operational.

6. Partnership

The relationship between the U.S. and Russia regarding transportation of SNM shows immense cooperation, recognizing the importance of transportation security, and stating that, “The sides note the importance of continuing cooperation through a joint project to ensure the secure transportation of nuclear material, and the need to develop a set of recommendations for further security enhancements.”¹²¹ The Joint Statement on Nuclear Material Protection, Control and Accounting During Transportation (which arose from the Gore-Chernomyrdin Commission), July 16, 1996 reflects this. “The sides consider that one of the priority issues regarding weapon-usable nuclear material protection, control, and accounting is providing the highest level of security during transportation.”¹²² Despite the upgrades provided under the Railcar Security Enhancements program, the partners saw WTS as still a major priority and one that needed more attention.

¹¹⁹ Garcia, et al 1998.

¹²⁰ Garcia, et al 1998.

¹²¹ Garcia, et al 1998.

¹²² Garcia, et al 1998.

However, implementation faced delays as a result of disagreements regarding levels of transparency. “The United States has required increased transparency for these shipments, and the process stopped between November 2004 and May 2005 while the United States and Russia resolved this issue.”¹²³ Sandia also expresses concerns about the political partnership: “Besides the broad technical issues, the magnitude and involvement of the many Russian stakeholders makes this effort complex and delicate.”¹²⁴ Russian political considerations clearly hampered some pursuits.

On an Implementational level, the initial guidelines indicated a desire to achieve its goals through, “an enhanced, yet cost effective, railcar transportation security system. The system incorporates a balance between the traditional detection, communications, delay, and response security elements to significantly improve the security of MINATOM SNM shipments.”¹²⁵ The “significantly” indicates Sandia’s and DOE’s belief that drastic improvements occurred; however, this phrase could also imply significant improvement, although not to the level of Western standards, because of the originally extremely poor security.

Implementation of WTS involved several levels of upgrades. First, DOE deploys “Rapid Upgrades,” or what Mr. Grant Hartanov, Special Assistant to the Director of the Defense Threat Reduction Agency, would term “putting out the fire.”¹²⁶ These initial upgrades, “quickly deploys mature and readily available technologies to realize a highly beneficial improvement in security capability.”¹²⁷ While sufficient for the short run,

¹²³ Woolf 2010.

¹²⁴ Ibid.

¹²⁵ Woolf 2010.

¹²⁶ This terminology arose in a conversation held with Mr. Hartanov on Thursday, December 2, 2010. Mr. Hartanov worked as a staffer for Senator Lugar before moving to the DTRA and has spent significant amounts of time in the U.S. and abroad working on CTR programs.

¹²⁷ Garcia, et al 1998.

these upgrades do not represent the full extent of security provided through WTS. The second level of security, termed the Security Overpack and sometimes installed in conjunction with the Rapid Upgrades, consist of metal caskets to hold SNM containers and various technological upgrades involving access delay. A third, controversial, form of upgrades, termed Railcar Security Force, involves security force personnel provided by MOD and is, “an area that is very sensitive and is being approached cautiously.”¹²⁸ Currently no policy exists that serves as a precedent for this; although a DOE and MOD joint task force is working on it.

On-Train Security constitutes the fourth level of upgrades and aims to, “incorporate and build upon Rapid Upgrades.”¹²⁹ This system provides automation and autonomous operation, virtually independent of operator interaction and more directly reflects a Westernized security concept preferring technology over personnel. This system supposedly integrates various levels of infrastructure: “the On-Train upgrades are being implemented in a manner that facilitates integration with future satellite communications capabilities to support data exchange with a MINATOM command and control center.”¹³⁰ Finally, the last level of upgrades closely relates to the development of infrastructure and provides for a Command and Control Center. “MINATOM command and control center will provide the capability to monitor the security and location of all railcar SNM shipments.”¹³¹ This computer-based system controls response activities in the event of a security problem.

¹²⁸ Garcia, et al 1998.

¹²⁹ Garcia, et al 1998.

¹³⁰ Garcia, et al 1998.

¹³¹ Garcia, et al 1998.

The WTS strategy outlines the method of implementation, with rapid upgrades intended to, “implement mature security technologies as quickly as possible. The rapid upgrades emphasize rapidly deployable delay elements, enhanced radio communications, and intrusion detection and surveillance.”¹³² This aligns with the idea that the program revolves around first, and quickly, putting out fires. Furthermore, the strategy indicates that, “subsequent upgrades will build upon the rapid upgrades and eventually be integrated into a final deployed system configuration.”¹³³ Implementers intended multiple levels of upgrades from the beginning, suggesting acknowledgement of an extended time frame. Finally, in commenting on the pace of implementation and prioritization of projects, Sandia indicates that, “deployment of the upgrades is being sequenced to maximize security benefit and funding resources.”¹³⁴ This demonstrates Sandia’s and DOE’s belief that implementation occurred as efficiently as possible within the priority and financial constraints.

Early on, Russian aversion to transparency made it difficult to establish program costs. DOD states that it had been “unable to confirm the estimate due to Russia’s reluctance to share data on local materials and labor costs.”¹³⁵ Additionally, security guards and those handling the nuclear materials and weapons presented enormous security risks, particularly immediately following the Soviet fall. High economic and financial incentives presented by the Black Market and exacerbated by low government wages and a loss in prestige factored into Russian worker calculations and legitimized

¹³² Garcia, et al 1998.

¹³³ Garcia, et al 1998.

¹³⁴ Garcia, et al 1998.

¹³⁵ “Soviet Nuclear Weapons: U.S. Efforts to Help Former Soviet Republics secure and Destroy Weapons,” Statement of Joseph E. Kelley, Director-in-Charge, International Affairs Issues, National Security and International Affairs Division, U.S. GAO, Testimony before the Committee on Governmental Affairs, U.S. Senate, 9 March, 1993.

fears of proliferation.¹³⁶ Finally, the level of partnership with the Russians depends on the relationship U.S. scientists, contractors, and other day-to-day implementers have with their Russian counterparts. To help facilitate this connection, the U.S. insisted on technical exchanges, seminars, and reciprocal site visits for Russians and Americans,¹³⁷ which built partnerships and allowed development of a rapport between Russia and the U.S. Table 8 summarizes the evaluation of WTS criteria.

| Criterion | Positive | Negative | Overall |
|----------------------|---|--|---------|
| Legal Framework | Addressed necessary elements | Delays occurred | + – |
| Bureaucracy | Good Cooperation Russians more organized | Criticisms arising from cooperation and communication between DOD and DOE | + |
| Economic Feasibility | Money Available Received Foreign Aid | The program continues to cost a lot | + |
| Infrastructure | N/A | N/A | + |
| Partnership | Ongoing, few setbacks Less suspicion High transparency Improved levels of access | Russian worker buy-in Continued significant U.S. involvement Levels and ongoing nature of upgrades | + – |

Table 8.

III. Weapons Storage Security

1. Program Description

Weapons Storage Security (WSS) aims to secure weapons and fissile materials storage sites to a mutually acceptable level of security. This program, essentially interchangeable with MPC&A, installs, “perimeter fencing, as a ‘quick fix’ for vulnerable sites, and more comprehensive upgrades, including alarm systems and inventory control

¹³⁶ The Background and Literature sections iterate these points, so for more information, please refer to citations given in those sections.

¹³⁷ U.S. GAO “Weapons of Mass Destruction: Reducing the Threat from the Former Soviet Union,” Report to Congressional Requesters, October 1994.

and management equipment to keep track of warheads in storage.”¹³⁸ As of a 2010 assessment of this program, upgrades had been completed and, “they have begun to shift funding towards sustainment activities, rather than further upgrades.”¹³⁹ DOD, DOE, and Sandia all implement aspects of WSS in coordination with various Russian and civilian agencies.¹⁴⁰

2. Legal Framework

Once again, the Umbrella Agreement underpins this project. The agreement requires yearly certification by the U.S. executive branch in order to disperse funds and aid. In 2002-2003, the Bush Administration did not certify Russia as having met requirement 6: “observing internationally recognized human rights, including the protection of minorities,”¹⁴¹ resulting in a freeze of all CTR activities until Russia could obtain certification. This clause disproportionately affects longer-running programs. Additionally, the Umbrella Agreement included a provision allowing new compromises should parties fail to agree. “If access to such locations at the facilities referenced in, and for the purposes described in Paragraph 1 of this Article is restricted by the legislation of the Russian Federation, the Executive Agents shall jointly develop alternative flexible, non-intrusive and mutually acceptable methods that do not require access by the representatives of the U.S. Party.”¹⁴² The importance of this clause emerges in its

¹³⁸ Woolf 2010

¹³⁹ Ibid.

¹⁴⁰ The inclusion of civilian sites recognizes that civilian research reactors hold nuclear material that presents a proliferation risk

¹⁴¹ Executive Branch Certifications, “Certification of the Commitments of the Russian Federation: Justification,” Hearing before the Committee on Foreign Relations United States Senate 102 Congress, 2nd Session, July 27, 1992, Washington; Woolf 2004.

¹⁴² Agreement between the Government of the United States of America and the Government of the Russian Federation Regarding Cooperation in the Area of Nuclear Material Physical Protection, Control and Accounting, Article IV, Paragraph 2. June 17, 1992.

acknowledgement of access difficulties and in considering the problems that could arise when negotiating implementing agreements for WTS.

The Implementing Agreements tailored legal frameworks to individual programs. The “Agreement Between the Department of Defense of the United States of American and Ministry of Defense of the Russian Federation Concerning Cooperation in Nuclear Weapons Storage Security through Provision of Material, Services, and Related Training,” was first signed on April 3, 1995 and was subsequently amended on June 21, 1995; May 27, 1996; April 8, 1997; January 14, 1999; November 1, 1999; June 12, 2000.¹⁴³ Although implementing agreements reflect remarkable degrees of cooperation and compromise, they also delay the programs since aid disbursement hinges on such agreements. “According to DOD, Russia needs to agree to various transparency measures for the storage facility and adhere to agreed upon audit and examination procedures before the project can move forward.”¹⁴⁴ Thus, these agreements negatively impacted implementation of the programs while simultaneously demonstrating one of the greatest feats of partnership.

3. Bureaucratic Politics

The Umbrella Agreement provides authority for DOE and Sandia to work directly with Russian counterparts, eliminating potentially inhibiting bureaucratic interactions. However, DOD and DOE handle aspects of this program, increasing the number of people involved in WSS, as well as potential communications, and other errors.

Congress asked the GAO to report on bureaucratic relationships in 2005. The GAO’s

¹⁴³ Letter from Paul Wolfowitz, Deputy Secretary of Defense, to Robert Stump, Chairman for the Committee on Armed Services, U.S. House of Representatives, notifying Congress of the Department of Defense’s intent to obligate funds for CTR programs, 18 December, 2001.

¹⁴⁴ U.S. GAO “Weapons of Mass Destruction: Reducing the Threat from the Former Soviet Union,” Report to Congressional Requesters, October 1994.

unflattering findings indicated poor communication between DOD and DOE and a lack of coordination on CTR implementation. DOD and DOE established a joint committee to improve and facilitate communication and coordination between the two departments as a result of this report.¹⁴⁵ Unfortunately, and despite improvements, bureaucracy will always pose challenges. According to Mr. Hartanov, although such delays still occur as a result of bureaucratic workings, the delay in implementation has significantly reduced since 1992, when delays could take up to 2-3 years.¹⁴⁶ Today, normal delays last a few months on average.

In terms of Russian bureaucracy, Russia faces fewer challenges than previously, thus improving their agencies' capacity to effectively implement CTR programs. However, Russian agencies constantly re-organize, leading to similar challenges seen at the outset of CTR;¹⁴⁷ however, people have learned how to implement CTR so the challenges prove less formidable when Russian agencies were neither formed nor knowledgeable about the implementation of CTR. However, the Russian bureaucracy has continuously re-structured in the past several years, once again causing delays and problems for implementation.

4. Economic Feasibility

The scope of WSS addresses all storage¹⁴⁸ and, "rail transfer points that store warheads from the Russian Navy, and plans to do the same at one or more sites for the

¹⁴⁵ "Weapons of Mass Destruction: Nonproliferation Programs Need Better Integration," U.S. GAO, January 2005.

¹⁴⁶ Mr. Hartanov expressed this view on Thursday, December 2, 2010 during a conversation I had with him. Mr. Hartanov worked as a staffer for Senator Lugar before moving to the DTRA and has spent significant amounts of time in the U.S. and abroad working on CTR programs.

¹⁴⁷ Gottemoeller, Rose, "Cooperative Threat Reduction Beyond Russia," *The Washington Quarterly*, Vol. 28, No. 2, Spring 2005, pp. 145-158.

¹⁴⁸ Woolf 2010.

Strategic Rocket Forces,”¹⁴⁹ but does not include operational sites because of their sensitivity and importance to the Russian MOD complex. Other sites for implementation include “national stockpile storage sites and smaller storage sites at Navy, Air Force, and Strategic Rocket Force bases.”¹⁵⁰ The purview of WSS also includes, “security enhancements at up to 42 permanent storage sites and temporary handling sites in Russia.”¹⁵¹ In accordance with verification and safety requirements, DOD intended to, “assist the Russian Ministry of Defense (MOD) in maintaining a capability to certify nuclear weapons handling equipment, procure systems to enhance nuclear weapons and guard forces, and address other known MOD requirements, including additional enhancements to physical security systems, personnel safety and screening programs, and fire-fighting capability improvements.”¹⁵² Such an extensive mission reflects the overall scope of WSS.

Between 1995 and 2007, DOD appropriated about \$745 million, the most money obligated out of any CTR program. The level of funding for WSS changes on a yearly basis to reflect DOD requests. DOD likely makes requests based on need and expectations for what the program will accomplish. In 2001, DOD obligated \$89.7 million; in 2006, Congress approved \$84.1 million with an additional \$44.5 million in the FY2006 Emergency Supplemental Appropriations package. This increased levels of access afforded implementers by a renegotiation of the implementing agreement precipitated these changes. “U.S. personnel can now conduct site assessments and other activities that support the installation of physical security upgrades at a number of

¹⁴⁹ “Weapons of Mass Destruction: Additional Russian Cooperation Needed to Facilitate U.S. Efforts to Improve Security at Russian Sites,” U.S. General Accounting Office, March 2003.

¹⁵⁰ Ibid.

¹⁵¹ U.S. Department of Defense. FY2006 CTR Annual Report to Congress. 31 December, 2004.

¹⁵² Ibid.

weapons storage locations. (in response to increased levels of access) This change is reflected in significant increases in funding for site security enhancements in the FY2005 and FY2006 budget requests for CTR.”¹⁵³ This example speaks most clearly to the issue of sufficiency because Congress augmented funding in response to an increased need, in doing so implying U.S. willingness to meet demonstrated needs.

In FY2007, Congress appropriated \$74.1 million; FY2008 saw a dramatic decrease in funding levels with \$23 million requested and \$47.63 million appropriated. In FY2009, the amount received dropped once again to \$24.1 million. The Obama Administration continued this trend, requesting \$15.1 million for FY2010 and \$9.6 million for FY2011. Such a drastic change in levels of funding, despite the previous increase, reflects a shift in program focus from one of installing upgrades to one of sustainment activities¹⁵⁴ and subsequent DOD estimations of funding levels necessary for sustaining previously installed upgrades.¹⁵⁵ Additionally, the switch to sustainment activities indicates continued U.S. involvement until WSS reaches an acceptable level of sustainability. Russian contribution has largely been in kind¹⁵⁶ with the G8 Partnership contributing at least \$2 billion per year since 2003. However, this money goes towards all CTR programming around the world, not just Russia; in fact the Russian Ministry of Foreign Affairs should send all this funding to Russia.¹⁵⁷

¹⁵³ Woolf 2010.

¹⁵⁴ Ibid.

¹⁵⁵ Ibid.

¹⁵⁶ Gottemoeller 2005.

¹⁵⁷ Ibid; for more specific budgetary information, see the Nuclear Threat Initiative’s website budget page.

5. Infrastructure

At the outset of CTR, “U.S. officials informed us that the FSU system lags 20 years behind that of the United States. While the Russians have had a facility-based material control and accounting (MC&A) system for all facilities on their territory, they never instituted a consolidated nationwide nuclear MC&A system for reconciling facility level records and transported shipments.”¹⁵⁸ At the beginning of WSS, Russia lacked a uniform, national-level accounting system for materials and shipping. To ease the problems created by this vacuum, “the Department of Energy has prepared a program plan for strengthening Russia’s nuclear MC&A system by creating a national level information system and improving MC&A and physical protection at the facility level by installing systems for two or three facilities.”¹⁵⁹

In 2001-2002, the U.S. Design Basis Threat (DBS), the system used by the U.S. to evaluate security levels¹⁶⁰ was adapted for use in Russia, establishing an important intellectual framework for the security of weapons and SNM. DBS requirements include, “improved protective force tactical capabilities with expanded training ranges and support facilities, advanced tactical training courses, and additional full-time instructors,”¹⁶¹ that are, “agile and responsive to [the] nation's needs.”¹⁶² In addition to this intellectual framework, DOE, in coordination with Russia, charged the MPC&A Office of National Infrastructure and Sustainability (ONIS) with developing a sustainability

¹⁵⁸ U.S. GAO “Weapons of Mass Destruction: Reducing the Threat from the Former Soviet Union,” Report to Congressional Requesters, October 1994.

¹⁵⁹ Ibid.

¹⁶⁰ Aloise 2007.

¹⁶¹ NNSA website, Department of Energy

<<http://www.nnsa.energy.gov/aboutus/ourprograms/nuclearsecurity/designbasisthreat>>

¹⁶² Ibid.

framework that could be applied across Russian sites.¹⁶³ Table 9 presents this Joint Sustainability Framework.

| Category | Description |
|--|---|
| MPC&A Organization | An independent MPC&A organization is responsible for planning, resources allocation, implementation, and testing and evaluating all aspects of MPC&A operations. An MPC&A organization with the authority to carry out all aspects of its MPC&A duties |
| Site Operating Procedures | Site has administrative systems, physical controls, or written instructions that aid in minimizing variation in nuclear material access, handling, processing, protection, and control. Site has written operating procedures or instructions that address threats and vulnerabilities, cover key aspects of MPC&A operations, cover emergency situations on site, and are supported by site management |
| Human Resource Management and Site Training | MPC&A staff has the requisite knowledge, skills, and abilities to perform critical MPC&A functions. Sites have the capability to assess MPC&A staffing needs. Sites have the capability to retrain staff to correct operational deficiencies. Sites have the capability to provide site-specific MPC&A training. Sites have a process to replace MPC&A staff with qualified trained personnel |
| Operational Cost Analysis | Operational cost data are collected in consistent and useful ways. Operational costs are understood and data are used for MPC&A system design decisions and for system life cycle management. The installed MPC&A system can be supported by Russian sites. The site has identified revenue sources for MPC&A program/system support |
| Preventative Maintenance, Repair and Calibration | MPC&A systems as sites are subject to an ongoing preventative maintenance, calibration, adjustment, and cleaning program to ensure optimal operation. System downtime after failure of critical components is minimized, and operational life of the MPC&A system is maximized |
| Performance Testing and Operational Monitoring | A program is in place to periodically evaluate the effectiveness of the system, subsystem, and components of the system; identify and correct deficiencies; and maintain continuous and effective MPC&A operations. The program monitors implementation of MPC&A procedures and correct operational deficiencies |
| Configuration Management | The upgraded MPC&A system is adequately documented, and a configuration consistent with threat mitigation is established in a |

¹⁶³ Pillai, Rekha S., Randolph, John D., Singh, Paul, and Welch, Tim D. “Meshing Site-Specific and Cross-Cutting Sustainability Programs: Case Studies from Kurchatov Insititute, VNIIEF, and Transportation Security,” Oak Ridge National Laboratory, 47th Annual Meeting, Nashville, TN, 16-20 July, 2006.

set of system description documents. An administrative system of review is in place to determine if work on or affecting the MPC&A system will change the established configuration and, if so, to determine that changes are reviewed, compensatory actions taken, and documentation updated

Table 9: Taken from Pillai, Randolph, Singh, and Welch, 2006.

In 2002, the U.S. and Russian began joint development of a field-test system. “The field-testing program for safety, security, and monitoring technologies is called TOBOS (the Russian acronym for Safety and Security Technologies for Russian Warheads) Program.”¹⁶⁴ This system progressed in three stages, to be completed between 2001 and 2004, with the final phase including evaluations of the testing system. “Tests will be conducted using routine MOD procedures in normal operational and storage environments. Additional testing will include extreme environmental conditions, accident environments, and threat environments.”¹⁶⁵ The comprehensive tests utilize Russian procedures, indicating the development and implementation of a security concept acceptable to both Russians and Americans.

Construction of the Security Assessment and Training Center (SATC) in Sergiev Posad addressed requisite training facilities and accompanying programs. The idea arose when, “technical interchanges with the MOD identified a need to establish a Security Assessment and Training Center (SATC) as part of the...project to integrate and test security equipment for use at MOD operational nuclear weapons storage sites in Russia.”¹⁶⁶ Sandia worked in conjunction with MOD and various agencies to develop the SATC, which is a vital piece of WSS supporting infrastructure. Aside from assessment capabilities, the SATC, “will be used to train Russian technicians to install, maintain, and

¹⁶⁴ Ellis, Dori. Ed. “TOBOS Safety and Security Technologies for Russian Warheads,” *International Security News*, Sandia National Laboratories, Vol. 2, No. 1, January 2002, pp. 5.

¹⁶⁵ Ibid.

¹⁶⁶ Ellis, Dori. Ed. “Site Security Enhancements in Russia,” *International Security News*, Sandia National Laboratories, Vol. 2, No. 1, January 2002, pp. 8.

operate the security equipment.”¹⁶⁷ This particular piece of infrastructure deals with the important “human factor” as it aims to train personnel and hold them accountable. In addition to this, “The United States is also helping Russia develop training programs for personnel with access to nuclear weapons,”¹⁶⁸ thus addressing another vital component of the “human factor.”

The Evaluation and Upgrade Facilities at SATC provide integral support for the maintenance and testing of equipment; however, Russian programs still rely heavily on U.S. support. “The testing results for Russian equipment that is brought to the SATC for evaluation are reviewed by Sandia specialists, and recommendations are made to DTRA based on performance of the equipment. Sandia provides an independent review and evaluation of all plans that include test methodologies, evaluation of equipment, and training at the SATC.”¹⁶⁹ This fact has two possible implications: the extensive transparency procedures required by DOD have led to a relationship where Sandia checks everything; or the Russians cannot adequately support the activities of SATC without support and independent evaluation by Sandia. Either way, the completed SATC provides invaluable testing, evaluation, and training functions.

In 2002, Sandia National Laboratories, in coordination with the All-Russian Scientific Research Institutes of Automatics (VNIIA) and Experimental Physics (VNIIEF) developed a new protection system titled Automated Monitoring and Inventory System.¹⁷⁰ The U.S. and Russia jointly field-tested this system since, “to validate these

¹⁶⁷ Ibid.

¹⁶⁸ Woolf 2010.

¹⁶⁹ Ellis, Dori. Ed. “Site Security Enhancements in Russia,” *International Security News*, Sandia National Laboratories, Vol. 2, No. 1, January 2002, pp. 8.

¹⁷⁰ Ellis, Dori. Ed. “TOBOS Safety and Security Technologies for Russian Warheads,” *International Security News*, Sandia National Laboratories, Vol. 2, No. 1, January 2002, pp. 5.

technologies and concepts, MOD requires these systems to be evaluated under realistic field conditions.”¹⁷¹ This indicates rising standards of MPC&A technologies, as well as higher standards for development and performance testing.

According to the Design Basis Threat, “Consolidation of SNM operations and storage is key to reducing the number of targets that must be defended and reducing the fiscal burden of protecting our sites.” This reflects the economic feasibility of sustaining WSS upgrades and the conceptualization of how to decrease the burden on Russia once the U.S. decreases or ends aid, exemplifying, indicating how infrastructure can help ameliorate economic concerns.

6. Partnership

The political partnership surrounding WSS, while supportive, suffers from disagreements over levels of access and transparency, although this problem has diminished over the years. Several instances exemplify Presidential support for WSS, including the 2005 Bratislava Summit where, “Presidents Bush and Putin pledged to accelerate work on weapons storage security.”¹⁷² As a result of this summit, DOD and DOE increased the pace of implementation, completing upgrades in 2008.¹⁷³

Additionally, the increase in funding that occurred in FY2007 reflect the agreement between Presidents Putin and Bush regarding the security of warheads.¹⁷⁴ Despite difficulties in gaining mutually acceptable levels of access, the two governments continued to work together to adjust agreements in accordance to the demands of the situation.

¹⁷¹ Ibid.

¹⁷² Woolf 2010.

¹⁷³ Ibid.

¹⁷⁴ Ibid.

On an Implementational level, WSS's extended timeline engenders criticism among politicians and implementers. Criticisms of the snail pace even in 2004 forced identification of over twenty sites that would receive expedited nuclear cleanout.¹⁷⁵ However, the initial goal of total cleanout by 2005 met with failure as many sites had yet to undergo the cleanout process,¹⁷⁶ while some even estimated that completion would not occur until 2020. As of 2007, DOE still had 35 sites to "secure" by the end of 2008.¹⁷⁷ Pace of implementation for WSS varies because of carrying levels of upgrades. Some sites received basic upgrades while others receive the comprehensive upgrades that the DOE considers as meeting all non-proliferation goals.¹⁷⁸

WSS has three phases of implementation.¹⁷⁹ First, initial rapid upgrades, were completed within six months and included the fences, armored guard towers, special windows and doors and protective equipment. These reflect Mr. Hartanov's description of DOD goals to "put out the fire" before doing anything else.¹⁸⁰ Comprehensive upgrades followed initial rapid upgrades, but only if the site was deemed vulnerable enough. The general timeline for implementation fell between 18 and 24 months to complete and included, "perimeter intrusion detection and assessment systems, guard and access control building, central alarm stations, and vehicle inspection areas."¹⁸¹ The final level of upgrades focus on sustainability include performance testing and preventive

¹⁷⁵ Allison 2004.

¹⁷⁶ Allison 2004.

¹⁷⁷ Aloise 2007.

¹⁷⁸ Aloise 2007; Woolf 2010.

¹⁷⁹ NNSA website, Department of Energy

<<http://www.nnsa.energy.gov/aboutus/ourprograms/nonproliferation/programoffices/internationalmaterialprotectionandcooperation/m-1>>

¹⁸⁰ Conversation with Mr. Hartanov, Decemer 2, 2010.

¹⁸¹ NNSA website, Department of Energy

<<http://www.nnsa.energy.gov/aboutus/ourprograms/nonproliferation/programoffices/internationalmaterialprotectionandcooperation/m-1>>

maintenance and major repairs, although, “the overall goal is to gradually transfer full responsibility to the Russians.”¹⁸²

Project status as of FY2001 indicates both gains and areas in need of continued improvement and implementation. Paul Wolfowitz states that, “CTR assistance will be used to continue the test, evaluation, procurement, and checkout of candidate security enhancement equipment and training at the Security Assessment and Training Center (SATC).”¹⁸³ Significant contribution by the U.S., therefore, remains necessary as of 2001. Wolfowitz’s letter also indicates a continued need for more upgrades along the lines of, “procure, ship and install outer perimeter security systems at permanent and temporary nuclear weapons storage sites.” Additionally, 2001 saw the development of more technologically based upgrades, such as the Automated Inventory Control and Management System, which could greatly improve the Russian SNM accounting systems. Thus, the U.S. decided to support Russia in the delivery, installation, certification, and installment of this program.¹⁸⁴ Finally, in conjunction with the purchase, delivery, and installation of the aforementioned programs, Wolfowitz indicated that DOD would provide, “consolidated logistical support to maintain equipment supplied to Russia under this agreement and program management.”¹⁸⁵ The level of cooperation is encouraging; the level of U.S. involvement is not. Despite almost ten years of WSS programs, Russia still required a lot of help.

¹⁸² Ibid.

¹⁸³ Letter from Paul Wolfowitz, Deputy Secretary of Defense, to Robert Stump, Chairman for the Committee on Armed Services, U.S. House of Representatives, notifying Congress of the Department of Defense’s intent to obligate funds for CTR programs, 18 December, 2001.

¹⁸⁴ Ibid.

¹⁸⁵ Ibid.

Finally, Russian attitudes acutely pertain to the sustainability of WSS. Several anecdotes presented the literature and in interviews cast Russian attitudes in a less than positive light. According to Dr William Potter, the Russian guards' attitudes did not reflect the severity of their mission. He recounted a Russian site visit where the guards allowed Dr. Potter and his colleagues access based solely on their manager's command. They did not follow proper procedures or regulations regarding the access of inspectors and visitors to the site.¹⁸⁶ Additionally, Dr. Potter referred to an event in which guards ignored an alarm because their outerwear did not adequately protect them from the cold.¹⁸⁷ Dr. Jennifer Moroney of the Rand Corporation conveyed similar experiences in Russia, assessing Russian interest as lacking. This surprised her since visits in previous years indicated significant interest among workers.¹⁸⁸ Mr. Hartanov expresses an opposing opinion regarding the attitudes of Russian workers, explaining that during his visits, Russian guards acted appropriately and with proper adherence to guidelines.¹⁸⁹

Additionally, those with access to nuclear material presented enormous security risks, especially early on, due to the Russian's poor economic and financial situation. Russian attitudes seem to have changed over time; while some reflect greater cooperation and a decreased aptitude to steal, others lost interests in the programs. Finally, the U.S.

¹⁸⁶ This represents a paraphrase of a story conveyed by Dr. William Potter to me in response to questions regarding the "human factor" and his professional experiences with CTR programs in Russia. Dr. Potter is a researcher at the Monterey Institute; his works on the subject include Dismantling the Cold War: U.S. and NIS Perspectives on the Nunn-Lugar Cooperative Threat Reduction Program and "Sustainability: A Vital Component of Nuclear Material Security in Russia" 23 July, 2010.

¹⁸⁷ Ibid.

¹⁸⁸ Dr. Moroney is a researcher at the RAND Corporation who studies various Cooperative Threat Reduction programs. The information presented represents a paraphrase of a conversation held with her on July 30, 2010.

¹⁸⁹ Mr. Hartanov expressed this view on Thursday, December 2, 2010 during a conversation I had with him. Mr. Hartanov worked as a staffer for Senator Lugar before moving to the DTRA and has spent significant amounts of time in the U.S. and abroad working on CTR programs.

attempts to address say-to-day working partnerships by insisting on technical exchanges, seminars, and reciprocal site visits for Russians and Americans.¹⁹⁰

Russian worker attitudes do not reflect the entirety of Russian partner mind-sets. Tension arising from disagreement surrounded WSS and, as a result, made it more difficult to come to mutually acceptable levels of transparency. Additionally, U.S. stringency on this particular condition may have rankled with Russian counterparts intent on maintaining certain levels of secrecy regarding various Russian MOD sites, providing a source of tension between the two partners. Despite this, Mr. Hartanov speaks of Russian willingness to allow access to many sites as obtainable, which is promising seeing the sensitive nature of the sites. Russian officials reluctantly shared data regarding costs, making it difficult to establish program costs; indeed, DOD had been “unable to confirm the estimate due to Russia’s reluctance to share data on local materials and labor costs.”¹⁹¹ Initially low levels of Russian cooperation in providing information about numbers and locations of sites in need of upgrades hampered implementation. “[The] effort was slowed by Russia’s reluctance to provide the United States with information about the precise number of sites in need of security upgrades and its refusal to allow the United States access to sites to design appropriate upgrades.”¹⁹² Additionally, MOD installment of DOD-purchased equipment, such as 123 km of perimeter fencing, proceeded slowly or not at all according to reports.¹⁹³ Similarly, DOD purchased and

¹⁹⁰ U.S. GAO “Weapons of Mass Destruction: Reducing the Threat from the Former Soviet Union,” Report to Congressional Requesters, October 1994.

¹⁹¹ “Soviet Nuclear Weapons: U.S. Efforts to Help Former Soviet Republics secure and Destroy Weapons,” Statement of Joseph E. Kelley, Director-in-Charge, International Affairs Issues, National Security and International Affairs Division, U.S. GAO, Testimony before the Committee on Governmental Affairs, U.S. Senate, 9 March, 1993.

¹⁹² “Weapons of Mass Destruction: Additional Russian Cooperation Needed to Facilitate U.S. Efforts to Improve Security at Russian Sites,” U.S. General Accounting Office, March 2003.

¹⁹³ Ibid.

tested CTR funds comprehensive upgrade equipment that went uninstalled because MOD refused access to U.S. personnel.¹⁹⁴ Table 10 summarizes the evaluation of WSS.

| Criterion | Positive | Negative | Overall |
|----------------------|---|---|---------|
| Legal Framework | <ul style="list-style-type: none"> • Theoretically Addressed | <ul style="list-style-type: none"> • Huge problems, setbacks, and difficulties | -- |
| Bureaucracy | <ul style="list-style-type: none"> • Good Cooperation • Russians more organized | <ul style="list-style-type: none"> • Criticisms arising from cooperation and communication between DOD and DOE • Relationship between MOD and MINATOM | + - |
| Economic Feasibility | <ul style="list-style-type: none"> • Russian/Foreign contribution? • Money available | <ul style="list-style-type: none"> • Hugely expensive | - |
| Infrastructure | <ul style="list-style-type: none"> • SATC • Evaluation systems | <ul style="list-style-type: none"> • Disagreements • Westernized? | + - |
| Partnership | <ul style="list-style-type: none"> • Completed upgrades • Increasingly transparent • Improved levels of access | <ul style="list-style-type: none"> • Russian worker buy-in • Suspicion • Preeminence of state secrets | - |

Table 10.

¹⁹⁴ Ibid.

Conclusions

I. Net Program Assessment

RSE, as a whole, faced few obstacles and was, according to the documentation and analysis, incredibly successful in meeting its goals. Thus RSE received a highly positive overall assessment. Evolving from a lack of foresight in RSE implementation, while WTS had few problems, those problems unfortunately proved fairly extensive, and diminishing the positive aspects of the program. Overall evaluation of criteria encourages optimism for the near future of WTS sustainability; thus this program receives a positive assessment, albeit less than RSE. While WSS bureaucracy, economic feasibility, and infrastructure encourage optimism, the rest of the criterion paint a rather grim picture. Suspicion and disagreement complicated the legal framework, while the partnership saw several problems. Infrastructure has immense potential, but the level of involvement of U.S. personnel indicates a level of dependence. The U.S. will probably not remove funding prematurely, so the potential for sustainability exists. However, looking through the history of the program's implementation, WSS receives an overall negative evaluation. Table 11 presents a graphical summation of net assessments.

| | Railcar Security Enhancements | Weapons Transportation Security | Weapons Storage Security |
|---|-------------------------------|---------------------------------|--------------------------|
| Net Assessment: | ++ | + | - |
| Sustainability Criteria Breakdown | | | |
| Legal Framework: | ++ | +- | - |
| Bureaucracy: | + | + | +- |
| Economic Feasibility: | ++ | + | - |
| Infrastructure: | N/A | + | +- |
| Partnership: Political Implementational | + | +- | - |

Table 11.

II. Confronting the “Why” Question

I would like to preface this section with a quick question: Should the U.S. fully pull out of CTR commitments once the programs have reached a sustainable level?

1. Legal Framework

The short period of time for RSE implementation made it significantly less likely that problems would arise under the executive branch verification clause. Conversely, this clause constitutes one of the most problematic aspects of the CTR legal framework for programs with an expansive time period, such as WTS and WSS. The likelihood of this clause affecting implementation increased the longer a program ran because of changing international and relationship structures, the election and retirement of presidents, the possibility of re-negotiating the Umbrella Agreement, and the large number of requirements stipulated under the agreement.

Additionally, Russian state security interest dominate considerations of transparency and access, despite the integral position these hold in the legal framework, and in ensuring proper and sufficient implementation of CTR programs. The Russians do not differ from this perspective. Therefore, Russian denial of U.S. access to some sites is completely understandable, even if it frustrates implementers. Levels of access have significantly improved over the years, beyond any conceivable notions in the Cold War era. Thus, considering historical tensions and concepts of deterrence, the fact that U.S. personnel have access at all speaks a lot to the level of trust and partnership in this pursuit. However, Assistant Secretary Gottemoeller iterated that, "The passage of the 1-2-3 Agreement through Congress opened an important door regarding the future of Russian motivation and engagement on CTR. This agreement creates a legal framework that will underpin extensive cooperation between Washington and Moscow and provide a

stimulus for the Russians to firmly establish themselves as co-equal partners in CTR."¹⁹⁵

The advent of this legislation will likely have large implications for the future of CTR and could therefore represent an area of further study.

The legal framework has one further implication regarding the security of Russian nuclear arsenals. The Russians fervently insist that their nuclear arsenals are safe, despite denial of access to many operational sites. Even the State Department in 1994 asserted its belief that the Russians maintained stringent security in their nuclear weapons complex, "we strongly recommend that this...include the view that the Russian system of warhead controls is robust."¹⁹⁶ This claim has remained the same over the years, meaning that the Russian arsenal either possessed extensive safeguards from the very beginning, or that they have upgraded their arsenals over time. Because U.S. implementers do not have access to all these sites, U.S. officials possess no way of evaluating security measures; however, contemplating whether or not the Russians have mirrored CTR upgrades in their own nuclear complex suggest interesting thoughts. If so, that would imply the presence of requisite levels of infrastructure to sustain CTR programs currently under U.S. purview. The existence of this infrastructure would also mean that Russian capabilities include evaluation measures currently supervised by U.S. personnel. However, without increased transparency provided through a new legal framework, the mystery will remain.

¹⁹⁵ This view was expressed during the course of an interview with Assistant Secretary of State Rose Gottemoeller on 10 December 2010.

¹⁹⁶ Letter from Carolyn S. Lowengart, Director, Management Policy, State Department, to Frank C. Conahan, Assistant Comptroller General, National Security and International Affairs Division, U.S. GAO, in response to inquiries about CTR programs, 2 June, 1994

2. Bureaucracy

At the outset of Nunn-Lugar, infant Russian bureaucracies struggled to handle both necessities of establishing themselves and CTR requests made by the U.S. implementing bureaucratic organs. These co-equal requirements likely split the attention of Russian agencies, reducing efficiency for both pursuits while this situation persisted. Additionally, because program implementation began immediately after the fall, many of the departments involved on the American side were unsure of the Russian feelings and responses and therefore had to resort to various methods, to try and gain cooperation. However, both sides had much to learn, with neither yet sure of a mutually acceptable translation. Despite this, American departments aided Russian agencies in establishing themselves, “it is amazing the number of questions you get now as to how can they really work a problem within their own Government. Questions like: “We have a problem with this agency of that agency? How would you Americans work the problem?”¹⁹⁷ This indicates that, although the U.S. compounded Russian duties with ongoing requests, the Russians relied heavily on U.S. examples to quickly and efficiently establish their own agencies.

Several likely reasons underlie WTS’s streamlined process, particularly for railcar requests, likely resulted for several reasons. First, the Russian agencies had gained several years of experience with CTR, which constitutes plenty of time to both establish working agencies as well as master the application process by which requests are made to relevant U.S. departments. Despite criticisms of Russian bureaucracy on constantly re-organizing, the relevant people still retained the requisite knowledge and experience. Additionally, several other ongoing CTR projects, such as Defense and Military Contacts,

¹⁹⁷ Ibid

had several years to establish a rapport between the partners, thus aiding more tangible programs, such as RSE, WTS, and WSS by bolstering less tangible elements such as relationships.

3. Economics

For RSE, implementers measured sufficiency with little regard for the future beyond the ten years expected useful life of the railcars. Such short term “fixes,” while technically sufficient to the immediate needs of the situation, undermine the sufficiency argument because they telescope the situation, ignoring future needs arising from technological development and economic changes. For example, knowing that railcars would need servicing or replacement in the future, why did DOD convince Russia that production in the U.S. would be more cost-effective? Did their cost-benefit calculations even consider the ten-year lifespan of the railcars and the requisite future upgrades? Would it not have been more economically feasible to create or bolster the proper industries in Russia? It seems likely that the U.S. considered these arguments but decided, based on the immediate, “put out the fire” need, the political rhetoric involving foreign aid, and technological considerations, to keep development in-country. Perhaps such an approach would have proved much more costly in the short term, but considering the near-constant past and future upgrades, which cost more?

Legal frameworks also factored in on levels of funding, particularly with regard to WSS, because the implementing agreements either expanded, thus necessitating more funds, or diminished, thus rendering some funds obsolete, the scope of the program. Fluctuating levels of funding indicate yearly deliberation on sufficiency; the low levels of funding in some pursuits, while somewhat disconcerting, have positive implications for the future sustainability of CTR programs, since it reflects both the ability and the

willingness to reduce, and perhaps eventually eliminate, U.S. funding. Additionally, the international community's increased attention on proliferation issues spurred by the September 11, 2001 attacks boded well for the future of CTR funding; however, recent rhetoric by some countries threatening to withdraw funds reflects frustrations with some aspects of programs, or possibly even international frustration and weariness with American foreign policy.

4. Infrastructure

The lack of supporting infrastructure for RSE led to the inclusion of very similar directives into the WTS program. Despite supposed ten years of useful life per railcar upgraded under RSE, 1996 saw the conceptualization of further upgrades. This has three possible explanations: first, technology had advanced enough in the short amount of time between RSE's completion of upgrades and WTS's creation to justify the need for greater technology; next, implementers of RSE acknowledged the program as merely one to "put out the fire" and therefore expected to continue working on this aspect, but under the auspices of WTS; lastly, soon after the completion of RSE, implementers realized its flaws and decided to take immediate action through another, more expansive program.

A switch to sustainment activities for WSS likely influenced the development of a joint sustainability framework. Additionally, while Russian workers during earlier programs were uncomfortable with the idea of a Western security culture or being held to Western security standards, today's WSS intellectual framework closely resembles Western security culture. While the causes behind the shift towards Western security standards remains unknown, it has several likely factors, including increasing technological and financial capabilities, and the realities and fears of terrorism, particularly terrorism involving WMD. Furthermore, this shift probably occurred

gradually over time, reflecting the changing technological capabilities of the Russians, the evolving U.S.-Russian relationship, and an acknowledgement of certain global security threats.

Finally, in developing upgrades and infrastructure, the most successful and long lasting ones seem to involve Russian counterparts during the development process. It seems reasonable to assume that systems developed under the supervision of both Russian and U.S. personnel will be more feasible and sustainable than those developed by U.S. personnel alone, ostensibly because Russian personnel more fully understand the specifics and needs of their own country. Applying this to the RSE case seems reasonable because only U.S. personnel developed the upgrades, upgrades that lasted less time than originally intended, and which Russians viewed as prohibitively heavy.

5. Partnership

Triggering events in the forms of treaties, summits, or conferences seem to predate many efforts by DOD and DOE to increase pace of implementation and improve partnerships. After the completion of RSE in 1996, multiple statements regarding the importance of securing SNM during transportation resulted in the strengthening of WTS. The Gore-Chernomyrdin Commission probably provided the political impetus for a re-envisioning, since the Commission released the Joint Statement arose from this meeting. Additionally, the Nuclear Threat Initiative's Nuclear Trafficking Database¹⁹⁸ reports an immense and disturbing leap in the number of incidents reported in 1991, 1992, and 1993, to the number of reports in 1994 and 1995. This indicates a potential "triggering" event in the sense that policymakers noticed the significant increase and therefore took actions, including the creation of WTS. Although the Database does not break down

¹⁹⁸ The Nuclear Trafficking Database is available at the Nuclear Threat Initiative's website <<http://www.nti.org/db/nistraff/index.html>>

instances by location or main source of vulnerability, many of these thefts probably occurred in transit or due to failures in transportation security. Fewer incidents occur after 1996, generally speaking; however, this data does not allow the assumption that WTS was a success because of the possibility of confounding factors.

The proliferation threat posed by Russian nuclear scientists and workers decreased as time went on, due to the improved economic situation, U.S. funding for nuclear scientists, and the CTR-facilitated installation of security upgrades. Thus, additional CTR programs provided incentives that resulted in securing problematic aspects of other programs. Differences between the Potter/Moroney accounts and the Hartanov account have several possible underlying reasons. First, they probably visited different sites, indicating lack of uniformity in security across upgraded sites. Additionally, they probably visited at different times during the implementation of the programs; thus, the difference in adherence could reflect the changing attitudes of the Russians over time. Dr. Moroney and Mr. Hartanov credit money as the reason for such attitudes changes over time. At the beginning of the program, most Russian workers were incredibly poor and in desperate need of money. Thus, the U.S. presence excited them because CTR injected money into the economy. Finally, Mr. Hartanov visited as a member of the DTRA, which has more authority than either of Dr. Potter's or Dr. Moroney's academic research groups.

The U.S.-Russian relationship, although faced with many challenges, still has had an important and tangible impact on other U.S. initiatives with Russia. Assistant Secretary Gottemoeller would characterize this situation thus: "Extensive cooperation with important Russian partners through CTR provided powerful insight on verification

and transparency measures that augmented and influenced future relations in various arenas, including the START Treaty."¹⁹⁹ As a final word, it is Professor Graham Allison's view, and I agree, that the failure of terrorists to either acquire or manufacture a nuclear device, and explode it, appears, "paradoxical in that, with as many holes in the system that exist, there are not more sensitive nuclear technologies or materials that have slipped out."²⁰⁰

III. A Surprising Conclusion: Economic Feasibility

Based on the literature, different criteria held varying levels of importance for the sustainability of Cooperative Threat Reduction. This original evaluation of the criteria resulted in a belief that economic feasibility would play a central role in the future sustainability of CTR because money underpins a significant portion of the program's ability to achieve goals. However, in evaluating each case study, economic feasibility seemed unimportant in determining relative success of one program to another. While unexpected, several possible reasons explain this reality. First, fluctuations in Russian markets, or the lack of a market altogether, rendered impossible the evaluation of this criterion on the ability of the Russian economy to financially support these programs. Additionally, much of the funding poured into CTR resulted in completion of significant, expensive, "big ticket" items such as the Mayak Fissile Material Storage Facility, or the SATC. The Russians will not have to rebuild these facilities if they properly maintain them. As evidenced by WSS budgetary requests, sustainment activities cost significantly less than upgrade activities, and, while the Russians will have to upgrade their systems in

¹⁹⁹ This view was expressed during the course of an interview with Assistant Secretary of State Rose Gottemoeller on 10 December 2010.

²⁰⁰ Conversation with Professor Graham Allison, Director for the Belfer Center at Harvard's Kennedy School of Government, 14 September 2010.

the future to meet changing technology, the level on which these upgrades will occur is far below that which the U.S. undertook at the beginning of CTR.

Finally, the formulation used in evaluating this criteria has a tendency to “lock in” economic feasibility as uncomplicated. This has several two explanations. First, fluctuation in U.S. funding levels implies consideration of need and sufficiency because Congress simply does not throw the same amount of money at the programs every year. It makes sense that Congress would allocate sufficient levels of funding because allocating more than that would be politically untenable. Arguments for allocation of less than sufficient funds weaken when presented with facts such as periodic additional Congressional appropriations of significant levels beyond the normal amount usually allocated. Second, imagining the counterfactual allows for a plethora of possible scenarios, all of which, and none of which, can be satisfactorily proven.

Policy Recommendations

I. Broad Recommendations

1. Develop Infrastructure at the Outset

Infrastructure represents one of the most important factors, because developing the abilities to create, test, maintain, and instruct about upgrades within a host country diminishes future U.S. responsibility for those activities. Evaluation measures help identify weaknesses, while development capabilities design solutions to those weaknesses. For a Russian security culture that depends more heavily on the “human factor,” ensuring that employees know how to utilize the upgrades, adequately safeguard sites, and actually understand the necessity of their job is vital. Although the most successful case study discussed failed to develop infrastructure, this failure greatly

impacted the future priorities and obligations of WTS. While ensuring the timely and satisfactory securing of weapons and materials remains the primary objective, such objectives do not speak to the long-term viability of upgrades. Therefore, the conceptualization and development of infrastructure proves crucial in reducing or eliminating the need for future U.S. intervention.

2. Exploit Educational Measures

If citizens and workers in the host country fail to recognize the importance of the upgrades and their purpose, then they have little intellectual and emotional incentive to sustain and properly manage upgrades and security measures. Countries where the “human factor” plays a significant role in security concept especially require such attention. For example, while Russian attitudes do not account for the majority of challenges and delays, they do result in some of the most disconcerting and damaging problems. Educational programs can go a long way towards providing information, but training programs for workers may help to ingrain these beliefs and improve levels of compliance with and adherence to rules and regulations.

II. Developing Specific Action Plans

1. Incorporate the Capabilities of Host Countries

Implementers must keep in mind the capabilities of the host country and not merely impose Western security standards, however ideal they may be. It is important to tailor a program to the abilities of the country and the site because simply imposing Western standards may require levels of framework, acceptability, and funding untenable in partner countries. Additionally, this weighs in on the U.S. partnership with host nations because simply imposing U.S. standards may be viewed as imperialistic and insensitive to the needs of the partner. Considering the abilities of specific sites when

developing infrastructure and frameworks will reveal the strengths and weaknesses of the sites and therefore the most important and pressing infrastructural needs per site. It may happen that one infrastructural element can adequately serve the needs of multiple sites or an entire program, such as SATC does for WSS. Furthermore, consideration of site- and host-specific capabilities will reveal the most pressing educational and training requirements for personnel, as well as factor in the opinions of those workers on the most sustainable and tenable measures for security and maintenance.

2. Utilize Successful Security Endeavors as an Example

Professor Graham Allison lauds this measure as one that will provide valuable insight from the private sector regarding sustainable security measures.²⁰¹ How do companies such as banks and jewelry stores prevent theft and abuses by employees and guards? While the educational component of this will be discussed in a different section, other lessons from these sectors include successful accountability measures, important frameworks for building personal relationships with workers that will increase personal investment in an endeavor and reduce incentives for cheating or indifference. Furthermore, using companies within the country with a high success rate in safeguarding its valuables may provide important insight how to tailor adequate and lasting security measures in that country.

3. Incorporate Partner Country Scientists and Technicians in all Levels of Development

The inclusion of this group of people will help ensure that any plans developed will more accurately reflect the capabilities of the host country. The CTR program employing nuclear scientists in non-nuclear fields represents an excellent potential resource because the people already possess the necessary knowledge and skills.

²⁰¹ Conversation with Professor Graham Allison, Director for the Belfer Center at Harvard's Kennedy School of Government, 14 September 2010.

Additionally, including Russian scientists may engender a sense of ownership for the upgrades because they were developed by Russians, for Russians. The literature discusses “Not invented here syndrome” affecting administrations on policies they didn’t event. Why shouldn’t this same concept apply to programs and upgrades developed for Russia?

4. Recognize Partners as Partners and Not Security Threats

The “Global Security Engagement: A New Model for Cooperative Threat Reduction,” devotes an entire chapter to the concept of engaging partners, indicating the importance of the term “partner.”²⁰² The U.S.-Russian CTR relationship has received several characterizations over the years, many of which have shown the U.S. in an imperialistic light and the Russians as meek recipients of U.S. aid. This is not just a matter of rhetoric, but attitudes as well. While this problem is probably less challenging today than it was twenty years ago, Russian counterparts still resent it. Thus, in order to fully engage partners at the beginning of the program, the U.S. must characterize this relationship as one of co-equal partnership in both word and deed. Mr. Hartanov takes this idea one step further and maintains that future U.S. partners will dislike U.S. characterization of their situation as a “security threat.” The Former Soviet, having spent decades priding itself in being a threat to U.S. security,²⁰³ had less of a problem with this terminology; however, future areas of CTR engagement, for example, Africa, will take offense, damaging the relationship before CTR programs even commence.

²⁰² “Global Security Engagement: A New Model for Cooperative Threat Reduction,” Committee on Strengthening and Expanding the Department of Defense Cooperative Threat Program. 2009 <<http://www.nap.edu/catalog/12583.html>>

²⁰³ Conversation with Grant Hartanov, 4 December 2010.

5. Achieve Worker Buy-In

Because the Russian security culture relies heavily on the human factor, effective CTR programs must achieve worker buy-in to forestall a serious proliferation threat. To this end, establish ownership through training programs may prove most effective in achieving this. U.S. personnel should incorporate educational aspects when designing training programs; however, developing a sense of ownership requires more than knowledge. Perhaps leadership exercises similar to the ones used to train security guards in Iraq and Afghanistan would improve motivation. Another idea stems from creating an ownership shape in the project. Perhaps Russian CTR sites could establish a rewards system tied directly to the success of the program so that when the program succeeds, the workers see personal benefits. Recommendations of a similar nature arise in Gottemoeller's "Cooperative Threat Reduction Beyond Russia." If CTR implementers linked the benefits of CTR programs with benefits in other aspects of society or domestic policy, then perhaps officials, if not workers as well, would see the merit of CTR programming beyond its stated purpose.²⁰⁴ For example, issue linkage of securing nuclear weapons with other security issues important to the constituency. Finally, Russian implementers should take the lead on creating these training programs, with U.S. personnel offering support and advice. This again recognizes that Russians know their own country and countrymen better than U.S. personnel do, thus increasing the chances of success of a program.

6. Redefine the International Verification System

In discussing the uniform securing of nuclear weapons and materials, Prof. Graham Allison returned to his concept of the "gold standard." Although conceptually very sound, I questioned the international community's ability to first decide on this

²⁰⁴ Gottemoeller 2005.

standard, and then enforce it across acknowledged and non-acknowledged nuclear states, as well as the numerous reactors and storage centers around the world. First, Professor Allison believes that the U.S.-Russian partnership forms the most important base for this new international system since the two countries have collaborated on CTR and have extensive experience in the programs' implementation. Thus, the U.S. and Russia should jointly establish a "gold standard" that they think adequately secures the weapons and materials. Then, the U.S. should establish a new nuclear "club" that adheres to this standard. As a past partner, Prof. Allison does not see extensive problems in negotiating Russia's ascension to this club.

However, the levels of transparency and verification that would be associated with the "gold standard" would require fairly invasive verification procedures. According to Assistance Secretary Gottemoeller, "The relationships built through CTR programs have helped U.S. verification procedures move past Cold War-era methods of satellite imaging into necessarily more intrusive measures that can help track and account for smaller SNM such as warheads."²⁰⁵ Theoretically a willing partner, the U.S. and Russia should work to bring the other acknowledged nuclear powers into an "inner" circle of partners. Professor Allison does foresee manageable hurdles with some partners; others, such as China, will pose greater challenges. This new "club" could also provide a mechanism for dealing with those countries outside the NPT that still have dangerous stockpiles of nuclear weapons or materials. As Professor Allison describes it, "for India and Pakistan, they would both likely want to join because neither would want to be left out. So I suspect that, for example, the Pakistanis are interested in being brought in from the 'nuclear cold,' especially since the recent U.S.-India deal has

²⁰⁵ Interview with Assistant Secretary of State Rose Gottemoeller, 10 December 2010.

somewhat legitimized the Indian nuclear arsenal. So here they would be admitted to the ‘high table,’ to the club, and the only price would be to secure their nuclear arsenal.”²⁰⁶

Once each of these nuclear powers entered, with the likely exception of North Korea (the only self-declared, unrecognized nuclear weapon state), nations with nuclear materials and/or reactors would form the second layer of membership. An inspectorate composed of mutually acceptable and diverse nuclear experts would conduct the inspections, helping alleviate fears of U.S. unilateralism. In terms of accountability, much would depend on attribution capabilities and the deterrent such abilities would provide. Should a nuclear device explode and the materials’ origin traced, the culpability will derive from the level of effort that the country of origin spent in securing their materials. A country that made a good-faith effort, but was ultimately unable to prevent theft would be less culpable than a state that did little to secure their nuclear weapons or materials. In order to fund this enterprise, I would recommend use of the funding provided by the G8, discussed previously, to support these efforts, with U.S. and Russian CTR implementers also taking the lead because of their knowledge and experience.

My Final Word

Returning to my question at the beginning of the conclusion section; none of the academics, politicians, implementers I have spoken advocated pulling out from CTR obligations. Rose Gottemoeller, Assistant Secretary of State in the Bureau of Arms Control, Verification, and Compliance, would advocate remaining partners even after drawing down or eliminating financial and logistical support because CTR programs provide confidence and increased transparency regarding the Russian nuclear arsenal, as well as forms the basis for important U.S.-Russian relationships on levels ranging from the executive to Russian and U.S. bureaucratic organs. Others, when questioned about sustainability, immediately focus on the U.S. ability to sustain them and the existence of DTRA, rather than my original conceptualization. Thus, while discussions of sustainability for programs absent U.S. financial and logistical support, might deserve tailoring to a discussion of diminished U.S. support and such a policy’s implications for partnerships and the U.S. budget.

²⁰⁶ Interview with Professor Graham Allison, 14 September 2010.

Appendix I: Cooperative Threat Reduction Programs & Funding
(Compiled from Woolf 2010)

| Program | Umbrella Program | Department | Years Administered | Total Appropriations (in millions of \$) |
|---|-------------------------------|------------|--------------------|--|
| Armored Blankets | Transportation Security | DOD | FY1992-FY1993 | \$3.1 |
| Emergency Response | Transportation Security | DOD | FY1992-FY1996 | \$29.2 |
| Railcar Security Enhancements | Transportation Security | DOD | FY1992-FY1994 | \$21.5 |
| Weapons Transportation Security | Transportation Security | DOD | FY1995-FY2010 | \$336.9 |
| Fissile Material Containers | Fissile Materials Storage | DOD | FY1992-FY2000 | \$82.2 |
| Storage Facility Design | Fissile Materials Storage | DOD | FY1993 | \$15 |
| Storage Facility Construction | Fissile Materials Storage | DOD | FY1994-FY2001 | \$387 |
| Weapons Storage Security | Weapons Storage Security | DOD | FY1992-FY2011 | \$841.44 |
| *SOAE – Russia | Destruction and Dismantlement | DOD | FY1993-FY2010 | \$1616 |
| SOAE – Ukraine | Destruction and Dismantlement | DOD | FY1993-FY2010 | \$590.8 |
| SOAE – Kazakhstan | Destruction and Dismantlement | DOD | FY1994-FY1996 | \$64.6 |
| SOAE – Belarus | Destruction and Dismantlement | DOD | FY1994-FY1996 | \$3.3 |
| WMD Infrastructure Elimination – Ukraine | Destruction and Dismantlement | DOD | FY1994-FY2003 | \$38.2 |
| WMD Infrastructure Elimination – Kazakhstan | Destruction and Dismantlement | DOD | FY1994-FY2003 | \$44.5 |
| Defense & Military Contacts | Demilitarization | DOD | FY1992-FY2011 | ~\$100 |
| New CTR Initiatives | Demilitarization | DOD | FY2009-FY2010 | \$27 |
| Global Nuclear | Demilitarization | DOD | FY2011 | \$74.5 |

| | | | | |
|---|-----------------------------------|---------|------------------------------|---------|
| Lockdown | | | | |
| Nonproliferation & Disarmament Fund | General CTR | State | FY1993-FY2011 | \$513.9 |
| Global Threat Reduction | Nonproliferation of WMD Expertise | State | ---- | ---- |
| Export Control & Border Security Assistance | General CTR | State | FY1998-FY2011 | \$273.6 |
| Navy Complex | MPC&A & Related Programs | DOE | FY2002-FY2011 | \$333.9 |
| Strategic Rocket Forces | MPC&A & Related Programs | DOE | FY2002-FY2011 | \$615.3 |
| Rosatom Weapons Complex | MPC&A & Related Programs | DOE | FY2002-FY2011 | \$697.4 |
| Civilian Nuclear Sites | MPC&A & Related Programs | DOE | FY2002-FY2011 | \$393.7 |
| Material Consolidation & Conversion | MPC&A & Related Programs | DOE | FY2002-FY2011 | \$229.1 |
| National Programs & Sustainability | MPC&A & Related Programs | DOE | FY2002-FY2011 | \$525.2 |
| Second Line of Defense Core Program | MPC&A & Related Programs | DOE | FY2002-FY2011 | \$653.7 |
| Global Initiatives for Proliferation Prevention | Defense Infrastructure Conversion | DOE | FY1994-FY2003; FY2005-FY2011 | \$558.1 |
| Elimination of Weapons-Grade Plutonium | Fissile Materials | DOD/DOE | ---- | ---- |
| Fissile Materials Disposition | Fissile Materials | DOE | ---- | ---- |

*SOAE stands for Strategic Offensive Arms Elimination

Appendix II: Interview Questionnaire

(Subject to change and personalization for individual interviewees)

1. What do you think is the greatest challenge facing CTR and why?
2. What do you see as the greatest barrier to the sustainability of CTR programs and why?
3. How would you determine whether or not a program had become “sustainable” within the host country? What is your reasoning?
4. Much of the literature, especially recent literature, focuses on how CTR has been such a huge success. I know that some earlier works criticize CTR for its slow pace of implementation and the bureaucracy in the U.S. and Russia, while later works characterize CTR as the most important and successful means of locking down nuclear weapons and fissile materials. As such, how you would explicitly define "success" as it relates to CTR programs.
5. Various works consider, obviously, the crisis situation brought on by the fall of the Soviet Union as the *raison d'etre* for CTR and that the programs were successful in their original objectives regarding the collapse of the Soviet Union. However, now that the situation is no longer that serious, why does, or why should, CTR continue, especially in light of our current economic situation, Sec. Gates' desire to reduce the defense budget, etc.
6. Others I have talked to, such as Dr. Bill Potter, Ambassador Bonnie Jenkins, and Rand Corporation's Dr. Jennifer Moroney, see the everyday Russian workers' attitudes, and their lack of buy-in, as a serious concern for the sustainability of CTR programs. This seems to be a common theme as each of these people described a similar experience despite the fact that they all visited and are speaking about different years. A significant recommendation early on involved Russian political buy-in and support from the top as necessary versus an emphasis on achieving buy-in from the day-to-day workers. What is your experience with day-to-day workers in CTR, how do you think the U.S. administrators of CTR could garner their support and interest, and do you think that current and new programs to educate the Russians as to the importance of safe-guarding nuclear materials will actually have an impact on those people and positively influence the ability of CTR to persist without the logistical and financial support of the U.S.?