Cooperative Security in the Post-Cold War International System: The Cooperative Threat Reduction (CTR) Process

by
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The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others.

To the memory of my Dad

Acknowledgement

This work is first of all a tribute to those in the United States and the former Soviet Union, who join efforts in addressing requirements of the post-Cold War international system to dramatically reduce nuclear arsenals, who believe that two former adversaries can be true partners, and who contribute to building the new U.S.-Russian relationship.

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This work is dedicated to my Dad, Dr. Oumirserik Kassenov, because his life example is my source of inspiration and it is to him I owe my fascination with the world of politics.

Abstract

The thesis explores cooperative security efforts between the United States and Russia in the framework of the Cooperative Threat Reduction (CTR) Programme and other non-proliferation programmes, which were established in the aftermath of the Soviet collapse as a response to nuclear proliferation threats in the former Soviet Union. One of the main objectives of CTR is to reduce nuclear dangers associated with vast nuclear arsenals, which first and foremost, means reductions in nuclear weapons.

This work presents an overview of different proliferation threats ranging from proliferation of nuclear material to potential "brain-drain" from the former Soviet nuclear complex, explains their technical and socio-economic aspects and assesses the effectiveness of the U.S.-Russian programmes, which deal with these threats. The CTR process has encountered some major obstacles on its way. The research suggests that some important problems in the implementation of CTR programmes are of bureaucratic nature. However, bureaucratic factors are aggravated by the political factors stemming from the fact that the national security policies of the U.S. and Russia are still in part based on concepts and strategies adopted during the Cold War. This is especially evident with regard to the role assigned to nuclear weapons by both countries. Therefore, the CTR process is used as a laboratory study of the U.S.-Russian strategic relations in the post-Cold War era.

The study demonstrates that the processes happening in the international security system below the surface and which might not be so obvious at a glance can be absolutely important for the future of the international system. The CTR process represents a mechanism, which can be used to build a new international system, where the role of the nuclear weapons becomes more and more obsolete.

Contents

Charts

Figures

Tables

Appendices

Abbreviations

ABM	Anti-Ballistic Missile (Treaty)
ASM	Air-to-surface Missile
ALCM	Air-launched Cruise Missile
BWC	Biological Weapons Convention
CDI	Center for Defense Information
CEIP	Carnegie Endowment for International Peace
CIS	Commonwealth of Independent States
CRADA	Cooperation Research and Development Agreement
CTBT	Comprehensive Test Ban Treaty
CTR	Cooperative Threat Reduction
DTRA	Defence Threat Reduction Agency
DOD	Department of Defence
DOE	Department of Energy
EkhZ	Electrochemical Plant
EMZ	Electromechanical Plant
FSB	'Federal'naya Sluzhba Bezopaznosti' (Russian Federal Security Service)
FSU	Former Soviet Union
GAN	'Gosatomnadzor' (Russian State Committee for the Supervision of Nuclear and Radiation Safety)
GAO	Government Accounting Office
GUMO	'Glavnoe Upravleniye Ministerstva Oborony' (12th Main Directorate of Russian Ministry of Defence)
HEU	Highly Enriched Uranium
IAEA	International Atomic Energy Agency
ICBM	Intercontinental Ballistic Missile
IISS	International Institute for Strategic Studies
ILAB	Inter-Laboratory Board
IPP	Initiatives for Proliferation Prevention
ISTC	International Science and Technology Centre
LANL	Los Alamos National Laboratory
LEU	Low Enriched Uranium
MCC	Material Conversion and Consolidation
MCC (SKhK)	Mining and Chemical Combine
MFA	Ministry of Foreign Affairs
MIA	Ministry of Internal Affairs
MIFI	Moscow Institute of Physical Engineering
MINATOM	Ministry of Atomic Energy

MIRV	Multiple Independently Targeted Re-entry Vehicle
MOD	Ministry of Defence
MOX	Mixed Oxide
MPC&A	Material Protection, Control and Accounting
NCI	Nuclear Cities Initiative
NIIAR	Scientific Research Institute of Atomic Reactors
NIS	Newly Independent States
NNSA	National Nuclear Security Administration
NPR	Nuclear Posture Review
NPT	Nuclear Non-Proliferation Treaty
NRDC	National Resources Defence Council
NRC	National Resources Council
NSC	National Security Council
NTI	Nuclear Threat Initiative
R&D	Research and Development
RANSAC	Russian-American Nuclear Security Advisory Council
SALT	Strategic Arms Limitations Treaty
SATC	Security Assessment and Training Centre
SCC (SKhK)	Siberian Chemical Combine
SEC	Safety Enhancement Centre
SLBM	Submarine-launched Ballistic Missile
SNF	Spent Naval Fuel
SORT	Strategic Offensive Reduction Treaty
SRF	Russian Strategic Rocket Forces
SSBN	Nuclear Ballistic Missile Submarine
START	Strategic Arms Reduction Treaty
SWU	Single Working Unit (in Low Enriched Uranium)
TMD	Theatre Missile Defence
UEKhK (UEIP)	Urals Electrochemical Combine
USEC	U.S. Enrichment Corporation
USIC	U.S. Industry Coalition
VNIIEF	All-Russian Scientific Research Institute of Experimental Physics
VNIINM	Bochvar All-Russian Scientific Research Institute of Inorganic Materials
VNIITF	All-Russian Scientific Research of Technical Physics
ZATO	"Zakrytoe Administrativno-Territorial'noe Obschestvo" ('closed' city)

Chapter 1
Introduction[1]

1.1. Topic of Research

1.1.1 U.S.-Russian Relations after the Cold War: Confronting the Nuclear Threat

The strategic nuclear confrontation between the United States and the Soviet Union was one of the defining features of the bipolar international system during the Cold War when the two superpowers accumulated immense nuclear arsenals. It would have been expected that the transformation of the security relationship between the United States and Russia would necessarily involve a fundamental shift in its military dimension. While this was true for the deployment of military forces in Europe, the strategic nuclear relationship did not change in line with the changes in the global security environment. Two seemingly contradictory and yet related phenomena could be observed: The structure of the nuclear relationship in terms of force and alert postures remained essentially the same, albeit at lower levels. At the same time, a major cooperative programme was launched to provide for the safe and secure dismantlement of nuclear weapons and the safety and security of nuclear materials and other elements of the nuclear weapons complex in the former Soviet Union. This Cooperative Threat Reduction (CTR) process significantly transcended the previous relationship based on insecurity and mistrust and constituted a genuine effort at cooperation that defied the assumptions of the international order during the Cold War period.

The current work looks in depth at cooperative security efforts between the United States and Russia – this includes Cooperative Threat Reduction (CTR Programme) and several other programmes, which were established by the different U.S. Departments and represent the cooperative threat reduction process. The CTR process is used as a laboratory study of the U.S.-Russian strategic relations in the post-Cold war era. It demonstrates both the achievements and limitations of the evolving new framework for interaction between the U.S. and Russia. In this respect, from a scholarly point of view, it

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[1] The U.S. spelling is preserved in the direct quotations and the names of the private organisations

is interesting to put the CTR process into a larger picture of U.S.-Russian relations, as it can also help to identify whether some problems of implementation of CTR programmes are influenced by political factors.

In this work, "cooperative threat reduction" refers to all the major U.S.-funded programmes designed to reduce the risk of nuclear proliferation in Russia. This includes the original Department of Defence's CTR Programme, and other programmes administered by the Departments of Energy, and State. The current work focuses on 'nuclear' dimension of cooperative threat reduction and does not cover issues of biological and chemical weapons proliferation, although concerns about these threats are addressed in the U.S.-Russian CTR cooperation.

The immediate concern that motivated the Cooperative Threat Reduction process was the risk of the loss of control of nuclear weapons, materials and expertise in the wake of the disintegration of the USSR and the social and economic dislocation in the former Soviet space. It became a more integral part of the evolving U.S.-Russian nuclear relationship as the reductions in the arsenals and the withdrawal of nuclear weapons from Eastern Europe and various parts of the former Soviet Union necessitated a substantial programme of warhead dismantlement and nuclear materials disposition in Russia. The dismantlement process entails many difficulties of technical and socio-political nature. First of all, the process of denuclearisation raises a lot of questions for the safety and security of nuclear weapons and materials. Thus, for example, a weapon to be dismantled in Russia should be first delivered to the assembly/disassembly plant. In a situation of political and economic instability, transportation of nuclear weapons becomes very dangerous. There is a problem of the technical safety of weapons to be transported in special rail trains. Moreover, there is a concern that during transportation these weapons can be stolen and used by unauthorised parties (dissident military leaders, those seeking financial profit from selling them to terrorist groups and organisations, or terrorist groups themselves). Even more dangerous is the amount of nuclear materials generated by the process of dismantlement. Fissile material from dismantled weapons can be re-used, and therefore, is attractive to threshold/rogue states, terrorists, or those looking for a quick profit from selling illicitly acquired goods.

There are also serious problems relating to the storage of nuclear weapons and materials. Currently, Russian storage facilities are overloaded with the nuclear warheads removed from the non-Russian republics as a result of their adherence to the Nuclear Non-Proliferation Treaty (NPT) as non-nuclear states.

The denuclearisation process in Russia also means that thousands of people are being deprived of their work, privileged position in society and the simple means of existence. It is not only a matter of state responsibility to provide former employees of the nuclear complex with jobs. These people possess unique knowledge which could significantly decrease the time for rogue states willing to pay for their services to obtain nuclear capability. The increase in the number of nuclear states can undermine the global system of non-proliferation, and will greatly increase instability in the world. The CTR Programme was designed to confront these problems. With time several other non-proliferation assistance programmes were established to address specific problems.

The CTR Programme defies conventional thinking about strategic relations as well as public policy. This is because it involves close technical collaboration on the most secret and closely guarded elements of the military-industrial complex that provides the backbone of the means to guarantee national security. It goes against the grain of political and military culture, and involves a degree of cooperation and altruism that marks a very radical departure from U.S.-Russian relations in the past. Moreover, it requires the political leaders to overcome considerable resistance among their political elites to confront a threat that may or may not be imminent and the overall dimensions of which are disputed and hard to estimate. It therefore requires an explanation of how CTR could come into existence, assess its achievements, the extent to which its objectives were accomplished and explain the constraints that caused it to fail to achieve its full potential or fully deal with the threat that it was designed to meet.

1.2 Conceptual Framework

The first research question identified for this thesis, which aims at placing the CTR process in the context of the U.S.-Russian post-Cold War strategic relations, can be answered with the help of the conceptual framework described in the following section.

The first part of my work (Chapter 2) discusses the issues of the U.S.-Russian strategic relations with regards to the changing role of the nuclear weapons in the new international security system in order to provide basis for testing problems of implementation for each individual programme (Chapters 4, 5, 6, and 7) on being dependent on political factors in U.S.-Russian strategic relations. An attempt is made to demonstrate the correlation between the significance of nuclear weapons assigned to them by Russia and the U.S. and various scenarios for bilateral relations. In order to fulfil this task the following conceptual framework (Table 1) is developed and main schools of thoughts on the role of nuclear weapons are presented.

Table 1 Possible Scenarios in U.S.-Russian Strategic Relations

Scenarios	*Characteristics*	*Associated Problems*
Scenario 1 **Complete Disarmament**	No nuclear arsenals retained by Russia and the U.S.;	Problem of rogue/threshold states
Scenario 2 **Cooperative Denuclearisation**	Very low level of nuclear arsenals, not on alert	Denuclearisation creates additional pressure on extending cooperative threat reduction
Scenario 3 **Strategic Arms Reductions**	Reductions within START[2] framework; significant nuclear arsenals on both sides	"Strategic Paradox" resulting from too many weapons for the post—Cold War era
Scenario 4 **Strategic Confrontation**	Retention of large nuclear arsenals	Instability of the international security system

The above scheme defines four major scenarios for the U.S.-Russian strategic interaction in relation to the role of nuclear weapons.

The first possible scenario would represent a complete disarmament. A total elimination of the nuclear arsenals possessed by Russia and America can be perceived as a final goal of the nuclear disarmament. In the ideal circumstances, such outcome would mean a disappearance of the threat of an all-wage nuclear war and increased stability in the world. However, this idealistic picture is far from being realisable, at least, for several decades to come. Even if other nuclear powers (member states of the NPT) would follow the unprecedented move of Russia and the U.S. for complete disarmament, a world will still face a number of so called rogue/threshold states and self-declared nuclear states. Taking into consideration the motives of the countries engaged in unauthorised nuclear production, it seems a much harder task to persuade them to give up with their nuclear intentions. These countries most always see the development of nuclear programme (covert or open) as a primary matter of their national security. Being deprived from other means of guarding their state security and being weak in other aspects (bad economy, low

2 START refers to Strategic Arms Reduction Treaties. START-limited systems are warheads and delivery vehicles, which fall under START requirements for dismantlement.

levels of conventional forces) they are out of direct influence or control of the NPT members (even in case of their own disarmament).

The second scenario is characterised by the emphasis being shifted away from the nuclear weapons. In other words, the role of the nuclear weapons in the world politics is changing dramatically. In this scenario, Russia and the U.S. would posses a very small amount of the nuclear arsenals, 'off alert'. The notion of cooperative denuclearisation is the most viable option for the current state of international security system.

The main feature of the third scenario is strategic arms reductions, which is represented by the START process. In today's circumstances, START is an important part of the U.S.-Russian strategic relations and is praised for reducing the numbers of weapons on both sides. But at the same time this process created a phenomenon of 'strategic paradox': both countries are reducing the numbers of nuclear weapons, but this reduction in absolute terms fails to make a difference. After meeting the START levels the U.S. and Russia will still remain with excessive numbers of the nuclear weapons. This fact creates a 'strategic paradox' when two countries are no longer enemies, but have a capability of destroying each other (as well as the rest of the world).

The need for the nuclear deterrence is driven by the presence of hostility between the states. If this is removed, the preservation of nuclear relations becomes absurd. Just after the end of the Cold War the problem of safety and security was clear cut for both the U.S. and the Russian governments. Attention was attracted to the elimination or at least reduction of nuclear threats and dangers from a disintegrating Soviet state. Safety was and still is at the core of U.S.-Russian cooperation, but not the question of nuclear relations *per se*.

The most negative scenario would be the retention of large arsenals on both sides. In other words, Russia and the U.S. would engage in a strategic confrontation similar to the Cold War period. Such outcome would mean a growing instability in the world.

The distinction between these four scenarios is not clear-cut. There can be a mixture of features of more than a one defined scenario. The U.S.-Russian cooperation within the CTR framework can be a part of scenarios 2 & 3. The goal is to test the assumption that the future of cooperative threat reduction is determined by the state of the U.S.-Russian strategic relations, and in particular, by the role the countries will assign to nuclear arsenals in their strategic policies.

One of the main hypotheses of this thesis is that the CTR process is influenced by unique conditions of a post-Cold war international security environment, in other words, that political factors are no less important than bureaucratic factors, and occasionally, there is no clear separation between the factors of political and bureaucratic nature.

The post-Cold War international security system calls for a re-evaluation of nuclear strategies of the U.S. and Russia and demands re-examination of the U.S.-Russian strategic relations currently still based on the dominant role of nuclear weapons. The role of nuclear arsenals has to be re-considered since their justification as a means of deterrence and war-fighting has been considerably reduced due to the changed nature of conflicts and new security requirements since the end of the Cold War. (See the discussion on the role of nuclear weapons in Chapter 2)

The response of the two large nuclear powers and former adversaries to the changed nature of their relationship and the international system more generally has been contradictory. On the one hand, one can say that the U.S. and Russia have failed so far to adjust their strategic relations to the new security environment. Their nuclear postures are still more appropriate for the Cold War period. Despite the positive rhetoric, U.S.-Russian relations are still far from demonstrating a true partnership. A decade since the end of the Cold War many aspects of the bilateral relations are influenced by lingering Cold War thinking, lack of trust and cultural differences.

On the other hand, despite the above *caveats*, the START process and the cooperative threat reduction process as well as U.S.-Russian interaction in the various non-proliferation fora exhibit a level of cooperation and a sense of joint responsibility for the future of nuclear weapons arsenals that is more in line with a strategic partnership. The CTR Programme not only took off the ground but has led to development of the cooperative threat reduction process, which now incorporates an array of programmes managed by different state agencies and aimed at addressing specific proliferation concerns. Many obstacles including the culture of secrecy and suspicion, conflicting interests of the key players, general confusion in the post-Cold War international relations and not fully articulated foreign policy objectives were overcome, if not fully, than to a considerable extent. The fact that cooperative threat reduction programmes are fighting their way through the bureaucratic and political jungle deserves appraisal. It demonstrates that new political thinking and shift from the Cold War practices is gradually developing in the United States and Russia even though obstacles exist on both sides.

1.3. U.S.-Russian Relations in the Contemporary International System: In Search of a Theoretical Framework

1.3.1. Choosing "Conceptual Lenses"

Finding an appropriate theoretical framework for this study serves two major purposes. First, it provides a necessary structure for conducting research (i.e. gives us "conceptual lenses"), and second, it helps to place current research into wider discourse about international relations (IR) theories and the nature of the international system after the Cold War.

The weight of the "political" factor is to be examined based on an analysis of the U.S.-Russia strategic relations in the post-Cold War era. To structure this analysis the study identifies four possible scenarios of the bilateral strategic relations with a focus on the role of nuclear weapons (Chapter 2). An examination of U.S.-Russian relations after the end of the Cold War calls for questioning the factors that motivate foreign policy, perceptions of security threats, and views on cooperative security held by the Russia and the United States.

Such an examination is expected to yield insights on the validity of some major IR theories in explaining the behaviour of states during and after the Cold War (for example, realism, neo-realism). The experience of the CTR process during the last decade questions some of the main assumptions of realism about the nature of the international system. Realism, in its newest manifestation of 'offensive realism' outlined by John Mearsheimer reaffirms the anarchical nature of the international system after the Cold War and asserts that the structure of the international system forces states to act aggressively toward each other in their pursuit of 'security'.[3]

Even if we assume that realism was a useful approach to study the international system in the Cold War period, it appears inappropriate for the contemporary era. The assumption that the international system is anarchical does not seem to be borne out by empirical observation. Quite the opposite is the case, states generally accept very substantial normative constraints in their relations, especially in relation to the use of force. The prevalence of inter-state conflict in the aftermath of the Soviet collapse has not been realised. Armed conflict in the post-Cold War world is almost exclusively sub-state,

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[3] John Mearsheimer, *The Tragedy of Great Power Politics*, W. W. Norton & Company, New York, 2001, p. 3

involving ethnic rivalry or other non-state actors (e.g. terrorism). With the exception of some specific, confined regional problems, states generally do not fear external aggression from other states. Especially in Europe and the Americas, states generally do not experience a 'security dilemma' and consequently military expenditure in most countries (with the United States, Israel and South Korea being notable exceptions) has declined precipitously and the notion of a 'national defence' policy has been all but abandoned by many countries.

During the time period under consideration, the United States and Russia sought to develop a relationship that would be part of a different international order based on international norms, cooperation and cooperative security. This involved the adoption of policies designed to eliminate the legacy of the Cold War and create a new foundation for the mutual security relationship. CTR was to be one important element, designed to deal with the dangers of the Cold War nuclear inheritance and develop a cooperative approach to nuclear safety and security. The intellectual foundation of this approach is explicitly contrary to the assumptions and notions of realism.

The nature of current security threats, especially in terms of potential conflicts, is important because it sheds light on the role for nuclear weapons in the post-Cold war international security system. The fact that the main security threats states confront in our age are either internal (economic instability, instability of governing regime, environmental dangers, etc.) or are coming from sub-state actors (the threat of terrorism) calls for a revised role for nuclear weapons in the security policies of the states. Nuclear weapons can neither deter nor be used as war-fighting tool in the sub-strategic type of conflicts more common in the post-Cold war era (see Chapter 2).

It is evident that the attitudes in the U.S. and Russia with regard to the future role of their arsenals and their nuclear relationship is characterised by ambiguity and uncertainty. In this respect, a conceptual framework of four possible scenarios of the U.S.-Russian strategic relations is presented to aid the analysis of the nature of their relations and the role they assign to nuclear weapons.

The evidence for the changes in the structure of international security and the U.S.-Russian relationship specifically confronts us with a strategic paradox. The structure of the strategic nuclear relationship has remained intact in terms of the force deployments, even though the erstwhile political rationale no longer applies. As far as CTR is concerned, the priority and commitment given to the programmes does not match the urgency of the threat as portrayed by its promoters in the U.S. administration or the Russian government.

It seems therefore that systemic explanations are not adequate to explain the phenomena under consideration.

Consequently this study aims to develop an explanatory model that accounts for the development of the CTR Programme and its consecutive growth into several independent non-proliferation programmes in the context of the post-Cold War international system, the failure to address what has been recognised as one of the most serious threats to international security effectively, and the conditions that would allow the CTR process to succeed. In this respect, particular emphasis is placed on the theoretical frameworks that relate domestic politics (bureaucratic politics) to the definition of the national interest and international behaviour.

Graham Allison's work in *Essence of Decision*[4] is considered one of the most substantial contributions in the development of the bureaucratic decision-making model; however, it was also criticised for the several shortcomings of a theoretical and methodological nature. Possible limitations of the Bureaucratic Politics Model when applied to the CTR process are discussed in detail in Chapter 3.

One of the main hypotheses of this study is that bureaucratic politics plays a major role in the way the CTR process evolved (the extent of this influence and dependence of bureaucratic politics on broader political factors are examined throughout Chapters 4, 5, 6, and 7). The main assumption of the Bureaucratic Politics Model is accepted with a view that different organisations and individual bureaucrats with their varying organisational interests and values influence the implementation track of major non-proliferation programmes.

The definition of bureaucratic politics is given at length by I. M. Dester:

> «Bureaucratic politics is the process by which people inside government bargain with one another on complex public policy questions. Its existence does not connote impropriety, though such may be present. Nor is it caused by political parties and elections, though both influence the process in important ways. Rather, bureaucratic politics arises from two inescapable conditions. One is that no single official possesses either the power, or the wisdom, or the time to decide all important executive branch policy issues

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4 Allison, *Essence of Decision: Explaining the Cuban Missile Crisis*, Little, Brown and Company, Boston, 1971

> himself. The second is that officials who have influence inevitably differ in how they would like these issues to be resolved...»[5]

This work attempts to grasp a complicated and intertwining net of key players in both countries. By defining vested organisational interests and values it is possible to understand the mechanisms both stimulating and constraining the implementation of non-proliferation programmes.

The argument of this work is that confusion or sometimes even rejection of important aspects of the programmes of cooperative threat reduction by different government agencies and departments demonstrates the confusion in the post-Cold war relations between Russia and the U.S. and is a result of varying organisational interests and values of key political actors involved.

The key players in CTR decision-making are often large influential organisations, such as the U.S. Department of Defence (DOD), State Department, Department of Energy (DOE), the U.S. Congress and the Russian Duma, Russia's Ministry of Atomic Energy (MINATOM), and the Russian Ministry of Defence (MOD).

There is a complex system of interrelations and interdependencies between the different structures of the state power. Different organisations pursue different and sometimes conflicting interests. There is also a serious lack of coordination between the different agencies responsible for different programmes. The way the bureaucratic system operates in the U.S. and Russia prevents a smooth and straightforward implementation of CTR projects.

The emphasis on Bureaucratic Politics is not taken to imply that other factors, and in particular the political objectives pursued by the political leadership are not also an important part of the explanation for the evolution of the CTR process. Quite the reverse, the political priorities set form an essential part of the story of Cooperative Threat Reduction.

Bureaucratic Politics Theory was used to test the second main assumption of this thesis (that is that bureaucratic factors have an important role to play in how the CTR process was established and why it encountered particular problems of implementation). The discussion in Chapter 3 explains why this model was chosen as a principal analytical tool for case studies of major CTR programmes, particularly with a view to understanding

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5 I. M. Destler, 'Organisation and Bureaucratic Politics' in Michael Smith, Richard Little, and Michael Shackleton, eds., *Perspectives on World Politics*, The Open University Press, 1981, p. 158

the constraints that affected them. Applying the Bureaucratic Politics Model to CTR a coherent account of the CTR process can be given that would otherwise not be possible. Although, successful in explaining some major trends in the CTR process and important in terms of providing structure for the case studies (i.e. programmes assessed at the level of the implementing agencies), it is not assumed that the Bureaucratic Politics approach will provide a full explanation for CTR due to some apparent limitations.

Those limitations are not connected with the model itself but with the scope of its applicability. Thus, some particular trends in the CTR process, such as the role of non-state actors in some of the programmes (example of Lab-to-Lab part of the Material Protection, Control and Accounting (MPC&A) Programme assessed in Chapter 5), fall outside the boundaries of the Bureaucratic Politics Model. The empirical evidence of the behaviour of the scientific community and non-governmental organisations (a section on role of NGOs in Chapter 3) calls for the utilisation of another theory, e.g. the theory of transnational movements, which assigns epistemic communities an important role in moving inter-state cooperation forward and in influencing policy decisions on important state-level issues. Several scholars (Thomas Risse-Kappen, Matthew Evangelista) have developed interesting ideas of how the arms control process was influenced by transnational relations, defined by Risse-Kappen, as "regular interactions across national boundaries when at least one actor is a non-state agent or does not operate on behalf of a national government or an intergovernmental organization".[6]

The example of U.S.-Russian cooperation on the level of nuclear labs, which involved nuclear scientists and was successful in avoiding bureaucratic hurdles, demonstrated the ability of epistemic communities to act beyond the immediate Cold War reflexes (typical for large state organisations). The important role played by non-governmental policy 'think-tanks' can be also looked at from the angle of the theory of transnational movements. Independent non-proliferation scholars tend to be more liberal in their views of cooperation between the U.S. and Russia and are putting pressure on the governments to further engage in cooperative threat reduction.

[6] Thomas Risse-Kappen, 'Bringing Transnational Relations Back In: Non-State Actors, Domestic Structures, and International Institutions' in Thomas Risse-Kappen, ed., *Bringing Transnational Relations Back In*, Cambridge University Press, quoted by Matthew Evangelista, 'The Paradox of State Strength: Transnational Relations, Domestic Structures, and Security Policy in Russia and the Soviet Union', International Organization, 49, 1, Winter 1995, pp. 1-38

1.3.2. Finding a Place in the Existing Literature and Wider IR Theories Discourse

The novelty of this research should be seen in the fact that it is the first attempt to use the CTR process as a case study for the U.S.-Russian strategic relations in the post-Cold war international security system. By attempting to answer questions, such as why this process is prone to some persistent problems of implementation and why it was possible in the first place, may yield some conclusions regarding the nature of U.S.-Russian relations, the achievements and limitations in the bilateral relationship since the end of the Cold War.

Only a very limited amount of academic work has been published on the subject of the CTR process. The existing works provide important insights on different aspects of CTR. The first major text devoted to this issue was published in 1997. [7] *Dismantling Cold War* remains the most comprehensive work, which covers perspectives of the U.S. and NIS countries on the CTR programmes and defines key players. Another substantial work was carried out by Jason Ellis from the National Defence University who published *Defense by Other Means: The Politics of U.S.-NIS Threat Reduction and Nuclear Security Cooperation*[8] in 2001. His work provides an invaluable and very detailed account of U.S. decision-making and the interagency process connected with the development of the CTR process. More recent work published by Michael Krepon *Cooperative Threat Reduction, Missile Defense, and the Nuclear Future*[9] looks at cooperative threat reduction from the point of the U.S. foreign policy, specifically in the area of nuclear policy.

This study looks at the CTR process from a different perspective by linking it to constraints in the U.S.-Russian relationship and by assessing specific problems in the CTR process, such as problem of fissile material disposition in terms of larger arms control process (dismantlement versus disposition).

It is a well-established principle in the literature of strategic arms control that the objective of arms control is not only to regulate technical aspects of the strategic

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7 Shields and Potter, eds., *Dismantling the Cold War: U.S. and NIS Perspectives on the Nunn-Lugar Cooperative Threat Reduction Program*, The MIT Press, Cambridge, Massachusetts, London, England, 1997

8 Jason Ellis, *Defense by Other Means: The Politics of U.S.-NIS Threat Reduction and Nuclear Security Cooperation*, Praeger, Westport, Connecticut, 2001

9 Michael Krepon, *Cooperative Threat Reduction, Missile Defense, and the Nuclear Future*, Palgrave, Macmillan, 2003

relationship, but more importantly to develop political relations. Indeed, some have argued that during the Cold War this was the principal purpose of strategic arms control.[10] The technical negotiations become a vector of larger political settlements. In view of the radical nature of the CTR programmes and the stated intentions of its proponents, the thesis assumes that this general principle also applies to CTR. Thus, although this thesis is focused on some specific technical programmes, there is an obvious link between their implementation and larger issues in the U.S.-Russian strategic relations in the post-Cold war, which this study attempts to demonstrate. An evaluation of U.S.-Russian relations since the end of the Cold War provides insights on the validity of different perspectives on the contemporary world order. On the face of it, the U.S.-Russian partnership in the framework of CTR programmes goes against realist notion of 'aggressive pursuit of power'; it appears to be a manifestation of a major shift in the international system as former antagonist powers search for a new form of interaction. The fact that the United States and Russia are willing to cooperate appears to go against realist argument that 'international anarchy fosters competition and conflict among states and inhibits their willingness to cooperate even when they share common interests'.[11] The behaviour of different U.S. administrations (Clinton and Bush) assessed in this work can be looked at from the angle of opposing schools of theory. The way the Clinton administration was constructing its policies towards Russia reflect ideas promoted by republican liberalism, which links democracy with peace.[12] Thus, for example, the democratic peace theory[13] assigns democracy an important role in decreasing the likelihood of war. The experience of the early and mid-1990s showed that the Clinton administration was pursuing a policy of 'democratising' Russia; President Clinton saw engaging Russia and supporting democratic processes in the country as crucial to the international security of the post-Cold war era. Events in Russia during the same period of time also showed signs of certain political

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10 Christoph Bluth, *Soviet Strategic Arms Policy Before SALT*, Cambridge University Press, Cambridge, 1992; Robin Ranger, *Arms & Politics 1958-1978: Arms Control in a Changing Political Context*, Macmillan Company of Canada Limited, 1979

11 As defined by Joseph M. Grieco, 'Anarchy and the Limits of Cooperation: A Realist Critique of the Newest Liberal Institutionalism' in David A. Baldwin, ed., *Neorealism and Neoliberalism: The Contemporary Debate*, Columbia University Press, New York, 1993, p. 116

12 David A. Baldwin, 'Neoliberalism, Neorealism, and World Politics', in Baldwin, ed., *Neorealism and Neoliberalism: The Contemporary Debate*, op. cit., p. 4

13 Bruce Russett, *Grasping the Democratic Peace: Principles for a Post-Cold War World*, Princeton University Press, Princeton, New Jersey, 1993

forces adopting values of liberalism. Chapter 2 describes the divide in Russia during the early years of Yeltsin cabinet between liberals promoting Russia's engagement with the world economy, integration into the international community with adopting Western democratic values and traditionalists, who were seeing the world from the realist position and were not ready to embrace a changing world order.

The current Bush administration seems to be more inclined to adopt ideas from realism by rejecting values of institutionalism and moving towards pursuing unilateral policies in search of security. The problem with such policies is that the post-Cold war world order seems to be developing under conditions, which do not fit with the realist explanations: due to nature of majority of security threats states are facing (threat from sub-state actors, environmental dangers, internal domestic problems) cannot be deterred by trying to weaken the other states. Cooperation between states, adherence to institutionalist values (respect for international mechanisms) is needed to confront most of the security threats. As George Perkovich has argued, by adopting an inappropriate nuclear policy and neglecting the international regimes of non-proliferation while demanding compliance of others, the Bush administration loses much of the soft power instruments that would render its policies of nuclear non-proliferation and counterproliferation much more effective.[14] The thesis will discuss the effects of the shift in U.S. nuclear policy on the CTR process in particular.

In sum, it appears that the post-Cold war world order, which is in the process of transition, cannot be explained on the basis of simply realist or liberalist schools of thought. There are conflicting trends in the policies of the countries (in this case, example of Russia and the United States). This study will consider the effectiveness of policies to deal with certain security threats (e.g. nuclear proliferation, illegal smuggling and terrorist use of WMD) based on cooperation as opposed to the unilateral projection of power. The technical issues raised in this thesis (such as the danger of accidental nuclear war or the unauthorised use of nuclear weapons – Chapter 2) are related to the arguments for a reduction of nuclear arsenals on both sides. A dramatic reduction of arsenals is more likely if the U.S. and Russia would see their own security in having fewer weapons than having more (i.e. a move away from balance of power towards an understanding of common security). The dissertation will examine the role that CTR might play both in provoking and facilitating such a shift.

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[14] George Perkovich, 'Bush's Nuclear Follies', Foreign Affairs, Vol.82, No.2, March/April 2003, pp. 2-8

The case studies of different proliferation threats connected with nuclear weapons and materials as presented in chapters 4, 5, 6, and 7 can contribute to the debate on the role of nuclear weapons (presented in Chapter 2), whether more nuclear weapons in the world means more or less security. The empirical evidence collected on risks associated with large nuclear arsenals suggest that their presence does not entail more security, especially in the light of the end of the Cold War superpower stand-off (the 'deterrent' value has diminished), the rise of international terrorism (threat of illegal use), and the changing nature of conflict in the world (a shift towards sub-strategic conflicts, in which nuclear weapons play no role).

This study can also provide some additional insights into validity of the Bureaucratic Politics Theory. The application of this theory to the study of the CTR process is expected to show its general validity, deal with some of the criticism (e.g. the alleged non-applicability to countries other than the United States) and demonstrate its limitations (not all decision-making in foreign policy analysis can be based on simple application of the Bureaucratic Politics Model; other factors also play a role).

Some new material can be found for the discourse on the theory of transnational movements (treated as a part of sociological liberalism, which links transnational interactions with international integration).[15] It is a hypothesis of this study that the success of certain projects and trends in the CTR process can be attributed to transnational movements (e.g. interaction between the nuclear scientists, which is capable of overcoming bureaucratic obstacles and influencing the state-level decision-making ("bottom-up" approach)).

The current study can, therefore, contribute to the existing literature a new dimension of looking at the CTR process. Moreover, it makes a contribution to the debate of the nature of the contemporary international system from the perspective of international relations theory.

1.4 Objectives and Hypothesis

The theme of this thesis is the construction of the security relationship between the United States and Russia in the emerging post-Cold War international order. Its particular focus is the strategic nuclear relationship; the sub-theme is the issue of nuclear safety and

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[15] Baldwin, 'Neoliberalism, Neorealism, and World Politics', in Baldwin, ed., *Neorealism and Neoliberalism: The Contemporary Debate*, op. cit., p. 4

security in Russia after the collapse of the Soviet Union. The assumption is that CTR can serve as case study that reveals the substantial features of the evolving bilateral security relationship.

The **hypothesis** of this thesis is as follows: The U.S. and Russia are in the process of adjusting to the changed post-Cold War environment. The main features of the contemporary international system of states include the absence of a systemic great power conflict, the obsolescence of Marxism-Leninism as an alternative to capitalism and liberal democracy, and the increasing acceptance of international norms by most states, with conflicts largely involving sub-state actors. In this New World Order, the United States and Russia are partners, rather than adversaries, in a cooperative rather than competitive security relationship. However, the process of adaptation to the new international environment remains incomplete. Aspects of foreign and security policy, especially nuclear, policy, are still informed by attitudes and ideas that stem from the time when the United States and the Soviet Union were bitter adversaries. The example of cooperative threat reduction as a case study of the U.S.-Russian strategic relations shows that although considerable achievements have been reached and cooperation such as in CTR framework became possible, this cooperation has been limited and constrained by factors of bureaucratic and political nature. At the political level, the attempt by political leaders to reconstruct the security relationship has to some extent been impeded by the failure of political elites to fully come to terms with the realities of the contemporary international order. At the same time bureaucratic politics has impeded change at the level of implementation. The CTR process reflects both the attempts to engage in a very radical reconstruction of U.S.-Russian security relations and the constraints imposed upon it by political recalcitrance and bureaucratic politics.

The following are the main objectives of the research:

1. An analysis of the post-Cold War U.S.-Russian strategic relationship with an emphasis on the role of nuclear weapons in their strategic policies, an evaluation of political environment of the post-Cold War international security system in order to identify how the CTR process fits into broader bilateral relations and to test the assumption that political factors influence the CTR process at the level of implementation. Such analysis is also necessary for establishing a link between the role of nuclear weapons in U.S.-Russian relations and the future of the CTR process.

2. An integrated and comprehensive account of the major non-proliferation programmes: the Cooperative Threat Reduction Programme (CTR Programme), the Material Protection, Control and Accounting Programme (MPC&A), the Nuclear Cities

Initiative (NCI), the International Technology and Science Centre (ISTC), the Initiatives for Proliferation Prevention (IPP), the Highly Enriched Uranium Agreement (HEU Deal), and the Plutonium Disposition Programme; an assessment of perceived proliferation threats and effectiveness of the programmes in terms of confronting stated threats, the future prospects of the programmes and the extent to which the non-proliferation goals of the states have been achieved; the development of an explanatory model that accounts for the development of the CTR process in the context of the post-Cold War international system, problems of implementation, and the conditions that will allow CTR to succeed. (the identification of the nature of problems of implementation is crucial to explaining why the CTR process has been limited in its scope and what will allow it to move beyond the current constraints)

1.5 Research Methods and Methodological Issues

1.5.1. Qualitative Methods

One of the main resources for the study is primary and secondary documents. According to Marcus Ethridge, "content analysis of official documents is much more manageable" since "documents are plentiful and relatively easy to access".[16]

There is extensive documentation from the U.S. government agencies, such as the Department of Energy and Department of Defence, U.S. Congress, State Department, National Security Council (NSC).

The research uses documents from non-governmental agencies in the United States, such as the National Resources Council (NRC), Carnegie Endowment for Peace (CEIP), Nuclear Threat Initiative (NTI), the Center for Science and International Affairs (CSIA) at Harvard University, Russian-American Nuclear Security Advisory Council (RANSAC), and the Center for Nonproliferation Studies (CNS) at the Monterey Institute for International Studies. The CNS maintains comprehensive databases of open-source information concerning the spread of nuclear weapons and missiles. These databases represent a unique collection of materials collected from more than 300 sources (many in foreign languages), including trade journals, government documents, newspapers, net sites, books, and conference proceedings.

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16 Marcus E. Ethridge, *The Political Research Experience: Readings and Analysis*, M. E. Sharpe, Armonk, New York, 1990, p. 169

There is also a wealth of documentation from Russian language sources, such as the journal *Yadernyi Control (Nuclear Control)* and other publications produced by PIR-Center in Moscow (Centre for Policy Research), and publications from research institutes, such as Russian Institute of World Economy and International Relations.

In the case of this study the documents from these sources *are* the evidence, or they straightforwardly reflect evidence - or in a more interpretative sense - for example they need to be read and interpreted for evidence.[17] The particular subject matter requires the analysis of the legislation that brought CTR into being, and track government policies from that point. The data include specific information about nuclear weapons deployments, as contained in the START memoranda and other official documents, and the various elements of the CTR programmes as reported to Congress. They also include a detailed survey of all elements of the nuclear weapons complex in Russia, as revealed in a range of official and non-governmental publications. While the raw data of official publications are considered reliable (unless shown otherwise), as regards their interpretation it is important to take into consideration the sensitive nature of the topic under consideration one should be aware of biased viewpoints.

The study of the political decision-making processes requires research beyond official documents and non-governmental publications. Another important qualitative method used for this research is elite interviewing. Interviewing typically generates a richer body of data than that produced by other survey methods. Because of this, it is a particularly useful way to gather information from relatively small groups of politically influential individuals (political elites).[18]

I have conducted interviews with the current and former U.S. officials (from Department of Defence, Department of Energy, State Department, National Security Council) and with the representatives of the leading policy non-governmental organisations, such as Nuclear Threat Initiative (NTI), Carnegie Endowment for Peace (CEIP), Russian-American Nuclear Security Advisory Council (RANSAC), Center for Strategic Studies and International Studies (CSIS), the Monterey Center for Nonproliferation Studies (CNS). I also interviewed members of Congress and Congressional Research Service. The above mentioned interviews were conducted in Washington D.C. during March-April of 2003.

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17 Mason, *Qualitative Researching*, op. cit., p.73

18 Ethridge, *The Political Research Experience: Reading and Analysis*, op. cit., p. 9

Another set of interviews was conducted in Moscow (Russia) during the period of May-June of 2003. In Moscow I interviewed former senior Russian military officials, representatives of non-governmental PIR-Centre, Carnegie Endowment for Peace (CEIP), physicists (Moscow Institute of Physical Engineering – MIFI), as well as U.S. representatives of the Moscow-based offices of the Nuclear Threat Initiative (NTI) and the International Science and Technology Center (ISTC).

The interviews were mostly one hour long, conducted face-to-face, apart from three telephone interviews with the experts residing outside of the Washington D.C. area. The interviews were qualitative, with 'qualitative interviewing' referring to in-depth, semi-structured or loosely structured forms of interviewing.[19] The interviews were conducted during the final year of research. The idea was to have an understanding of the situation surrounding the issues of CTR implementation prior to interviewing. The whole process of denuclearisation in Russia with the use of American funds is very controversial and extremely sensitive for both sides.

I experienced high cooperation from the side of non-governmental organisations (especially from those individuals, who were instrumental in developing CTR ideas), as well as from the side of the government officials. One organisation hosting my field work in the U.S. – the Monterey Center for Nonproliferation Studies – played a crucial role in facilitating the process of arranging the interviews.

In Russia PIR-Center provided a wealth of Russian sources for the research in the form of policy papers and journals published by it.

The spectrum of views was often predetermined by the position occupied by the interviewee. Thus, current officials were usually presenting a more formal view with a limited acknowledgement of the problems of implementation in the cooperative threat reduction programmes, while non-government sector representatives were more outspoken on the problems of such cooperation.

The reliability of the information given was another important issue of processing the data obtained through interviewing. In order to get an objective picture it was useful to cross-check information obtained from interviews (by asking the same question several unconnected interviewees). The other method I used was mixing different survey methods in relation to one and the same problem.

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19 Mason, *Qualitative Researching*, op. cit., p. 38

The interviews are not generally considered a complete research method by itself[20], nonetheless as a *part* of a survey they constitute a unique opportunity to enhance the information available from other sources and were a main source of unpublished 'raw' data. Due to sensitivity of the topic some of the information received during the interviews could not be incorporated into the final work, however, it helped to form assumptions and define the ideas central to main lines of arguments in this thesis.

1.5.2. Quantitative Methods

Data analysis (aggregate data) is an important tool for reaching certain conclusions in this study. The work with numerical data helps to analyse levels of nuclear arsenals in Russia and the U.S. throughout the last decade. Some important questions in this research require careful consideration of numerical interrelations. One of them is whether Russia needs START agreements. In the current economic circumstances Russia is no longer capable of modernising its nuclear forces, let alone maintain the Cold War levels of nuclear weapons.

The analysis of the current composition of Russian nuclear force, life cycles of nuclear weapons (how long they can be maintained before retirement) and current level of production can provide assumptions on what will be the 'natural' (economically driven) requirement in Russia to reduce its arsenal. The 'natural' obsolescence of Russian nuclear weapons and Russian obligations under START have a direct impact on the cooperative threat reduction process, since CTR programmes provide for the dismantlement of weapons (the CTR Programme), the disposition of fissile material from dismantled warheads (HEU Deal and Plutonium Disposition Programme) and will follow the trend of minimising nuclear production.

The performance of practically all programmes studied can be measured in numerical terms: how many warheads were dismantled, what is the percentage of fissile material secured, and the percentage of nuclear material, which has been accounted for adequately. In this respect, the analysis of data is important.

Another utilisation of data analysis is the work with budgets allocated to programmes budgets. Fluctuating budget levels provide important information on the scope of programmes at different stages, they also reflect political developments, e.g.

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20 Jones, *Research Methods in the Social and Behavioural Sciences*, op. cit., p. 139

additional funding appropriated in the aftermath of the financial crisis in Russia in August 1998 or after events of 9/11, when a threat of WMD proliferation was reiterated.

1.6 Structure of the Thesis

The study begins with setting out the theoretical framework for the research in Chapters 2 and 3.

Chapter 2 addresses the larger questions like the changing nature of U.S.-Russian relations, the new evolving international security system, the post-9/11 non-proliferation agenda, and the role of nuclear weapons in this new system. It tests the conceptual framework designed to define the main scenarios for U.S.-Russian strategic relations, especially in relation to the role of nuclear weapons in the bilateral relations. This chapter puts cooperative threat reduction into a broader framework of U.S.-Russian relations in the post-Cold war era. By identifying political conditions and especially by demonstrating that nuclear weapons still remain central to the U.S.-Russian strategic relations, it is possible to assess the influence of these factors on the problems of implementation of CTR programmes discussed in the consecutive chapters.

Chapter 3 provides an overview of the Bureaucratic Politics Model, which is used as a framework for explaining individual programmes and identifying problems in their implementation. The Bureaucratic Politics Model serves two purposes: it determines the structure of the case studies (i.e. the programmes are evaluated with a focus placed on the implementing agencies) and it is used to test the assumption that bureaucratic politics can be seen as a source of some of the problems of CTR implementation.

Chapters 4, 5, 6, and 7 give an overview of particular proliferation threats that exist in Russia and present case studies of the individual programmes dealing with different aspects of the threats identified.

Chapter 4 has two goals: to present an analysis of the Cooperative Threat Reduction (CTR) Programme and the evolution of this particular programme into a cooperative threat reduction process.

Chapters 5 and 6 discuss the threat of fissile material proliferation and three major programmes designed to address this threat: the Material Protection, Control and Accounting (MPC&A) Programme, the Plutonium Disposition Programme, and the Highly Enriched Uranium (HEU) Purchase Agreement.

Chapter 7 addresses the potential threat of a "brain-drain" of former Soviet nuclear scientists and engineers (i.e. proliferation of nuclear expertise) and provides an overview of the three different programmes to counter it: the Nuclear Cities Initiative (NCI), Initiatives for Proliferation Prevention (IPP), and the International Science and Technology Center (ISTC) Programme.

Throughout chapters 4, 5, 6, and 7 the problems of implementation are identified in order to evaluate their underlying reasons – how bureaucratic and political factors contribute to them.

The Conclusion (Chapter 8) summarises the results of the research and the conclusions with regard to the assumptions and hypotheses stated at the outset of the study, and discusses the implications for the interpretation of U.S.-Russian strategic relations in the contemporary international system.

Chapter 2
U.S.-Russian Strategic Relations: The Role of Nuclear Weapons

2.1. Introduction

Cooperative threat reduction is at the heart of the U.S.-Russian strategic relations. It is closely interlinked with the role of nuclear weapons in the bilateral relations, and should, therefore, reflect the changing nature of the U.S.-Russian relationship.

The CTR process can be looked at as a laboratory study of U.S.-Russian relations. It demonstrates both the achievements and limitations of the evolving new framework for interaction between the U.S. and Russia. Putting the CTR process into a larger picture of U.S.-Russian relations can help to identify whether some problems of implementation of CTR programmes are influenced by political factors. Since one of the research arguments of this thesis is that certain problems in implementation of CTR programmes is linked to political factors in bilateral relations, it is necessary to assess what is the nature of this relationship in the post-Cold war international security system.

The main body of the chapter focuses on contemporary U.S.-Russian strategic relations and looks closely at what should be a changing role of nuclear weapons in the post-Cold War period. An assessment of the U.S. nuclear posture, Russian military doctrine and data on numbers and state of alert of existing nuclear arsenals demonstrates a serious mismatch between the nuclear postures and the nature of bilateral relations – a phenomenon of a so called “strategic paradox”.

The final part of the current chapter assesses the role of the cooperative threat reduction process in U.S.-Russian relations and serves as an introduction to the chapters to follow on the actual programmes of cooperative threat reduction. It provides a background of political environment, in which these programmes operate and provides information for analysis on whether limitations in the CTR process can be explained by limitations in the U.S.-Russian strategic relations.

2.2. The Role of Nuclear Weapons in U.S.-Soviet Relations During the Cold War

U.S.-Soviet relations during the Cold War played a central role in shaping of the international system after the World War II. The superpower competition for economic, political, and ideological influence in different parts of the world was a dominant feature of the Cold War period.

Nuclear weapons were the key factor in defining the superpower status of the U.S. and the Soviet Union. The overwhelming numbers of nuclear weapons were seen as destabilising and stabilising at the same time. Some scholars saw the presence of vast nuclear arsenals on both sides as a source of instability due to many factors, not least, due to the danger of accidental war (Scott Sagan).[21] Others considered the 'overkill' nuclear capabilities as a source of self-restraint (or self-deterrence) for the superpowers. It was considered that the prospect of mutually assured destruction in the event of a nuclear exchange between the U.S. and the Soviet Union had a war-preventing effect (Kenneth Waltz, John Lewis Gaddis).[22]

There are varying theories on what was, is and will be the role played by nuclear capabilities in the states' hierarchy of power.

Thus, for example, Kenneth Waltz and some other neo-realists believed that nuclear arsenals possessed by the super powers had a stabilising effect. Waltz argued that:

> «...Nuclear weapons produced an underlying stillness at the center of international politics...»[23]

The cost of using nuclear weapons against the other country was so unbelievably high that their use was becoming irrelevant and illogical. Waltz argued that the war remained possible, but the victory in war was too dangerous to fight for.[24]

The period of the Cold War was christened as «Long Peace» by John Lewis Gaddis to emphasise the lack of major wars during that period. The presence of massive nuclear

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21 Scott Sagan, *The Limits of Safety: Organizations, Accidents, and Nuclear Weapons*, Princeton University Press, Princeton University, 1993

22 Kenneth N. Waltz, 'The Spread of Nuclear Weapons: More May Be Better', Adelphi Paper No.171, London: IISS 1981, John Lewis Gaddis, *The Long Peace: Inquiries Into the History of the Cold War,* Oxford University Press, New York, Oxford, 1987

23 Kenneth Waltz, 'The Emerging Structure of International Politics' in International Security, Vol. 18, No. 2, 1993, p. 54

24 Kenneth Waltz, 'More May Be Better' in Scott D. Sagan & Kenneth H. Waltz, eds., The Spread of Nuclear Weapons: a Debate, W.W. Norton & Company, New York/London, 1995, p. 5

capabilities on both sides was a very effective deterrent for both of them, despite (or because of) the continued expansion and refinement of the strategic arsenals.[25]

The evidence (including the Strategic Arms Limitations Treaty (SALT) process and the Anti-Ballistic Missile (ABM) Treaty) suggests that the logic of nuclear deterrence and mutual assured destruction was accepted by both sides. The nuclear weapons were acquired for the sake of better stability with a clear idea that their use would bring a disaster.

During the Cold War the world escaped a major nuclear war. However, the possibility of such a war was always present, especially as the two main nuclear powers moved towards the adoption of a policy of launch-on-warning. It can be argued that during the major nuclear crises (such as the Cuban missile crisis and the 1983 crisis) the avoidance of nuclear war was by no means inevitable.[26] Given the intense rivalry between the superpowers and the hair-trigger alert postures of their nuclear arsenals, the risk of catastrophic miscalculations was a clear danger to international security.

The world population can consider itself lucky to have escaped an all-destroying war. Even though there is no longer the same adversarial relationship between the main nuclear powers, the persistence of the arsenals means that a tangible threat of a catastrophic war remains.

Another IR theorist, John J. Mearsheimer even supported a «well-managed» proliferation:

> «... Peace in Europe during the Cold War has resulted from bipolarity, the approximate military balance between the superpowers, and the presence of large numbers of nuclear weapons on both sides...»[27]

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25 John Lewis Gaddis, *The Long Peace: Inquiries Into the History of the Cold War*, op.cit.

26 Cuban Missile Crisis refers to a 13-day stand-off between the Soviet Union and the U.S. when the U.S. discovered that Soviets had placed strategic offensive missiles in Cuba and the U.S. responded with a naval quarantine of Soviet shipments to Cuba. The 1983 crisis refers to an incident when NATO undertook military exercises, which involved raising the alert level of U.S. nuclear forces based in Europe to simulate preparations for an attack. The Soviet Union took as an indication of a preparation for a surprise nuclear attack. Sources: Allison, *Essence of Decision: Explaining the Cuban Missile Crisis*, op. cit. and Peter Vincent Pry, *War Scare: Russia and America on the Nuclear Brink*, Praeger, Westport, 1999

27 John J. Mearsheimer, 'Back to the Future: Instability in Europe After the Cold War' in International Security, Vol. 15, No. 1, 1990, p. 13

Some other scholars believe that the stability of the bipolar world was, to a large extent, overestimated.[28] The conflicts at the periphery (Vietnam, Cuba) were an indication that a larger war could not be excluded.

The controversial argument that the immense nuclear capabilities of the superpowers had a stabilising effect may be accepted with some reservations for the period of the Cold War. However, the role of nuclear weapons in a post-Cold War world has changed completely.

Taking into consideration a scholarly discourse on the stability/instability effect of nuclear weapons, the following assumption can be made. The nuclear arsenals of the United States and the Soviet Union did have a mixed effect on the international security. A deliberate use of nuclear weapons by either of the parties was unlikely (though not entirely impossible) due to the deterrence factor. In that sense, the central role of nuclear weapons in military parity of two superpowers played a stabilising role. Nuclear deterrence, by definition, assumes an adversarial relationship. In the post-Cold war era, this function of nuclear weapons is rendered unimportant if the relationship between the main nuclear powers becomes one of partnership, of shared values and goals. It was therefore important for Russia and the United States to develop a new understanding of the purpose of their nuclear arsenals in the context of their emerging new relationship.

2.3. U.S.-Russian Relations in the Post-Cold War Period

The end of the Cold War and the subsequent collapse of the Soviet Union brought a completely new set of conditions to the international security scene. In a short period of time the bi-polar world lost one of its poles, and the whole structure of international relations changed in accordance with that new development. The international system is still in transition.

There was a qualitative shift in U.S.-Russian relations after the end of the Cold War. However, the real extent of *how* different these relations are still remains vague. The present state of U.S.-Russian relations best of all can be described as a "constrained partnership" – a relationship characterised by a mixture of unprecedented level of cooperation and a remaining lack of trust.

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28 Christoph Bluth, *The Nuclear Challenge: U.S.-Russian Strategic Relations After the Cold War*, Ashgate, 2000, p. 14

The early years of new post-Soviet Russia were met with euphoria in the West. In the early 1990s President Yeltsin's regime was seen as a determining factor for a fast and successful transition of modern Russia to a full-pledged democracy. The foreign policy of Russia during that period had a more or less pro-Western trend in it, led by the Foreign Minister Andrei Kozyrev. It was a time of expectations that Russia would fully integrate into the international system. The rhetoric pledged Russia's willingness to move towards a democratic society. However, Russia was not ready for a full-scale democracy. People in the Russian bureaucracy were not all for democracy, and the political system was not able to absorb political changes of the post-Cold war era.

Society was split between those who wanted Russia to be a modern Western country, and those, who still adhered to old values. Many of the former group were part of the new political establishment.

President Yeltsin proved to be a somewhat 'controversial' democrat. He had to manoeuvre between the demands of the West and the expectations of the world community of Russia becoming a democratic country on the one hand, and the demands of Russia's domestic politics on the other. Politics at the domestic front required Yeltsin to show resistance to Western pressure for Russia to accept Westernised democracy values. Yeltsin's opponents at home used every opportunity to accuse him of being 'submissive' to Western demands on how Russia should develop.

In some ways, Yeltsin felt compelled to use methods typical for a Communist system. He sometimes used his authority to impose unilateral policy decisions on the political system (one of the examples was the parliament crisis in October 1993, when Yeltsin forcibly dissolved the Parliament after a bitter conflict between the President and the legislative branch).

Overall, Yeltsin's policies had a dual character: he tried to appear anti-Western at home, while in his foreign policy, he was pushing arms control forward and was interested in engaging in cooperative denuclearisation with the U.S.[29]

The Russian political establishment in early 1990s was divided between 'reformists', who were supporting values of economic liberalisation, free market, and Russia's integration into world economy and political system (Foreign Minister Andrei Kozyrev, Yeltsin's advisor on economic affairs Yegor Gaidar – famous for leading radical economic reforms dubbed "shock therapy"). The other group held more traditional views and the

[29] Strobe Talbott, *The Russia Hand*, Random House, New York, 2002

rapid intensification of U.S.-Russian relations in that period was seen as a dangerous trend of Russia losing its national identity. They advocated a 'Eurasianist' approach to foreign policy predicated on putting Russia's national interest first, treating the other newly independent states (the 'near abroad') as Russia's sphere of influence and maintaining links with some of the allies of the former Soviet Union.[30] The political forces behind the second group were anti-Western and suspicious of U.S. motives on many aspects in bilateral relations, and it was especially noticeable in the case of cooperative threat reduction. Some representatives of Russian parliament were openly accusing the U.S. of trying to undermine Russia's national security by denuclearising Russia and spying on 'nuclear' secrets.

The U.S. failed to commit enough resources to support Russia. The U.S. was reluctant to commit financial resources to the Russian economy, which was very unstable and corrupted and it was unclear whether Russia could absorb financial aid in a way to decisively aid economic growth. However, even for symbolic reasons the U.S. should have done more, since it would have demonstrated Western support for Russia's economic recovery.

The initial "honeymoon" in U.S.-Russian relations was short-lived and to a certain degree expectations both countries had about each other were ungrounded. The West expected Russia to move rapidly towards becoming a full-fledged democracy, while Russia expected Western assistance in economic sphere, even though it was not ready to fully embrace Western democratic values and to integrate into the world political and economic community.

The decade following the end of the Cold War has demonstrated that the legacy of antagonism between the two countries persisted on many levels – it is also deeply embedded into the organisational culture of the U.S. and Russia.

The U.S. and Russia have faced a number of complicated international policy-related issues, which had a substantial impact on the overall state of bilateral relations. The main issues of that nature included: disagreements over NATO enlargement, wars in Kosovo and Chechnya, the U.S. military presence in Central Asia during the operation in Afghanistan and beyond, the U.S. position on several key non-proliferation agreements, Russia's nuclear cooperation with Iran.

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30 Hannes Adomeit, 'Russia's national security interests', in Roy Allison and Christoph Bluth, eds., *Security Dilemmas in Russia and Eurasia*, The Royal Institute of International Affairs, London, 1998, pp. 33-50

These issues are a reflection of the transitional character of U.S.-Russian relations as the two countries seek to develop and define their strategic partnership. Despite the commitment at the top to develop their political and strategic relations on a partnership basis, the political elite in Russia have been slow to absorb and internalise the conceptual framework of international relations based on shared norms, principles and common security. Communist ideas have been replaced not just by Western ideals, but by a melee of notions including visions of Russia as a Great Power, nationalism and Slavic solidarity. Moreover, there remains an echo in many people's minds of the old adversarial, zero-sum relationship between the two countries that makes them reluctant to fully embrace a strategic partnership. The recurring tensions between the United States and Russia, which seems to defy an analysis of their common interest, can be explained as a consequence of the inability of people and institutions to keep up with the very rapid changes in the international system.

U.S.-Russian disagreements surrounding NATO enlargement are a good example of the contradictions that arise as both states are trying to adjust to new realities.[31] Having been created as a collective defence organisation to counter the Soviet threat, NATO's role in the contemporary international system without the Warsaw Pact has to be re-defined. U.S. lobbying for NATO enlargement became a matter of serious annoyance in Moscow by 1994. There was a broad consensus in the political elite in Russia to oppose the expansion of NATO on the basis that it constituted a threat to its national security. The deployment of NATO forces close to Russian borders (in case of expansion) was seen as a direct threat to Russian national security. However, that perceived threat was based on presumption of a possible armed conflict between Russian and the West at the time when there was no political ground for such a conflict.[32]

Russia's perception of threat from NATO's enlargement was questioned by observers, as were the justifications for the Western decision to proceed with the enlargement.[33] If NATO enlargement was justified as contributing to stability in Europe, it would be hard to define in what ways it actually would achieve it considering the internal

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31 Caroline Kennedy-Pipe, 'Russia and the North Atlantic Treaty Organization' in Mark Webber, ed., *Russia and Europe: Conflict or Cooperation?*, Macmillan Press Ltd., 2000, pp. 46-66

32 Oksana Antonenko, 'Russia, NATO and European security after Kosovo', Survival, 1999, Vol. 41, pp. 124-144

33 Christoph Bluth, 'The Post-Soviet Space and Europe' in Allison and Bluth, eds., *Security Dilemmas in Russia and Eurasia*, op. cit., p. 334

nature of instability within the Eastern and Central European countries. If the enlargement was to confront external threats to European security, then Russia's concerns that it was designed against itself would be not ungrounded. By the time of the summit in Helsinki in May 1997, it became clear that NATO expansion would proceed with or without Russia's consent. Yeltsin had to accept that enlargement was becoming a reality and was forced to go along with the process, which was underway. On May 27, 1997 – NATO and Russia signed the "Founding Act on Mutual Relations, Cooperation and Security between NATO and Russian Federation".

The mid-1990s brought several developments, which had a negative impact on U.S.-Russian relations. By 1995 legislative branches in both countries became more hostile and aggressive with regard to bilateral issues, partly due to Communists and hard-liners gaining the majority in the Russian parliament (State Duma) and more traditional Republicans having greater influence in the U.S. Congress.

At the same time, the war in Chechnya broke out, which the U.S. government had disapproved of to a varying degree over the years. Even though the U.S. leadership was not officially denouncing Russia's role in the Chechen conflict, the voices within the U.S. expressed their negative view of Moscow's policy towards Chechnya and its inability to stop the bloodshed. The U.S. government had proved to be cautious in voicing its concern over Moscow's policies in a break-away republic. The Clinton administration preferred to engage Russia in all important international policy issues, rather than disengage from them completely as a punishment for Russia's treatment of Chechen problem.

Yeltsin's victory in Russian presidential elections in 1996 resulted in a temporary improvement in U.S.-Russian relations as the United States considered the alternatives (eg. the election of Communist leader Zyuganov) unacceptable.

In 1997 Presidents Clinton and Yeltsin agreed on outlines of the new arms reduction treaty (START III) at a summit in Helsinki – the reductions were projected at a level of 2,000-2,500 of warheads to remain on each side. [34] The idea was for Russia to go down to 2,000 warheads due to the economic pressures to downsize, and the U.S. would maintain 2,500 warheads.

By 1998 an escalation of conflict in Kosovo severely undermined Russia-U.S. relations. President Yeltsin adamantly opposed a Western intervention in Kosovo. Although no friend of Milosevic regime, Yeltsin had to play in the hands of strong opponents of U.S.

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34 Bluth, *The Nuclear Challenge*, op. cit, p. 109

intervention in Kosovo (1999), which was perceived by many in Russia as an attack on the 'Slavic brothers' in Serbia. There was outrage at U.S. actions in Kosovo in the Russian parliament and the military, and Yeltsin had to demonstrate his ability to express Russia's opposition to the U.S. on that issue.[35]

Overall, the Clinton Administration saw Russia as a key to international security and was ready to compromise (e.g. with the issue of Chechen war) in order to keep a cooperation with Russia flowing notwithstanding several major crises in the early and mid-1990s. The Clinton Administration had many reasons to see Russia as a vital player on the international security scene: Russia was still the only nuclear power capable of destroying the U.S.; the fact that Russia possessed a large nuclear arsenal also meant that cooperation such as in the framework of CTR had to be in place in order to avoid nuclear anarchy. It was unclear how the whole region would develop (Central European States, former Soviet republics) and Russia was a linchpin to all this. Clinton Administration believed that the U.S. had to somehow 'manage' Russia's transition in order to avoid major international security problems.

Throughout the 1990s the personal relationship between Yeltsin and Clinton played a major role in U.S.-Russian relations – the two presidents shared a very strong bond. First of all, Russia was always high on the U.S. foreign policy agenda, because Clinton had a number of dedicated people in his team, who saw Russia and former Soviet Union as very important for the international security system. Secondly, on several crucial occasions Clinton expressed his loyalty to Yeltsin and reiterated his personal trust in Yeltsin and his policies. Yeltsin saw his relationship with Clinton as very important to the bilateral relationships and saw both of them as capable of solving any problems, which two countries might have had.[36]

The years 2000 and 2001 brought new leaders in Russia and the U.S. respectively, who are characterised as pragmatic and realistic. The advent of the Bush administration resulted in some major changes in American non-proliferation policies, which do not have a wholly positive effect on the international non-proliferation regime. The Bush-Putin relationship is qualitatively different from that between Yeltsin and Clinton. President Putin is a different kind of leader for Russia. He exercises a tighter grip on the affairs in his cabinet and has a more constructive relationship with the Russian parliament. President Putin had to

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[35] Talbott, *The Russia Hand*, op. cit.

[36] Talbott, *The Russia Hand*, op. cit

offer Bush administration several concessions, most importantly, with the U.S. withdrawal from the ABM Treaty and the War on Terror (when U.S. military forces were stationed in Central Asia – a region of Russia's traditional national security interests). The Bush administration was less willing to offer Russia anything in return for those concessions apart from agreeing to lock recent agreements on further arms reductions into a bilateral treaty (SORT), which initially the U.S. did not want to sign. The main difference between Clinton's and Bush's policies towards Russia is the level of priority given to Russia in U.S. foreign policy. Since Bush Administration came into power, Russia has been moved backward from the foreign policy agenda.

Russian expert Mikhail Delyagin characterised U.S.-Russian relations since the change of administrations in the U.S. in the following way:

> "A negative attitude of the new U.S. leadership towards Russia is, from a fundamental point of view, a natural result of the way American society positions itself in the modern world. The U.S. is united in its aspiration for "universal security", which includes protection not only and not as much from specific threats (such as terrorist acts), as from the slightest discomfort, the slightest differentiation existing outside of it [security]. Such understanding of security dictates Americans a maximally wide expansion of their way of life and values, because a society, which orientates itself towards different values, is subconsciously perceived as an irritating source of potential threats."[37]

However, the terrorist attacks on September 11, 2001 marked a turning point in U.S.-Russian relations. The proclamation of a "strategic partnership" became frequent in high-level rhetoric. Russian participation in the War on Terror is crucial to American interests for a number of reasons: Russian intelligence on Afghanistan, Russian agreement to U.S. forces being deployed in Central Asia (in countries bordering Russia), and the Russian role in the U.N. Security Council (although, the role of the U.N. Security Council has been, at least, partially diminished after the U.S. government started a military operation in Iraq without a further explicit authorisation of the U.N. and against the opposition of most Security Council members).

Russia's participation in the War on Terror can be explained by several reasons. The opinion poll conducted in Russia showed that 44% of Russians believed that the main

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[37] Mikhail Delyagin, 'Agoniya ili renessans? Novye otnosheniya s S.Sh.A' (Novye 'Agony or Renaissance? New Relations with the U.S.', Svobodnaya Mysl'-XXI, #6, (1508), 2001, pp. 17-38

reason for Putin's support for the U.S. fight against terrorism was his expectation that the West would tone down its criticism on Russia's campaign in Chechnya.[38] Another reason for Russia's willingness to assist the U.S. in the War on Terror could also be connected to the problem of Chechnya. In the words of Oksana Antonenko from the Institute for International Strategic Studies (IISS), "the U.S. campaign in Afghanistan – by targeting training camps, financial flows, and fighters that have been aiding Chechen forces – directly helps Russia's Chechnya campaign."[39] But above all, it is believed, that Putin used the post-9/11 crisis to demonstrate Russia's desire and ability to be a serious (and necessary) partner of the U.S. and the Europe in shaping the new global security environment.[40]

The next section provides an evaluation of the role of nuclear weapons in U.S.-Russian relations against a background of more general trends in the bilateral relations since the end of the Cold War described above.

2.3.1. The Role of Nuclear Weapons in U.S.-Russian Strategic Relations

To a large extent, this new role of nuclear weapons in the U.S.-Russian post-Cold War strategic relations has yet to be defined. The two extreme opinions were articulated by Waltz and Sagan in their famous dialogue transformed into a book 'The Spread of Nuclear Weapons: a Debate'.[41]

The main idea defended by Waltz was:

> "Nuclear weapons restore the clarity and simplicity lost as bipolar situations are replaced by multipolar ones"[42]

Sagan, in his turn, was more sceptical about the 'rationality' of the new proliferators by stating that their actual behaviour would be strongly influenced by military organisations within those states and that the common biases, rigid routines, and parochial interests of

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38 Oksana Antonenko, 'Putin's Gamble', Survival, #43, 2001, pp. 49-60

39 ibid

40 ibid

41 Sagan & Waltz, eds., *The Spread of Nuclear Weapons: a Debate*, op. cit

42 Waltz, 'More May Be Better' in Sagan & Waltz, eds., *The Spread of Nuclear Weapons: a Debate*, op. cit, p. 15

these organisations would lead to deterrence failures and accidental uses of nuclear weapons despite national interests to the contrary.[43]

In Sagan's opinion, nuclear weapons should play a much smaller role than they do:

> "The United States and Russia should become more like some of the nascent nuclear states, maintaining very small nuclear capabilities, with weapons components separated and located apart from the delivery systems, and with civilian organizations controlling the warheads."[44]

The early years of the post-Cold War era were characterised by euphoria in U.S.-Russian relations, and that was fully reflected in the fairly ambitious concepts of co-operative denuclearisation that started to surface in the early 1990s. The liberal nuclear strategy thinkers were advocating a new nuclear posture, which would reflect a new relationship that the West was building with Russia.

There was a positive trend during Clinton administration years with regard to the gradual down-grading of the role of nuclear weapons. Although, complete denuclearisation was never a formal policy of Clinton government, Clinton officials created a very ambitious non-proliferation framework, which would constrain existing nuclear postures, if realised in practice. The cooperative security agenda was brought into government by individuals, who before joining Clinton administration have already being developing a framework for cooperative denuclearisation in their scholarly work.[45] Among such individuals were Les Aspin (appointed as Secretary of Defence), Ash Carter and Graham Allison (who were previously at Harvard University, where they developed works on cooperative denuclearisation and highlighted nuclear threats in the disintegrating Soviet Union), Laura Holgate, William Perry and others, who joined the Department of Defence team as soon as Clinton came to office.

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43 Sagan, 'More Will be Worse' in Sagan & Waltz, eds., *The Spread of Nuclear Weapons: a Debate*, op. cit, p. 87

44 Sagan, 'More Will be Worse' in Sagan & Waltz, eds., *The Spread of Nuclear Weapons: a Debate*, op. cit, p. 91

45 Main works include: Campbell Kurt, Carter Ashton, Miller Steven, and Zraket Charles, eds., *Soviet Nuclear Fission: Control of the Nuclear Arsenal in a Disintegrating Soviet Union*, CSIA, Harvard, 1991, Graham Allison, Ashton Carter, Steven Miller, Philip Zelikow, eds., *Cooperative Denuclearization: From Pledges to Deeds*, Cambridge, CSIA Studies in International Security, No. 2, January 1993, Ashton Carter, William Perry, John Steinbruner, 'A New Concept of Cooperative Security', Brookings Occasional Paper, Washington D.C., 1992

Jason Ellis of the U.S. National Defence University concluded that:

> "…particularly in the Office of Secretary of Defense, these officials brought to bear a well-defined policy agenda, and, during their time in office, endeavoured to translate their largely predetermined preferences into policy. They placed heavy emphasis on, among other things, the safety and security of the Soviet nuclear arsenal, NIS denuclearization, U.S.-Russian military and defense relations, and defense conversion."[46]

Secretary of Defence Les Aspin supported a reduced role for nuclear weapons, and Ash Carter, in particular, was trying to implement ideas on denuclearisation that himself and his colleagues developed during their academic career at Harvard. Carter and his colleagues from Harvard's Center for Science and International Affairs were instrumental in developing concept of cooperative denuclearisation and cooperative threat reduction. The concept of cooperative denuclearisation was first developed in the work of 1993 'Cooperative Denuclearization'[47], while their earlier study 'Soviet Nuclear Fission' played a significant part in raising the concerns that led to the establishment of the Cooperative Threat Reduction (CTR) Programme. (The role of academia and of this particular report for the CTR process is discussed in Chapter 4).

There was hope for a radical change in the nuclear posture prior to the Nuclear Posture Review of 1994. It formally began in 1993 and operational responsibility for the review was assigned to Ashton Carter and Lieutenant General McCaffrey.[48]

The ideas of Ash Carter were a quintessence of the 'new thinking' in the post-Cold War era. Carter was thinking about ways to reduce the dangers emanating from the high state of alert ('hair-trigger') of nuclear forces and from the deteriorating safety and security of Russian nuclear weapons. Those dangers could be dealt with by reducing the number of nuclear forces on both sides and by eliminating the most destabilising categories of weapons (those, which were considered more vulnerable to attack and therefore contributing to instability by requiring a high state of alert, such as land-based missiles).

That particular moment in history could have been a turning point in U.S.-Russian strategic relations if Carter and his supporters had received backing from within the U.S.

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46 Jason Ellis, *Defense by Other Means: the Politics of U.S.-NIS Threat Reduction and Nuclear Security Cooperation*, op. cit, p. 110

47 Allison, Carter, Miller, Zelikow, eds., *Cooperative Denuclearization: From Pledges to Deeds*, op. cit

48 Bluth, *Nuclear Challenge*, op. cit, p. 33

political system and military establishment. It is highly likely that if the U.S. was ready to engage in sweeping nuclear reductions and eliminate 'first-strike' weapons, such as intercontinental ballistic missiles (ICBMs), Russia would have undertaken similar changes in its nuclear posture. However, Carter ran into bureaucratic difficulties and resistance from the side of the military, who were not willing to see the role of nuclear weapons diminish.

The practice of the last decade has demonstrated resistance on both sides (in the U.S. and in Russia) to move away from the Cold War postures (nuclear postures and command and control systems are discussed in detail in the subsequent sections). Such resistance is especially apparent within the more traditional state establishments, such as military and security structures. A greater unwillingness of these agencies to change the Cold War practices is explained by the organisational interests and culture, which determine their organisational behaviour (as discussed in Chapter 3, in which the bureaucratic politics model is tested on all the major organisations involved in the CTR process).

If during Clinton administration there were, at least, attempts to change the nuclear policies, de-alert its forces, give up launch-under-attack postures, and downgrade the role of nuclear weapons, the Bush administration set the process in reverse. While the Clinton administration supported multilateral non-proliferation regimes, such as the NPT, the Comprehensive Test Ban Treaty, and the Fissile Material Cut-Off Treaty, the Bush administration has developed a very different approach to international security and international non-proliferation regimes that is at odds with the dominant international consensus.

The Bush administration has voiced its general scepticism that non-proliferation regimes work, and this creates an enormous contradiction in its policies. The U.S. is heavily involved in pressuring countries to adhere to non-proliferation obligations (a war in Iraq; diplomatic efforts in North Korea, Libya); at the same time, the U.S. government has neglected some of its own obligations with respect to non-proliferation. The U.S. unilaterally withdrew from the Anti-Ballistic Missile Treaty of 1972, which for more than 30 years, was one of the main pillars of the U.S.-Soviet/Russian arms control. It has stalled the process of the Biological Weapons Convention (BWC) coming into force by refusing to sign a Convention Protocol outlining verification mechanisms. The U.S. officials quote their obligation to protect commercial interests of bio-technology, pharmaceutical companies, which would have to be checked for compliance with the BWC obligations. More recently, the U.S. has decided to modernise its nuclear testing sites, which makes it possible that it will resume nuclear testing in the future and thus undermine the

Comprehensive Test Ban Treaty (CTBT). Although not ratified by the U.S., it has been observed so far. The Bush administration also started research and development of new nuclear weapons (low-yield, so called "small nukes") and lowered the threshold of using nuclear weapons – these developments can send a wrong signal to the international community and create incentives for third countries to acquire nuclear capability.

On the one hand, the current U.S. administration demonstrates its willingness to reduce levels of nuclear arsenals, on the other, the role of nuclear weapons in sub-strategic conflicts has been upgraded. During the Cold War a general consensus emerged that the role of nuclear weapons was that of a tool of deterrence in strategic conflicts. The changed nature of conflicts (from strategic to sub-strategic) challenges the relevance of nuclear weapons, since deterrence does not work in sub-strategic conflicts. Although, conflicts between states still arise, contemporary wars primarily involve sub-state actors. For political as well as military reasons, it is not plausible to use nuclear weapons against non-state actors, and therefore, they cannot deter conflict, they have no role in the war-fighting itself, or in peace-enforcement missions. The conflict in Bosnia involved four nuclear states but this fact had no impact on the conflict or its resolution. The military campaign in Afghanistan and the war in Iraq have demonstrated that nuclear weapons have no role to play in the most important conflicts in the new century.

The level of sophistication reached by American conventional forces has also an important role to play in the discourse on the future role of nuclear weapons. The U.S. has such a capacity to project power on a global basis that it can be regarded as a conventional weapons superpower at a time when the existing or potential conflicts require the use of conventional weapons. In other words, nuclear weapons are not needed for the military contingencies the United States has to contend with.

Russian policies related to its nuclear posture also do not seem rational from the standpoint of international security. From the point of national security, Russia's nuclear weapons provide it with 'existential' guarantee – i.e. that in case of a nuclear attack on Russia, it will be able to retaliate. However, in terms of the current international security environment, a threat of nuclear attack on Russia hardly exists. At the same time, there are other threats to Russian national security – such as disintegration tendencies in parts of Russian state, like in Chechnya, or threats coming from the Southern borders of Russian Federation, such as threat of Islamic fundamentalism or regional instability in the Southern former Soviet Republics, which can spill over to Russia. These threats cannot be deterred by the existence or by speculation with regard to the use of nuclear weapons.

Both Russia and the U.S. did not use the opportunity presented to them in the aftermath of the Cold War. They could have used the momentum to reduce numbers of warheads in their respective nuclear arsenals to a minimum, which would send a positive message to the non-nuclear weapon states (parties to the Nuclear Non-proliferation Treaty (NPT)). The NPT initially was a compromise between nuclear and non-nuclear weapon states based on the agreement that nuclear states would disarm eventually. The failure of the main nuclear custodians – Russia and the U.S. – to implement sweeping reductions reflects on the legitimacy of the international non-proliferation regime. Overall, the discourse on what the role of nuclear weapons should be for Russia and the U.S. has varied from optimistic and ambitious scenarios of complete eventual disarmament to the realisation that neither country is prepared to introduce radical changes in its nuclear posture. Although, the rhetoric always seems to be positive in both countries, an analysis of real value of the arms control agreements reached and an evaluation of the posture and state of alert of the nuclear arsenals demonstrate the anachronistic nature of nuclear policies.

If Russia and the United States sincerely intend to form a dramatically new type of relationship based on mutual trust, cooperation and sense of shared responsibility, the presence of excessive stockpiles of nuclear weapons becomes irrelevant. Up until now, both countries have demonstrated good will and persistence in reducing their nuclear arsenals by implementing several arms control treaties. However, the case of the CTR programmes is one of the examples of how complicated the process of restructuring strategic relations can be.

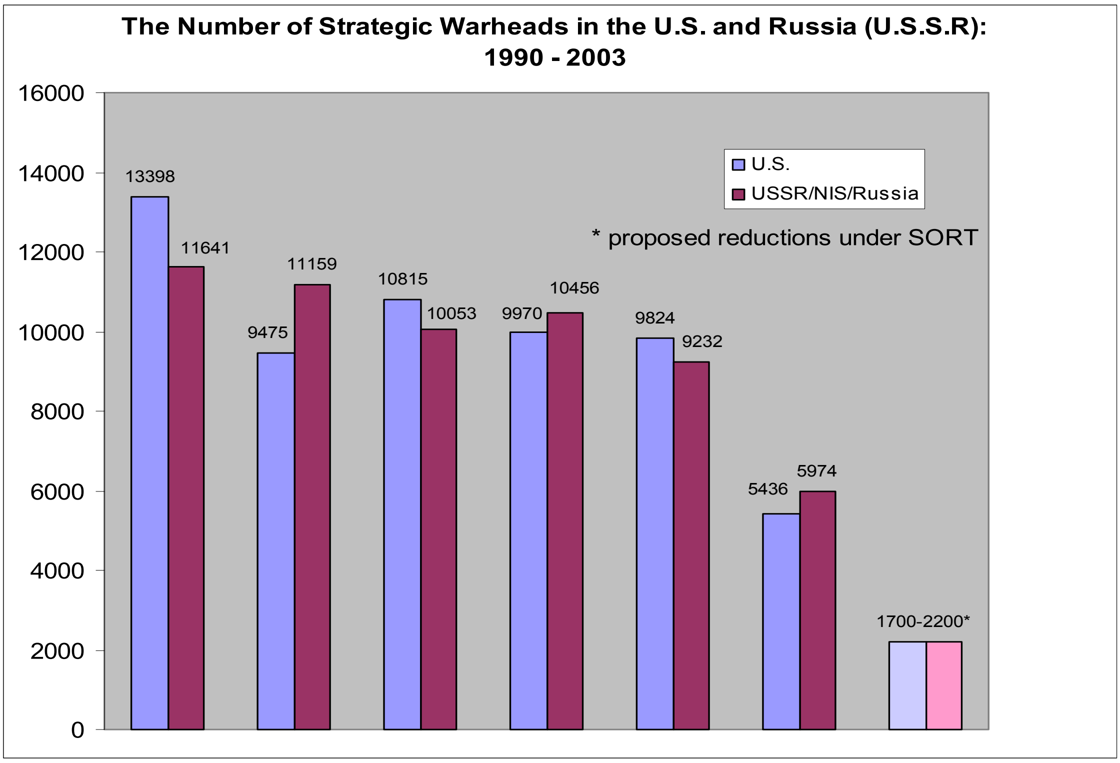
It is very important for both countries to decide what role they assign to nuclear weapons in their military forces. Whether it will be the case of a total denuclearisation or just a limited process of reducing the nuclear armaments is not the question which needs an immediate answer. Nevertheless, the process of strategic arms control and by implication CTR have suffered from the absence of a clear definition of the end goal to be achieved in the long term.

Russia and the United States are not isolated from the rest of the world and have to consider the developments in other countries. Regional nuclear proliferation (case of India and Pakistan, Israel, Iran, North Korea) has a direct impact on how Russia and America define their nuclear strategies. Having said this, it should be noted, that at the moment, the nuclear capabilities of Russia and the United States are so overwhelming in comparison with the others that it is mainly up to two of them to bear the responsibility for the nuclear balance in the world.

Russia and the U.S. - as major nuclear powers – are in a position to set trends of non-proliferation and denuclearisation and set an example of their own for the others to follow. In this respect, the joint efforts in the framework of cooperative threat reduction are a unique example of this new trend. In the first place, we should analyse the role of strategic arms control, assess how it reflects the changing state of strategic nuclear relations, before considering the impact of CTR.

2.3.2. Main Post-Cold War Arms Control Treaties

Figure 1 The Number of Strategic Warheads in the U.S. and Russia (U.S.S.R): 1990-2003[49]



There are three main arms control treaties, which were designed to reduce the number of nuclear weapons since the end of the Cold War. Those are: START I (signed in 1991), START II (signed in 1993 – did not enter into force), and Moscow Treaty (signed in 2002). The abovementioned bilateral agreements will be assessed here in terms of their direct impact on the size and composition of the nuclear forces of the U.S. and Russia. (Figure 1 presents the number of strategic warheads in the nuclear arsenals of Russia and the United States during the period of 1990 to 2003).

49 Military Balance, IISS, London, Issues: from 1990-1991 to 2003-2004

START I was signed in the summer of 1991 – a few months before the Soviet Union collapsed. The main provisions of START I included reductions in strategic nuclear offensive weapons in three stages over a seven-year period. On completion of START I reductions, each side was limited to have no more than 1,600 missile delivery vehicles and no more than 6,000 warheads.[50]

The collapse of the Soviet Union in December 1991 meant that all four republics, on whose territory the START-accountable nuclear systems were located, became parties to the Treaty. Belarus, Kazakhstan, and Ukraine along with Russia and the U.S. signed the Lisbon Protocol, which converted a bilateral U.S.-Soviet START I Treaty to a five-party agreement (the process that resulted in non-Russian republics agreeing to be parties to START I and join the Nuclear Non-Proliferation Treaty (NPT) as non-nuclear weapon states is discussed in Chapter 4). START I was the first bilateral agreement to significantly reduce the number of deployed strategic nuclear warheads. The Treaty also stipulated highly intrusive verification and transparency measures.

The START II Treaty was negotiated in a very short period of time and signed in January 1993. The qualitative changes in U.S.-Russian relations were a main factor that enabled a swift move to further reduction beyond START I. The Russian government had also decided that it was necessary to move to lower levels of warheads due to the declining financial resources available to the government and the need to phase out of service missile systems that had been manufactured outside the territory of the Russian Federation. The reductions mandated by START II would leave each side with 3,000-3,500 nuclear warheads.[51] The main achievement of START II was the proposed elimination of the most destabilising component of the ICBM force – missiles with multiple warheads (multiple independently targeted re-entry vehicles (MIRV-ed ICBMs).

START II signified a further step in the cooperative reduction of nuclear forces. However, the Treaty never formally came into force. The ratification of START II by the Russian Duma quickly became a hostage to President's Yeltsin's stand-off with the Parliament and to several serious problems in U.S.-Russian relations. Critics of START II in the Russian Parliament were not satisfied with the perceived imbalances in the Treaty. In the first place, the Treaty did not ban MIRVed submarine based missiles (SLBMs). The United States had developed the only MIRVed SLBM with a hard target kill capability

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50 Jozef Goldblat, *Arms Control: A Guide to Negotiations and Agreements*, PRIO, 1996, p. 66

51 Goldblat, *Arms Control: A Guide to Negotiations and Agreements*, op. cit., p. 72

comparable to that of ICBMs. Due to the technical asymmetries of the two arsenals, this provision of the treaty put the United States at a distinct advantage. Secondly, the rules for 'downloading' warheads (i.e. putting single warheads on missiles that previously had re-entry vehicles with multiple warheads) favoured the United States because the maximum permitted number of warheads that could be downloaded was six; that meant that Russia's MIRVed ICBMs (SS-18s, SS-24s – which had 10 warheads each) had to be scrapped[52], while the United States only had to take 100 *Peacekeeper*[53] out of service and could keep its Minuteman II force by replacing the three warhead re-entry vehicle. This had two important consequences: by storing the original re-entry vehicles for the Minuteman II, the United States would retain the capability to quickly upload warheads in the event it decided to break out of the Treaty. The other consequence was that in order reach the START II limits Russia had to manufacture new single-warhead missiles, thus considerably increasing the cost of arms control. These factors made the Treaty unfavourable to Russia in the view of the Russian legislation branch and representatives of the military-industrial complex.

The U.S. government's intentions to develop its missile defence capabilities were also a matter of serious concern for the State Duma. Disagreements between the two countries on what were the technical criteria of the Anti-Ballistic Treaty (ABM) Treaty of 1972 aggravated in the second half of the 1990s. The ABM Treaty prohibited the development of defensive weapons since sophistication of defence of one country meant devaluation of other country's offence capabilities. The United States was keen to develop theatre missile defences (TMD), and the two sides were attempting to distinguish between strategic and non-strategic defences (TMD demarcation); however, it proved to be a serious challenge.

At Helsinki summit in 1997 Presidents Clinton and Yeltsin agreed on extending the START II implementation period by five years (in order to put less pressure on the Russian side) and they also came out with a number of clarifications of the ABM Treaty (in an attempt to eliminate disagreements on its technical provisions).

By 1998 even the military-industrial complex in Russia started to realise that due to the deteriorating economic situation it was not realistic to cling to the existing posture, and

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52 Goldblat, *Arms Control*, op. cit, p. 72

53 The *Peacekeeper* was a ten warhead ICBM (also known as the MX-missile)

that START II was needed to secure U.S. reductions in the situation when Russia would have to implement reductions due to economic reasons.[54]

In April 1998 President Yeltsin made another attempt to get START II ratified by sending to Duma a package of documents, which included agreements reached on the demarcation between ABM and TMD. The State Duma designed additional provisions to be attached to START II ratification, which would envisage provisions for future arms reduction negotiations. Ratification was postponed in response to the bombing of Iraq in *Operation Desert Fox* which outraged many in the Russian political elite. The ratification was then expected to take place in April 1999, but the vote was cancelled due to the U.S. and its NATO allies campaign in Kosovo.[55]

START II was finally ratified in 2000, after Putin had assumed the presidency and START had ceased to become a pawn in the political game between the Duma and the President. Putin developed a more constructive working relationship with the Parliament and sought to put relations with the West back on a proper footing after the disagreements over Kosovo and Chechnya. Two main conditions were attached: U.S. ratification of START II protocol extending the implementation framework and U.S. ratification of the demarcation agreement, which was signed in 1997. The conditions were not met, and START II technically never came into force.

The Bush administration came into office with a different approach to nuclear strategy and arms control. In particular, it wanted to abrogate the ABM Treaty in order to be able to deploy a National Missile Defence (NMD) system. Although Bush was willing to reduce the number of strategic warheads deployed, he was against continuing arms control treaty regimes. At the same time on the Russian side there was hesitation about START II. Given the strategic and economic circumstances, a distinct preference emerged to move towards a new agreement based on the discussions between Clinton and Yeltsin about START III, bypassing START II and moving to lower levels instead.

The most recent strategic arms reduction treaty was signed in Moscow in May 2002. The Strategic Offensive Reduction Treaty (SORT) was negotiated in an extremely short period of six months. The final document was very brief and did not include extensive verification and counting rules. The officials on both sides claimed that that new type of agreement demonstrated a new level of trust between the countries, which did not

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54 Bluth, *Nuclear Challenge*, op. cit, pp. 112-113

55 Pavel Podvig, ed., *Russian Strategic Nuclear Forces*, MIT, 2001, p. 572

require the Cold War practice of singling out all the conditions of Treaty's implementation. At the same time, arms control experts in both countries saw other reasons behind the lack of details in the SORT, the main one being a failure to work out issues of transparency and verification.[56]

The main provision of SORT consists of proposed reductions to 1,700-2,200 operationally deployed warheads on each side. The reductions signify a further decrease in nuclear strategic arms in the U.S. and Russia. However, the Treaty has some deficiencies, according to critics, and some arms control experts in Washington and Moscow think that it does not make any difference to the existing trends in Russian and American nuclear policies.

It was mentioned before that the signed document lacks explicit verification and transparency mechanisms. Moreover, the numerical reductions envisaged in the Treaty do not reflect the real numbers of warheads, which will remain in the U.S. The United States is planning to meet SORT levels by downloading warheads and storing them. It means that at any point the U.S. can upload them back on delivery vehicles. Therefore, even after implementation of announced reductions, the U.S. will have a potential capability of approximately 5,000 warheads.[57]

Russia, in its turn, does not have a capability of maintaining its current delivery vehicles for long, therefore, it will not have the option of increasing the number of operationally deployed warheads. In the Russian case, the reductions will be irreversible. The current issue with delivery vehicles revolves around the fact some of the production lines are located outside of Russia (e.g. in Ukraine).

The signing of the Moscow Treaty (SORT) was preceded by complex negotiations. The Russian side was proposing to implement real reductions of deployed warheads from START-I levels of 6,000 to 1,700-2,200, provide for the elimination of strategic delivery vehicles by using the most economically rational method, expand on transparency and confidence-building measures based on the START I system of control and lock in

56 Nikolai Sokov, "START III": An End or Beginning of Negotiations', Research Story of the Week, CNS, May 13, 2002 at http://cns.miis.edu/pubs/week/020513.htm retrieved on 30.06.02

57 Sokov, "START III": An End or Beginning of Negotiations', op. cit

interdependence of strategic offensive forces reductions with the limitations on defensive forces (in connection with the muted U.S. withdrawal from the ABM Treaty).[58]

The U.S. demonstrated its lack of interest in developing extensive verification and transparency measures and was not interested in signing a bilateral Treaty – the U.S. government initially proclaimed that it would reduce the number of its nuclear weapons without signing an agreement with Russia. This position reflects the policy of President Bush of unilateral approaches to international security, which may sound positive if reductions are proposed, but it does create the potential for unilateral reversals of the reductions in nuclear weapons. Moreover, unilateral actions favoured by the Bush administration undermine the spirit of cooperative threat reduction.

With SORT being the most recent nuclear arms reduction agreement, the approximate size, posture and composition of the U.S. and Russian nuclear forces can be projected. It is evident that SORT does not fundamentally change the posture of the nuclear weapons, i.e. the structure of the triad remained the same (nuclear forces consist of air-, land-, and sea-based weapons), the balance of Russian and the U.S. forces remained approximately the same (at the level of mutual assured destruction), and the level of alert of nuclear weapons was not decreased (except for the status of strategic bombers), which means (according to some analysts)[59] there remains a low but non-negligible danger of an accidental nuclear launch.

The apparent example of arms control 'in reverse' is demonstrated by the fact that SORT abandons the ban on the most destabilising group of weapons – ICBMs with multiple warheads (MIRVed missiles). That in fact represents a step back from the provisions of START II, which prohibited MIRVed land-based missiles. Like START II, SORT failed to ban MIRV-ed submarine-launched missiles (Trident-II).

2.3.3. The U.S. Nuclear Posture

The U.S. nuclear posture review (NPR) conducted towards the end of 2001 provides some interesting conclusions about the role the current White House administration assigns to nuclear weapons.

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58 Yurii Baluevskii, First Deputy Chief of General Staff, interview with Yadernyi Kontrol (Nuclear Control), PIR-Centre, Moscow, #1, 2003, p. 10

59 Blair, *The Logic of an Accidental Nuclear* War, op. cit.

The nuclear posture review proposes a new nuclear posture shifting from a traditional nuclear triad of intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), and long-range bombers to a new triad consisting of:

- Offensive strike systems (both nuclear and non-nuclear);
- Defences (both active and passive); and
- A revitalised defence infrastructure. [60]

However, in reality, the U.S. nuclear posture, in this way, remains the same: it is still a triad, since neither of ICBMs, SLBMs, or bombers are eradicated from the nuclear forces. What changed is the rhetoric on what the U.S. presents as a threshold for using its nuclear weapons. An analysis of implications of NPR demonstrates that what Pentagon attempted to present as a policy, which decreases the chances of using nuclear weapons, is actually a policy for lowering the threshold for their use.

The U.S. Defence Secretary Donald Rumsfeld presented the New Triad as one, which could both reduce U.S. dependence on nuclear weapons and improve its ability to deter attack in the face of proliferating WMD capabilities in two ways: the addition of defences (decreasing dependence on offensive strike forces) and the addition of non-nuclear strike forces (decreasing dependence on nuclear weapons in offensive capability).[61] Rumsfeld emphasised that the new U.S. nuclear posture "puts the Cold War practices related to planning for strategic forces behind" and that "the U.S. will no longer plan, size or sustain its forces as though Russia presented merely a smaller version of the threat posed by the former Soviet Union."

A closer analysis of the body of the available excerpt from the NPR questions some of these claims. The impact of the U.S. nuclear policies on the international non-proliferation regime and stability, on the whole, is ambivalent.

2.3.3.1. The Nuclear Threshold

The U.S. administration claims that the NPR makes the use of nuclear weapons less likely due to its decreased reliance on them in offensive strikes. The nuclear policy experts, however, have a different view on that. The evaluation of the practical implications of modifications to the U.S. nuclear posture suggested by the NPR shows that they blur the borderline between nuclear and non-nuclear weapons. Moreover, for the first time official

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60 Donald Rumsfeld, U.S. Secretary of Defence, Foreword to Nuclear Posture Review Report submitted to U.S. Congress on 31 December, 2001

61 Rumsfeld, Foreword to Nuclear Posture Review Report, op. cit

Washington moved away from the rhetoric of not using nuclear weapons against non-nuclear states (a commitment under the NPT) to proclaiming the possibility of using nuclear weapons against some non-nuclear states. The implications of these two major provisions on the potential use of nuclear weapons are assessed below.

The "New Triad" outlines four main defence policy goals: to assure, dissuade, deter and defeat.[62] The "defeat" component of the revised defence policy is defined in the following way:

> "Composed of both non-nuclear systems and nuclear weapons, the strike element of the New Triad can provide greater flexibility in the design and conduct of military campaigns to defeat opponents decisively. Non-nuclear strike capabilities may be particularly useful to limit collateral damage and conflict escalation. Nuclear weapons could be employed against targets able to withstand non-nuclear attack (for example, deep underground bunkers or bio-weapons facilities)."[63]

By mixing nuclear and non-nuclear offensive strike systems the U.S. does not decrease the role of nuclear weapons (as claimed by Pentagon), but on the opposite, increases the number of circumstances, in which use of nuclear weapons is defined as appropriate.

The NPR singles out several countries, as states, which potentially can be engaged in immediate, potential and unexpected contingencies and suggests the U.S. sizes its nuclear arsenal according to the possible danger coming from them (meaning, the U.S. is prepared to use its nuclear weapons against them if it considers it appropriate). Among countries on the list are North Korea, Libya, Iraq, Iran, Syria, China and Russia. While China and Russia are nuclear states themselves, the rest of the countries are signatories to the NPT as non-nuclear states (except for North Korea). Countries that are still formally non-nuclear NPT signatories were previously not to be attacked by the U.S. unless they would attack it first in concert with a nuclear weapon state (according to the negative security assurances of the NPT).

The 2001 NPR for the first time openly proclaims a possible use of nuclear weapons against non-nuclear states. Some experts point out that a potential use of nuclear

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62 Nuclear Posture Review [Excerpts], Submitted to Congress on 31 December, 2001, p. 12

63 Nuclear Posture Review [Excerpts], op. cit, pp. 12-13

weapons in a pre-emptive strike is not new.[64] An option of using nuclear capabilities was not ruled by the U.S. sometimes mentioned in relation to the cases if any nation would threaten U.S. with the use of chemical weapons or against China (before it acquired nuclear capabilities) or North Korea. While it may be the case that the potential use of nuclear weapons against non-nuclear states by the U.S. was not ruled out before, but the NPR elevates such a contingency to the level of formal policy.

By announcing its readiness to use nuclear weapons against several countries mentioned in the NPR, which are signatories of the NPT, the U.S. undermines the international non-proliferation regime. A further weakening of the NPT could result in increased nuclear proliferation all around the world. Moreover, by threatening to use nuclear weapons against any nation considered to be a threat to national security, the U.S. government increases the likelihood that the countries would try to acquire nuclear weapons fearing a possible nuclear attack from the U.S.

Former U.S. Secretary of Defence Robert McNamara and former Clinton administration official Thomas Graham Jr. concluded:

> "…the basic implication of the NPR – that the U.S. reserves the right to target any nation with nuclear weapons whenever it chooses to do so – is itself likely to increase the risk of the nuclear weapons proliferation. If a country believes it's falling out of favour with Washington, what is the first thing it is likely to do? A quote attributed to Indian Defense Minister George Fernandes provides some insight: 'Before one challenges the United States, one must first acquire nuclear weapons.'"[65]

2.3.3.2. Russia – Still a Target

Although, Rumsfeld's message accompanying the report on the NPR emphasises that Russia is no longer seen as a threat, the report itself appears to contradict this. The NPR divides the contingencies for which the U.S. must be prepared in terms of sizing its nuclear arsenal. Three defined categories include: immediate, potential and unexpected contingencies. While Russia does not figure among Iraq, North Korea, Libya, which are seen as potential participants in the immediate contingencies, and potential contingencies outlining possible "new, hostile coalition against the U.S. or its allies in which one or more

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64 'The Nuclear Posture Review: What Role for Nuclear Weapons?', Strategic Comments, Volume 8, Issue 3, April 2002, The International Institute for Strategic Studies, London

65 Robert McNamara, Thomas Graham Jr., 'A Pretty Poor Posture for a Superpower', *Los Angeles Times*, commentary, March 13, 2002

members possesses WMD" do not necessarily hint at Russia, the third group of unexpected contingencies quite openly do so. Unexpected contingencies are defined as "sudden and unexpected security challenges", when "contemporary illustrations might include a sudden regime change by which an existing nuclear arsenal comes in the hands of a new, hostile leadership group".[66] The NPR notes the absence of "ideological sources of conflict with Moscow" and claims that "the U.S. seeks a more cooperative relationship with Russia and a move-away from the balance-of-terror policy framework."

At the same time, it concludes the following:

> "Russia's nuclear forces and programs, nevertheless, remain a concern. Russia faces many strategic problems around its periphery and its future course cannot be charted with certainty. U.S. planning must take this into account. In the event that U.S. relations with Russia significantly worsen in the future, the U.S. may need to revise its nuclear force levels and posture."[67]

The U.S. stance on what should be the size of operationally deployed and responsive nuclear forces demonstrates that the U.S. military planning does not make any distinction between the different potential contingencies. NPR states: "The operationally deployed forces are sized to provide the capabilities required to meet the U.S. defense goals in the context of immediate and unexpected contingencies".[68] In other words, the U.S. chooses to have a size of operationally deployed weapons matching that of Russia's, as far as Russia is present in the unexpected contingencies group. The level of announced reductions and the size of the nuclear arsenal the U.S. will keep after the reductions take place during the next decade provide an additional demonstration of that.

According to the NPR, in the next decade the U.S. will reduce the size of its 'operationally deployed' strategic force to the range of between 1,700-2,200 warheads.[69]

The problem with this number is that it does not reflect the number of warheads constituting the 'responsive force'. It means that the U.S. can upload warheads existing in its responsive force, thereby increasing significantly the nominal number of warheads planned to be on operationally deployed forces. This ambiguity was pointed out by several

66 Nuclear Posture Review [Excerpts], op. cit, p. 16

67 Nuclear Posture Review [Excerpts], op. cit, p. 17

68 ibid

69 Nuclear Posture Review [Excerpts], op. cit, p. 15

experts.[70] Even more importantly, there is no contingency that requires 1,700-2,200 warheads, except to deter the use of about 1,500 warheads that Russia might keep. Consequently, contrary to official statements, the configuration of the U.S. strategic arsenal continues to be based on Russian nuclear capabilities.

Peter Scoblic, an arms control expert and an editor of Arms Control Today claims that the real problem with the NPR is that:

> "…it reaffirms the cold-war nuclear status quo. By calling for a large nuclear reserve force, 'ground-penetrating' nuclear warheads, and a revitalization of the U.S. nuclear weapons infrastructure, the Bush administration is institutionalizing a strong reliance on nuclear weapons for the indefinite future…"[71]

In May 2003 the Bush administration has requested funding for four nuclear weapons-related projects. They included: research for developing the Robust Nuclear Earth Penetrators (RNEPs) - the so called "bunker busters", study of new types of weapons, such as low-yield nuclear weapons ("mini-nukes"), the enhancement of the nuclear test site readiness, and design and technology development for a new plutonium pit production facility, which will allow the manufacture of several hundred weapons per year.[72] The opponents of the new programmes state that at a minimum the administration is taking the first steps toward restarting nuclear testing and rebuilding the capacity to produce nuclear weapons.[73]

In his analysis of the impact of the four proposed nuclear programmes and the split in Congress between the opponents and proponents of new initiatives, Charles Ferguson points out that some of those opposed to the new nuclear projects link them to Russia:

> "Although the four nuclear weapons programmes on Congress' plate this year do not appear to be directed at Russia, some senators opposed to these programs were quick to point out to the administration's Nuclear Posture Review, which included Russia on a list with six other countries (China, Iran,

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70 'The Nuclear Posture Review: What Role for Nuclear Weapons?', Strategic Comments, op. cit

71 Peter Scoblic, 'Think Anew About U.S. Nukes', *The Christian Science Monitor*, March 19, 2002

72 Charles Ferguson, 'Congressional Debate on Nuclear Weapons Policy: from the Nuclear Brink to the Slippery Slope', Research Story of the Week, October 27, 2003, CNS, at http://www.cns.miis.edu/pubs/week/031027.htm retrieved on 01.11.03

73 ibid

> Iraq, Libya, North Korea, and Syria) that 'could be involved in immediate, potential or unexpected contingencies.'"[74]

By late 2003 President Bush approved allocation of funds for the creation of low-yield weapons and granted funds for modernisation of Nevada nuclear test site for underground testing.

2.3.4. Russian Military Doctrine and Nuclear Weapons

Russian strategic military planning also bears distinctive features of Cold War thinking. The difference between Russia and the U.S. is that Russia is constrained economically with regard to resources available for the maintenance of its nuclear weapons; therefore, the Russian government is interested in bilaterally coordinated reductions of nuclear arsenals. The Russian objective is that reductions in the number of its weapons should be synchronised with reductions on the American side. The Bush administration has demonstrated that it does not believe in arms control and places the focus on unilateral reductions. President Bush summed up his position by noting: "we don't need an arms control agreement to convince us to reduce our nuclear weapons down substantially, and I'm going to do it".[75] However, it is in the interest of both sides to engage in arms control to balance the numbers and bind both sides into a process that preserves strategic stability. If an uneven balance of forces emerges, with Russia most probably being the vulnerable side, the potential for nuclear escalation can aggravate: Russia might be tempted to launch its weapons on a dubious warning, since its forces due to their inferiority in size and the level of protection would not survive a first strike from the U.S. (the problem is further aggravated by the aging warning systems in Russia as discussed later in this chapter).

Even though Russian nuclear systems are ageing and Russia is pushed to reduce the number of warheads, it does not anticipate drastic reductions in arms. The reason for that is that Russia does want to keep its weapons for the foreseeable future.

Russia views nuclear weapons as an important factor in its superpower status. While being deprived economically, technologically and conventionally, Russia remains the only power, which has enough nuclear weapons to pose a counterweight to the United States. The Russian weakness in conventional forces is an important factor on placing the

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74 ibid

75 Barry Schweid, 'Bush Decides on Nuclear Weapons', AP, November 8, 2001 at http://dailynews.yahoo.com/htx/ap/20011108/pl/us_russia_30.html retrieved on 12.11.01

nuclear weapons in the centre of its offensive strike capabilities. The remaining significant nuclear arsenal in the U.S. is seen as a requirement for Russia to maintain matching nuclear forces of its own. A growing number of states which potentially can acquire WMD capabilities is also seen by Russian decision-makers as one of the reasons for keeping nuclear capabilities in Russia for the foreseeable future.

Those four major reasons for giving nuclear weapons a central role in Russian military strategic planning are openly presented by the Russian policy-makers, and there are no dubious declarations about shifting emphasis away from the nuclear arsenal (as it is the case with the U.S.) – mainly, because Russia's conventional forces in their sophistication and size are no match for U.S. conventional capabilities.

By the end of 1993, Russian military doctrine had abandoned the Soviet-era pledge of no-first-use of nuclear weapons. The military doctrine adopted in 1993 had nuclear deterrence as its major component. However, apart from a dramatic shift in rhetoric about the possibility of first-use, the doctrine lacked any detailed scenarios as to when and how the nuclear weapons could be used.[76]

The National Security Concept of the Russian Federation, signed into a Decree by President Putin in December 1999, does not specify that nuclear weapons would not be used in case of a non-nuclear attack; on the contrary the wording suggests that nuclear forces can be used in different types of conflicts:

> "The main task of the Russian Federation is to deter aggressions of any scale against it and its allies, including with the use of nuclear weapons. The Russian Federation must have nuclear forces capable of delivering specified damage to any aggressor state or a coalition of states in any situation…"[77]

The Concept further stipulates that Russia proceeds from the following principle when regarding the possibility of using military force for ensuring its national security:

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76 Ivan Safranchuk, 'Buduschee yadernyh sil Rossii' ('The Future of Russian Nuclear Forces'), (Nauchnye zapiski), #10, PIR-Centre, Moscow, April 1999, p. 30

77 'National Security Concept of the Russian Federation: January 2000' (English translation, full text, *Rossiiskaya Gazeta*, January 18, 2000. Note provided by *Rossiiskaya Gazeta*: Concept approved by Presidential Decree No. 1300 of December 17, 1999 (given in the wording of Presidential Decree No. 24 of January 10, 2000), Acronym Institute

> "…the use of all available means and forces, including nuclear weapons, in case of the need to repel an armed aggression when all other means of settling the crisis situation have been exhausted or proved ineffective."[78]

The Russian Military Doctrine of 2000 updated the military doctrine of 1993 and vaguely pointed to the scenarios of when the nuclear weapons can be used:

> "The Russian Federation retains for itself the right to use nuclear weapons in response to the use of nuclear and other kinds of weapons of mass destruction against it and its allies, and in response to wide-scale aggression using conventional weapons in situations critical to the national security of the Russian Federation and its allies."[79]

The above suggests that Russia might decide to use nuclear weapons in response to a non-nuclear attack. Moreover, nuclear weapons might be used against a non-nuclear state:

> "The Russian Federation will not employ nuclear weapons against states parties to the Treaty on the Nonproliferation of Nuclear Weapons that do not possess nuclear weapons, except in case of an invasion or any other attack on the Russian Federation, its territory, its Armed Forces or other troops, its allies, or on a state with which it has a security obligation, carried out or supported by such a state that does not possess nuclear weapons, together with or in the presence of allied obligations with a state possessing nuclear weapons."[80]

The most recent information for the analysis of Russian nuclear policy was provided by a report produced by the Ministry of Defence named "Immediate Tasks of Development of the Armed Forces of the Russian Federation".[81] The new policy paper further develops the Russian Military Doctrine of 2000 and elaborates on the missions for nuclear weapons in a detailed way. The document also demonstrates that Russia is watching closely the moves of the U.S. government in terms of its intention to develop new (low-yield) weapons and U.S. modernisation of testing capabilities. Nikolai Sokov, an

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78 Ibid

79 Draft Russian Military Doctrine, BBC Worldwide Monitoring - October 11, 1999, Original source: *Krasnaya Zvezda*, Moscow, in Russian, October 9, 1999, pages 3, 4. Available at http://www.fas.org/nuke/guide/russia/doctrine/991009-draft-doctrine.htm retrieved on 04.01.04

80 Ibid

81 "Aktual'nye zadachi razvitiya Vooruzhennyh Sil RF", Ministry of Defence, available at http://www.rian.ru retrieved on 24.12.03

expert in Russian strategic forces, in his examination of the Ministry of Defence document concludes that:

> "the future shape of the nuclear posture does not seem to hold any surprises. One remaining element of uncertainty is related to future U.S. policy on nuclear weapons: if the United States proceeds with the development of a new, more "usable" nuclear weapon and especially if it resumes nuclear testing as many expect, then Russian nuclear policy might begin to change and Russia will strive to acquire similar capabilities."[82]

2.3.4.1. Size of the Russian Nuclear Arsenal

The current size of the Russian strategic nuclear arsenal consists of 5,436 operational nuclear warheads distributed among the triad components: 3,072 - inter-continental ballistic missiles (ICBMs), 1,732 - submarine-launched ballistic missiles (SLBMs), and 632 - bombers (air-launched cruise missiles – ALCMs).[83] The lack of financial resources severely constrains Russia's ability to maintain its nuclear arsenal. The resource constraints and the fact that the existing arsenal is reaching the limits of its operational lifetime, the existing strategic nuclear forces can be maintained only till 2005 even in the absence of arms control.[84]

Therefore, the size of the nuclear arsenal in Russia will be determined by two major factors: Russia's economic resources and bilateral U.S.-Russian reductions.

According to some estimates, Russia's economic resources would allow the county to maintain approximately 1,500-2000 warheads.[85] Other sources claim that by 2010 Russia may be able to deploy no more than 1,100 warheads – this number is calculated taking into account changes in production and deployment rates, which were established after the

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82 Nikolai Sokov, 'Russian Ministry of Defense's New Policy Paper: The Nuclear Angle', Monterey Institute of International Relations, Center for Nonproliferation Studies, at http://www.cns.miis.edu/pubs/reports/sok1003.htm retrieved on 26.10.03

83 'The Military Balance: 2003-2004', The International Institute for Strategic Studies (IISS), Oxford University Press, October 2003, p. 229

84 Vasilii Lata, 'Strategicheskie yadernye sily Rossii segodnya i v perspektive' ('Russian Strategic Forces Today and in the Future')

85 Vasilii Lata, 'Strategicheskie yadernye sily Rossii segodnya i v perspektive' ('Russian Strategic Forces Today and in the Future'), op. cit

Russian Security Council determined in 1998 the structure of strategic nuclear forces for the following 10-15 years. [86]

The most recent agreement between the U.S. and Russia signed in Moscow in May 2002 (SORT) foresees reductions on each side towards the level of 1,700 – 2,200 warheads each, which means that natural retirement of nuclear weapons in Russia would reach that level (and may even go lower) any way. It is apparent that in any scenario, Russia will maintain a range of 1,100-1,700 warheads due to economic constraints and reductions introduced by SORT of 2002. The size of 1,100-1,700 nuclear warheads to be maintained by Russia still represents an excessive amount of weapons, and it does not reflect the requirements of the post-Cold War security environment unless a confrontation with the U.S. is seen as a likely possibility.

Stephen Blank of the Strategic Studies Institute (U.S. Army of War College) points out that:

> "Russian threat assessments and planned procurements remain wedded to the threat of a war with the United States and/or its allies as well as to nuclear scenarios for that war even as Russia demands equality with the United States."[87]

The Military Doctrine of 2000 and the "White Paper" of Russian Defence Ministry of 2002 confirm that statement. It is noticeable, however, that official statements on nuclear weapons bear little relation to Russia's real security needs or the likely military contingencies Russia faces. Nuclear weapons are becoming a less and less important factor of a superpower status. Nuclear capability can hardly help the country to overcome its economic difficulties, and moreover, brings an additional burden on the state budget. Russia simply cannot afford to maintain the huge stockpiles of nuclear warheads and missiles.

The military modernisation is undermined by the decline in Russia's economy. According to Steven Rosefielde, economics imposes three distinct kinds of restrictions on Russia's military power. It diminishes the nation's productive potential, the demand for

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86 Pavel Podvig, ed., *Russian Strategic Nuclear Forces*, op. cit, pp. 576-577

87 Stephen Blank, 'Nuclear Strategy and Nuclear Proliferation in Russian Strategy', Commission to Assess the Ballistic Missile Threat to the United States, Appendix III: Unclassified Working Papers, at http://www.fas.org/irp/threat/missile/rumsfeld/pt2_blank.htm retrieved on 13.02.03

defence services, and efficiency.[88] The economic performance is gradually becoming more important in terms of the influence the country can exercise in the world affairs. The military capabilities, even the nuclear ones, do not have a decisive role anymore.[89] It is evident that Russian military thought has not yet fully adapted to the realities of the contemporary international security environment.

2.3.5. Command and Control in the Post-Cold War Era – the Danger of an Accidental Nuclear War

A particular symbol of the U.S.-Russian strategic relationship has been the targeting of nuclear weapons against each other. In May 1994 President Yeltsin and President Clinton agreed to stop aiming missiles at one another – a step, which could have sent an extremely positive message except for the fact that it fell short of a real change in nuclear force and alert postures.

A well-known U.S. specialist in strategic weapons and currently head of the Washington-based Center for Defense Information (CDI) – Bruce Blair – argues that the pledge to re-target missiles in technical terms does not make any substantial difference to Cold-War time postures.[90] The U.S. missiles were retargeted and were re-programmed to fall into the ocean if launched. However, such a trajectory is set to be a default one only if no changes are made in the computer orders regulating the launch. Blair points out that the original Russian aims for U.S. missiles are still programmed into memory banks and it will take only 10 seconds to retarget them to the original settings.

After Clinton and Yeltsin's announcement in 1994 to re-target their missiles, the Russian intercontinental missiles were set to a "zero flight plan". However, similar to the state of the U.S. missiles, the original targets are still present in missiles' memory banks and can be re-ordered from authorised personnel in Moscow to change targeting – a procedure, which will take only 10 seconds (as in the case of the American missiles).

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88 Steven Rosefielde, 'Economic Foundations of Russian Military Modernization: Putin's Dilemma', Paper prepared for the Conference Volume on The Russian Armed Forces at the Dawn of the New Millennium, U.S. Army War College, Carlisle Barracks, Pennsylvania, 7-9 February 2000, First Draft, April 2000, p.3

89 Christoph Bluth, 'Norms and International Relations: The anachronistic nature of neo-realist approaches', paper to be published at http://www.leeds.ac.uk/polis

90 Interview with Bruce Blair, Washington D.C., September 2003 and Bruce Blair's article 'Where Would All the Missiles Go?' in *The Washington Post*, 15.10.1996, p. A15

The submarine-launched missiles on both sides will also need just a few minutes to restore the original target set. Therefore, the highly publicised pledge that none of the missiles are targeted at Russia or the U.S. has merely a rhetoric value and reflects the immediate status of their nuclear arsenals, but does not mean that there was a substantial change in nuclear postures of two countries.

The continued maintenance of target sets from previous strategic operational plans and the continued maintenance of a high status of alert of the nuclear forces in both countries have a detrimental effect on security and stability. Dangers of an accidental nuclear war run high due to the technical factors described above and due to the potential for false tactical warnings. An unauthorised nuclear launch can trigger retaliation by another side. One third of Russian and American strategic arsenals have a status of "launch-readiness".[91]

A false alarm can be a source of an accidental nuclear exchange as well. Misinterpreted attack warnings can set off a launch-on-warning on both sides. In this respect, ageing warning systems in Russia are a matter of grave concern. The more unreliable warning systems become, the greater the danger is for the attack to be launched in what would be perceived as a second strike in retaliation, although in reality it could be a first strike to initiate a nuclear war. The unreliability of warning systems also can contribute to a negative judgement for the decision-makers at the crisis time – with Russian nuclear forces becoming less capable of surviving a first-strike attack, the decision-makers can be forced to exaggerate a dubious warning rather than dismiss it.

Bruce Blair pointed out in late 1990s:

> "…in their present configuration, Russian forces could not ride out an attack. Russia today in fact faces far stronger pressures and incentives to 'use or lose' its strategic nuclear arsenal than at any time since the early 1960s."[92]

The political improvements witnessed in the last decade considerably reduce the dangers of state-authorised nuclear attacks. However, both U.S. and Russia are in danger of an accidental nuclear war, the chances for which are exacerbated by the number of nuclear missiles on each side, their status of alert and the targeting information still keyed in the databanks. The current status of nuclear strategic arsenals in the U.S. and Russia not only

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91 Ibid

92 Bruce Blair, 'Hearings on The Changing Strategic Landscape of Nuclear Policy', Statement before Subcommittee on Strategic Forces, Senate Armed Services Committee, March 31, 1998

fails to reflect the new international security system, in which two countries are no longer enemies, but also has a detrimental effect on strategic stability.

De-alerting and denuclearisation are processes, which have to be gradually carried out in order to improve security and stability in the post-Cold war environment. Cooperative threat reduction is an important part of denuclearisation and it has contributed significantly to this process. Interestingly, cooperative threat reduction has a two-fold meaning, when evaluated within the framework of U.S.-Russian denuclearisation: it has both influenced the larger process of denuclearisation but also has been influenced by it (the limitations of U.S.-Russian denuclearisation efforts have a direct impact on the limitations within the CTR process).

2.3.6. The "Strategic Paradox" [93]

The current trend in the U.S.-Russian strategic relations can be characterised as a "strategic paradox" phenomenon. It is evident that nuclear strategies, the size, composition and level of alert of nuclear forces in the U.S. and Russia do not reflect what is supposed to be a new level of partnership between former enemies. A completely different international security setting of post-Cold War era makes deliberate attack of the U.S. on Russia or the other way around – an almost inconceivable scenario. There are new security threats acknowledged by both countries, and there are high-level declarations of true cooperation between them in their fight against new threats (such as joint efforts in the global war on terrorism). Nonetheless, in strategic terms, the U.S. and Russia still continue to behave in a way more suitable for the Cold War antagonism, which does not reflect current security environment realities.

START and SORT are important nuclear arms reduction treaties, however, their successful implementation would not make a substantial difference in the posture and state of alert of nuclear arsenals remaining in the U.S. and Russia. Although, reduction in numbers of weapons targeting each other does contribute to the arms control process, it does not change the military aspects of the bilateral security relationship since the two countries continue to possess numbers of warheads that represent an 'overkill' capability. The size of a minimal nuclear arsenal capable of having a maximum deterrent value would be calculated on the basis of understanding that "stability is evidently reversely

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93 The term "Strategic Paradox" was first used by Bluth in *Nuclear Challenge*, op. cit

proportional to the probability of a first strike."[94] In other words, a country would be less likely to engage in a first strike if the retaliatory strike from the other side after accepting the attack would inflict on it an unacceptable damage.

The nearest formula for mathematically calculating such a balance was offered in the 1960s by the then U.S. Defence Secretary McNamara. The threshold of unacceptable damage deduced by him was the destruction of about 70 per cent of the industrial potential and 30 per cent of the population. It was calculated that such destruction would require approximately 400 nuclear warheads of the megaton class; so "McNamara Index" (or M-Index) was the aggregate megatonnage divided by the number 400. The McNamara threshold was determined on the basis of calculations on how many warheads would be required for the 'efficient' destruction of industry and population; the calculations showed that after certain level of warheads, the law of diminishing return would come into force, and having more warheads above that level would make less and less difference to the overall capability to destroy.[95] If to accept M-Index for calculating required levels of warheads for the U.S. and Russia ("McNamara threshold" is the only method based on objective and measurable parameters), the levels to be reached in accordance with the last arms reduction agreements (SORT) of 1,700-2,200 warheads on each side would be significantly more than required for a mutual assured destruction relationship between the United States and Russia.

The more weapons there are in two countries, the higher the chances are that a nuclear exchange can be triggered. The danger of an accidental nuclear war – possible due to deteriorating early warning systems in Russia and remaining hair-trigger alert of a substantial part of nuclear forces - increases in direct correlation with the size of operationally deployed forces.

Experts from the Washington-based "think-tank" Carnegie Endowment for International Peace note:

> "There are real dangers associated with large, deployed forces. Missiles with multiple warheads are considered high-value targets. In order to protect these assets, military commands in both countries keep such missiles on high alert,

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94 Yevgeny Primakov, executive editor, Alexei Arbatov, head author, *Disarmament and Security: 1987 Yearbook*, USSR Academy of Sciences, Institute of World Economy and International Relations, Moscow, 1988, p. 249

95 The description of M-Index is provided in 'Disarmament and Security: 1987 Yearbook', op. cit, pp. 248-249

ready to launch within minutes. Given the poor and degrading state of the Russian early-warning system, the continued deployment of multiple-warhead ICBMs poses a major risk of accidental launch or launch-in-error, even during periods of strategic stability. Such risk could rise exponentially if U.S.-Russian relations deteriorate."[96]

Apart from the dangers associated with the hair-trigger alert of significant numbers of forces, there is also a problem of safety and security of those forces. The problem of physical security is exacerbated by higher numbers of nuclear weapons and materials to protect. This problem is undeniably more acute in Russia, but even in the U.S. concerns are occasionally voiced about the security of nuclear facilities. With the current arms reduction treaties – Russia will be dismantling multiple-warhead missiles but it will be forced to produce some new warheads in order to meet the limits of SORT. The new U.S. nuclear posture calls for developing new nuclear weapons (e.g. earth-penetrating warheads). In this way, both countries will need additional nuclear material in order to produce weapons. With more material being stored in both countries, the chances for material diversion also increase. In other words, Russia and the U.S. follow policies, which might be undermining their own security. In the era, when they do not have to maintain large nuclear arsenals, decision to do so, creates a 'strategic paradox' characterised by Cold War nuclear postures in the post-Cold War era.

2.4. The Cooperative Threat Reduction Process in U.S.-Russian Relations

The evidence presented in this chapter indicates that current U.S.-Russian strategic relations can be identified as Scenario 3 (Strategic Arms Reductions with a problem of a 'Strategic Paradox') among four scenarios defined in Table 1 in Chapter 1. The empirical facts suggest that there was a temporary shift in the U.S political thinking during the Clinton term towards cooperative denuclearisation (identified as Scenario 2 in Table 1, Chapter 1), however, it was not further developed due to reluctance of U.S. military and the U.S. Congress and a consequent change in the U.S. administration. This ambivalence about the strategic nuclear relationship is reflected in the implementation of CTR.

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[96] Joseph Cirincione, Jon Wolfsthal, 'Does the Size of the Russian Nuclear Arsenal Matter?', Carnegie Analysis, November 13, 2001, at http://www.ceip.org/files/nonprolif/templates/article.asp?NewsID=1773 retrieved on 20.03.2002

The process of cooperative threat reduction is a pioneering effort designed to further the transition to the post-Cold War security environment. Since the U.S. and Russia are no longer enemies, joining efforts in limiting threats to international security, is a logical endeavour. Cooperative threat reduction is a process, which is not limited to the implementation of nuclear safety programmes. It is a much more complex process of defining the new role for nuclear arsenals in two countries, it is a demonstration of how different the relations between former enemies can be, it is a way of overcoming Cold War legacies in state and organisational cultures, and a tool of enhancing international security and stability.

It is important to note that while CTR itself impacts on U.S.-Russian relations, it is also to some extent dependent on the state of U.S.-Russian relations at any given time. By having several CTR programmes running for more than 10 years, Russia and the U.S. created an unprecedented example of former enemies joining their efforts in combating nuclear and other WMD-related threats. Cooperation in the area of nuclear safety and security is even more remarkable, since nuclear arms industries in both countries were central to the Cold War. The nuclear complexes in both countries were the most resource-consuming and secretive industries. It is a unique situation that Cold War adversaries consider it possible to cooperate in reducing the threats created by the Cold War arms race. The implementation of the CTR programmes in some ways constitutes an endeavour to overcome the organisational, bureaucratic and political mechanisms within the countries. These programmes are capable of gradually changing the perceptions deeply embedded in organisational thinking in the U.S. and Russia.

The unique programmes, which have evolved out of the original CTR legislation, now represent a stable productive part of the U.S.-Russian post-Cold War relationship. At the same time, the limitations of CTR implementation clearly demonstrate the limitations of the U.S.-Russian partnership itself. Answering the question of why some areas of CTR work are successful, while in some others – the cooperation has stalled can lead to conclusions relevant to the overall state of U.S.-Russian relations in the post-Cold War era. The analysis of CTR programmes with a focus on why they experienced certain problems in their implementation is presented in Chapters 4, 5, 6, and 7. The consecutive chapters using major CTR programmes demonstrate that the CTR process can be treated as a case study of U.S.-Russian strategic relations in the post-Cold war era. The CTR process provides a vivid example of the limitations of the new relationship between the U.S. and Russia. The study of CTR programmes shows that the boundaries of what can be achieved in bilateral cooperation were significantly expanded; however, they were not removed.

Chapter 3
Decision-Making Processes and Cooperative Threat Reduction

3.1. Introduction

The introduction proposed the hypothesis that the achievements and limitations in the U.S.-Russian cooperative threat reduction reflect the new type of post-Cold War security relationship between the two countries, which can be characterised as "constrained partnership" and that the problems in implementation of various CTR programmes can be explained on two levels: the level of bureaucratic politics and political level. By 'political level' we mean the broader context of U.S.-Russian relations in which the CTR process is embedded and that has been elaborated in the previous chapter. However, even given agreement at the highest political level to proceed with the programmes such as CTR, it is a central hypothesis of this study that their implementation was significantly influenced by bureaucratic politics. This chapter attempts to analyse the complex decision-making and implementation structure in the U.S. and Russia applied to cooperative threat reduction process. It provides an overview of key political players and serves as a basis for explanatory model that accounts for the development of the CTR process in the context of post-Cold war context (each programme is assessed in the following chapters).

The implementation and decision-making network for CTR programmes can be explained with the help of Bureaucratic Politics Model posited by Graham Allison. The Bureaucratic Politics Model sees governmental decision-making as a process determined by the views, interests, and goals of organisations and individual bureaucrats. In other words, foreign policy is not necessarily formed by the determination of the most efficient means to achieve well-defined objects on the basis of the national interest, but rather is influenced by all the different perspectives and interests of the key political players. The foreign policy that emerges from the decision-making process does not necessarily bear any relation to the priorities and objectives it is alleged to serve. In case of the U.S.-Russian cooperative threat reduction, we observe how conflicting interests of different agencies and bureaucrats in the U.S. and Russia, as well as the persistence of a Cold War mentality in some organisations, complicates implementation of a unique post-Cold War initiative.

In this respect, it is important to identify the key players involved in decision-making and the implementation of CTR in both countries in order to clarify the role of each of them, their interests, and what impact they have on the final outcome.

The first part of this chapter presents the theoretical framework, which is applied in this study. The main propositions and criticism of Bureaucratic Politics Model are explained in order to demonstrate its possible theoretical limitations for the current analysis. Although, the Bureaucratic Politics Model can not be treated as the 'perfect' model to explain problems of implementation in cooperative threat reduction process, it is, by far, one of the most suitable.

The second part of this chapter presents key players (organisations and individuals), who play a crucial role in shaping the cooperative threat reduction process. The players are presented in terms of their role in non-proliferation programmes, their interests, and views. On the U.S. side key players include: Congress, the Department of Energy (DOE), the Department of Defence (DOD), the National Security Council (NSC), the State Department, the U.S. Industry Coalition (USIC), the U.S. Enrichment Corporation *(USEC)*, as well as NGOs and the national nuclear laboratories. In Russia key players in the decision-making and implementation of CTR programmes are: the State Duma (Russian Parliament), the Ministry of Atomic Energy (MINATOM), the Ministry of Defence (MOD), the State Committee for the Supervision of Nuclear and Radiation Safety known as Gosatomnadzor (GAN), the Ministry of Foreign Affairs (MFA), various nuclear installations (institutes and facilities) and NGOs.

By identifying key political actors in the U.S.-Russian cooperative threat reduction, their organisational interests and relevant bureaucratic process, this chapter provides a basis for developing an explanatory model for achievements and failures of CTR programmes, assessed individually in consecutive chapters.

3.2. The Analytical Framework

3.2.1. The Bureaucratic Politics Model

The decision-making/implementation mechanism is analysed with the help of the Bureaucratic Politics Model. This Model is an integrated version of Model II (Organisation Process) and Model III (Government Politics) presented by Graham Allison in his well known and widely discussed work *Essence of Decision: Understanding the Cuban Missile Crisis.* [97]

In his work Allison tried to demonstrate how the choice of a theoretical framework determines the way foreign policy decisions are explained, and how this choice

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[97] Allison, *Essence of Decision*, op. cit.

predetermines the array of questions regarding a certain event. In order to prove his theory, Allison presents three conceptual models – Model I (Rational Actor), Model II (Organisation Process), and Model III (Government Politics) – and applies each of them to the Cuban Missile Crisis of 1962.

3.2.2. Model I – Rational Actor Model

The Rational Actor Model is one of the most widely used theories in foreign policy analysis. The theory's main proposition is that it is possible to explain the actions of a state on the basis of a very specific set of objectives. According to this theory, foreign policy decision-making is determined by the interests of a state and security considerations. In schematic terms, the foreign policy of a particular state can be understood as a reflection of the state's rational interests. The state is seen as a unified actor, and the foreign policy goals are transcribed into foreign policy actions. Nonetheless, there are **limits** to what extent we can rely on the Rational Actor theory.

In this respect, Allison notes that:

> "…Although, the Rational Actor Model has proved useful for many purposes, there is powerful evidence that it must be supplemented, if not supplanted, by frames of reference that focus on the government machine – the organisations and political actors involved in the policy process…"[98]

Judging by this statement, Allison does not deny the importance of the Rational Actor Model, but at the same time he encourages to apply a wider range of models when explaining foreign policy decision-making.

Some limitations of the Rational Actor Model are obvious from the example of the U.S. and Russian actions in terms of cooperative threat reduction process. There are certain patterns in the behaviour of both countries, which cannot be explained from the point of view of the Rational Actor Model, since the actions do not correspond to the set objectives. In particular, we will see how the implementation of cooperative threat reduction efforts is sometimes hampered from within the countries – as a result of actions and views taken by certain branches of state power, agencies, and individual bureaucrats, contrary to the stated objectives of policymakers.

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98 Allison, *Essence of Decision*, op. cit., p. 5

Another argument, which can be added to Allison's discussion of theoretical frameworks, is: not only conceptual framework predetermines the questions asked and the answers found in the foreign policy analysis, as Allison argued, but **the nature of the political problem suggests the choice of a conceptual framework.** In this respect, the Rational Actor Model can be appropriate in explaining decision-making process when a clear linkage between enunciated goals and policy is discernible and bureaucratic processes or vested institutional interests do not constrain the achievements of the stated objectives.

In case of the cooperative threat reduction, the perceived threat was neither immediate nor certain (especially before the events of 9/11). The CTR process is a process that evolves over the long term. The goals set by CTR are still not final, and if complete denuclearisation or drastic cooperative reduction in nuclear armaments is chosen as the final goal, CTR still has a long way to go. Therefore, the CTR process cannot be treated as a foreign policy problem, where decisions are taken and implemented quickly enough to provide a direct link between the decision-making and the achieved results. The decade of existence of CTR programmes has demonstrated that the process of cooperative threat reduction is an evolutionary process, very complex in its nature and embedded into bureaucratic politics, inter-agency 'pushing and pulling' and entangled in perceptions held by the U.S. and Russia about each other. In this light, the Rational Actor Model does not seem adequate to analyse the problem of cooperative threat reduction in U.S.-Russian relations.

The CTR process has two main prerequisites: resources (human and material) and cooperation on the level of different organisations, particularly, on the level of security institutions, which, in their turn, are designed to be suspicious of cooperation in the sensitive areas. Moreover, noting that the risk coming from unsecured nuclear weapons and materials in Russia was never certain or immediate, CTR had to overcome quite a few major institutional obstacles in order to take off the ground.

Why was it possible to achieve this kind of cooperation at all and why is it successful in some areas while less so in the others? How is it possible to provide a sustainable appreciation among political actors of the rationality and necessity of cooperative threat reduction and why are they reluctant to recognise the dangers and how can the patchy outcome of the CTR programmes be explained? These are the questions, which might receive answers by looking at the interests and actions of the key political actors involved in the CTR process. In order to do that it is necessary to choose a theoretical framework. As discussed above, the Rational Actor Model, although an attractive model to establish a clean-cut link between the foreign policy objectives and decision-making, is not suitable for the study of the CTR process if used on its own.

The Bureaucratic Politics Model, which represents a blend of Allison's initial Model II (Organisation Process) and Model III (Government Politics), seems to be the most appropriate tool in assessing problems of decision-making and implementation of the U.S.-Russian CTR initiatives. In order to understand the Bureaucratic Politics Model, we should look at the attributes of its two integral parts: Models II and III as presented by Allison.

3.2.3. Model II – Organisation Process

The Organisation Process Model, as presented by Allison, places a major emphasis on the role of organisations that make up the government. The organisations, not the states, are seen as the key players determining the state policy. The state policy is, in the end, a product of a complex process, involving actions of organisations in defining their interests, defending them, promoting ways, which they think are most suitable for them, and hampering alternative options, which can be viewed as harmful to their organisational interests.

The following definition is given by Allison:

> "…Government behaviour can therefore be understood […] less as deliberate choices and more as **outputs** of large organizations functioning according to standard patterns of behaviour […] each organization attends to a special set of problems and acts in quasi-independence on these problems. But few important issues fall exclusively within the domain of a single organization. Thus government behaviour relevant to any important problems reflects the independent output of several organizations, partially coordinated by government leaders. Government leaders can substantially disturb, but not substantially control, the behaviour of these organizations…."[99]

The Organisation Process Model can be an important tool in evaluating the CTR process, if the main provision of the Model is accepted. In case of cooperative threat reduction programmes, a whole range of large organisations and government agencies is involved. Their organisational interests and immediate goals do not necessarily coincide, sometimes they are at conflict, and these factors reflect on their behaviour. Moreover, organisational interests predetermine the way organisations and state agencies interact with

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99 Allison, *Essence of Decision*, op. cit., p. 67

each other and with their partners in the other countries. An evaluation of CTR key decision-making and implementing bodies in the U.S. and Russia demonstrates the applicability of this model.

Key players on the Russian side all have their individual patterns of behaviour determined by their organisational interests and perceptions of cooperative threat reduction process. As a result, overall Russia's policy on cooperative threat reduction is often a mix of different attitudes, views, and actions of these organisations. There are several extraneous factors in organisational behaviour of Russian agencies involved in U.S.-Russian non-proliferation programmes: an intra-agency struggle for CTR funding; the interests of the Ministry of Atomic Energy (MINATOM) in preserving the nuclear complex; Ministry of Defence (MOD) interest in keeping nuclear capabilities and a Cold War-time legacy in attitude towards U.S.-funded CTR initiatives; Federal Security Service (FSB) reservations about U.S.-Russian cooperation in the security sphere; the Russian Parliament's suspicions towards U.S. non-proliferation assistance; a clash of interests between MINATOM and the nuclear safety regulating agency (GAN), and also the MOD and GAN.

The interaction of governmental institutions takes place in the context of an extraordinary shortage of resources that intensifies the competition for turf, preserving existing assets and new sources of financial resources. As a result of the vested interests and institutional culture, different organisations in Russia follow their own aims and guard their own interests.

On the U.S. side some problems of an organisational nature are: an overall lack of coordination between different agencies involved in non-proliferation assistance programmes; conservative attitudes towards Russia of the Department of Defence (DOD); concern in the State Department an active engagement of the Department of Energy (DOE) in Russia; the DOE's concern about a too active role of national labs; national labs' interest in receiving CTR-related funding; the reluctance of Congress to support cooperative threat reduction; *USEC*'s commercial interests versus non-proliferation objectives in the HEU Purchase Agreement. [100]

At least, rhetorically, there is a high-level support towards the CTR process both in the U.S. and Russia; however, the overall process is not always satisfactory. One of the

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100 *USEC* is a commercial entity overseeing implementation of the HEU Purchase Agreement – an agreement designed for the U.S. to buy Russia's Highly Enriched Uranium (HEU) in order to reduce risk of its diversion from unprotected sites in Russia

main reasons for setbacks is the problem of organisational behaviour in the U.S. and Russia, and between American and Russian organisations.

3.2.4. Model III – Government Politics

The Government Politics Model is another part of what later became known as the Bureaucratic Politics Model. Many of its main attributes are similar to that of the Organisation Process Model. The defining difference is that the main players, according to Government Politics Model, are individual bureaucrats and not the states (as in the Rational Actor Model) or organisations (as in the Organisation Process Model).

The officials and bureaucrats involved in decision-making, policy-making, and policy-implementing process are treated as representatives of their organisations (which parallels with the Organisation Process Model) and as individuals, who participate in this process with their own beliefs, set of principles, personal and professional goals.

Allison defines the Government Politics Model as the one, which:

> "[…] sees no unitary actor but rather many actors as players – players who focus not on a single strategic issue but on many diverse intra-national problems as well; players who act in terms of no consistent set of strategic objectives but rather according to various conceptions of national, organizational, and personal goals; players who make government decision not by a single, rational choice but by the pulling and hauling its politics.…"[101]

The opinions of various individuals involved in the political process directly and indirectly vary substantially, and the struggle between the different views, perceptions, and strategies of lobbying their ideas can be a battlefield for the formulation of a state policy. In metaphorical terms, this process can be seen as a chess game, where 'a number of distinct players, with distinct objectives but shared power over the pieces, could be determining the moves as the resultant of collegial bargaining'. [102]

The Bureaucratic Politics Model as presented by Allison assigns individual bureaucrats an important role in shaping foreign policy decisions taken by the government. It is suggested that not only organisations, as integral entities, but the individuals representing them, determine the outcomes of the political decisions taken by the state.

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101 Allison, *Essence of Decision*, op. cit., p. 144

102 Allison, *Essence of Decision*, op. cit., p. 7

In this respect, Allison noted:

> "…Constitutional prescription, political tradition, government practices, and democratic theory all converge to accentuate differences among needs and interests of individuals in the government, and to divide influence among them. Each participant sits in a seat that confers separate responsibilities. Each man is committed to fulfilling his responsibilities as he sees them…"[103]

In this light, the role of several key individuals who shaped the CTR process is assessed.

Extensive 'elite' interviews conducted for this study have demonstrated the validity of the main provision of the Government Politics Model. Views and perceptions of more than 30 Russian and American officials and experts interviewed vary, as does the contribution they bring to the process (positive or negative) defined by a set of numerous factors: individual backgrounds, political values, organisational interests.

A separation of the Government Politics Model from the Organisation Process Model is not justified, since Allison, himself, acknowledges that one of the factors of 'pulling and hauling' politics are the organisational interests of individuals. Therefore, merging of these two models is logical.

The Government Politics and the Organisation Process Models are often discussed as well as criticised as a combination of two, known as the **Bureaucratic Politics Model.**[104] Since the Bureaucratic Politics Model is used as one of two main tools[105] in evaluating the major hypothesis of this work, a thorough examination of this Model is important. Knowledge of limitations of the chosen theoretical model would help to avoid its artificial application to the study. The bureaucratic politics perspective first appeared before Allison used it to develop his models and explain Cuban missile crisis. However, his work remains the most widely discussed work on the Bureaucratic Politics theory and, therefore, the limitations of this particular approach will be discussed on the basis of criticism received by Allison's models.

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103 Allison, *Essence of Decision*, op. cit., p. 148

104 Michael Clarke, Brian White, eds., *Understanding Foreign Policy: The Foreign Policy Systems Approach*, Edward Elgar, 1989, p. 110

105 The Bureaucratic Politics Model is used to evaluate the influence of bureaucratic factors on the problems of implementation of the CTR programmes, while a conceptual framework outlining 4 possible scenarios in the U.S.-Russian strategic relations is used to assess influence of political environment on the CTR process

3.3. Criticism of Allison's Models in the Existing Literature

Allison's work stirred a hot debate among political theorists on the validity of his assumptions, the importance of the proposed model to theoretical frameworks of International Relations, and their originality. To present a comprehensive account of the debate prompted by Allison is not a goal of this work; however, it is important to evaluate major critical comments in order to comprehend the limitations of the chosen model. One of the most articulate criticisms of Allison's work came from Steve Smith. Smith presented his critical evaluation of Allison's Models in several publications, including the chapter he authored for *Understanding Foreign Policy.* [106]

Smith's criticism of *Essence of Decision* can be summarised as follows: the alternative models are not original, the actual account of the Cuban Missile Crisis is not entirely correct; the American political system is misrepresented, **responsibility is removed from the government, cognitive factors are ignored, there are limitations in the applicability of the Bureaucratic Model to other countries.** [107]

Smith also argued that there were generic problems in Allison's theory construction. In his summary of his own arguments and critical comments of other policy theorists, Smith comes up with the following three main points: the three models are inseparable, there is a problem in Allison's definition of 'logic' and 'politics', models are rather analogous than explanatory. It is important to assess the criticism of Allison's Models and his work, but such an assessment is done only in respect to aspects relevant to the choice of the Bureaucratic Politics Model for this study.

Responsibility is removed from the government

There should be an understanding of a distinctive difference between the top leadership decision-making on major problems and the process of implementation of these decisions. Allison is testing his model on the process of decision-making in a time of crisis *per se*. His account of the Cuban missile crisis seen through the 'lens' of the Bureaucratic Politics Model does not suggest the removal of responsibility from the government and top leadership. It rather demonstrates the extent, to which their decision-making is influenced

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106 Brian White, 'Perspectives on the Foreign Policy System: Bureaucratic Politics Approaches' in Clarke and White eds., *Understanding Foreign Policy*, op. cit., pp. 109-134

107 Smith, 'Perspectives on the Foreign Policy System: Bureaucratic Politics Approaches' in Clarke and White, *Understanding Foreign Policy*, op. cit., pp. 109-134

by the organisations and individual bureaucrats, and on how the policy implementation process can be affected by them. This criticism of the Bureaucratic Politics Model is therefore not justified; the admonition that political leaders have to take responsibility does not invalidate the analytical conclusions about the policy process.

Cognitive factors are ignored

Smith cites several theorists, who criticise a lack of recognition of cognitive factors and Allison's exaggerated attention to divergent organisational interests. The Bureaucratic Politics Model was said to undervalue the 'influence of generation mind sets', the presence of shared values among the bureaucratic players, and to present 'any bureaucratic battles as reflecting bureaucratic differences *per se*' at the time when they demonstrate the differences between the fundamental values. [108]

Smith also quotes Jervis on this matter, who noted that:

> "what seems to be a clash of bureaucratic interests and stands can often be more fruitfully viewed as a clash among values that are widely held in both society and the decision-makers' own minds…we have no grounds for claiming that a different constellation of bureaucratic interests and forces would have produced a different result."[109]

When applying the Bureaucratic Politics Model to the process of cooperative threat reduction, it is necessary to keep in mind the above mentioned criticism. The CTR process is a unique phenomenon of the post-Cold War security system. The U.S. and Russia – former antagonists - are engaged in cooperation in the extremely sensitive area of denuclearisation. The nature of this process is complex and controversial – the two countries are joining efforts in dealing with the nuclear threats resulting from the decades of an arms race when they were adversaries. The decades of the Cold War are most certainly deeply embedded into mentality of many American and Russian people, including politicians. Even though the Cold War is over, and the U.S. and Russia are developing a partnership, a heritage of antagonism is still present in some circles in both countries. Therefore, the factor of "generation" brought up by Smith is valid. The principles, stereotypes and values shared by the current generation of bureaucrats in both countries

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108 Smith, 'Perspectives on the Foreign Policy System: Bureaucratic Politics Approaches' in Clarke and White, *Understanding Foreign Policy: The Foreign Policy Systems Approach*, op. cit., p. 119

109 Jervis, as quoted by Smith, *Understanding Foreign Policy*, op. cit., p. 119

influence the political processes. In other words, apart from organisational and individual goals, interests, and perceptions bureaucrats also base themselves upon the 'generational' values typical for the Cold War period – still present today in both societies.

There are limitations in applicability of the Bureaucratic Model to other countries

Criticism on part of limited applicability of the Bureaucratic Politics Model to other countries other than the United States is most important as far as the model is chosen to be applied not only to the U.S. but to Russia as well. There are some obvious differences in the bureaucratic structure and culture in the U.S. and Russia. This factor complicates the simple application of the model to Russian bureaucratic realities. However, Allison's model is valuable as an abstract theoretical framework. It should be seen more than just a case study explanatory model and should not be limited to analysis of American policy decision-making only.

It is imperative to single out key players in the Russian decision-making. While the roles played by similar executive, legislative agencies and the extent of their power and influence on the decision-making in the U.S. and Russia can vary substantially, the main provision of the Bureaucratic Model Politics remains relevant. The idea of 'hauling and pulling' by different actors occurring in politics is universal and can be applied to any country, including Russia.

3.4. Russian Decision-Making

3.4.1. Overview

The structure of Russian decision-making and policy implementation in the non-proliferation area is somewhat complex and confusing. There is no formal overseeing body, although the Ministry of Foreign Affairs regulates the formal aspects of bilateral cooperation. There is some tension between the key state agencies in some of the areas of cooperative threat reduction – mainly resulting from the desire to be an implementing agent for certain CTR-funded projects.

The organisational behaviour varies even within the single Ministry: i.e. different parts of the Ministry of Defence have different records in terms of success of cooperation with the U.S. Russian Navy, which is a part of the Defence Ministry, has been praised for smooth and effective CTR implementation track, while other parts of the establishment remain less cooperative.

Russian Ministry of Atomic Energy (MINATOM) is one of the key players in the decision-making and implementation process of the U.S.-administered non-proliferation programmes. As the main overseeing body of the Russian nuclear complex, MINATOM's stance in the process of threat reduction has been exceptionally important for an overall Russian policy in this area. MINATOM's first Minister Mikhailov has been an important individual in defining the path for the U.S.-Russian cooperation. His role is ambiguous and deserves special attention.

The relationship between Russia's nuclear complex controlling body Gosatomnadzor (GAN) and the other two major players – MINATOM and Defence Ministry – is a clear example of conflicting organisational interests.

The Russian Parliament – State Duma – as the main legislative body of the country - plays an important role in formulating Russia's policy on cooperative threat reduction. State Duma has the power to decline to ratify international agreements, which provide basis for non-proliferation assistance programmes.

The non-governmental sector is not very developed in Russia, and only few non-government organisations have a degree of influence on cooperative threat reduction decision-making. The major policy "think-tank" specialising in nuclear non-proliferation is Moscow-based PIR-Centre (Centre for Political Research).

The U.S. sees the Russian government as a 'very cumbersome and very bureaucratic', which is 'not disposed towards openness'. [110]

3.4.2. The Ministry of Atomic Energy (MINATOM)

The Russian Ministry of Atomic Energy, known as MINATOM, is a unique organisation with power and structure not typical for any other Russian Ministry. MINATOM includes a vast complex of civilian and military research institutions, production and storage facilities. MINATOM's fields of activity include: fundamental research, applied research and development, nuclear weapons and disarmament, mining and processing industry, nuclear fuel and reactor materials, reactor engineering, instrument making, microelectronics, mechanical engineering, nuclear power plants construction and

110 The U.S. Congress Representative Ike Skelton, remark at the hearing on the U.S. and Russian threat reduction programmes, March 4, 2003

operation, construction industry, ecology and international cooperation in the areas of its expertise.[111]

There is no other government organisation in Russia, which would incorporate such a wide range of activities. Since the Soviet times, MINATOM was often referred to as a "state-inside-a-state" for its autonomous, self-sufficient structure.

MINATOM's participation in cooperative threat reduction is an interesting case of mixing and balancing organisational and state interests. MINATOM is probably one of the most important players in the U.S.-Russian cooperative threat reduction process. To comprehend MINATOM's role and evaluate its participation in this process, we need to define its structure, look at the historic background of its development and analyse its current motives, interests and abilities in nuclear non-proliferation and disarmament, in general, and in bilateral programmes, in particular.

The inception of the Soviet nuclear complex goes back to 1937, when the first steps were made towards the development of nuclear weapons. In 1937 Soviet scientists carried out their first active experimental research on atom nucleus. In 1943 a special physics laboratory – Laboratory #2 – was established in Moscow; the lab is currently known as the Kurchatov Russian Scientific Centre (*Kurchatov Institute).*

In 1945 the Soviet government took a decision to establish an interagency governmental organ – the *First Main Directorate ('Pervoe Glavnoe Upravlenie').* The main responsibility of the newly established structure was to oversee and coordinate all the research and production in the area of nuclear science and technology. In 1949 the Soviet nuclear complex had a breakthrough by testing its first nuclear bomb and ending the American monopoly on nuclear weapons. Four years later, in 1953, the government established the Ministry of Medium Machine Building ('Ministerstvo srednego mashinostroeniya' – 'Minsredmash'). In 1989 that Ministry was re-organised into the USSR's Ministry of Nuclear Engineering and Industry.

President Yeltsin established the Russian Federation Ministry of Atomic Energy – MINATOM – on the basis of the USSR's Ministry of Nuclear Engineering and Industry by his decree No. 61 of January 29, 1992. MINATOM was designed to carry out the following functions: support nuclear and radiation safety of the nuclear complex; organisation and realisation of the federal regulation of activity of firms and organisations of the nuclear

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111 MINATOM's old home-page, at http://www.x-atom.ru/minatom/fields.htm retrieved on 24.09.02

complex of the Russian Federation; realisation of the federal state technological, investment and structural policy in the field of nuclear energy and engineering; support of creation and implementation of development of programmes of modernisation, production and reduction of nuclear weapons, radioactive waste management, systemic realisation of defence conversion of the nuclear complex. [112]

MINATOM is one of the main key players in the CTR process. As a government entity it represents an extensive network of nuclear plants, research institutions, weapons development bureau. The Russian nuclear complex, the interests of which MINATOM represents, is one of the most important state industries. It occupies a special place in Russian political and economic life. The contribution of MINATOM to CTR decision-making and implementation process is hard to overestimate.

As in the case of any government organisation, but especially in Russian political life, the role of the leader is decisive in the overall strategy of the organisation. In case of MINATOM, the role of one individual was as important as controversial. Minister Viktor Mikhailov was the first head of Russian MINATOM and was leading the organisation when the CTR process was at its inception. The other two Ministers – Evgeniy Adamov and Rumyantsev – are also discussed but in less detail.

Viktor Mikhailov was the head of MINATOM from 1992 to 1998. His role in evolution of cooperative threat reduction in Russia is controversial. As a head of MINATOM he played an important role mainly due to two reasons: first of all, he was leading the Ministry, when the CTR process was at its initial stage, and secondly, he served in that position for the longer than anyone else so far. The personality factor was also important. In many ways, Mikhailov's example demonstrates the uneasy adjustment of the U.S.-Russian thinking to new world order and new security challenges.

Mikhailov started his career in the All-Union Scientific Research Institute of Experimental Physics and then worked in the Scientific Research Institute of Impulse Engineering. He holds a degree of technical sciences. In 1992 Mikhailov became the first Minister of the newly created Ministry of Atomic Energy of the Russian Federation (MINATOM).

Mikhailov found himself in a rather difficult situation, when the cooperative threat reduction process was getting underway. As head of the most secretive industry working

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112 MINATOM's home-page at http://www.minatom.ru/english/about/print_index.html retrieved on 24.09.03

for the development and production of nuclear weapons, he was reluctant to pursue the type of cooperation the CTR programme was offering. At the same time, Mikhailov probably rightly appreciated the urgency of receiving non-proliferation assistance from the U.S. During the years of 1992-1998 Mikhailov was found criticising the threat reduction programmes, while at the same time offering his crucial support when it was needed.

In December 1992 Russian Duma held hearings on the CTR umbrella agreements. It was Mikhailov, who insisted on the importance of the U.S.-Russian cooperation in the nuclear field and persuaded Russian parliamentarians to support the Programme.[113]

In his famous memoirs titled *I am a Hawk* (published in 1993), Mikhailov reiterated the necessity of cooperation between the U.S. and Russia and the importance of bilateral nuclear reduction agreements by stating the following:

> "….It is communication and more communication that will bring the people of our planet together. In the presence of so many nuclear weapons, peace is as fragile as an ice-floe in spring – one careless move and it will shatter. We all applaud the two great powers' steps to reduce their nuclear arsenals…"[114]

In an annotation to Mikhailov's memoirs, the editor calls him a 'convinced supporter of general and complete disarmament', but adds that 'he [Mikhailov] at the same time emphasises that, at this stage, stable peace of Earth can be guaranteed only by nuclear parity, and warns of the possibility [of] tragic consequences of unilateral disarmament by our [Russia] country'.[115]

In later years (1995), Mikhailov often criticised the idea of CTR and was quoted as saying the following:

> "…If I had been asked, not as Minister but as a scientist, whether it was worth signing the agreements with the Americans, my response would be 'no'…"[116]

Mikhailov's views on some of the main issues relevant to CTR activities are presented in Table 2.

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113 Vladimir A. Orlov, 'Perspectives of Russian Decision-Makers and Problems of Implementation' in Shields and Potter, eds., *Dismantling the Cold* War, op. cit., p. 86

114 Viktor Mikhailov, *Ya – Yastreb (I am a Hawk)*, Memoirs, Kron-Press, Moscow, 1993, p. 12

115 Annotation to Mikhailov, *Ya – Yastreb (I am a Hawk)*, op. cit., p. 1

116 Interview with Viktor Mikhailov, Yadernyi Kontrol, No. 2, 1995, pp. 9-11

Table 2 - Mikhailov's Views on Issues of Cooperation in Nuclear Non-Proliferation

Issue	Attitude	Comment
General U.S.-Russian cooperation in the elimination of nuclear weapons	Cautious	Mikhailov: "Cooperation in this area is a delicate matter. Our specialists believe that destruction processes should not be subject to verification, but the exchange of information about these processes is obviously necessary. The destruction itself, however, should be conducted by each side separately".[117]
Elimination of tactical weapons, artillery shells and mines, construction of fissile material facilities	Welcomed American assistance for the construction of storage facilities	Mikhailov: "…The problem is that the lack of adequate storage space for nuclear materials – weapons-grade plutonium and uranium – is a bottleneck in the elimination of our tactical nuclear weapons, nuclear artillery shells and mines. Because of our financial difficulties, the construction of new storage facilities could take up to five years, and this is certain to delay the implementation of the initiatives for up to 10 years".[118]
Lab-to-Lab and MPC&A	Generally pleased, but pointed out deficiencies in MPC&A area.[119] Recognised the need to improve MPC&A systems and the lack of domestic funds for those needs, but at the same time mentioned Russia	Mikhailov: "…lots of people come to discuss MPC&A, there [is] a lot of repetition and clarification [is] needed…"[121] Mikhailov: "…we would be able to improve MPC&A ourselves…I am personally satisfied by the implementation of only two

117 Mikhailov, *Ya – Yastreb (I am a Hawk)*, op. cit., p. 23

118 Mikhailov, *Ya – Yastreb (I am a Hawk)*, op. cit., p. 22

119 Katherine E. Johnson 'Sustaining Nuclear Threat Reduction Programs' in Potter and Shields, eds., *Dismantling the Cold War*, op. cit., pp. 246-247

	could deal with it on its own.[120]	implementation of only two agreements: on containers and the storage facility design. Frankly speaking, it is the U.S. side that is responsible for these delays…"[122]
Proliferation of missile materials and technology and the "brain-drain"	Expressed concern over non-proliferation of "sensitive" materials but was rather confident in professionalism of the former Soviet nuclear scientists, who would not, in his opinion, "leak" any knowledge to dangerous parties.	Mikhailov: "…we have not seen any indication of a "brain-drain" from enterprises and research centers of the nuclear-arms complex to foreign countries…"[123] Mikhailov (in a capacity of the Head of the closed nuclear research centre in Sarov): "…Professional secrets of nuclear research workers are thoroughly protected, and the bearers of these secrets are not likely to confide them to anyone…none of Russian nuclear experts, or the so-called bearers of top secret information about "the bomb", has gone abroad in order to stay there permanently.."[124]

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[120] Orlov, 'Perspectives of Russian Decision-Makers and Problems of Implementation' in Shields and Potter, eds., *Dismantling the Cold War*, op. cit., pp. 91-92

[121] Johnson 'Sustaining Nuclear Threat Reduction Programs' in Shields and Potter, eds., *Dismantling the Cold War*, op. cit., pp. 246-247

[122] As quoted by Orlov, "Perspectives of Russian Decision-Makers and Problems of Implementation' in Shield and Potter, eds., *Dismantling the Cold War*, op. cit., pp. 92-93

[123] Popov, Chernenko, 'The Keys to the Nuclear Arsenal: interview with Viktor Mikhailov', abridged reprint from 'Pravitel'stvennyi Vestnik' ('Government Bulletin'), No. 1, 1992, available in English at http://www.fas.org/nuke/guide/russia/agency/jptac010_194001.htm , p. 24

[124] 'Former Atomic Minister Plays Down Possibility of Passing Nuclear Secrets Abroad', BBC Monitoring Service, November 23, 2001 at http://www.nci.org/01/11f/23-4.htm retrieved on 01.12.01

Overall, the perception of Mikhailov in the U.S. was summarised by a former U.S. DOD official:

> "Because of his stature, he [Mikhailov] was able to move beyond the traditional perspectives of the community, to move the community... [But] he did it around the government structures not with them; therefore, progress made was not durable." [125]

Evgeniy Adamov served in the post of Minister till 2001 – he succeeded Mikhailov in March of 1998. Adamov's scientific career included work for the Moscow Kurchatov Institute of Atomic Energy (IAE), where he started as an engineer and later became the Deputy Director; in 1986 he was promoted to the position of the General Designer and Director of Research and Development Institute of Power Engineering in Moscow. After the Chernobyl nuclear power plant accident in 1986 Adamov was directly involved in dealing with the consequences of the accident and coordinated the activities of IAE experts.[126] Adamov was seen as 'weak' in the West compared to his predecessor Mikhailov, who enjoyed a degree of influence well beyond the boundaries of nuclear complex.

Alexander Rumyantsev is the current (as of 2004) Head of Russia's MINATOM. He succeeded Adamov in March 2001. Before his appointment to the ministerial post, he led the Kurchatov Institute in Moscow, where he started as an engineer and from 1994 worked as a Director. It is believed that Rumyantsev occupies an even weaker position within the Russian political establishment than did Adamov, but he receives more favourable accounts from the U.S. policy experts. It is perceived as an important factor that MINATOM's head Rumyantsev and U.S. Secretary of Energy Abraham have a good working relationship, a better relationship than did Adamov and Richmond.[127]

3.4.3. The State Duma (the Lower Chamber of Russian Parliament)

State Duma is the main legislative organ of the Russian Federation. It is responsible for approving all international agreements, signed by the state, and in this way, has a direct influence on the destiny of all CTR-related activities. The role of the State Duma in the CTR process sometimes proves to be an example of how a beneficial international

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125 Interview with a former U.S DOD official, Washington D.C., 28.03.03

126 Adamov's Bio, at http://www.x-atom.ru/minatom/press/adamov2.htm retrieved on 04.12.02

127 Interview with the former U.S DOD official, Washington D.C., 28.03.03

cooperation becomes hostage to factors of domestic and international politics and bureaucratic processes (this equally applies to the role of the U.S. Congress). Certain fractions of the Russian Parliament represent the "old" Cold War thinking, which is reflected in their attitude to the U.S.-sponsored non-proliferation assistance programmes.

The prevailing view in the State Duma saw, from the very beginning, the CTR programmes as part and parcel of a larger framework of U.S.-Russian relations. Over the years, the degree of anti-American sentiment in the State Duma has been fluctuating, depending on foreign policy developments and problems in Russia's internal politics. Overall, on critical occasions the Duma has supported key agreements regulating U.S.-Russian cooperative threat reduction.

The following section brings together political developments in U.S.-Russian relations and processes occurring in the Russian State Duma in relation to the CTR process. It becomes apparent that the decision-making process in State Duma on CTR issues was influenced by its composition (which forces were dominating the legislative branch) and political factors of domestic and international politics.

In December 1992 State Duma held a hearing on the issues of the CTR Programme. At that hearing, Duma's representatives severely criticised the bilateral agreements in the area of cooperative threat reduction because they "contradicted the Russian Constitution", as some thought.[128] The negative attitude of State Duma's CTR critics was based on the two major negative assumptions that: Americans would use CTR as a tool of undermining Russia's nuclear capabilities (by stimulating Russia's unilateral denuclearisation); and that the required access to nuclear facilities in the process of implementation of CTR activities would provide critical information for the U.S. intelligence.

Although, the initial stage of CTR coming into force was characterised by controversial debates within the State Duma, it did vote for the ratification of the CTR umbrella agreement. The head of MINATOM, Mikhailov, played an important role in confronting the scepticism in the Duma and defended Russia's interests in cooperative threat reduction. It is possible that the denuclearisation of non-Soviet Republics with the help of CTR funds was seen by Russian parliamentarians as an important incentive to allow the CTR Programme to be taken off the ground.

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128 Orlov, 'Perspectives of Russian Decision-Makers and Problems of Implementation' in Shields and Potter, eds., *Dismantling the Cold War*, op. cit., p. 86

The years 1994-1995 were a period of several foreign policy events, which had a negative impact on the state of U.S.-Russian relations. The State Duma was the first place, where the deterioration in bilateral relations became apparent. First of all, legislative branches in both the U.S. and Russia had experienced a change of power in 1994-1995. Communists had gained the majority in the Russian Parliament after the parliamentary elections in December 1995, while Republicans won over the U.S Congress. Russian communists and Republicans in the U.S. held more traditional views on the relationship between former adversaries. The two groups were much more cautious of each other's motives and demonstrated less willingness to support cooperative threat reduction.

Apart from the internal political changes within the legislative powers, the relations were under stress from the developments taking place on international scene: Russia started the war in Chechnya at the end of 1994. The U.S. government was accusing Russia in continuing research in bio-weapons field and illegal nuclear trade with Iran, while Moscow was growing extremely critical of NATO's plans for expansion.

In June 1995 the Republican majority in the U.S. Congress voted for an amendment to the CTR legislation, which proposed freezing any financial assistance to Russia (quoting its underground bio-weapons programme). [129] Although, that amendment was withdrawn later, it demonstrated the determination of Congress to use CTR as a tool for punishing Russia as a result of problems in bilateral relations. It was not the last time when CTR programmes were in danger of being cancelled due to negative developments in U.S.-Russian relations.

Shortly after the U.S. Congress almost succeeded in freezing all CTR funding, the Russian Duma refused to ratify START II. The negative impact of critical problems in U.S.-Russian relations on the CTR process is evident, however, CTR managed to survive through the lowest points. This proves that, overall, there is a general understanding on both sides that cooperative threat reduction has to continue.

The current Russian President Putin has a qualitatively different relationship with the State Duma, compared with his predecessor. The Russian Parliament is less hostile to the executive branch and the Duma is under greater influence from the President, in comparison with Yeltsin's era. The parliamentary elections of 2000 left the Duma with a much weaker Communist representation and stronger centrists forces (the composition of

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129 Orlov, 'Perspectives of Russian Decision-Makers and Problems of Implementation' in Shields and Potter, eds., *Dismantling the Cold War*, op. cit., p. 88

State Duma changed even more favourably for the Russian President after the most recent Duma elections in December 2003). Those developments had a positive impact on the attitude inside the Russian Duma towards U.S.-Russian cooperation.

The events of 9/11 resulted in what, at least, on the surface, should seem like a shift in U.S.-Russian relations. The U.S. was interested in having Russia as its ally in the War on Terrorism, and the Russian leadership demonstrated its willingness to assist the U.S. in that respect. At the same time, developments which have followed an initial short-lived euphoria undermined what was seen as a newly found strategic partnership. There were two major reasons for Russia's concern for how the American government was handling the War on Terror: unilateral approaches in military operations in Afghanistan and Iraq, and the U.S. military presence in Central Asia – a region historically considered to be a zone of Russian security interests. In other words, the U.S.-Russian relationship under Putin remains controversial – with some progress made and some problems remaining, which results in a mixed mood within the State Duma.

3.4.4. The Ministry of Defence (MOD)

The Russian Ministry of Defence (MOD) represents one of the most conservative state organs with strong traditional views on the U.S.-Russian relationship. MOD is a main recipient of CTR funding. It oversees the dismantlement of bombers, missile silos, land-based and sea-based strategic missiles. The MOD's role in CTR is interesting in several ways: first of all, it is one of the main implementing agencies while being an organisation, less likely to be supportive of CTR goals (i.e. the reduction of nuclear weapons). Therefore, it is useful to examine how the MOD's organisational interests correlate with CTR objectives. Secondly, the MOD's role in the Russian political establishment and its relations with other state actors has a direct impact on CTR implementation (i.e. rivalry for CTR funding).

The Ministry has been undergoing a transformation as all other Soviet government bodies as a result of the Soviet break-up. In December 1991 the Soviet Ministry of Defence was reorganised into CIS Supreme Command *("Glavkomat")*. In April 1992 the functions of *Glavkomat* were transferred to the newly established Ministry of Defence of the Russian Federation. Throughout all the transformations the control over nuclear weapons was continuously implemented through the MOD's 12th Main Directorate *("Glavnoe Upravlenie Ministerstva Oborony")*, also known as GUMO. [130]

The Main Directorate was first established within the Ministry of Medium Machine Building (later – MINATOM) in 1957. Among the Directorate's main responsibilities were: taking receipt of nuclear ammunition from the production facilities, transport of nuclear arms to the military forces, training of military specialists in nuclear weapons maintenance, as well as the construction and operation of nuclear storage sites. In 1959 the Directorate was transferred to the Ministry of Defence and became a part of the Strategic Rocket Forces, and only in 1974 the Directorate became an independent subdivision of the MOD under the name of the 12th Main Directorate (GUMO). [131]

The Directorate has functions similar to the U.S. Defence Nuclear Agency for nuclear weapons security and units in the U.S. military responsible for physical security of nuclear weapons assigned to U.S. military units. [132] The Russian 12th GUMO is considered to be quite liberal in accepting foreign assistance. [133]

In the mid-90s the MOD was seen as having a generally positive attitude towards the CTR Programme. In the words of the U.S. former official Gloria Duffy:

> "…The MOD has always expressed a very positive attitude toward its cooperation with the United States in the CTR Program, and has always been a practical, positive collaborator with the United States…"[134]

However, the MOD's unofficial attitude was not always as positive as it was portrayed. Some officials within MOD did not always judge cooperation with the U.S. as

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130 '12th Main Directorate (Glavnoe Upravlenie Ministerstva Oborony)', FAS, at http://www.fas.org/nuke/guide/russia/agency/12gumo.htm retrieved on 06.12.02

131 Dmitriy Litovkin, 'Cooperation of the MOD's 12th Main Directorate and the U.S. DOD within the CTR Programme' ('Sotrudnichestvo 12-go glavnogo upravleniya ministerstva oborony RF i ministerstva oborony Soedinennyh Shtatov Ameriki po programme sovmestnogo umensheniya ugrozy'), in Ivan Safranchuk, ed., Cooperative Threat Reduction Programme: Assessing Efficiency and Development Prospects (Programma sovmestnogo umen'sheniya ugrozy: otsenka effektivnosti i perspektivy razvitiya), PIR Study Paper #13, 2000, PIR Centre, Moscow, p. 13

132 '12th Main Directorate (Glavnoe Upravleniye Ministerstvo Oborony', http://www.fas.org/nuke/guide/russia/agency/12gumo.htm retrieved on 06.12.02

133 Interview with the former senior MOD official, Moscow, June 2003

134 Gloria Duffy, 'Cooperative Threat Reduction in Perspective' in Shields and Potter, eds., *Dismantling the Cold War*, op. cit., p. 33

favourable to Russia. Along with the list of common concerns about the CTR objectives (like, a lack of trust on the Russian side about American motives – discussed in the section on the State Duma), there were several conditions attached to the implementation of the CTR Programme, which resulted in cynical views of CTR assistance on the Russian side.

For example, constraints attached to how CTR-sponsored equipment can be used by Russian forces, was a source of resentment on the Russian side. A former senior strategic nuclear forces official described dissatisfaction with some particular provisions of CTR assistance. Thus, for example, cranes and bulldozers allocated to the Russian military could be used *only* for purposes strictly related to dismantlement of weapons. Such equipment was monitored from space in order to track its movements. If equipment was used for any other purposes, the American side would express its dissatisfaction. In case any crane or bulldozer was in need of repair, it was to be fixed *only* by Americans. It is obvious that some impractical conditions attached to how equipment can be used and a lack of trust on the American side were prompting negative emotions among Russian people "on the ground" involved in first-hand implementation of CTR projects.[135]

It might be the case that there was always an overall support for CTR projects, however, there were the above mentioned concerns embedded in the implementation process. If MOD as a single state entity was always officially ready for collaboration with the U.S. in the framework of the CTR Programme, there were visible differences in performance of the different constituent parts of the Russian military.

The Russian Navy was praised by the American experts, as the most cooperative partner in non-proliferation programmes assistance. Data on MPC&A upgrades implemented by U.S. DOE at Russian Navy sites confirm the successful cooperation between the U.S. and Navy: by FY 2003 rapid MPC&A upgrades were completed on of the estimated 60 tonnes of naval fuel, with only 2 per cent remaining to have comprehensive upgrades applied. Rapid upgrades had been completed on sites housing an estimated 99 per cent of Russian Navy nuclear warheads.[136]

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135 Interview with the former Russian senior military official, Moscow, May 2003

136 Bunn Matthew, Wier Anthony, Holdren John, 'Controlling Nuclear Warheads and Materials: a Report Card and Action Plan', Project on Managing the Atom, Belfer Center for Science and International Affairs, John F. Kennedy School of Government, Harvard University, Commissioned by NTI, March 2003, an on-line companion at http://www.nti.org/e_research.cnwm/securing/mpca.asp retrieved on 15.01.04

The Russian Strategic Rocket Forces (SRF) are involved in the implementation of the CTR Programme mainly by participating in the fulfilment of obligations under START. The CTR Programme provided the SRF with equipment totalling to $10,2 million (as of January 2000) for the project of strategic arms elimination.[137] Cooperation between SRF and DOD went through qualitative changes. The level of trust has increased significantly in large part as a result of joint efforts in implementing CTR projects.

The SRF's Lieutenant-General (res.) Vasiliy Lata has noted:

> "…Implementation of the CTR Programme allowed to significantly widen contacts between the Russian and the American military. Even seven years ago [as of 2000] it was hard to imagine U.S. rocket forces servicemen visiting sites of Russian SRF. However, today we have a sustainable practice of annual delegation exchange between the Russian MOD and U.S. DOD with coverage of a wide scope of issues connected with threat reduction…"[138]

The Russian MOD is an organisation in which Cold War practices and mind-sets are very deeply embedded, more so than in any other institutions. For several decades, the whole Ministry was geared for an arms race against the American enemy. The high echelons of the MOD are still largely staffed by the representatives of older generation, whose careers developed during the height of the Cold War. In this sense, the CTR process is an unprecedented case of cooperation between the military establishments of Russia and the U.S.

It is evident that cooperation does not always go smoothly, and organisational interests and bureaucratic politics are the main factors hampering it. Although, economic conditions push Russia towards a smaller nuclear arsenal and international security conditions call for a re-consideration of the role of nuclear weapons in Russian military doctrine – most of the Russian military still hold the view that nuclear forces need to be preserved. Any motivation and incentive on the part of the Russian military to engage itself in unilateral denuclearisation can only be present if CTR planners balance American and Russian interests. The American interests include helping Russia reduce its arsenal and render the remaining weapons and materials safer, while the Russian military is interested in

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137 Vasiliy Lata, 'The Cooperative Threat Reduction Programme and Future of Russia's Strategic Rocket Forces' ('Programma sovmestnogo umensheniya ugrozy i buduschee raketnyh voisk strategicheskogo naznacheniya Rossii'), in Ivan Safranchuk, ed., *Cooperative Threat Reduction Programme*, op. cit., p. 18

138 ibid

downsizing its nuclear weapons but in a way responsive to its own perceived national interests.

The implementation of the CTR projects is influenced by internal bureaucratic struggles within the Russian political establishment and inter-agency disagreement and competition for CTR funds. One of the potential tension zones is between MOD and Russia's Federal Atomic Inspectorate (The State Committee for the Supervision of Nuclear and Radiation Safety - Gosatomnadzor – GAN) (GAN's role is discussed in the subsequent section). GAN is a regulating body whose function initially was to oversee nuclear safety at all MINATOM and MOD facilities. GAN's oversight role was defined by President Yeltsin in June 1992 and confirmed by a Presidential Decree in September 1994. GAN started inspecting MOD facilities in April 1993.

A Russian expert from Moscow office of Carnegie Endowment for Peace, Alexander Pikayev mentioned that the Russian President's decision to allow GAN inspect MOD facilities considerably strained relations between two agencies. There was a case of open non-compliance with the Presidential decrees, when the commander of the White Sea naval sea base at Severodvinsk refused GAN inspectors admission to the base. As a result, GAN had to apply with a formal complaint to the General Prosecutor's Office.[139] In 1995 MOD facilities were released from GAN's inspections.

Intra-agency fights for funding can be treated as another source of tension between these two structures. GAN is among the recipients of CTR funds, and as such is a potential rival for MOD and other agencies (i.e. MINATOM).

3.4.5. Gosatomnadzor (GAN)

The State Committee for the Supervision of Nuclear and Radiation Safety known as Gosatomnadzor (GAN) is one of the important CTR players. It has been renamed several times since 1991; however, its structure and the main activities remained the same throughout. Its main responsibilities include the inspection and licensing of all facilities that handle nuclear and other radioactive materials.

In terms of CTR programmes, GAN plays a dual role: as an implementing agent for particular MPC&A projects, and as an inspecting body at other facilities, which receive CTR funding designed to help them comply with GAN's requirements for nuclear safety.

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139 Alexander Pikayev, 'The CTR Program and Russia: Is a New Start Possible? A Russian View' in Shields and Potter, eds., *Dismantling the Cold War*, op. cit., p. 122

GAN is involved in implementation of some MPC&A projects, such as the development of a federal MPC&A information system and MPC&A Information Centre. GAN works with the U.S. DOE on assessing and upgrading MPC&A systems at six nuclear research reactors, and DOE provided MPC&A equipment and training to GAN inspectors.[140]

As an inspecting body, GAN was put at odds with several influential state agencies, such Ministry of Atomic Energy (MINATOM) and the Ministry of Defence (MOD), which are also recipients of CTR funds. Both MINATOM and MOD did not welcome GAN's inspections and MOD was powerful enough to lobby through a Presidential decision to exempt the MOD from GAN's inspections.

3.4.6. The Federal Security Service (FSB)

The role of Russian security service – FSB – is crucial, but largely clandestine and not formally defined. Although the role of FSB as an organisation is not widely discussed in open literature, indirect references to this agency can be found in the analysis of existing implementation problems in the CTR process.

The FSB – as a state organ – is responsible for guarding national secrets of the Russian Federation and has been concerned with the CTR-related cooperation from the outset of those programmes. The implementation of all the non-proliferation assistance programmes requires access of American experts to Russian nuclear facilities. The access required varies according to the type of project. The most intrusive inspections are required by MPC&A projects – since the MPC&A Programme deals with fissile material taken out of nuclear warheads – and the isotopic composition of material inside the weapons is the most strictly guarded information. In some cases, not only facilities but the whole cities ("closed" nuclear cities) fall into the category of places, where access of foreigners is restricted.

The problem of access is quoted as one of the most serious among implementation problems for all CTR programmes. The FSB is responsible for issuing permission to visit "closed" cities or nuclear facilities. On many occasions access has been denied, even to the American programme managers. The procedure of applying for access is a long, bureaucratically strenuous process. Many of the American officials and experts have complained about FSB being too suspicious of the work carried out by the Programmes.

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140 Jessica Eve Stern, 'Cooperative Activities to Improve Fissile Material Protection, Control and Accounting' in Potter and Shields, eds., *Dismantling the Cold War*, op. cit., p. 334

A current DOE official mentioned: "It is generally understood that security services pay attention to us. Some in Russia believe that the CTR programmes are used to collect information, but we only need information to verify".[141] At the same time, considerable progress has been made over the years, and there seems to be more understanding on both sides on the "rules of the game". Interestingly enough, it was mentioned that on some occasions personal connections of facilities' managers or mayors of the 'closed' cities with the local security services play a crucial role of how the U.S. experts are treated by the latter. Historically, the FSB is an organisation permeated with Cold War mindsets. It is not surprising that it often acts as a barrier to the U.S.-Russian cooperation in the nuclear weapons area.

3.4.7. Nuclear Research Institutes, NGOs

An examination of the role of nuclear research institutes and NGOs in the CTR process has revealed that Bureaucratic Politics Model, especially in its Organisational Model part, would not be able to explain the observed trends. The nuclear scientists and representatives of the non-governmental sector in Russia are the most uninhibited in terms of cooperation with the U.S. in the field of nuclear safety and security. This can be explained by a lack of complicated standard operating procedures typical for large government organisations and also by the values held by those in scientific and research communities. In this respect, the transnational movement theory can be the useful tool in explaining some of the trends in CTR cooperation when the actors do not represent government agencies.

Russian nuclear scientists and engineers are engaged in the CTR process in various ways: in developing, carrying out specific MPC&A projects, in joint scientific endeavours through the ISTC and IPP programmes, in providing expertise required for all the different aspects of threat reduction. The interviews with the Russian and American experts and officials have revealed that cooperation 'on the ground' between nuclear scientists, who speak 'the same language of science' is least affected by the bureaucratic politics and organisational cultures. Russian physicists are equally disapproving of FSB practices

141 Interview with the DOE official, Washington D.C., March 2003

preventing their American colleagues from coming to Russia and State Department's bureaucratic hurdles complicating their travel.[142]

The practice of projects run by the ISTC and IPP has demonstrated that both Russian and American scientists are very interested in bilateral cooperation in the nuclear field. They are excited about the opportunity to work together after decades of limited information about what work has been done by the other side. Russian scientists are welcoming American achievements in high technology, while American scientists are extremely interested in Russian fundamental science expertise. The case of nuclear scientists demonstrates that a relative detachment of science from politics in the former Soviet Union has contributed to their more liberal views on cooperation with the U.S. Although being the "brain" of the arms control race, numerous nuclear installations, research institutes and centres find it easier to accommodate to the new reality of post-Cold war period. Their primary scientific interests might be the decisive factor in willingness to engage in mutually beneficial cooperation.

The non-governmental sector working in the area of nuclear policy expertise, nuclear safety and other nuclear-related issues is not very well developed in Russia. There are only few NGOs, which are able to influence policies or public opinion in the sphere of nuclear non-proliferation and nuclear safety. The major Russian "think-tank" working on policy issues of nuclear non-proliferation is Moscow-based Centre for Policy Studies (PIR-Centre). The PIR-Centre is the leading non-government institution in this field. It is engaged in research, educational and consulting activities, as well as publishing. The PIR-Centre's publications were the main source of Russian-language materials for this study. The PIR-Centre has associates, who either had direct experience with nuclear dismantlement, strategic military planning, or are currently working on CTR-related issues. Two other non-governmental organisations working in the area of nuclear non-proliferation in Russia are representative offices of American "think-tanks" – the Moscow Carnegie Endowment for International Peace (CEIP) and the Moscow office of the Nuclear Threat Initiative (NTI). Both offices are mainly staffed with Russian experts and are engaged in nuclear non-proliferation policy analysis and publication of relevant material in Russian language.

There is an obvious lack of well-established non-government organisations involved in analysis of nuclear policies and problems of nuclear non-proliferation in Russia. The fact

142 Interview with the Russian physicist involved in MPC&A projects, Moscow, June 2003

that there are only a small number of "think-tanks" and their limited influence on the policy-making is a demonstration of a still transitional stage in Russia's development towards a full democracy.

3.5. U.S. Decision-Making

3.5.1. Overview

The roles of American key political players are considerably better defined than those of the Russian ones. Several state agencies (the Department of Energy (DOE), the Department of Defence (DOD), and the State Department) are responsible for the management of the non-proliferation assistance programmes, while the U.S. Congress has legislative powers and authority to allocate funding. The National Security Council (NSC) plays a coordinating role, and two non-governmental entities (USIC and *USEC*) are directly involved in two of the CTR programmes.

The Department of Energy has responsibility for the HEU Deal, the Plutonium Disposition Agreement, the MPC&A Programme, the Initiatives for Proliferation Prevention (IPP) and the Nuclear Cities Initiative (NCI). The Department of Defence oversees the CTR Programme. The State Department plays a dual role – as an implementing agent for the International Science and Technology Centre (ISTC) and as a state agency formulating the foreign policy and regulating all international cooperation. The role of the U.S. Congress is crucial in the cooperative threat reduction process, since it has the power to authorise programmes, allocate funding or suspend them. The U.S. Industrial Coalition (USIC) is a key organisation for implementing IPP projects, while the U.S. Enrichment Corporation (*USEC*) is an implementing agent for the HEU Deal.

3.5.2. Congress

The U.S. Congress is by far the most important political actor in the process of cooperative threat reduction. It authorises all the legislation necessary for the implementation of the programme, determines the amounts to be spent and judges whether the monies were spent appropriately in Russia (through Testimonies of experts, officials and GAO reports). The U.S. Congress, the same as its Russian counterpart, the Duma, has reflected the mood in U.S.-Russian relations over the past decade. Table 3 lists some key developments on Capitol Hill.

Table 3 Key CTR Developments in the U.S. Congress

Period	Political environment	Developments on Capitol Hill
1991-1992	The collapse of the Soviet Union, political and economic crisis in Russia. The dangers coming from deteriorating nuclear complex are recognised by American scholars and are voiced by U.S. Senators Nunn and Lugar.	After some struggle Senators Nunn and Lugar manage to introduce a piece of legislation, which gives a basis for the CTR Programme.
1994-1995	Republicans gain control in the Congress, Communists are in a majority in Russian State Duma. Russia starts war in Chechnya. U.S.-Russian relations deteriorate.	Several conditions are attached to CTR legislation, while proponents of CTR continue to address issues of nuclear threats in Russia and stress the necessity to continue assistance to Russia and other former Soviet republics.
1998	A financial crisis in Russia. A danger of 'brain-drain' as a result of severe economic situation becomes even more acute.	U.S. Congress is presented with the idea of Nuclear Cities Initiative (NCI) to address potential 'brain-drain' problems. Reluctantly, Congress approves the Programme.
2000	George Bush becomes U.S. President; Republicans take major position in Congress and the government. Vladimir Putin becomes Russian President.	CTR is under threat of considerable cuts in funding and scope. New Administration is more reluctant to assist Russia with its denuclearisation needs.
2001	Terrorist attacks on the U.S.	U.S. government channels a lot of funding into homeland security but fails to expand on cooperative threat reduction.
2002-2003	U.S.-led War on Terror, military operation in Afghanistan and Iraq.	Agreements for two important non-proliferation assistance programmes – Plutonium Disposition Programme and Nuclear Cities Initiative (NCI) are not extended due to disagreements over liability issues.

The first CTR Programme was a Congress initiative – the idea was brought up by bi-partisan group led by Republican Richard Lugar and Democrat Sam Nunn (how Senators Nunn and Lugar established the CTR Programme is discussed in Chapter 4).

From its inception, the CTR Programme was having a controversial reception at the Capitol Hill due to the same reasons, which were making Russian State Duma uncooperative in CTR issues (i.e. lack of trust towards the other side, protection of the country's own interests, and lack of understanding of the magnitude of problem). At the beginning CTR proponents led by Senators Nunn and Lugar failed to secure approval from their colleagues to authorise the CTR initiative. Although, later approved, the CTR Programme has always being struggling to expand the pool of its supporters on Capitol Hill.

The way the CTR programmes developed to a substantial extent, was interrelated with the internal politics of Congress. At the very beginning, the 'buy-American' clause attached to the CTR Programme (all equipment had to be bought in the U.S. and all the contractors were American companies) was introduced especially to secure support for the Programme on the Capitol Hill. In this way, members of Congress knew that the American taxpayers' money would be boosting American economy, not Russian. The 'Buy-American' clause caused problems at the initial implementation stage of the CTR Programme. It was not practical, since it would have been easier, faster and more rational to buy Russian-made equipment. It was a source for growing scepticism towards the Programme on the Russian side (later, it was allowed to have Russian subcontractors, while American companies remained main contractors).

Congress also introduced certification process for the U.S. President. That meant that before appropriations for every fiscal year, the U.S. President had to certify that Russia complies with arms control agreements and does not violate human rights. The requirement for certification resulted in a year-long freeze on new funding in 2001-2002. By early 2003 President Bush was granted the authority to waive certification requirements.

The main problem for the CTR programmes is the lack of awareness among U.S. Congress representatives and Senators of their value for U.S. and international security. According to a Capitol Hill insider, no administration at any time had Congress focused enough on the importance of cooperative threat reduction.[143]

143 Interview with the Capitol Hill staffer, Washington D.C., March 2003

Senate has proved to be more attuned to the benefits to international security of CTR programmes than the House of Representatives. This especially applies to Senators representing states, where American nuclear labs are located. Apart from Senator Lugar and former Senator Nunn, the largest proponents of CTR on Capitol Hill are Senator Pete Domenici (Los Alamos National Laboratory in New Mexico) and Senator Ellen Tauscher (Livermore National Laboratory in California). This can be explained by the fact that U.S. nuclear labs have managed to underscore the importance of non-proliferation cooperation.[144] It is considerably harder to persuade House members of the importance of nuclear non-proliferation assistance to Russia – they have immediate concerns of their constituencies and find it difficult to appreciate how helping Russia with nuclear dismantlement would benefit their voters.

The number of true supporters of CTR programmes on the Capitol Hill is small, but those are influential legislators, who proved to be very determined to constantly overcome hurdles of Congress bureaucratic machine. There are also some dedicated critics of the programmes, such as a Chairman of the House Armed Services Committee Senator Duncan Hunter.

After two unsuccessful projects under the CTR Programme[145] Senator Hunter called the cooperative threat reduction process as being "wasteful" and stated the following:

> "Twelve years and more than $7 billion later, it is worth revisiting the original purpose of this program. Designed as a temporary, focused effort to shrink Moscow's vast strategic arsenal with American funding and know-how, the CTR program has, over time, morphed into an open-ended, unfocused and sometimes self-defeating venture."[146]

Some in Congress prefer to support programmes in rhetoric but then vote against them, while claiming to be Russia's "best friends and her harshest critics."[147]

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144 Interview with Elisabeth Turpen, Henry Simpson Center, Washington D.C., March 2003

145 One project involved construction of a facility to convert rocket fuel from nuclear missiles into chemicals. Shortly before the project was completed Russia announced it had used its rocket fuel for other purposes. The second project involved developing a construction plan for a disposal plant to burn missile engines indoors. The project got halted due to environmental concerns of Russian local authorities.

146 Duncan Hunter, 'Wasteful "Threat Reduction" in Russia', op-ed, *The Washington Post*, March 4, 2003

147 Interview with the U.S Congress Representative, Washington D.C., April 2003

The way Congress perceives different programmes provides some important observations about the interests of Capitol Hill. From the analysis of Congress' attitude towards several key non-proliferation initiatives, the following trend is evident: projects dealing with straightforward dismantlement of Russian nuclear weapons, scrapping of delivery vehicles and sealing off silos are the ones considered to be most successful. Their value for America's national security can be easily demonstrated by referring to the numbers of weapons, which will never be targeted at America.

At the same time, the 'softer' programmes, which are designed to help Russia with the socio-economic consequences of downsizing its nuclear complex, are the least popular. A good example for that is the case of the Nuclear Cities Initiative (NCI).

The NCI Programme addresses a long-term problem of creating non-weapon work for Russian weapons scientists. There have been problems with the programme management and the programme has failed to deliver impressive results in terms of the number of jobs created. At the same time, it should be remembered that with the programmes, like NCI, it is much harder to produce results, which can impress the Congress. NCI cannot quote the number of weapons eliminated; it cannot prove how many former weapon scientists would have gone to rogue states, if not supported by programmes like NCI and others. As a result, NCI is seen as a programme, which simply helps Russia with its internal problems of a socio-economic nature. The fact that the U.S. Congress has refused to consider assisting Russia with providing housing for former weapons scientists and military officers demonstrates that it is interested in programmes, which directly promote American interests.

3.5.3. The Department of Defence (DOD)

The U.S. Department of Defence (DOD) was at the forefront of the cooperative threat reduction process, since the initial Cooperative Threat Reduction (CTR) Programme was brought under DOD's budget and supervision.

The DOD-administered CTR Programme was designed to assist in the dismantlement and destruction of Soviet nuclear weapons (falling under START reduction requirements); it helped to remove nuclear weapons from all three non-Russian republics (Belarus, Kazakhstan, and Ukraine). The CTR Programme continues work on dismantling and demilitarisation of former Soviet industrial and scientific infrastructure. There are also various projects dealing with biological and chemical WMD threats. (However, current work focuses only on nuclear aspects of the non-proliferation programmes).

The Material Protection, Accounting and Control (MPC&A) and the International Science and Technology (ISTC) programmes, in their initial forms, were also under auspices of the DOD. However, the MPC&A Programme was later moved to the Department of Energy (DOE), because DOE had relevant expertise for the work to be implemented. For some time, the expertise for MPC&A was coming from DOE, while funding was still coming out of the DOD's budget.

The ISTC Programme was also moved out of DOD, and became the responsibility of the State Department.

As a result of a review of all CTR programmes in 2001, it was decided to transfer a programme on plutonium reactor shut-down in Russia to the Department of Energy from the Department of Defence. That decision was taken as a response to criticism and resistance from the Pentagon and lawmakers to support a programme, which apart from shutting down Plutonium reactors envisaged the construction of conventional plants to substitute them for energy production.[148]

It seems possible that DOD as an organisation could not be too enthusiastic about certain aspects of cooperation with Russia, at first. For the first two years money for CTR activities were to come out of the pre-planned DOD's budget because the legislation only authorised DOD to exercise a 'transfer' authority, in other words, DOD did not receive any new funds but had to cut out its own expenses to implement the programme.

Jason Ellis characterised that arrangement in the following way:

> "In practice, this involved a programming trade-off: every dollar spent on the CTR Program meant one less for a program or policy priority already identified by the Bush [senior] administration. It is not surprising, then, that Secretary Cheney reportedly called it a foolish program, or that the Pentagon was quickly criticized for a perceived pattern of "foot-dragging" during its first two years."[149]

DOD as a military organisation stands separately in the political system of the United States. It also has its particular features, most important of them being its stronger traditional approaches to international security. The Pentagon, by virtue of its organisational interests and values, is logically more interested in building new weapons,

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148 Phillip Bleek, 'Threat Reduction Boosted by Policy Review, Spending Bills', Arms Control Today, January/February 2002

149 Ellis, *Defense by Other Means,* op. cit., p. 117

enhancing the army and strengthening its military capabilities, rather than assisting another country overcome its trouble with nuclear weapons-related problems.

DOD is also the most 'closed' organisation in the U.S. establishment with the strictest security regulations, and it can be assumed that these factors contribute to the complexities of the bureaucratic processes within the DOD. DOD was the only organisation involved in the U.S. on the American side, whose representatives were not available to be interviewed on the achievements and failures of the CTR Programme due to security clearance problems.

3.5.4. The Department of Energy (DOE)

Currently, the Department of Energy (DOE) oversees several major non-proliferation assistance programmes. They include: the MPC&A Programme, the Nuclear Cities Initiative (NCI), the Initiatives for Proliferation Prevention (IPP), the HEU Agreement, the Plutonium Disposition Programme and the Plutonium Reactor Shut-Down.

As a civilian organisation, DOE proved to be more flexible in many ways in implementing its programmes (as opposed to DOD). A civilian status of DOE also helped overcome some of the suspicion on the side of the Russian secret services. Most importantly, DOE holds technical expertise needed for implementation of the key CTR programmes.

The level of DOE's determination in moving forward the programmes has varied throughout the years – it has been influenced by the DOE's leadership. Most of DOE's Programmes were boosted during the Clinton administration, when officials at key DOE positions were the active proponents of cooperative threat reduction. Key officials, who contributed to the CTR process during that period, were Secretary of Energy Hazel O'Leary, Rose Gottemoeller, Leonard Spector, and Kenneth Luongo. These individuals are not members of the current government, but most of them by working in non-governmental sector still influence U.S. policies regarding non-proliferation. The profile of DOE's non-proliferation programmes has somehow diminished after Clinton administration left; however, they received renewed attention after the events of 9/11.

DOE constantly comes under scrutiny of the U.S. Government Accounting Office (GAO), which produces reports assessing the performance of DOE-managed programmes.

Proponents of cooperative threat reduction lobby for increases in funding allocated to DOE for its non-proliferation programmes, however, DOE officials are quite cautious about requesting more money. One of the reasons for it is a concern for the risk that money allocated to DOE might not be spent within the time required.[150] Although, not explicitly spelled out by DOE representative, it might be an indication that there are not enough of experts within DOE assigned to work on non-proliferation assistance, and as a result, a lack of potential to expand on existing projects.

3.5.5. The National Security Council (NSC)

The National Security Council (NSC) is somewhat of a 'shadow' player in cooperative threat reduction. The NSC is responsible for the coordination of all the non-proliferation assistance administered by different departments. The NSC holds inter-agency meetings on matters of the macro-management of the programmes, at the same time it does not want to be pulled into 'micro-managing'.[151] Such a position might be a response to a widely criticised lack of coordination between the U.S. agencies implementing CTR programmes.

The 'Controlling Nuclear Warheads and Materials' report (2003) indicated that the NSC has assigned a very small fraction of its resources to the effort of CTR coordination, and has only a limited ability to control directions that the different agencies choose to take.[152]

3.5.6. State Department

The State Department plays a dual role in the cooperative threat reduction process: as an implementing agency for several non-proliferation assistance programmes in the FSU, and as an overseeing body for all international cooperation between the U.S. government and other countries.

The State Department is responsible for the International Science and Technology Centre (ISTC) and for export control assistance programmes designed to assist former

150 Interview with the DOE official, Washington D.C., March 2003

151 Interview with the NSC official, Washington D.C., March 2003

152 Matthew Bunn, Anthony Weir, John P. Holdren, 'Controlling Nuclear Warheads and Materials: A Report Card and Action Plan', Belfer Center for Science and International Affairs (Harvard University), commissioned by NTI, March 2003, p. 50

Soviet republics in interdicting illegal smuggling (this study does not cover export control programmes). The ISTC Programme (discussed in detail in Chapter 7) has been praised in recent years as one of the most successful areas of threat reduction cooperation between the U.S. and Russia.

It is interesting to look at the State Department's role in the CTR process as that of an agency regulating international cooperation on the whole. It has been noted by some key participants of the earlier CTR programmes, that there was some degree of tension within the State Department (between different offices) and between the State Department and other U.S. agencies in the earlier years of the programmes.

There was some tension over the locus of authority with regard to the CTR process within the State Department, because there were two teams working on issues, which in the case of CTR overlapped. One team was responsible for non-proliferation, and it was headed by John Bolton. The other team, a so called NIS desk, had a regional focus and oversaw cooperation with all the former Soviet republics (the NIS desk's head was Ann Harrington). In the earlier years of the MPC&A Programme, when DOE was trying to build a more informal relationship with Russia, there was some tension between the State Department (NIS desk) and DOE. Overall, there was a lot of support for the programmes coming from the different teams within the State Department, but there was tension over day-to-day activities.[153]

The example of some DOE versus State Department stand-offs is regarding more informal approaches to MPC&A programme, which went against State Department views of proper procedure, demonstrates that there was a clash between the State Department's organisational culture and some of the approaches, which because of their informality could be valuable for the CTR process. The State Department's main responsibility is to ensure that cooperation with Russia takes place within an established framework of overall U.S. policy towards Russia and that this cooperation is formalised. The bureaucratic mechanisms within the State Department often come under attack from both the U.S. and Russian side (mainly from people working 'on the ground', directly engaged in programmes' implementation).

An example of how the formal approach of the State Department can negatively affect the implementation of CTR programmes are its rigid rules for issuing visas to Russian participants and for the time-consuming and strict procedures for authorising U.S.

153 Interview with a former DOE official, Washington D.C. , March 2003

experts to travel to Russia. In recent years the State Department has tightened its rules on American specialists travelling to Russia, and according to a State Department official, it was more of an administrative measure due to very high numbers of American personnel travelling to Russia and a request from the U.S. Embassy in Moscow, which is engaged in country clearance process (an interagency clearance process takes place prior to a trip of U.S. officials or experts to Russia) .[154]

Some Russian interviewees, who have to travel to the U.S. regularly for training and other purposes of the CTR process, have complained that it takes them a long time (up to 6 months) to obtain a visa or that some of their colleagues have been denied it altogether. Russian experts involved in programmes, such as MPC&A, also raised concern over bureaucratised procedures their American colleagues have to go through before being able to travel to Russia to implement projects.

3.5.7. U.S. Enrichment Corporation *(USEC)* [155]

The privatisation of *USEC* – an implementing agent for the HEU Deal designated by the U.S. to buy HEU from Russia – raised a debate on how appropriate it was to have a commercial company being the sole executive agent for a programme of significant non-proliferation value. It was evident that *USEC*'s interests as a commercial enterprise did not necessarily coincide with the objectives defined by the HEU Agreement in the context of CTR. *USEC* was simply not interested in buying Russian low-enriched uranium (LEU) at low prices – thereby undermining its status at the U.S. uranium market. The non-proliferation objectives of the programme designed to downblend Russia's HEU into LEU and remove it to safer locations in the U.S. for further sale to commercial enterprises were at odds with *USEC*'s own interests as a uranium producer, which had its own uranium to sell on the U.S. market.

Nonetheless, Russia and the U.S. managed to reach an interim consensus on the conditions of the HEU Deal and *USEC*'s role in is now less controversial.

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154 Interview with a State Department official, Washington D.C., March 2003

155 *USEC*'s role in the HEU Deal and the politics of the U.S. uranium market is discussed in detail in Chapter 6

3.5.8 Nuclear Labs, NGOs

Similar to Russian nuclear scientists, American scientists are the least influenced by the dogmas of the Cold War thinking. The best evidence for that is the success of the lab-to-lab cooperation between the American labs and Russian nuclear institutions, which was carried out as a part of the MPC&A Programme. Its purpose was to overcome the bureaucratic hurdles of more formal state-level cooperation, and it proved successful. The assessment of the lab-to-lab initiative in Chapter 5 suggests that the transnational movement theory is an appropriate framework to explain the success of moving CTR cooperation forward below the government-organisational level. It is evident that on the 'ground' level there is almost a bond between the nuclear scientists of two countries.

The non-governmental sector working in the area of non-proliferation in the U.S. is very well-developed and influential. A number of well established 'think-tanks' play an important role in shaping the policies. Many of them employ former senior Clinton administration officials, who were instrumental in establishing CTR programmes and developing them into a broad CTR process.

The Monterey Center for Nonproliferation Studies (CNS) (based in Monterey, California) has a reputation of a leading research centre for all aspects of non-proliferation. CNS contributes to the process by providing extensive expertise to government and government subcontractors working on the programmes. It also represents one of the main sources of information with publications on important non-proliferation issues and running databases on nuclear smuggling and constantly updated resources on WMD threats in the FSU. The head of the CNS office in Washington D.C. is Leonard Spector, who worked as an Assistant Deputy Administrator for Arms Control and Non-proliferation at the National Nuclear Security Administration (DOE) during the Clinton Administration. Leonard Spector managed the Initiatives for Proliferation Prevention (IPP) and the Nuclear Cities Initiative (NCI) programmes.

The Russian-American Nuclear Security Council (RANSAC) is another important non-governmental player. RANSAC's Executive Director - Kenneth Luongo - served as the Senior Advisor to the Secretary of Energy for Non-Proliferation Policy and the Director of the Office of Arms Control and Non-proliferation at the U.S. Department of Energy during the Clinton Administration. In addition, Luongo was the Director for of the Russia and Newly Independent States Nuclear Material Security Task Force. Prior to these positions, he served as a Special Assistant for Non-proliferation Issues to Secretary of Energy, Hazel R. O'Leary. RANSAC developed the idea for what later became the Nuclear Cities Initiative (NCI). It provides substantial information resources on all aspects of U.S.-

Russian nuclear cooperation. RANSAC promotes better awareness of the existing problems in cooperative threat reduction by organising workshops, including some especially designed for members of the U.S. Congress.

The Nuclear Threat Initiative (NTI) is a non-profit organisation founded by media-magnate Ted Turner and by one of the two founders of the CTR Programme – former Senator Sam Nunn. Apart from being headed by one of CTR's founders Sam Nunn, NTI also has several key individuals as its members, such as Laura Holgate, who managed the DOD's Cooperative Threat Reduction programme during the previous administration. She also served as director of the Office of Fissile Materials Disposition at the U.S. Department of Energy. NTI has substantial resources and has been able to sponsor several non-proliferation assistance projects implemented in different parts of the world from its own funds.

The Carnegie Endowment for International Peace (CEIP) – is a non-government 'think-tank', which runs a programme on non-proliferation. CEIP employs Rose Gottemoeller, another key former senior official from Clinton administration with direct experience in the CTR programmes. Rose Gottemoeller is a former deputy undersecretary for defence nuclear non-proliferation in the Department of Energy. Previously, she served as the department's assistant secretary for non-proliferation and national security, with responsibility for all non-proliferation cooperation with Russia and the NIS. Rose Gottemoeller has been instrumental in establishing the Nuclear Cities Initiative (NCI).

The U.S. NGOs involved in policy-relevant research exercise a stronger degree of influence on the U.S. policies than similar institutions in Russia. The experts working in the non-government sector often testify before the relevant U.S. Senate Committees, publish reports, which provide a thorough assessment of CTR programmes and in this way prompt current officials to review some of the government's practices in the CTR process.

There are several NGOs, which are concerned with the dangers of ecological and social consequences of nuclear production and testing. One of the most active one is Initiative for Social Action and Renewal in Eurasia – an NGO, which among other activities, lobbies for safer nuclear stewardship.

3.6. Conclusion

The organisational culture of key political actors predetermined their attitude towards the CTR process. However, attitudes of different organisations were never fixed; they have been shifting in different directions under the influence of several important factors, such as the views of key individuals at the top, the prevailing atmosphere in the U.S.-Russian relationship, problems of domestic politics and conflicting interests between different government bodies, both in Russia and the U.S. More importantly, the nature of each individual programme has an important role to play in how it is perceived by the governments, implementing agencies and people on the ground. An account of the evolution of different programmes, problems in their implementation and role of organisations and individuals in this process provide some explanations of why CTR programmes have succeeded in some areas while failing in others, what were the reasons for setbacks and what factors caused them to advance.

For example, the MPC&A Programme, which requires most intrusive verification mechanisms, has experienced a lot of setbacks due to unwillingness of Russia to grant access to its sensitive facilities (due to heightened FSB concerns). At the same time, the example of the MPC&A Programme has led to two main observations: 1) moving a programme from a more conservative U.S. DOD to a civilian DOE helped to bring the cooperation forward; 2) cooperation on the level of labs between Russian and American scientists (Lab-to-Lab part of MPC&A Programme) proved to be successful because scientists are less influenced by Cold War thinking and their work is less subjected to bureaucratised mechanisms of state agencies.

The more conservative military establishments (i.e. the U.S. DOD and the Russian MOD) are still heavily represented by people of the Cold War generation, whose careers were shaped and whose beliefs were moulded during the height of antagonism between the U.S. and the Soviet Union. In this respect, involving these organisations in the process of cooperative threat reduction was a groundbreaking development in U.S.-Russian relations. Apart from well-deserved praise for implementing the unique and first of its kind CTR Programme, the military establishments do occasionally stumble over the Cold War legacy and organisational values. Another cause of tension between the two military organisations is that their interests differ: while the U.S. DOD (as well as the U.S. government as a whole) is interested in dismantling and eliminating as many nuclear weapons, warheads, and silos in Russia as possible, thereby reducing the dangers to its own national security, the Russian MOD, while recognising a pressing need to downsize its nuclear forces, wants to do it on its own terms and implement it according to its perceptions of Russia's military requirements.

The implementation of all CTR programmes requires cooperation from the side of the Russian security services – namely, the FSB. The priority interests of the FSB are to ensure that no harm is inflicted to Russia's national security interests while the bilateral cooperation is underway. Therefore, opposition by the FSB to more intrusive U.S.-funded projects and restriction on access of American officials and experts to Russian sensitive sites and 'closed' cities is directly linked to the FSB's organisational values.

The U.S. State Department has to meet its organisational priorities – and that is to ensure that cooperation with Russia does not get outside of the formal framework of U.S. policies towards Russia. A desire to be 'in control' of bilateral cooperation and internal bureaucratic processes sometimes contributes to slowing down the pace of the programmes. At the same time, as an implementing agent for the ISTC, the State Department achieved considerable success, and the ISTC is currently attributed as one the most successful CTR projects underway.

An examination of U.S. and Russian legislative branches and their behaviour in terms of the CTR process shows how remarkably similar the attitudes of the U.S. Congress and of Russian State Duma are. Being at the forefront of representing the interests of their people, members of the U.S. Congress and Russian parliamentarians prove to be very vigilant when it comes to cooperation between two countries. Both the Congress and State Duma have repeatedly put pressure on the programmes by voicing concern over the motives of the other party and by making them hostages to problems in bilateral relations and domestic politics.

The Ministry of Atomic Energy (MINATOM) was of necessity a key player in the implementation of CTR. While keen to receive CTR funding, its institutional interests (the preservation of the Russian military nuclear complex) were not always congruent with the objectives of CTR. The analysis of the organisational behaviour of MINATOM therefore is crucial to an understanding of the development of CTR as a whole.

Overall, the following major conclusions can be drawn from the examination of key political actors and the developments in the CTR process: the role of individuals was and remains to be crucial for the CTR process, especially on the U.S. side, where the funding and political will has to be secured; the bureaucratic mechanisms and patterns of operation within the organisations slow down the pace of programmes' implementation; the U.S. and Russian organisations have a set of their organisational interests, which they try to guard while participating in cooperative threat reduction process; even though on some occasions there is a clash between organisational/individual interests and CTR objectives, both the U.S. and Russia have preserved the cooperation and continue to move forward with a varying degree of commitment and political will.

The Bureaucratic Politics Model is used as one of the major analytical tools in evaluating programme performance in the CTR process. Although it fails to cover all aspects of cooperation in CTR framework and alternative theoretical approaches should be employed, the focus on organisations and individual bureaucrats suggested by the Model is imperative. This is due to nature of the CTR process, in which state organisations are primary players and the individual members of the government exercise specific influence on how CTR programmes are developed and perceived. In order to employ the model the following chapters define key political players for each programme and evaluate their role in its implementation. An examination of the problems of implementation for major non-proliferation assistance programmes provides evidence that some (although not all) of them can be explained by the organisational values and interests, their standard operating procedures, and by the role of individuals engaged in programme decision-making and implementation process. The case studies of main CTR programmes demonstrate how bureaucratically-based problems of implementation are further negatively supplemented by political problems in the U.S.-Russian strategic relations.

Some problems of implementation in CTR programmes cannot be attributed to purely bureaucratic or political factors (e.g. technical problems connected with disposition of fissile material). Therefore, the Bureaucratic Politics Model cannot provide explanations for all problems defined in the course of examination of CTR programmes, but it provides an important structural framework for this research by focusing attention on implementing agents, i.e. state organisations. In the following chapters we will consider specific elements of CTR, in order to understand the various factors that affected the implementation of the programmes and the evolution of CTR as a whole.

Chapter 4
The Cooperative Threat Reduction (CTR) Programme and the Evolution of the CTR Process

4.1. Introduction

This chapter provides a historical background for all the programmes assessed in this thesis with an analysis of the political and economic environment in the Soviet Union shortly before the collapse. It describes the concerns in the West that called for measures to confront potential nuclear threats stemming from the disintegrating Soviet Union and the reasons why Russian government accepted the assistance. The chapter presents an account of the Cooperative Threat Reduction (CTR) Programme, which provided the foundation for the process of U.S.-Russian cooperative threat reduction, and was the first formal U.S. non-proliferation assistance programme to be implemented in Russia. It describes the history of the inception and the main objectives of the CTR Programme. This is followed by a description of its evolution into several non-proliferation programmes funded and administered by different U.S. agencies (each of these programmes is further discussed in chapters 5, 6, and 7).

The chapter analyses the problems of the implementation of the CTR Programme, which are shown to be endemic to most of the non-proliferation assistance programmes (empirical evidence provided in Chapters 5, 6, and 7). Allison's model of bureaucratic politics is tested against the decision-making and implementation track of the CTR Programme. In order to do that, the role and interests of key organisations are addressed throughout the chapter. The goal of this chapter is to analyse how some of the problems of implementation of bureaucratic nature are influenced by problems on the political level, since it is evident from the case studies analysis that the legacy of the Cold War thinking is still present in some organisational procedures. Most typically, a lack of trust and unresolved issues in the U.S.-Russian post-Cold War strategic relationship have an impact on the implementation tracks of the CTR Programme, as well as on other major CTR programmes (discussed in Chapters 5, 6, and 7).

In conclusion, the overall effectiveness of the CTR Programme is assessed based on its achievements and limitations.

4.2. Historical Background

4.2.1. The Economic and Political Crisis in the Soviet Union

The initial major objectives of the CTR Programme included: assistance for the denuclearisation of Belarus, Kazakhstan, and Ukraine; the elimination of START-limited systems and infrastructure; assistance to Russia for accelerating strategic arms reductions to START levels; enhancing military reductions and reforms in FSU recipient countries.[156] The CTR Programme generated an array of non-proliferation activities, now managed by different U.S. agencies, and as such represents an important phenomenon of post-Cold War international security cooperation.

There were several key events that played an important role in establishing the CTR Programme in 1992. First and foremost among these was the economic and political situation in the former Soviet Union by the end of 1980s.

Already in 1990 Soviet decision-makers demonstrated their concern about the vulnerability of tactical nuclear weapons deployed on Soviet territory, and there were discussions underway between Soviet academics and Western specialists regarding the control over nuclear weapons in the event the Soviet Union should break up. However, no actions were taken to address this problem.[157]

The failed coup-d'état in August 1991 undertaken to overthrow President Gorbachev demonstrated that the Soviet Union was facing a new set of threats. The country was going through severe political turbulence, and safety and security of nuclear weapons and materials became questionable. Speculation as to whether the Soviet President, Mikhail Gorbachev, had lost control of the nuclear arsenal during the attempted putsch gave new credence to the fear that nuclear control might be lost and a nuclear holocaust might be brought about by accident and as a result of unauthorised launch. It never became clear whether control over the huge Soviet nuclear arsenal was fully lost, but it is known that Gorbachev was cut off from all communication, including the "nuclear briefcase" (the communication device integrating the President and the Defence Minister into the nuclear launch authorisation process, also called "football"). The Soviet system designed to generate an order for a nuclear attack was called Kazbek

156 The Cooperative Threat Reduction Programme, at http://www.osd.mil/ctr retrieved on 04.11.02

157 Bluth, *The Nuclear Challenge*, op. cit, p. 129

and involved at least three authorising parties. At the time of the August coup, the three authorising parties included Mikhail Gorbachev, Minister of Defence General Yazov, and Chief of General Staff General Moiseyev. Under the Kazbek system the decision to launch nuclear weapons was supposed to be formed jointly by the three parties. In peacetime the three authorised persons were supposed to communicate via special devices, which would allow them to generate and transmit their part of the electronic authorisation codes. The separate codes sent by the country's president and the Minister of Defence would travel to an electronic device with a special algorithm. That device ["nuclear briefcase"] was to validate, combine and send off the codes to another device, which would have an input from the Chief of General Staff. The composed code would then travel to the Commanders in Chief of the strategic forces to authorise the launch.[158]

Most probably, Gorbachev did not have control of his "nuclear briefcase" *per se*. It seems as through it was not technically possible anyway for the coup-d-état organisers to acquire full command and control over nuclear weapons due to the multi-stage authorisation system needed to launch nuclear weapons. However, it is not only such extreme situations as a short-lived attempt at a coup-d-état that can represent a real nuclear danger to the world. A less extreme and prolonged period of transition to a new stable state bears numerous obvious and hidden proliferation challenges. The failed attempt to overthrow the legitimate government of the Soviet Union exacerbated concern which had already existed in the West. That concern led to a fundamental assessment of threats arising from the possible dissolution of a Soviet nuclear state.

4.2.2. The Harvard Study on the Soviet Nuclear Threats

Scholars from Harvard's J. F. Kennedy School of Government carried out a study entitled *Soviet Nuclear Fission: Control of the Nuclear Arsenal in a Disintegrating Soviet Union*.[159] That report was praised as "a timely study [...] that outlined in an analytical, scholarly format the dangers of nuclear command, control, and safety in an unstable Soviet Union".[160]

158 Blair, *The Logic of Accidental Nuclear War*, op. cit, p. 72

159 Campbell, Carter, Miller, and Zraket, eds., *Soviet Nuclear Fission*, op. cit.

160 Senator Sam Nunn, 'Foreword: Changing Threats in the Post-Cold War World' in Shields and Potter, eds., *Dismantling the Cold War*, op. cit., p. xvii

The study outlined the following major risks. The break-up of the Soviet Union into 15 constituent republics would result in the creation of new nuclear states, including four (Russia, Belarus, Ukraine and Kazakhstan) with strategic nuclear weapons. That would raise profound questions about the nuclear non-proliferation treaty (NPT) regime, which did not envision the creation of new legitimate nuclear powers. The future destiny of the nuclear weapons located on their territory was unknown, especially because the nature and stability of the new governments was unknown. In times of political and social upheaval, nuclear weapons might fall into the wrong hands. Tactical weapons were seen as particularly problematic, given that many of them were deployed in crisis regions and were not adequately protected against unauthorised use.[161] Storage sites for weapons grade nuclear materials had inadequate systems for materials control and accounting and were not sufficiently protected. [162]

The *Soviet Nuclear Fission* report was, in other words, a formal and written reaffirmation of major concerns and worries of the post-Cold War environment, which envisaged the disappearance of a great nuclear power.

4.2.3. The U.S. Senators Sam Nunn and Richard Lugar: An Appreciation of the Threat

At the time of publication of the *Soviet Nuclear Fission*, two U.S. Senators – Sam Nunn and Richard Lugar - became active in promoting awareness in the U.S. about the great dangers of nuclear proliferation looming as a result of political and economic crisis in the Soviet Union. Senator Sam Nunn had a personal communication with Mikhail Gorbachev soon after the attempted coup-d'état in August 1991, and Gorbachev indicated that "command and control" of the Soviet nuclear arsenal during the coup was unclear.

Senator Nunn later stated:

> "...I concluded that the Soviet Union was in great peril. In particular, I believed that we needed to do everything we could to help the Soviet

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161 Soviet tactical nuclear weapons were not universally equipped with permissive action links (PALs – electronic devices that require the input of a code before the weapon can be activated).

162 Campbell, Carter, Miller, and Zraket, eds., *Soviet Nuclear Fission*, op. cit.

> authorities gain control and keep control over their own nuclear weapons..."[163]

Meanwhile, the Chairman of the House Armed Services Committee Les Aspin had proposed a humanitarian aid package for the Soviet Union, which had already received defence authorisation and had been included in appropriation bills. Senator Nunn and Congressman Les Aspin tried to put the humanitarian aid package and concerns about WMD together in a conference initiative. However, their attempt was unsuccessful. As on many other occasions in the consequent evolution of CTR, that initiative became hostage to internal political battles.

At that point, Senator Nunn asked for cooperation from another Senator - Richard Lugar, who like Senator Nunn himself was a devoted non-proliferation activist. Both of them appealed to a small group of experts, including David Hamburg (President of the Carnegie Foundation), William Perry (from Stanford University, who later became Secretary of Defence), Ashton Carter (from Harvard University, co-author of the *Soviet Nuclear Fission* report) - to present their findings to 15-20 key senators. The group succeeded in getting support of some other members of Congress.[164]

Initially, there was opposition from some key individuals in Congress and the first Bush administration (see the analysis of the role of Congress in the cooperative threat reduction process in Chapter 3). Part of the problem was that the money for the CTR Programme would be coming out of Department of Defence budget. However, Senators Nunn and Lugar realised the urgency of the matter, and offered their legislation to the Senate on November 25, 1991. The proposal was called the "Soviet Nuclear Threat Reduction Act of 1991", and the legislation became known as the 'Nunn-Lugar' act.

Just in few weeks after the briefing by the experts called out by Senators Nunn and Lugar, the relevant legislation was passed in the Senate and then in the House almost without any opposition. The proposal was adopted with a vote of 86-6 by Senate, and later approved by the House. On December 12, 1991 President Bush (Sr.) signed the Nunn-Lugar proposal and it became a law (Public Law 102-228, 12/12/91).[165]

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163 Senator Sam Nunn, 'Foreword: Changing Threats in the Post-Cold War World' in Shields and Potter, eds., *Dismantling the Cold War*, op. cit, p. xvi

164 John Felton, 'The Nunn-Lugar Vision: 1992-2002', NTI, p. 5

165 'The Nunn-Lugar Cooperative Threat Reduction (CTR) Program', NTI, at http://www.nti.org/db/nisprofs/russia/forasst/nunn_lug/overview.htm

The Nunn-Lugar legislation was passed in the form of amendments to an unrelated bill. It provided $400 million for the nuclear control area, which later became known as the Nunn-Lugar Programme, and $100 million in humanitarian aid. That was the origin of the Nunn-Lugar Programme. The money was supposed to come from the overall budget of the Department of Defence (DOD). That factor was one of the major stumbling blocks in popularising the Programme. The critics saw no logic in U.S. defence money being spent on addressing nuclear complex problems of another country. The Programme was informally called the Nunn-Lugar Programme until the Clinton Administration started referring to it as to Cooperative Threat Reduction Programme from 1993.

Only two weeks after the Nunn-Lugar legislation was signed by the U.S. President the Soviet Union collapsed, leaving four nuclear states (Russia, Belarus, Kazakhstan, and Ukraine) instead of one.

Former Senator Sam Nunn, currently – co-chair of Nuclear Threat Initiative (NTI) and Senator Richard Lugar remain the most active proponents of raising awareness in the U.S. and the world about the dangers of WMD proliferation.

4.3. The CTR Programme: Implementation

The CTR Programme provides equipment, services and technical support to assist not only Russia, but all other FSU republics in preventing proliferation and securing and dismantling weapons of mass destruction, related materials and production facilities.[166]

The denuclearisation of three non-Russian republics is assessed thoroughly since that development has a direct relation to the issues of safe transportation, storage, and dismantlement in Russia. A brief overview of what has been done by the CTR Programme in Belarus, Kazakhstan, and Ukraine in terms of nuclear safety and security is presented as well. The section covers CTR assistance to these three republics since it was

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retrieved on 24.10.02

166 This cooperation is not limited to nuclear weapons and materials only (it covers areas of biological and chemical weapons too). However, the main focus of this research is limited to Russia and its nuclear complex only, therefore, attention is paid only to cooperative threat reduction in the nuclear field.

a case of complete denuclearisation of three states, which, otherwise, might have become nuclear.

The CTR Programme began in 1991, and will continue, at least, until June 2006. The protocol to the "Agreement between the Russian Federation and the United States of America concerning the Safe and Secure Transportation, Storage and Destruction of Weapons and the Prevention of Weapons Proliferation" was signed on June 15-16, 1999.[167]

The CTR Programme is a symbiotic array of different projects, addressing problems of the whole non-proliferation spectre: reduction of arms, safety and security of weapons and materials elimination, storage, and transportation, personnel reliability, and general facilitation of U.S.-FSU non-proliferation communication. The CTR Programme has given way to several different programmes led by different U.S. agencies, which address specific goals of CTR in a more narrowed down, focused way.

The following section evaluates the achievements of the CTR Programme in each of the areas of the stated objectives.

4.3.1. Assistance for the Denuclearisation of Belarus, Kazakhstan, and Ukraine; the Elimination of START-limited Systems and Infrastructure

The appearance of four nuclear states instead of one after the Soviet Union broke up in 1991 brought a completely new set of possible threats. Although, Belarus, Kazakhstan, and Ukraine did not have the formal status of a nuclear power nor had an independent comprehensive nuclear infrastructure of their own – they all (to a different extent) possessed nuclear weapons, materials, technologies, delivery systems, and expertise on their territory.

The question of whether those three independent states would give up nuclear weapons located on their territories was not answered until 2-3 years after the collapse. Each national government went through an evaluation of its security, economic, and political needs, as well as the pros and cons of adhering to the Non-Proliferation Treaty (NPT) as non-nuclear states. The CTR Programme played a substantial role in the final

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167 DefenseLINK News: United States and Russia Extend Nunn-Lugar Cooperative Threat Reduction Agreement, at http://www.defenselink.mil/news/Jun1999/b06241999_bt307-99.html retrieved on 20.06.03

decision of all three states to become non-nuclear parties of NPT. The denuclearisation of Belarus, Kazakhstan, and Ukraine was linked to the START process (refer to START agreements discussed in Chapter 2) – and was seen as an instrument of nuclear non-proliferation. START I was signed by the U.S. and the Soviet Union on July 31, 1991. When the Soviet Union collapsed there was a fear that START I would become ineffective.

In January 1992 Russian Federation announced itself the legal successor of all international treaties signed by the Soviet Union, and that statement was not challenged by any of the newly independent states (NIS). The U.S. did not accept that Russia should be the sole successor to the START Agreement, and it insisted that the four republics would share that role. A special Protocol was signed in relation to Belarus, Kazakhstan, and Ukraine adhering to START I. In this way, START became a multilateral agreement by making all five countries (U.S., Russia, Belarus, Kazakhstan, and Ukraine) parties to START I, and committed the non-Russian republics to enter NPT as non-nuclear the shortest possible time.[168] The Protocol was signed in Lisbon on May 23, 1992.

All three presidents of the newly independent states of Belarus, Kazakhstan, and Ukraine also had sent letters to the U.S. Government whereby they pledged to remove nuclear weapons from their territories within seven years after START I's entry into force.[169] The U.S. Senate ratified START I on October 1st, 1992, stipulating that the Lisbon Protocol and the letters of the three heads of the state carried the same legal obligations as the START I treaty itself.[170] Russia was very keen on ratifying START I because it was perceived as a mechanism of the denuclearisation of Belarus, Kazakhstan, and Ukraine. The Russian Parliament ratified START I on November 4, 1992.

However, the process of ratification and implementation of Lisbon Protocol in non-Russian states was not an easy one; and it fully demonstrated the uncertainties present in all three republics about the destiny of nuclear weapons and materials left on their territories. The following section describes the process of denuclearisation country by country.

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168 Protocol to the START I Treaty (Lisbon Protocol), Source: Conference on Disarmament document CD/1193, 5 April 1993, available in Jozef Goldblat, *Arms Control: A Guide to Negotiations and Agreements*, PRIO, 1996, p. 675

169 Marco De Anreis and Francesco Calogero 'The Soviet Nuclear Weapon Legacy'. SIPRI Research Report No. 10, SIPRI, Oxford University Press, 1995, p. 11

170 De Anreis and Calogero, 'The Soviet Nuclear Weapon Legacy', op. cit, p. 12

Belarus

Among the three states Belarus was the one where the ratification of the Lisbon protocol and joining the NPT as a non-nuclear state was the least controversial. This was mainly due to the political considerations of Belarussian government, which always, to a large extent, oriented itself to political developments in Russia and was seeking close ties with it. Moreover, the new constitution adopted after Belarus had gained independence codified the neutral and non-nuclear status of the country. That is why the ratification of the NPT and START I did not raise any arguments in Belarussian political circles.

On February 4, 1993 the Belarussian parliament ratified START I and the Lisbon Protocol (which laid down the procedure for the re-deployment of the 81 SS-25 strategic nuclear missiles on Belarussian soil to Russia, and thereby committed the country to disarmament and eventual non-nuclear status with very little opposition). It also voted for Belarus to join NPT as a non-nuclear state.[171]

Belarus had the lowest number of nuclear weapons on its territory of all the non-Russian republics. It amounted to 800 weapons (including 100 warheads for the road-mobile SS-25 ICBMs and 725 tactical nuclear weapons)[172], and a smaller number of launch sites among three non-Russian republics. The CTR Programme managed to return to Russia all 54 SS-25s (the SS-25 is an Intercontinental Ballistic Missile (ICBM) with one warhead).[173] At some point, some officials in Belarus were hinting that the country would retain some of the ICBMs, but notwithstanding such claims by November 1996 all the ICBMs were removed from the Belarussian territory.

Belarus also possessed 81 SS-25 launch sites, and the U.S. had allocated CTR assistance for their destruction. However, due to a deterioration of the U.S.-Belarussian relations all CTR assistance to Belarus ceased in March 1997, and the equipment provided by the U.S. for launch sites destruction was withdrawn.[174]

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171 Vyachaslau Paznyak, 'Belarus: in Search of a Security Identity' in Allison and Bluth, eds., *Security Dilemmas in Russia and Eurasia*, op. cit., p. 159

172 Joseph Cirincione with Jon B. Wolfsthal and Miriam Rajkumar, *Deadly Arsenals: Tracking Weapons of Mass Destruction*, Carnegie Endowment for Peace, 2002, p. 319

173 Nuclear Status Report: Nuclear Weapons, Fissile Material, and Export Controls in the former Soviet Union, No. 6, June 2001, The Monterey Institute of International Studies & The Carnegie Endowment for International Peace, p. 53

174 Ibid

Kazakhstan

Kazakhstan was one of the major republics of the Soviet nuclear complex. A large number of strategic offensive and tactical nuclear weapons, which compromised as much as 7,6% of the total share of Soviet nuclear arsenal was deployed on its territory.[175] That included an estimated 1,400 strategic nuclear warheads, 104 SS-18s, and 47 heavy bombers.[176] Moreover, Kazakhstan accommodated on its territory a wide range of former Soviet missile testing grounds, bombing ranges and so forth, covering some 4% of its land surface, which have been the subject of negotiations with Russia. The most important Soviet strategic assets on Kazakh territory were the ICBM bases, with 104 SS-18s, the Semipalatinsk nuclear test site, the Baikonur space launch centre and the ABM radar site.[177] Kazakhstan would have become the fourth largest nuclear weapons state if it had decided to consolidate all the nuclear weapons, materials, and related technologies present on its territory in the immediate aftermath of the Soviet break-up.

The decision of the government of Kazakhstan to transfer all nuclear weapons to Russia, destroy its nuclear weapons infrastructure and adhere to the NPT as a non-nuclear weapon state - was not immediate. Concerns of Kazakhstan and Ukraine of transferring nuclear weapons from their territories to Russia were not surprising. The Soviet nuclear complex was developed at the expense of the vast human and economic resources, which were not exclusively Russian. Kazakhstan was subjected to nuclear tests on its territory, which irreversibly damaged the environment, and led to serious health problems of several generations of people. Moreover, the young ex-Soviet republics were facing uncertain security threats, and nuclear weapons could have provided some sort of existential deterrence.

The process of decision-making on the issue of nuclear capabilities left in Kazakhstan after the break-up of the Soviet Union fully reflected dilemmas of national security concerns and interests of the Republic. For some time, Kazakhstan occupied a 'wait-and-see' position closely watching the developments in Ukraine, which was about to

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175 Data of 'Where the weapons are' (Bulletin of the Atomic Scientists), vol. 47, no. 9 (Nov. 1991), pp. 48-49; and Norris, R. S. 'The Soviet Nuclear Archipelago', (Arms Control Today), vol. 22, no. 1 (Jan./Feb. 1992), pp. 24-31 cited by De Anreis and Calogero 'The Soviet Nuclear Weapons Legacy', op. cit, p. 5

176 Nuclear Status Report, op. cit, p. 52

177 Oumirserik Kassenov, 'Central Asia: National, Regional and Global Aspects of Security' in Allison and Bluth, eds., *Security Dilemmas in Russia and Eurasia*, RIIA, 1998, op. cit, p. 193

make a choice about the nuclear weapons left on its territory. There was a choice between keeping nuclear weapons, thus securing some sort of power leverage in the region, and giving them up for the sake of a good international image and receiving security guarantees from the nuclear powers. (It should be said that Kazakhstan did not consider taking control over the weapons, but considered their presence on Kazakh territory as forward-based weapons under Russian control.) The opinions within the Republic on which path to choose were divided and demonstrated different perceptions of threats to national security and ways to protect against them.

The supporters of keeping nuclear capabilities were concerned about two of Kazakhstan's neighbours – Russia and China – both nuclear weapon states. An extremely unstable Russia was considered to be a very likely source of threat to the national security of Kazakhstan, especially, because of a potential strengthening of "neo-right" and "neo-imperialist" power in Russia.

The proponents of denuclearisation argued from the point of view of national security interests as well. However, in their opinion, trying to keep nuclear weapons was seen not as a deterrent to possible security threats, but on the contrary, as a source of instability. The rationale behind such arguments was obvious: by attempting to force its way inside the 'nuclear club' Kazakhstan would undermine the existing nonproliferation regime, fail to earn any political leverage as a country, and even trigger some unpredictable developments in the region. It was also fairly obvious that a young state would not be capable of sustaining a required level of infrastructure to support nuclear weapons.

For observers Kazakhstan's position was almost intentionally dubious. The Russian opinion on the nuclear policy of Kazakhstan of early 1990s was expressed by a Russian expert Davydov:

> "It looks as Kazakhstan got maximum dividends from its previous ambiguity on whether to be a nuclear or a non-nuclear state by securing nuclear defence, mainly at the expense of Russia, and by raising its political prestige as a state, which supports the regime of nuclear non-proliferation."[178]

In the end, Kazakhstan chose to join the NPT as a non-nuclear weapon state, because that option to a larger extent than any other, reflected the national interests of

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[178] Davydov cited by Oumirserik Kassenov, Dastan Eleukenov, Murat Laumulin, *Kazakhstan I Dogovor o Nerasprostranenii Yadernogo Oruzhiya (Kazakhstan and the Nuclear Non-Proliferation Treaty)*, Kazakh Institute for Strategic Studies, Almaty, 1994, p. 6

the Republic. Joining the NPT and ratifying START I were seen in the light of strengthening state security by obtaining security guarantees in exchange for nuclear weapons it had possessed.

One of the important factors reinforcing the security of Kazakhstan after its Supreme Council ratified the nuclear Non-Proliferation Treaty (NPT) as a non-nuclear state in December 1993 was the acceptance of formal security assurances from Russia, the Unites States and the United Kingdom. If Kazakhstan becomes a victim of aggression or an object of threats to use nuclear weapons, then Russia, the United States and the United Kingdom will demand immediate action from the UN Security Council to render assistance to Kazakhstan as a non-nuclear member state of the NPT.[179]

Assistance within the CTR Agreement was important in denuclearisation of Kazakhstan. With the help of the CTR Programme, out of 47 heavy bombers – 40 were returned to Russia and 7 were destroyed.[180] By September 30, 1999 all 147 silos in Kazakhstan were dismantled and eliminated.[181] All of the 1,400 strategic nuclear weapons and 104 SS-18s were returned to Russia.

On July 29, 2000 the CTR Programme completed the destruction of the world's largest nuclear test site, which was the most important testing ground for the Soviet Union. The test site was situated in the tunnels of Degelen Mountain in Kazakhstan and comprised of 180 tunnels and 13 vertical boreholes.[182]

Ukraine

The process of denuclearisation of Ukraine proved to be the most difficult one. Ukraine had stronger nuclear ambitions than Belarus and Kazakhstan. The nuclear arsenal on its territory comprising of 1,240 warheads on strategic nuclear missiles and

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179 Oumirserik Kassenov, 'Central Asia: National, Regional and Global Aspects of Security' in Allison and Bluth, eds., *Security Dilemmas in Russia and Eurasia*, op. cit, p. 192

180 The Cooperative Threat Reduction Programme, at http://www.dtra.mil/ctr/project/projkaz/ctr_strat_bomb.html, retrieved on 23.04.03

181 The Cooperative Threat Reduction Programme, at http://www.dtra.mil/ctr/project/projkaz/ctr_ss18_silo.html retrieved on 23.04.03

182 'Nunn-Lugar Program Closes Most Important Soviet Era Nuclear Test Site', press-release, 31.07.00

between 2,650 and 4,200 tactical nuclear weapons[183] was seen as a lucrative heritage by the Ukrainian government.

Ukraine signed the Lisbon Protocol in May of 1992 and thereby assumed the obligations of the Soviet Union under START I Treaty.

The subsequent moves of the Ukrainian political elites were a matter of serious concern to the international community, and to Russia, in particular (Russia was keen on ensuring it was the only nuclear power on the post-Soviet space). The Ukrainian leadership was sending mixed signals to whether it would try to retain the weapons on its territory or whether it would simply prolong the process of transference in order to use them as a bargaining chip in the political and economic trade-off with Russia and the West.

The most important questions of the debate were how safe were the weapons on its territory and whether Ukraine could become a nuclear power. Concerns about the safety and security of nuclear weapons in Ukraine were an important dimension of the Western interest in Ukraine's denuclearisation. Ukraine had some important assets necessary for nuclear weapons industry. For example, the largest missile factory in the world 'Yuzhnoye' (in Dnepropetrovsk), where the SS-18 missiles were manufactured and the SS-24s were assembled, was located in Ukraine. Ukraine also maintained nuclear research centres in Kharkov, which had expertise in missile guidance, targeting and control.[184]

The most common opinion, which was generated in academic circles during early 1990s indicated that although Ukraine "could in principle become a nuclear weapons state", the costs of building a nuclear weapons establishment to maintain the weapons and create early warning as well as command and control facilities were prohibitive.[185] The main trouble for Ukraine would be dealing with the nuclear warheads. Ukraine never produced warheads and did not have production facilities, which would provide necessary technical maintenance. However, at the time it was acknowledged that Ukraine was dependent on Russia in terms of spare parts and expertise as much as Russia

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183 Cirincione *et al.*, *Deadly Arsenals: Tracking Weapons of Mass Destruction*, op. cit, p. 323

184 Christoph Bluth, Anton Surikov, Igor Sutyagin, 'Ukraine's Security Dilemmas and Nuclear Weapons: A Recipe for Catastrophe?', unpublished paper, Royal Institute of International Affairs 1994, p. 2

185 Ibid

depended on certain facilities located in Ukraine. There was a concern that Russia would feel inclined to assist Ukraine, at least, temporarily with maintaining the arsenal on its territory. Having said this, it could only be a possibility for a limited amount of time until Russia implements reductions in its arsenals by dismantling those missiles, which were manufactured in Ukraine.

The whole issue with Ukrainian dependence on Russian expertise in maintaining the nuclear arsenal on its territory highlighted the controversy surrounding the 'security' value Ukraine placed on retaining nuclear weapons. Some political groups in Ukraine were voicing concern about possible "Russian aggression" and believed the country should retain the weapons to protect itself, from Russia, in the first place.[186] Those counting on nuclear weapons as a deterrent against Moscow ignored the technical characteristics of missiles present on Ukrainian territory. It was not possible to fire those weapons against Russian targets because they were long-range inter-continental missiles. At the height of the concern about Ukraine's moves indicating it would go nuclear, the reports were delivered claiming that Ukrainian researchers were working on reducing the range of the SS-24s by carrying out the so called "loop-manoeuvre" and on converting nuclear weapons into radiological (those works were assumed to have been carried out without Parliament approval).[187]

Until the mid-1990s the status of control over the nuclear weapons on Ukrainian soil remained vague. Ukraine declared "administrative control" over the weapons. In early April 1992 President Kravchuk announced that all forces on Ukrainian territory were under the command of the Ukrainian military. That measure, however, did not mean that Ukrainian leadership had operational command and control, i.e. President Kravchuk did not have access to the codes needed to launch the weapons.[188]

The very idea that one state should transfer its nuclear arsenal to another was not attractive to political elites in Ukraine. Nonetheless, it did not mean that official Kiev was against the idea of becoming a non-nuclear state. From the point of view of Ukrainians, nuclear disarmament had to be separated from the question of transferring weapons to

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186 Amy Wolf, Theodor Galdi, 'Nuclear Weapons in the Former Soviet Union: Location, Command, and Control', Congressional Research Service Brief, February 9, 1994, p. 6

187 'Nuclear Weapons in the Former Soviet Union: Safety and Security Aspects', p. 27

188 Wolf, Galdi, 'Nuclear Weapons in the Former Soviet Union: Location, Command, and Control', op. cit, p. 6

Russia. One of the most common perceptions held at the top of Ukrainian political elites was that the weapons were present on its territory temporarily; however, until they were destroyed Ukraine was their owner. Ukrainian efforts to translate the presence of nuclear weapons from the arsenal of the former Soviet Union on its territory into tangible benefits in terms of military and economic security focused on compensation for the fissile material in the weapons and support for the costs of dismantlement (one of the arguments was that the Soviet nuclear complex, especially in its part in Ukraine was built with the Ukrainian human and material resources, and therefore, the state had to be compensated for this part) as well as a demand for some unspecified security guarantees.[189] Nuclear weapons deployed in Ukraine were a bargaining chip in Ukraine-U.S. negotiations. The Ukrainian leadership was attempting to attract the Western attention to the economic and security problems faced by a new state.

From the above, it appears that Ukraine did not have some sophisticated plan of persuading the West that it really wanted to keep the weapons and then reap off the benefits for abandoning this idea. The decision-making process in relation to the Ukrainian nuclear policy was more likely a reflection of conflicting views on what the country should do with the nuclear arsenal, and what was seen in the West as a 'confused' policy was not a unified state agenda, but rather the outcome of the lobbying of different political groups performed by President Kravchuk who was trying to accommodate varying political interests.

In the end, it became evident that Ukraine could not delay its denuclearisation, and one of the most important reasons was its inability to guarantee safety of the nuclear weapons on its territory. When Ukraine assumed 'administrative control' over the ICBM bases, Russian support staff for the maintenance of the weapons was withdrawn. Soon reports were published about safety problems with nuclear warheads, and some warheads were quickly transported to Russia due to radiation leakages. The level of risk from warheads in Ukraine at the time remains under dispute, but the issue was used by Russia to put additional pressure on Ukraine to agree to the transfer of all warheads.[190]

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189 Bluth, *The Nuclear Challenge*, op. cit, pp. 81-93

190 Martin DeWing, 'The Ukrainian Nuclear Arsenal: Problems of Command, Control, and Maintenance', Working Paper No. 3, Monterey Institute of International Studies, October 1993

In early 1994, Ukraine signed a Trilateral Agreement with the United States and Russia, which outlined the requirements for complete elimination of all nuclear weapons on its territory. The major provisions of the treaty stipulated: all nuclear warheads were to be transferred to Russia; Ukraine was to receive compensation in the form of nuclear fuel for civilian reactors and a share in the proceeds from the sale of fissile material recovered from the weapons; and Ukraine was given the standard assurances against nuclear attack as a non-weapon signatory of the NPT.[191]

The above discussion demonstrates that denuclearisation of Ukraine was not a smooth and easy process. Both the political ambitions from having significant nuclear arsenals left on its territory and inhibitions resulting from Ukraine's perception of security threats (and as a result a view that nuclear weapons should be kept as a deterrent) were a serious factor in the strong opposition to disarmament within the Ukrainian political establishment.

The negotiations on U.S. assistance for Ukraine's disarmament to be channelled through the CTR Programme began in 1992. In October of 1993 Ukraine and the United States signed an umbrella agreement on eliminating strategic nuclear weapons and preventing the proliferation of weapons of mass destruction. Shortly after, five CTR implementing agreements were also signed.[192] The significance of the CTR Programme for Ukraine's denuclearisation is apparent: first of all, Ukraine would not be able to deal with the costly process of disarmament on its own; and secondly, Ukrainian leadership was adamant it had to receive some sort of compensation for the nuclear weapons it was giving up (that demand, to an extent, was justified, especially, in the light of the Chernobyl tragedy Ukraine had to endure as a result of nuclear weapons research and production being carried out on its territory).

CTR funds may have not been the critical factor in Ukraine's decision to disarm, but they played an important role in it. More importantly, CTR assistance ensured that no major accidents connected with safety and security had occurred while nuclear weapons were present on Ukrainian soil.

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191 John Lepingwell, 'The Trilateral Agreement on Nuclear Weapons', RFE/RL Research Report, Vol. 3, No. 4, January 24, 1994, pp. 12-20

192 Konstyantyn Hryshchenko, 'Reducing the Nuclear Threat through Joint Efforts' in Shields and Potter, eds., *Dismantling the Cold War*, op. cit., pp. 155-156

4.3.2. Assistance to FSU in Accelerating Strategic Arms Reductions to START Levels and Providing Safe and Secure Transportation and Storage for Weapons and Materials

Elimination of arms

The disarmament obligations stipulated by START involved substantial financial burdens that created difficulties for Russia due to its severe economic problems. The CTR Programme assists Russia in meeting its START obligations by helping to eliminate weapons and associated infrastructure.

As of December 2003, the cumulative reductions funded by the CTR Programme include: 6252 warheads deactivated, 527 ICBMs destroyed, 455 ICBM silos eliminated, 8 ICBM mobile launchers destroyed, 124 bombers eliminated, 668 nuclear air-to-surface missiles (ASMs) destroyed, 408 submarine-launched ballistic missile (SLBM) launchers eliminated, 460 SLBMs eliminated, 27 nuclear ballistic submarines (SSBNs) destroyed, 194 nuclear test tunnels/holes sealed.[193] (see Table 4)

Table 4 CTR Scorecard[194]

	2003	2007	2012	CTR Baseline
Warheads Deactivated	6252	8564	9444	13300
ICBMs Destroyed	527	821	1131	1473
ICBM silos eliminated	455	485	485	831
ICBM mobile launchers destroyed	8	174	381	442
Bombers eliminated	124	129	138	207
Nuclear ASMs destroyed	668	708	708	708
SLBM launchers eliminated	408	520	628	728
SLBMs eliminated	460	629	712	936
SSBNs destroyed	27	35	40	48
Nuclear test tunnels/holes sealed	194	194	194	194

193 'CTR Scorecard', at http://www.dtra.mil/ctr/ctr_score.html retrieved on 05.02.04

194 'CTR Scorecard', at http://www.dtra.mil/ctr/ctr_score.html retrieved on 05.02.04

Transportation

The danger of diversion of nuclear weapons or materials is high during any stage of their handling, and that includes transportation. Each year there are numerous movements of weapons, warheads, and material between the operational sites, storage facilities, dismantlement facilities.

CTR assistance in this area includes: the procurement of transportation services, provision of fissile material containers, super-containers for weapons, railcars, equipment to enhance ability of Russian Ministry of Defence (MOD) to respond to a nuclear weapons transportation accident, the enhancement of safety and security of non-heated cargo railcars.

An Implementing Arrangement on nuclear weapons transportation was signed in November 1999, and by September 2002, 131 shipments of tactical and strategic nuclear weapons from operational sites to dismantlement facilities and consolidation sites were completed.[195]

Russia received 150 super-containers for transporting nuclear weapons to dismantlement sites. These containers provide protection from small arms, fire protection and physical protection during handling by precluding direct access to weapons[196]. The storage site at Mayak was provided with 1,000 transportation containers for fissile material extracted from dismantled weapons.[197] In Soviet times, the weapons were transported by special railcars. Currently, the CTR Programme is assisting in modification of the old railcars by enhancing the safety and security of 100 non-heated cargo railcars, providing MOD with their maintenance and certification, extending the service life of 100 new heated cargo and 15 new guard railcars, while eliminating some 215 old railcars.[198]

A Safety Enhancement Centre (SEC) for the MOD 12th Main Directorate was established in St. Petersburg in support of the transportation of nuclear weapons during

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195 The Cooperative Threat Reduction Programme, at http://www.dtra.mil/ctr_index.html retrieved on 15.05.03

196 ibid

197 ibid

198 ibid

the consolidation and dismantlement process. The SEC is designed to provide safety analysis and certification of nuclear weapons handling and support equipment.[199]

At five regional areas and St. Petersburg the CTR Programme has provided emergency support equipment, training and material necessary to respond to a nuclear accident/incident during transportation. Among equipment provided: five modules each including radiological situation evaluation equipment, emergency and rescue equipment, diagnostic systems, individual protective gear and portable power supplies.[200] CTR has also supplied the Russian MOD with special Pomoshnik emergency response vehicles (by 1st quarter of 2003 Russia received 445 vehicles), and 15 trucks/trailer systems to transport emergency response equipment modules were scheduled for delivery through FY2003. This equipment will enhance response in severe cold weather, nuclear weapon diagnostic, emergency access and data transfer and communications capability.[201]

At Krasnoyarsk the CTR Programme provided equipment to support emergency response in the event of an accident involving transportation of missile or propellants.[202]

Fissile Material Disposition/Weapons and Material Storage

One of the most important projects in this area is construction of a fissile material storage at the Mayak facility. The scope of the non-proliferation value of such facility is enormous. When operating in full force Mayak will be capable of storing 25,344 containers of fissile material received from dismantled weapons – that amount equates to approximately 25,000 nuclear weapons.[203]

199 ibid

200 ibid

201 ibid

202 ibid

203 ibid

By December 2003 a 25,000 container storage wing was completed and it is expected that the first 34 tons of weapons-grade plutonium dismantled from warheads will soon be placed in the storage facility.[204]

In 2000 and 2001 the CTR Programme had commissioned two facilities (Zvezda and Zvezdochka) after both of them were provided with Low Level Radioactive Waste (LLRW) volume reduction capabilities.[205]

At Votkinsk a low pressure, contained burn system to remove the solid propellant from Russian SS-24, SS-25, and SS-N-20 missile motors in a sound environmental manner was to be constructed, with initial start-up in 2004 and complete systematisation and facility certification in the end of 2006.[206] However, the project stalled due to a conflict with the local Russian authorities, which refused to issue land permits for the construction of the facility due to environmental protection considerations. That unsuccessful example of CTR funds wasted on a project was widely publicised by critics of the Programme and used as an example of lack of cooperation on the part of Russia. [207]

Another CTR-funded project aims at providing means for storage, transportation and reprocessing or placing into interim dry storage of Spent Naval Fuel (SNF) removed from eliminated SSBNs. A 40-ton SNF storage/transport cask was designed, tested and certified. Russian SevMash won a contract for serial production of casks, and Raytheon company got a task order to design a dry storage facility Mayak.

4.3.3. Assistance to Russia in Providing Training in Areas of Nuclear Weapons and Material Control, Security Assessment, Personnel Reliability Control

By 2000 the Security Assessment and Training Centre (SATC) was constructed in Sergiev Posad. At SATC the Russian Ministry of Defence together with the U.S.

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204 'Russia Commissions Unique Nuclear Storage Facility', RIA Novosti, December 17, 2003, Nuclear News, RANSAC

205 The Cooperative Threat Reduction Programme, at http://www.dtra.mil/ctr_index.html retrieved on 15.05.2003

206 ibid

207 Fact Sheet, House Armed Services Committee, March 2, 2003 (Note: House Armed Services Committee Chairman Hunter is generally very critical of CTR activities)

Department of Defence are able to test, select, and integrate systems needed to upgrade physical security at nuclear storage sites in Russia. The Centre is also used for guard force training.[208]

The CTR Programme is also providing Russian guard forces at sites throughout Russia with special training and equipment (small arms training stimulators, live-fire shooting ranges, and site communication equipment) in order to enhance the personnel's ability to protect access to nuclear weapons.[209]

Two projects assist in the area of personnel reliability and safety. The first provides testing devices for alcohol and drug screening of the personnel having direct access to nuclear weapons. The other project has provided radiation dosimeter systems to ensure personnel safety[210].

4.4. The CTR Programme: the Key Players

The CTR Programme is managed by the U.S. Department of Defence (DOD). Within the DOD, there are two offices responsible for the CTR Programme: CTR Policy Office and DTRA's (Defence Threat Reduction Agency) the CTR Programme Office. CTR Policy Office has a decision-making authority, it develops the "vision" of the Programme, determines the priorities. DTRA's CTR Office is responsible for the implementation of the Programme on the ground.

Among the U.S. agencies involved in cooperative threat reduction (namely, Department of Energy, State Department, U.S. Enrichment Corporation, U.S. Industrial Coalition (USIC), which administer main CTR programmes studied in this research), DOD is certainly the most closed organisation with strict and conservative views on

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208 The Cooperative Threat Reduction Programme, at http://www.dtra.mil/ctr_index.html retrieved on 15.05.03

209 ibid

210 ibid

sharing of information.[211] On the Russian side, the main counterpart of CTR projects is the Ministry of Defence (MOD).

4.5. The Evolution of the Cooperative Threat Reduction Process

The following section provides an analysis of how the CTR Programme has evolved over the years and evaluates key developments in the perception of cooperative threat reduction in the U.S. and in Russia and introduces key individuals crucial to those developments. It demonstrates that DOD's CTR Programme (with its original Nunn-Lugar legislation) provided a unique foundation for an array of joint non-proliferation efforts now led by different agencies. The transfer of some programmes from one U.S. agency to another is traced. An evaluation of the political environment throughout the decade shows that some of the problems of implementation (which are discussed in the following section) resulted from the political problems in the U.S.-Russian relationship.

4.5.1. Stage 1 (1990-1991) – The Vision

The failed attempt to overthrow Soviet leader Gorbachev, concern about the disintegrating Soviet Union, and a realisation of the emergence of new nuclear proliferation threats created grounds for apprehension in certain circles of the U.S. Senators Sam Nunn and Richard Lugar concluded that there were severe dangers with regard to Soviet nuclear weapons, materials, and expertise, which could leak out to nuclear threshold states, terrorist organisations etc. Their vision proved to be strategic in the long run.

That was a period of the Programme's struggle to exist. It was the time of the Bush Sr. Administration, the idea was very new and it did not have any real support in the government. The initiative to take action in the face of the emerging nuclear risks was taken in Congress. After some debate and a lot of effort on behalf of Senators Nunn and Lugar, as well as Harvard experts (the authors of *Soviet Nuclear Fission*[212]), the relevant

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211 DOD was the only agency, whose representatives were not available for interviews due to clearance regulations. Communication with the corporate communications office of DOD was also unsuccessful.

212 Campbell, Carter, Miller, and Zraket, eds., *Soviet Nuclear Fission*, op. cit.

legislation was passed by the U.S. Senate in November of 1991 (as was discussed earlier in this chapter).

Less than two weeks after Nunn-Lugar law came into force President Gorbachev resigned, and the Soviet Union ceased to exist with the destiny of the vast Soviet nuclear arsenal becoming very unclear. The need of the former Soviet Union to get help with control over its nuclear weapons and materials was therefore rightly anticipated by the Senators Nunn and Lugar, as well as by other concerned experts. Persuading the American government to assist the Soviet Union (and later, FSU) in preventing the spread of nuclear weapons, materials, and expertise, as well as helping it in meeting START obligations was a politically wise exercise, and its importance cannot be overestimated.

That first critical stage was successful in establishing the Programme due to the crucial role played by several key individuals. These include: Senators Sam Nunn and Richard Lugar, Ashton Carter (from Harvard University, co-author of *Soviet Nuclear Fission* and from 1993 Assistant Secretary of Defence for International Policy), William Perry (from Stanford University, later Deputy Secretary (1993-1994) and Secretary of Defence (1994-1997)), Les Aspin (member of Arms Houses Committee, later – Secretary of Defence (1993-1994)).

The political debate preceding the establishment of the Cooperative Threat Reduction Programme can be analysed at two levels: the level of bureaucratic politics and that of the post-Cold War international system. These two dimensions closely intertwine in the cooperation threat reduction process. At the bureaucratic politics level, there was internal resistance inside the Congress when the idea first resurfaced. When a small coalition of CTR proponents succeeded with securing Congressional support, the administration adopted a position of resistance towards the programme. To the administration, the CTR Programme was a Congressional initiative, which was based on a belief of U.S.-Russian relations not shared by the U.S. officials.[213] The opponents both within Congress and the administration were not persuaded by the arguments of defending America's own national security by preventing Russian loose nuclear weapons and materials falling into terrorist hands. There was a lack of trust towards the Russian government due to the Cold War legacy. CTR opponents were questioning the rationality behind assisting Russia with its nuclear complex problems. Many in the U.S. suspected

213 Interview with the U.S. Congressional staffer, Washington D.C., March 2003

that by assisting Russia with dismantling of old obsolete weapons America would be saving Russia's own resources for modernisation of its forces.

4.5.2. Stage 2 (1992-1993) – Getting the Programme Off the Ground

After Nunn-Lugar legislation was signed into law, the first important step was to persuade former Soviet states to agree to this unique kind of cooperation. By the end of 1993 all four former Soviet republics which had nuclear weapons or materials on their territories had agreed to implement CTR (Nunn-Lugar) Programme.

The very fact that such cooperation was offered by the American government and accepted by the former Soviet republics demonstrated a dramatically new era in U.S.-Russian relations. At the same time, that initial stage of the programme was marked by a high level of distrust on both sides. There were opponents of cooperative threat reduction in the U.S., and in Russia many believed that offer of such assistance was a shield for American pursuing its interests of disarming the Russian state. Nonetheless, the political decision taken by the leadership of the U.S., Russia, Belarus, Kazakhstan, and Ukraine was in favour of the programme.

On the U.S. side, the problem was with the source of funding. At the outset of the CTR Programme in 1991, Senators Nunn and Lugar had to "sneak it in" in the DOD budget for FY1992, and it was not a direct appropriation. The opponents of the programme considered that to be a "direct hit on operations and maintenance of Pentagon."[214] Organisational interests, determined as primary in organisational decision-making by Bureaucratic Politics Model, have been critical for Pentagon's initial unfavourable disposition towards the programme.

4.5.3. Stage 3 (1994-1998) – The Evolution of the Original Nunn-Lugar Programme

During the Clinton administration the CTR Programme enjoyed strong support within the White House. The key individuals supporting the programme's implementation joined the Clinton government and were appointed to high positions. Ashton Carter was appointed as an Assistant Secretary of Defence for International

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214 Interview with the former senior Clinton Administration official, Washington D.C., March 2003

Security Policy (1993-1996), Graham Allison received the position of an Assistant Secretary of Defence for Policy and Plans (1993-1994), William Perry became Deputy Secretary of Defence in 1993; Les Aspin assumed the position of Secretary of Defence in 1993. When Les Aspin resigned in 1994 William Perry became the Secretary of Defence and stayed in that position until 1997. William Perry was praised for his important role in changing the attitude of Pentagon to CTR and his real support for the Programme. It is believed in Washington that William Perry changed some key attitudes in Pentagon and transformed the Programme on the Capitol Hill.[215]

Department of Energy also was led by the individuals, who realised the importance of moving cooperative threat reduction forward. These were: Hazel O'Leary (Secretary of DOE from 1992), Kenneth Luongo (served as the Senior Advisor to the Secretary of Energy for Non-proliferation Policy and the Director of the Office of Arms Control and Non-proliferation), Leonard Spector (worked as an Assistant Deputy Administrator for Arms Control and Non-proliferation). At that period, Senator Domenici joined the efforts of Senator Nunn and Lugar to lobby for cooperative threat reduction on the Hill.

As discussed in Chapter 2, the Clinton administration was giving the relationship with Russia a high priority in the U.S. foreign policy agenda (one of the examples was the fact that Strobe Talbott was brought into President's office in the capacity of a special advisor on Russia and Eurasia and later became Deputy Secretary of State). More importantly, fundamental support for arms control and non-proliferation was at the core of Clinton's policies. The composition of Clinton's team in the Departments of Energy and Defence was evidence for that.

The period of 1994-1997 was characterised by the expansion of the CTR Programme, its evolution into several major non-proliferation programmes, which were transferred to different U.S. agencies. Efforts on securing fissile material in FSU were formalised under the Material Protection, Control and Accounting Programme (MPC&A) and moved to the Department of Energy (DOE). In fiscal terms, it meant that a $50 million budget for MPC&A was transferred to DOE.

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215 Interview with the former senior Clinton Administration official, Washington D.C., March 2003

In 1994 the State Department established an International Science and Technology Centre (ISTC) in Moscow aimed at providing civilian research opportunities for former Soviet WMD scientists.

In 1993 Russia and the U.S. signed a Highly Enriched Uranium (HEU) Agreement, designed to provide funds for purchasing Russian uranium from dismantled weapons in order to reduce the risk of its diversion. The HEU Deal was initially administered by the Department of Energy, but by 1998 the executive agent on the U.S. side – U.S. Enrichment Corporation *(USEC)* – was privatised and, technically, the Deal was out of DOE's jurisdiction.

The so-called "balkanisation" of the original the CTR Programme was in many ways a natural process of programme development and expansion of cooperation. Many experts agree that bringing in different agencies with their specific expertise was important for providing for the effective implementation of projects. Another factor, which was equally important, bringing in new agencies, meant bringing in new budgets, and in this way, new resources for the programmes. [216] There were certain challenges to that too. The very first interagency meeting devoted to conducting non-proliferation assistance work had demonstrated that different agencies had different views. Another valid criticism was and remains: the presence of a lot of players in the cooperative threat reduction process sometimes results in duplication of effort, since different agencies do not always coordinate their activities well. Different activities to be implemented by different agencies also meant there were different Congressional concerns embedded in them.

The intensification of U.S.-Russian cooperation in the nuclear-related area had, unfortunately, a limited negative effect on the CTR process. On the Russian side, Federal Security Bureau (FSB) became concerned with the increased number of American visits to the Russian nuclear sites; the same fact was a matter of concern to the U.S. State Department too. At one point, the State Department adopted a more restrictive attitude to the country clearance process [country clearance is a standard procedure for giving permission for officials, including national lab specialists, to travel to a foreign country]. According to Rozanne Olivier, Senior Policy Coordinator at the State Department's Office of Proliferation Threat Reduction, there were large numbers of people travelling,

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216 Interviews with the individuals with a direct experience in establishment and implementation of the CTR-related programmes. Washington D.C., March-April, 2003

and it became chaotic. As a result, the U.S. Embassy in Russia requested to give them more days in advance for coordinating visits of American delegations to Russia. Olivier noted that it was an administrative measure[217] and not a matter of politics.

Until 1994-1995 U.S.-Russian relations were characterised as being in the stage of "euphoria" and "naivety". There was a perception of common foreign policy aims. That state of affairs changed with the victory of Republicans in the U.S. Congress, and major problems in the foreign policy arena.

The Republican revolution in the U.S. Congress in 1995 had an impact on the CTR Programme. In 1995 and 1996 some Republican Congress members tried to attach several conditions to the appropriation of CTR funds. The proposed amendments included a requirement for a presidential certification that Russia was in compliance with all arms control treaties and was not pursuing biological weapons research. Those amendments sponsored by Congress Representatives Gerald Soloman and Robert Dornan failed to become law and did not influence the funding schedule.[218]

Important legislation sponsored by Senators Nunn, Lugar and Domenici was passed in 1996; it expanded the scope of non-proliferation programmes. With the funds allocated by Congress, new dimensions of cooperation became possible: the disposition of spent fuel from Russian nuclear submarines, the replacement of nuclear power plants that generated weapons-usable plutonium, and new programmes on combating threats from biological and chemical weapons. [219]

Up until 1998 there was a steady evolution, expansion and growth of the cooperative threat reduction process. [220]

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217 Interview with Rozanne Olivier, Office of Proliferation Threat Reduction, U.S. State Department, Washington D.C., April 11, 2003

218 'The Nunn-Lugar Cooperative Threat Reduction (CTR) Program', http://www.nti.org/db/nisprofs/shared/ctr/overview.htm

retrieved on 07.07.02

219 Felton, 'The Nunn-Lugar Vision: 1992-2002', op. cit, p. 10

220 Interview with Sandy Spector, Monterey Center for Nonproliferation Studies, Washington D.C., April 10, 2003

4.5.4. Stage 4 (1998-2001) - The Financial Crisis in Russia: A New Boost to the Programmes

The financial crisis of 1998 brought a new dimension to the problem of nuclear proliferation in Russia. The country was experiencing a severe economic crisis, and the fears of nuclear leakage of any form became stronger again. The collapse of the Russian economy was a major factor that prompted the introduction of a new programme, called the Nuclear Cities Initiative (NCI). The proponents of NCI were rightly worried about the destiny of the nuclear scientists, who were not receiving salaries due to the economic collapse. There was an understanding that in the aftermath of an economic collapse, the problem of a potential "brain drain" deserved a very close attention. The idea of the NCI Programme was to provide nuclear scientists (mostly living in ten so-called "nuclear cities") with civilian jobs and help Russia downsize its nuclear complex (the history of NCI Programme is discussed in Chapter 7).

A financial crisis in Russia had prompted an $800 million initiative from the U.S. government – the idea was to reinforce CTR projects experiencing implementation problems. All the agencies were requested to comment on what was important, and for what they needed extra financial resources.[221] That period was characterised by a certain degree of harmony in the way the programmes were perceived within the U.S. Administration. There was a consensus regarding their importance.

In January 1999, President Clinton proposed another major expansion of Nunn-Lugar legislation, which he called the Expanded Threat Reduction Initiative. President Clinton requested additional $1.8 billion for the programmes over the next five fiscal years, and also promised to push other countries to contribute. He succeeded in getting Congress to approve the increase, but did not persuade allies to support the programmes.[222]

In June 1999 the U.S. and Russia signed a protocol to continue the CTR Programme in Russia through June 2006.[223]

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221 Interview with Sandy Spector, Monterey Center for Nonproliferation Studies, Washington D.C., April 10, 2003

222 Felton, 'The Nunn-Lugar Vision: 1992-2002', op. cit, p. 10

223 'United States and Russia Extend Nunn-Lugar Cooperative Threat Reduction Agreement', U.S. DOD News Release, June 24, 1999 at http://www.defenselink.mil/news/Jun1999/b06241999_bt307-99.html

4.5.5. Stage 5 (January 2001 – September 2001) – The Bush Administration

The change of administration in the White House resulted in many key individuals crucial in taking non-proliferation programmes off the ground leaving the Government. Some new senior officials in the State Department, National Security Council (NSC), and Department of Defence (DOD) were not supportive of the programmes.

There is a view shared by many in Washington D.C., that the initial months of new administration made many observers think the programmes were in trouble, and that they were not at all favoured in the White House.[224] It seemed that the fundamental guiding principle of the Bush administration was: 'Anything but Clinton'. The new Bush administration has revised U.S. non-proliferation policies, and although, rhetorically, support for processes such as CTR and arms reductions is expressed, the political environment of CTR programmes and arms reduction treaties has changed in a dramatic fashion.

In the words of Congress Representative John M. Spratt Jr.:

> "Although the Bush Administration is officially supportive, its support is hardly zealous. Its stated policies are correct but often not backed up by its budget policies, and the White House seems more inclined toward counter-proliferation than non-proliferation."[225]

The programmes under immediate threat of their funding being cut were the programmes administered by the Department of Energy - Material Protection, Control and Accounting (MPC&A), the Nuclear Cities Initiative (NCI), and the Plutonium Disposition Programme.[226] The new Bush Administration also requested a full review of all the non-proliferation assistance programmes soon after it came into office. Some

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retrieved on 03.20.02

224 Interviews with the U.S. former and current officials involved in the CTR process, Washington D.C., March-April, 2003

225 John M. Spratt, 'Stopping a Dangerous Drift in U.S. Arms Control Policy' in Arms Control Today, March 2003

226 'Bush Administration Backtracks on U.S. Non-Proliferation Programmes in Russia', Council for a Livable World, March 21, 2001, at http://www.clw.org/control/threatredcut.html retrieved on 20.01.02

experts in the U.S. believe it was a "non-strategic" review, and was implemented for internal political reasons.[227]

Kenneth Luongo, who is currently a Director of the Russian-American Nuclear Security Advisory Council (RANSAC) and was formerly an official at the Department of Energy during Clinton administration at the time, commented on the review in the *New York Times*:

> "A prejudiced review that looks at what can be eliminated, and not what can be improved, is missing an enormous opportunity and is likely to further rile relations with Russia."[228]

The review could not identify major faults with the programmes and found that "most of U.S. programmes to assist Russia in threat reduction and non-proliferation work well, are focused on priority tasks, and are well managed".[229]

In April 2002 the Bush administration froze future work on securing warheads, the dismantlement of submarines and long-range missiles, and on creating new jobs for former Russian chemical and biological scientists. That move was connected with requirements imposed by Congress for the U.S. President to certify that Russia complies with the arms control agreements before funding for cooperative threat reduction can be approved by the Congress. According to U.S. officials, a decision to freeze funds for any new cooperative threat reduction work[230] meant to send a warning 'message' to Russia on its alleged non-compliance with its arms control obligations in relation to chemical and biological weapons programmes.

The funds were frozen for a year until President Bush signed special orders in January 2003 to release them. At the administration's request Congress passed legislation in December 2002 that gave the U.S. President power to waive certification

227 Interview with the U.S. Congress staffer, Washington D.C., April 2003

228 Vladislav Nikiforov, 'U.S. Reviewing Aid for Nonproliferation Programs in Russia', April 17, 2001 at http://www.belona.no retrieved on 28.02.02

229 'Administration Review of Nonproliferation and Threat Reduction Assistance to the Russian Federation', Fact Sheet, The White House, Office of Press Secretary (Crawford, Texas), December 27, 2001

230 The certification requirement applied to programmes administered by the Department of Defence, State Department, but did not cover programmes administered by the Department of Energy

requirements.[231] The decision to renew funding for CTR work was most likely motivated by the events of 9/11 and the greater awareness of the need to prevent terrorists from obtaining WMD and WMD materials.

4.5.6. Stage 6 (September 11, 2001 – 2003) - The Post-9/11 Security Environment

The terrorist attacks on the World Trade Centre in New York changed the international security environment: the threat of mass casualties became a reality. Terrorists used conventional means to cause severe damage and loss of life, and demonstrated the determination and ability to inflict severe destruction. A post 9/11 international security system has to be defined by new factors, such as the possibility that terrorists might use WMD in any future attack. The scope of potential destruction and human tragedy, which can be brought upon the world by the use of nuclear or radioactive material in any sort of weapon of any level of sophistication by sub-state actors, is enormous. Russia remains to be one of the most attractive places for any terrorist organisation to try and get hold of nuclear material, expertise, or technology. Securing anything that can be of use and interest to terrorists at the source (at the facilities, sites, research institutes, reactors in Russia) is the wisest possible way to protect the world community from a possible attack with the use of nuclear weapons.

In the immediate aftermath of the events of September 11, President Bush announced that the prevention of WMD use by terrorists now had the highest priority for the United States. There were some emergency measures taken, including an Emergency Supplemental Act appropriating additional funding in the amount of $260 million.[232] There was a renewed interest in the CTR programmes.

However, there is a clear understanding in the policy-related circles of Washington D.C. that rhetoric often does not match the actual deeds in terms of bringing cooperative threat reduction process to a new level, which would fairly reflect a heightened danger of nuclear proliferation. An increasing number of experts believe that much more should be done, and done faster, in order to prevent a catastrophe. This

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231 Peter Eisler, 'Bush Frees Cash to Secure Soviet Arms; U.S. Wants to Stop Foes from Getting Weapons', <u>*USA Today*</u>, January 14, 2003, page A.01

232 Interview with Elisabeth Turpen, Senior Associate, Henry Stimson Center, Washington D.C., April 1, 2003

criticism is justified to an extent, however, there are also some objective constraints – such as a lack of financial and human resources, a need to prioritise spending by the U.S. government, and limitations of the process of cooperative treat reduction, e.g. the problem of access to Russia's most sensitive sites, bureaucratic hurdles and other factors). (This is discussed in more detail in the section on the problems of implementation).

Overall, the current state of all the major non-proliferation assistance programmes is more or less stable. The programmes have passed through a worrying stage in the beginning of Bush Administration, but seem to enjoy support and appreciation within all the U.S. agencies involved in the implementation of programmes and the White House administration. There are problems of implementation determined by various factors, but U.S.-Russian cooperation is continuing.

In May 2002 Senators Pete Domenici, Joe Biden, and Richard Lugar introduced a Nuclear Non-Proliferation Act, and in June 2002 Senator Pete Domenici introduced a Nuclear Non-Proliferation Initiative largely based on that Act. The legislative amendments introduced by Domenici's Initiative authorised $100 million to renew and build on existing programmes and create new cooperative initiatives.[233]

In June 2002 the G-8 leaders signed an agreement on a Global Partnership Against the Spread of Weapons and Materials of Mass Destruction. The G-8 countries agreed on providing $10 billion to Russia plus a U.S. contribution of another $10 billion over a 10 year period. This arrangement is informally known as the 10+10 over 10 initiative. This development demonstrates a qualitatively new stage in the cooperative threat reduction process – from being mostly bilateral it changes to a multilateral exercise and Russia shifts from being just a recipient to an equal partner in this process with its announced commitment to provide $2 billion for the effort.

An on-going CTR process will provide a benchmark for Global Partnership. In this respect, the analysis of achievements and problems of implementation can be important for the future cooperation within a multilateral framework.

233 Chris Gallegos, 'Senate Accepts Domenici Nuclear Non-proliferation Initiative', New Mexico Institute of Mining and Technology, at http://www.nmt.edu/mainpage/news/2002/26june01.html retrieved on 21.10.02

4.6. Problems of Implementation

The analysis of the problems of implementation and the overall effectiveness of the CTR Programme supports the hypothesis of this thesis that the achievements and limitations of the cooperative threat reduction process reflect the nature of U.S.-Russian relations in the post-Cold War environment. These relations are seen as a "constrained partnership" – a dramatically new type of bilateral relations, which made possible such unique cooperation at first place, despite the persistence of a certain degree of suspicion, legacies of the Cold War, and bureaucratic hurdles. Problems of implementation result from a mixture of bureaucratic constraints exacerbated by political problems. It is often hard to distinguish between the bureaucratic and political factors, since they are closely interlinked in the case of the CTR process.

An analysis of problems of implementation shows that some of them are directly determined by a still present lack of trust on both sides. At the same time, some of the limitations of cooperation can be explained on the basis of a Bureaucratic Politics Model to the process of threat reduction. In other words, bureaucracy and conflicting interests of organisations and individuals play a substantial role in some of the areas too.

The major impediments on the way to the implementation of the CTR Programme are: problems with access to Russian nuclear sites, lack of trust and legacy of Cold War attitudes in implementing the Programme's objectives, bureaucratic hurdles, the negative attitude of some individuals in key political positions, and some conditions attached to the cooperation by the U.S. Some of the problems of implementation discussed are endemic to the whole process of threat reduction, not only to the CTR Programme – this is evident from the case studies material provided in Chapters 5, 6, and 7.

Some typical problems of implementation have clearly defined bureaucratic characteristics, such as a lack of coordination, a clash of organisational interests, and there are some, which have mixed characteristics. For example, the problem of access to Russian facilities has to some extent mundane bureaucratic causes: lengthy procedures to obtain visas and permissions for access. The bureaucracies act on the basis of their own values and perception of their purpose (e.g. the Russian FSB as an organisation is meant to guard country's security interests, which due to its culture, mind-sets and procedures results in its overhyped suspicion towards U.S. visitors). At the same time, concerns over access are further aggravated by political factors in the U.S.-Russian relationship, especially, by a residual lack of trust. The same explanation can be applied to

Congressional reluctance to provide unconditional assistance to Russia. Apart from the immediate interests of Congressmen to ensure that their work is first of all directly beneficial to their constituencies, they are also troubled by the lingering Cold War perceptions of Russia as a former enemy.

The following description of problems of implementation shows that most of the problems of implementation result, to a different extent, from underlying bureaucratic and political factors, and some problems are purely political.

4.6.1. The Lack of Interagency Cooperation, and the Clash of Organisational Interests and Internal Political Factors

The bureaucratic factor and varying organisational interests play a substantial role in the U.S.-Russian cooperative threat reduction process.

Authors of a report commissioned by Nuclear Threat Initiative (NTI) in March 2003, summarise the problem of bureaucratic impediments in the following way:

> "…Bureaucracies around the world tend to follow their standard operating procedures, and to have difficulty moving quickly to pursue a new mission in a new way. The incidents of threat reduction efforts being substantially delayed or bogged down by bureaucratic procedures, interagency infighting, and the like – both in Washington and in Moscow and other recipient capitals – are a legion. When an expert on physical protection of nuclear facilities is spending his time doing the twelfth revision of a contract proposal requested by headquarters, he is not spending his time actually implementing security upgrades…"[234]

Bureaucratic impediments are present on two levels: within the countries, and between them. Some procedural requirements, which take too much time delay the implementation process. These include: the clearance process within the State Department for the American specialists and officials wishing to travel to Russia, a long process of granting access to Russian facilities by the Russian government, and a long waiting period for issuing visas for Russian experts wishing to travel to the U.S.

No less important is the bureaucratic struggle between the organisations. In Russia MINATOM and Gosatomnadzor (GAN) had a controversial relationship, with its most antagonistic point in 1994 due to GAN having been appointed a controlling agency,

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234 Bunn, Wier, Holdren, 'Controlling Nuclear Warheads and Materials, op. cit, p. 44

monitoring MINATOM. At the moment, there is still a limited on-going struggle between MINATOM and GAN. However, the role of GAN has diminished over time. Moreover, it is believed that these two organisations have now succeeded in finding a formula for interaction.[235] The same was true for the Russian Ministry of Defence, when GAN for a short period of time, was the body overseeing the safety and security of MOD nuclear facilities. In 1995 President Yeltsin removed this function of GAN, largely in response to opposition from the military-industrial complex.

The U.S. administration also has some issues within its establishment from time to time. There are two offices within the U.S. State Department with overlapping responsibilities for matters relating to CTR. There is an office responsible for the NIS region as a whole, and there is another one dealing with the issues of non-proliferation. At the earlier stage of programme implementation, there was some tension between the NIS desk responsible for all the assistance going to former Soviet Union by and large and the Department of Energy. There was a lot of support for cooperative threat reduction within the both agencies, but there was friction over day-to-day issues.[236]

There is also a perception among some U.S. experts that the State Department sometimes gets concerned that the DOE plays too active a role. Some U.S. specialists express their dissatisfaction with the State Department's practices of issuing visas to their Russian colleagues and getting permission for their own travel to Russia. They share this with their Russian colleagues in the informal conversations.[237]

It is believed in certain circles in the U.S., that DOE, in its turn, is concerned with the role of the national labs, which sometimes move forward in U.S.-Russian cooperation without paying attention to the constraints of policies in Washington.

There is also a particular role of the U.S. General Accounting Office (GAO), which is designed to monitor how well the programmes work. Very often GAO produces critical reports on the implementation results of the major non-proliferation assistance programmes. DOD and DOE agree with some of the comments, and disagree with the others.

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235 Interview with Daniil Kobyakov, PIR-Centre, Moscow, May 2003

236 Interview with the former U.S. senior DOE official, Washington D.C., April 2003

237 Interviews in Moscow with the Russian experts involved in the programmes of cooperative threat reduction, Moscow, May-June 2003

Non-proliferation assistance programmes are sometimes kept hostage by the U.S. House of Representatives in an attempt to get certain concessions from the Senate. Traditionally, the Senate always has more a longer term view, while the House members are judging policies by their relevance to the immediate interests of constituencies they represent.[238]

There is a serious problem of lack of coordination between the implementing agencies both in Russia and the U.S. Former 12th GUMO chief General Maslin noted, that there are frequent bureaucratic struggles between different agencies in Russia, and "funds are received not by an agency, most critically in need, but by those, who can better than others elbow their way".[239] In the U.S. the problem of coordination of all the cooperative threat reduction assistance is acute. Two American agencies are involved in protecting nuclear warheads in Russia. These are Department of Defence (DOD) and Department of Energy (DOE). DOD is focusing more on storage sites, while DOE has being assisting the Russian Navy and following the Navy's request, focused on security upgrades at operational sites, where warheads are deployed with delivery vehicles. Although, coordination between these two agencies improved recently, DOD and DOE still face coordination issues according to the U.S. GAO. Some of their plans overlap and the same sites are included in each agency's plan of security assistance. U.S. interagency guidelines were issued only in January 2003.[240]

One of the failures in the cooperative threat reduction process blamed on bureaucratic problems inside Russia and the U.S. relate to a case concerning a fuel conversion facility in Krasnoyarsk. U.S. $100 million were used to construct a facility in Krasnoyarsk to convert rocket fuel to commercial use. When the construction was completed, it was found out that there was no fuel to convert at that facility since Russia had diverted it to its space programme.[241]

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238 Interview with the U.S. senior policy expert, Washington D.C., April 2003

239 Evgenii Maslin, 'Cooperative Threat Reduction Programme and Russia's National Security Interests' ('Programma sovmestnogo umensheniya urgozy i interesy natscional'noi bezopasnosti Rossii'), in Safranchuk, ed., Cooperative Threat Reduction Programme, op. cit, p. 7

240 GAO report "Weapons of Mass Destruction: Additional Russian Cooperation Needed to Facilitate U.S. Efforts to Improve Security at Russian Sites', March 2003, GAO-03-482, p. 41

241 'Specialists Hit Efforts to Secure Russian Arms Threat is Greater than Iraq, They Say', *The Boston Globe*, 05.03.03, A9

4.6.2. The Problem with Access

The problem with access of American experts to some of Russia's sites, where nuclear material and parts are located and where upgrades of security and safety are vitally needed, remains a major impediment to a smooth and swift implementation of projects. Both sides believe they have grounds for insisting on their way of doing the business. The U.S. side believes it has every right to monitor the implementation of the projects, which it funds. The Russian side sees American request to enter almost any site in Russia as an intrusion to an area of national security interests.

The report of the U.S. General Accounting Office (GAO) ("Weapons of Mass Destruction: Additional Russian Cooperation Needed to Facilitate U.S. Efforts to Improve Security at Russian Sites") published in March 2003 stated as its key finding:

> "…The Department of Defense and Energy have made slow progress in helping improve the security of sites in Russia with weapons of mass destruction against the threat of theft or diversion because Russia is not providing needed access to many sites. Unfortunately, there is little reason to believe this situation will change in the near future…"[242]

Experts from Moscow's PIR-Centre note:

> "…overall, problem of access to the Russian weapons complex sites is one of the most 'painful' and hard to be solved problems in U.S.-Russian relations…It seems that in the near future it is not going to be possible to solve it…"[243]

The first formal agreement on access was signed in 2001-2002. The opinion on whether that agreement brought anything new varied. Some believe that it just formalised all the conditions and rules, which were operating from the very beginning. Another group of U.S. experts and project managers believe that it had a positive role, since all the conditions were codified and certain issues were solved (albeit not all). Oleg Bukharin of Princeton University believes that: "it [the agreement] was certainly useful in a way – it

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242 'Weapons of Mass Destruction Additional Russian Cooperation Needed to Facilitate U.S. Efforts to Improve Security at Russian Sites', GAO report, op. cit.

243 'Sotrudnichestvo vo imya global'noi bezopasnosti' ('Cooperation for the Global Security'), *Nauchnye Zapiski PIR-Centra*, #1 (19), 2002, p. 198

helped to break the log-jam at many facilities […] it was certainly a positive development."[244]

This agreement stipulates how many visits can take place; it sets the conditions on how the U.S. can operate and commits Russia to accepting some on-site visits. The two sides also agreed on a list of approved U.S. personnel, who can have a shorter waiting period of their application for access being reviewed (30 days). For the moment, the waiting period for a regular review for access is 45 days.

A quite prolonged waiting period of gaining access to some of the "closed" cities and sites (which is not guaranteed) is often an impediment to project implementation. Getting access to "closed" cities, where most of the sensitive work is done, is especially hard. In these cities, not only sites are closed, but the whole cities – this creates complications on moving forward the projects connected with the commercialisation of former weapons facilities, since American businessmen and national lab experts have difficulties visiting the cities, where these facilities are located. The sites, which are completely inaccessible to U.S. experts, are nuclear warhead construction sites.

Senior White House member of the National Security Council (NSC) Susan Koch mentioned that over time major strides were made to overcome issues of access, and steadily the programmes were expanded, and the work was done where access was granted. She believes it is important to build true habits of cooperation with the U.S. side recognising Russian security concerns, and Russia having to understand concerns of the U.S.[245]

Overall, U.S. officials and experts see access issue as a serious problem; however, some of them find Russia's security concerns legitimate. Many on the Russian side appreciate the American interest in controlling results of their activities in Russia and becoming equal participants of the threat reduction process. However, there are limits to where Russians can open their doors – some of the sensitive sites cannot be visited due to laws on the protection of national security interests. Some on the U.S. side believe that limitations in granting access and using national security as an excuse are sometimes a

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244 Interview with Oleg Bukharin, (W. Wilson School of Public and International Affairs, Princeton University), Washington D.C., April 01, 2003.

245 Interview with Susan Koch (Director for Proliferation Strategy, National Security Council, The White House), Washington D.C., April 08, 2003

result of mentality peculiarities of Russian elites, who "not always perceive interests of donor-states in adequate manner…"[246]

An important factor for the Russian state is the lack of reciprocity. Even though the U.S. government is providing assistance to Russia, it cannot expect unlimited access to sites of high sensitivity, especially, when Russian specialists are not able to visit sensitive U.S. sites. It is notable that even some U.S. experts see the lack of reciprocity from the U.S. side as an impediment to a smoother programme implementation. It is believed that providing better transparency on a mutual basis will help ease the tension on access issues.

Russian policy specialists from PIR-Centre believe that although it is hard to solve the problem of access as such in the near term, it is important to reduce the area of contradictions as much as possible – in other words, come up with a list of sites, which under all conditions will remain closed for foreign inspectors. At the same time, Russia should be granted reliable guarantees that the information received in the course of work at the opened sites will remain confidential, and a study should be undertaken on measures of indirect control of the use of equipment supplied by the United States to Russia.[247]

In this respect, there are ideas of trying to navigate between the U.S. need to verify how the money are spent, and how the work is done, and Russian national security obligations. There are suggestions from the U.S. side too to think of less intrusive projects less relying on access[248], or bring in technologies to verify results of the U.S. funded upgrades without the physical presence of U.S. personnel at the site.

From the above it is evident that the problem of access is not just a matter of bureaucratic obstacles. There are real limits of the extent to which Russia is prepared to share information about the details of its nuclear weapons programmes. Likewise the refusal by the United States to accept reciprocity of access is a result of the unwillingness to allow Russian specialists to gain further insights about U.S. nuclear weapons

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246 'Sotrudnichestvo vo imya global'noi bezopasnosti' ('Cooperation for the Global Security'), op. cit, p. 10

247 'Sotrudnichestvo vo imya global'noi bezopasnosti', ('Cooperation for the Global Security'), op. cit, p. 198

248 Interview with Raphael Della Ratta (Russian-American Nuclear Security Council (RANSAC)), Washington D.C., April 03, 2003

technology. These attitudes persist despite the fact that they create a serious constraint on the ability to achieve the central objectives of CTR, and point to the limits of the strategic partnership between the former adversaries.

4.6.3. The Cold War Legacy and the Cultural Clash

It seems there are two levels of operation in today's U.S.-Russian relations. There is a level of countries' political commitment, a general understanding of a need of a completely new type of interaction in the aftermath of the Cold War. At the same time, there is another implementation level: at this level various kinds of contradictions in bilateral relations clash. While the international system changed very rapidly, the bureaucratic systems of government and the mind-sets of people take time to adapt to this transformation.

There are many factors, which indicate that a residual legacy of the Cold War still persists. A lack of trust from both sides (Americans wanting to check closely on where Russians spend money and Russians suspecting Americans of trying to get their state secrets) is one example. There is still a certain level of hostility from the parts of U.S. and Russian establishment – against any U.S.-Russian cooperation in the security field. Some members of the U.S. Congress are deeply opposed to the CTR Programme, because it constitutes assistance to a former enemy, whom they still do not trust. There is a widespread perception among some that Russia would use its own resources (saved because of U.S. assistance) on modernising its military capabilities. There are sections of Russian State Duma, especially, ultra-left wing, which do not trust American motives.

Both American and Russian experts believe it will take generations to change some of the ways of Cold War thinking deeply embedded in both countries. It is notable that the legacy of the Cold War is more obvious on the level of large organisations – especially more conservative ones, like military complexes of the U.S. and Russia, which for a long time were on the forefront of the Cold War.

There is also a problem of cultural differences. Certain things, which are absolutely normal for one side, contradict the usual practices of the other. One example is that there is a high turnover of U.S. experts working on projects in Russia, and there were complaints from the Russian side that it hampers the project implementation. While in Russia successful performance of any enterprise depends a lot on the human factor, on personal relationships and trust built over time, in the U.S. frequent rotation of cadres is a regular thing.

4.6.4. The Conditions Attached to Cooperation

Throughout the years, the CTR Programme was a hostage to conditions and political issues in U.S.-Russian relations.

One of the conditions determining implementation, especially in the earlier years – was a "Buy-American" clause. The equipment and services required for implementing agreed projects under the CTR Programme had to be bought in the U.S. Investment in U.S. own economy while fulfilling a non-proliferation objective in the interest of the U.S. state was a good bargaining chip in the hands of the Programme's supporters. It played a positive role in persuading U.S. Congress to agree to engage in CTR activities.

However, there were some negative aspects to such a provision. Very often a Buy-American condition meant delays in project implementation, more money being spent than if the equipment had been procured locally. There is a consensus in the Russian political and expert circles that in many cases Russian equipment would be more suitable for Russian conditions. No less important is the sustainability factor. When the CTR Programme, as well as the other programmes, reaches its end point, and the present equipment completes its operation cycle – it will be harder to change everything over to local equipment. There is also a question of whether Russia would have sufficient resources for that. Those in Russia, who were directly involved in the first years of the CTR Programme implementation note that the Programme was perceived quite negatively due to strict conditions attached to it. American-made equipment supplied by the CTR Programme could only be used for the purposes specified.

An attempt to make CTR funding conditional on other political issues, such as compliance of Russia with the Chemical Weapons Convention, cessation of cooperation with Iran and some other is harmful for the implementation process, which goes against interests of both countries. U.S. President is required to certify that Russia complies with all the arms control agreements and other conditions. Only recently Congress provided President with a 3-year waiver authority to grant CTR program contracts without certification. Attempts of the Programme's supporters to receive a permanent presidential waiver have been unsuccessful so far.

Evgenii Maslin, former chief of the 12th GUMO stated:

> "…it is worrisome that the Programme is annually tied up by Congressmen with political conditions, which have no direct connection with the CTR

> Programme at all….Keeping such policy of artificial linkages does not fund understanding and results in disappointment…"[249]

U.S. senior policy experts see the preparedness of the State Department to put conditions on the Programme as a real step backwards.[250]

4.6.5. The Donor-Recipient Relationship

When the idea of the CTR Programme was developed the former Soviet Union was in a deep economic crisis. There could be no other mechanism apart from the direct assistance from the U.S. side. Unfortunately, that created a donor-recipient relationship, which sometimes is not the best basis for genuine partnership and cooperation.

First of all, there is a perception on the Russian side that the priorities of Russia in non-proliferation work are not taken into consideration because the U.S. side is the funding party. Priorities vary on the importance of certain projects (like, for example, which nuclear sites are in greater need of security upgrades, or which type of nerve agents should be destroyed first in the chemical weapons destruction programme). There is a feeling in Russia that often they receive assistance, which is readily available in the U.S., but which does not match real Russian needs.

Secondly, not engaging Russia as an equal partner in the CTR Programme, as well as all other major non-proliferation assistance programmes, has a negative effect on sustainability of the programmes. Excluding Russians from the management of the programmes, or not trying to consider the priorities of Russia in securing its nuclear arsenals and expertise lessens the support for the cooperative threat reduction on the Russian side. Russian Foreign Ministry representative noted that Russia has "a very limited influence on the processes [of fund allocation, choice of subcontractors]", and that is "wrong".[251]

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249 Evgenii Maslin, 'Programma sovmestnogo umensheniya ugrozy i interesy natsional'noi bezopasnosti Rossii' ('Cooperative Threat Reduction Programme and Russia's National Security Interests'), in Ivan Safranchuk, ed., <u>Programma sovmestnogo umensheniya ugrozy: otsenka effektivnosti i perspektivy razvitiya</u> (<u>Cooperative Threat Reduction Programme: Assessment of Effectiveness and Prospects for Development</u>), Moscow, 2000, p. 6

250 Interview with the U.S. senior policy expert, Washington D.C., April 2003

251 Valerii Semin, 'Programma sovmestnogo umensheniya ugrozy imeet potentsial dal'neishego razvitiya', ('Cooperative Threat Reduction Programme Has Potential for Further

The recent Global Partnership, designed to unite resources of G-8 countries against spread of WMD, which engages Russia as a partner not a simple recipient is a positive and important development.

4.7. The Overall Effectiveness

The CTR Programme is to a large extent a unique phenomenon of a post-Cold War world environment aiming at joining the efforts of two former adversaries - Russia and the United States - to reduce, limit, and even eliminate, if ever possible, the dangers arising from the nuclear weapons. It is unique because the two countries are trying to deal with the dangers created by huge nuclear arsenals, which were a «birth product» of their own mutual mistrust, agony, and aggressiveness. It is an unprecedented attempt to deal with the whole range of complicated issues arising from the presence of nuclear weapons in the security environment.

The mere existence of such kind of cooperation changes the character of U.S.-Russian bilateral relations. The CTR Programme (based on the Nunn-Lugar legislation) has enormous value as a foundation for all the other non-proliferation assistance programmes. The umbrella CTR agreement was a starting point for developing and expanding cooperation between Russia and the U.S. in the area of threat reduction, and it provided the basis for making this assistance more specialised by involving other agencies rather than just DOD.

The CTR Programme is an important tool of non-proliferation: it gives the U.S. a chance to participate in protecting nuclear expertise, weapons, and materials in Russia and in such way protect its own national security from a possible attack from a threshold state or terrorist organisation, and at the same time it helps Russia to meet its START-related obligations, improve safety and security of its weapons and materials, which can be used within Russia by unauthorised groups.

The CTR Programme enabled numerous contacts between the Russian and American military, nuclear physicists, officials, scientists and policy experts. It had the intangible result of building a working relationship in the area of nuclear safeguards,

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Development"'), in Safranchuk, ed., Programma sovmestnogo umensheniya ugrozy, op. cit, p. 9

safety and security. This kind of cooperation is unprecedented for the former ideological enemies.

Among concrete objectives achieved by the CTR Programme first and foremost is denuclearisation of three former Soviet Republics of Belarus, Kazakhstan, and Ukraine. The CTR Programme was not only one of the determining factors in the decision taken by three states to join NPT as non-nuclear states, but it certainly played a very important role in it. The CTR Programme has provided vital equipment and other resources for eliminating certain weapons, transporting the rest, and destroying the supporting infrastructure left on their territories. CTR projects dealing with fissile material disposition, weapons and material storage have also been important in reducing the threat of nuclear proliferation.

However, there are limitations to the achievements of the CTR Programme. The problems of implementation discussed above and limitations of U.S.-Russian relations are setting back a more effective and smooth cooperation in threat reduction.

Chapter 5
Preventing the Proliferation of Fissile Material: the Material Protection, Control and Accounting (MPC&A) Programme

5.1. Introduction

Chapter Five and Chapter Six should be seen as two parts of one segment of this work, assessing threats from the proliferation of fissile material and CTR programmes, which have been designed to deal with these particular threats. Chapter Five evaluates the potential dangers of fissile material proliferation from the Russian Federation and other ex-Soviet Republics in the aftermath of the Soviet collapse. An attempt is made to demonstrate the magnitude of the problem, assess the risks, and analyse programmes, which deal with the issues of fissile material non-proliferation. The main purpose of Chapters Five and Six is to provide an account of all the major activities undertaken by the U.S. and Russia to tackle the threat of nuclear material leakage from Russia and to point out the achievements and the deficiencies of those actions. This Chapter (Five) evaluates the achievements and failures of Material Protection and Accounting (MPC&A) - a major programme designed to confront nuclear material safety and security issues. Chapter Six is divided into two thematic sub-chapters, which deal with the problems of weapon-grade Plutonium (Plutonium Disposition Programme) and Highly Enriched Uranium (HEU) (HEU Deal) respectively.

It is important to analyse the infrastructure of the production, storage and disposition of weapons-grade nuclear material in Russia. In this respect, key players involved at any of the above mentioned stages of handling the fissile material are presented. The final part of Chapter Six explores larger questions arising from the discussion of the role of fissile material in the future of non-proliferation and nuclear cooperation between the U.S. and Russia. It assesses the interconnectedness of the production volumes and disposition, as well as the problem of a growing stockpile of the fissile material due to Russia's dismantlement obligations and needs.

An assessment of the approximate volumes of the fissile material already produced and the surpluses added to it annually, as well as approximate rates for the disposition of this material help to evaluate the magnitude of material proliferation problem. The following two chapters demonstrate the immediate dangers arising from the inadequate material storage, lack of comprehensive material accounting and protection systems, and how the general social, economic and political turbulence in Russia aggravate the existing problem. The aim is to show how the whole problem of fissile material relates to the future of Russia's nuclear arsenal and the U.S.-Russian arms control treaties, and what the role of the cooperative threat reduction is in this process. MPC&A, Plutonium Disposition and the HEU Deal represent important components of the CTR process. An examination of problems of implementation they encountered, an analysis of why cooperation has been limited and, on the other hand, why it was possible at all – provides an insight of the nature of the U.S.-Russian strategic relations in the post-Cold War period.

5.1.1. The Danger of Fissile Material Proliferation

Fissile materials are composed of atoms that can be split by neutrons in a self-sustaining chain-reaction to release enormous amounts of energy.[252] Plutonium and Highly Enriched Uranium (HEU) are the materials that can be used to make nuclear warheads. All of the isotopes of Plutonium (most importantly Pu_{239}, Pu_{240}, Pu_{241}, and Pu_{242}) and two isotopes of uranium (U_{233} and U_{235}) can sustain an explosively growing chain reaction.[253]

The proliferation of fissile material is considered to be a major threat to nuclear safety and stability in the world. While it is possible in principle for unauthorised parties to acquire control over nuclear weapons, their physical and electronic protection is such that this remains a remote contingency. It is widely believed that fissile material proliferation is a more significant threat to international security. In a situation when ready-made weapons are hard to get and fissile material, which can enable proliferators to build them, is not adequately protected, the chances of material falling into the wrong hands rise considerably. This is especially the case as persons with access to fissile material are often poorly paid and may see fissile material as an opportunity to improve their situation.

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252 'Fissile Material Basics', Institute for Energy and Environmental Research, at http://www.ieer.org/fctsheet/fm_basic.htm retrieved on 09.08.02

253 Matthew Bunn, John P. Holdren, 'Managing Military Uranium and Plutonium in the United States and the Former Soviet Union (excerpts)', at http://www.ransac.org/new-web-site/pub/reports/bunnholdren1.htm retrieved on 02.07.02

The lack of access to fissile material is the most important barrier that stops terrorists/rogue states from making a nuclear weapon. The scholars from Harvard University in their comprehensive report on nuclear proliferation risks 'Controlling Nuclear Warheads and Materials' give the following assessment:

> "If they [terrorists] got the materials, making a bomb is at least potentially within the capability of a large and well-organised terrorist group. With enough HEU, terrorists could potentially make a simple "gun-type" bomb, little more than firing two pieces of HEU into each other to form a critical mass."[254]

It is trickier to build a weapon using plutonium or with an amount of HEU too small for a gun-type weapon, because in this case the type of weapons will be 'implosive' – which means, explosives have to be set off around the core with the fissile material in order to crush it into a smaller, denser configuration for the chain reaction to begin. Although, such a scenario is more challenging for terrorist organisations, it is not impossible.

The authoritative report of Harvard's Managing the Atom Project reiterates:

> "Detailed examinations by U.S. nuclear weapons experts have concluded again and again that with enough nuclear material in hand, it is possible that a sophisticated terrorist group could build at least a crude nuclear explosive – including, potentially, an implosion bomb, though that would be substantially more difficult for them than a gun-type bomb."[255]

Up until now nuclear material rather than ready weapons has been a more appealing product on the illegal nuclear market. Technically, even in Russia nuclear weapons are relatively well secured, while the protection of nuclear material is doubtful. There are several reasons for serious concern about safety and security of the nuclear material in Russia.

First of all, there is a large number of sites in Russia, where small or large amounts of dangerous materials are located. According to some estimates, Russia possesses some 130-200 tonnes of Plutonium[256] and 800-1,200 tons of HEU.[257]

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254 Bunn, Wier, Holdren, 'Controlling Nuclear Warheads and Materials', op. cit., p. 12

255 ibid

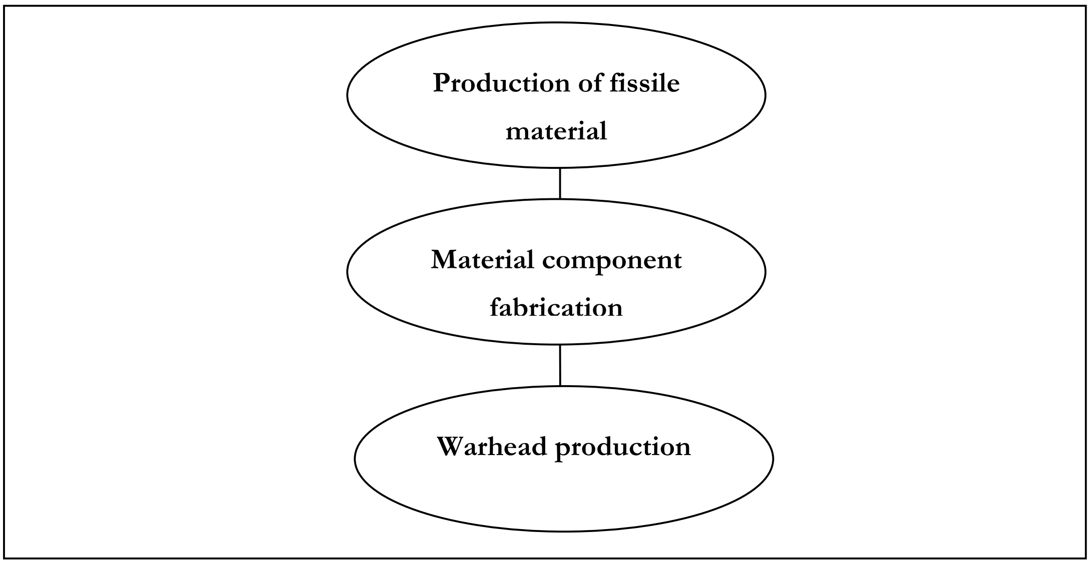
256 The figure of 200 tonnes is given in Graham T. Allison, Owen R. Coté, Jr., Richard A. Falkenrath, Steven E. Miller, eds., *Avoiding Nuclear Anarchy: Containing the Threat of Loose Russian Nuclear Weapons and Fissile Material*, The MIT Press, Cambridge, Massachusetts, London, England, 1996, p. 21; the figure of 115+/-20 tonnes was calculated by David

Another source reports the possession of approximately 650 metric tons of weapons-usable fissile material in the countries of the former Soviet Union, not including the material currently in nuclear warheads.[258] The amount required for a nuclear warhead ranges from 5 kilograms of plutonium to 15 kilograms of HEU.[259] The immense amounts of fissile material in Russia can provide more than enough for terrorist groups if they decide to obtain it by using loopholes in Russian inadequate material safety and security. Second, the already extensive material stockpile keeps on growing due to dismantlement process (with material being extracted from weapons) and because of the continuing production of plutonium in Russia.

There are several sources of fissile material in Russia. At several stages of making a nuclear warhead, its dismantlement and fissile material disposition the material can be at risk of diversion. The process of warhead production and dismantlement involves the following stages outlined in the next chapter.

5.1.1.1. Process of Warhead Production and Weapon Dismantlement

Chart 1 Process of Warhead Production



Process of warhead production

Albright. Frans Berkhout, and William Walker, *World Inventory of Plutonium and Highly Enriched Uranium 1992*, SIPRI, Stockholm, 1992, p. 37

257 Allison, Coté, Jr., Falkenrath, Miller, eds., *Avoiding Nuclear Anarchy*, op. cit., p. 21

258 Nuclear Status Report, op. cit., p. 75

259 ‘Fissile Material Basics’, op. cit.

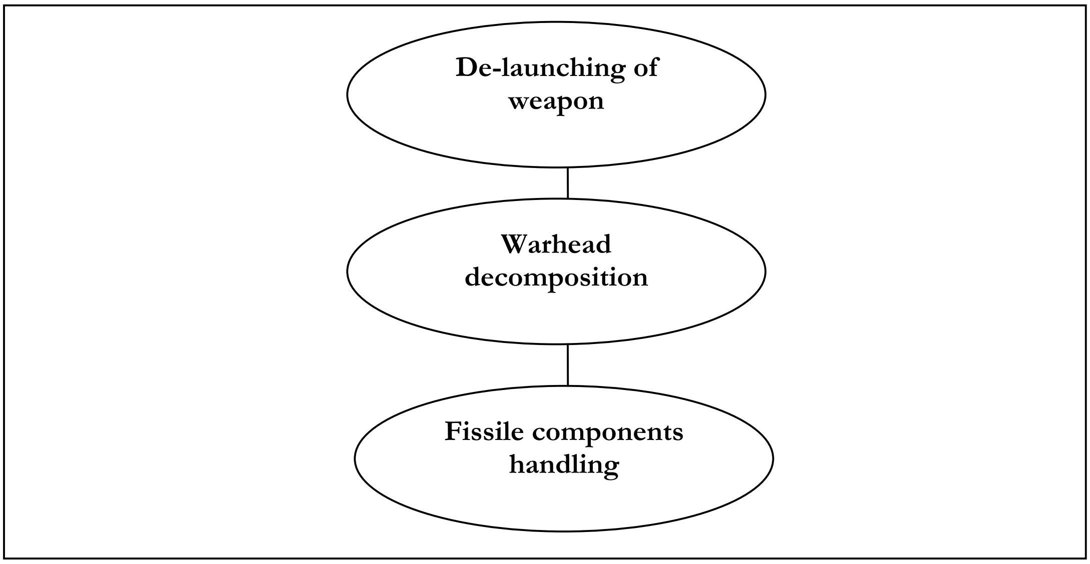
First Stage – Production of Fissile Material: The initial stage of warhead production involves the production of fissile material. HEU is produced in uranium enrichment plants. Plutonium is produced at special plutonium production reactors and is later separated at a reprocessing facility.

Second Stage – Material Component Fabrication: After the first stage of production is completed, the fissile material is transferred to a fissile material component fabrication facility, where it is moulded and shaped into required form.

Third Stage – Warhead Production: At this final stage the components shaped and moulded are transferred to a warhead production facility, where they are mated with the other required components, such as high explosives and sophisticated triggers.

Chart 2 represents the process of weapon dismantlement.

Chart 2 Process of Weapon Dismantlement



Weapons Dismantlement Process

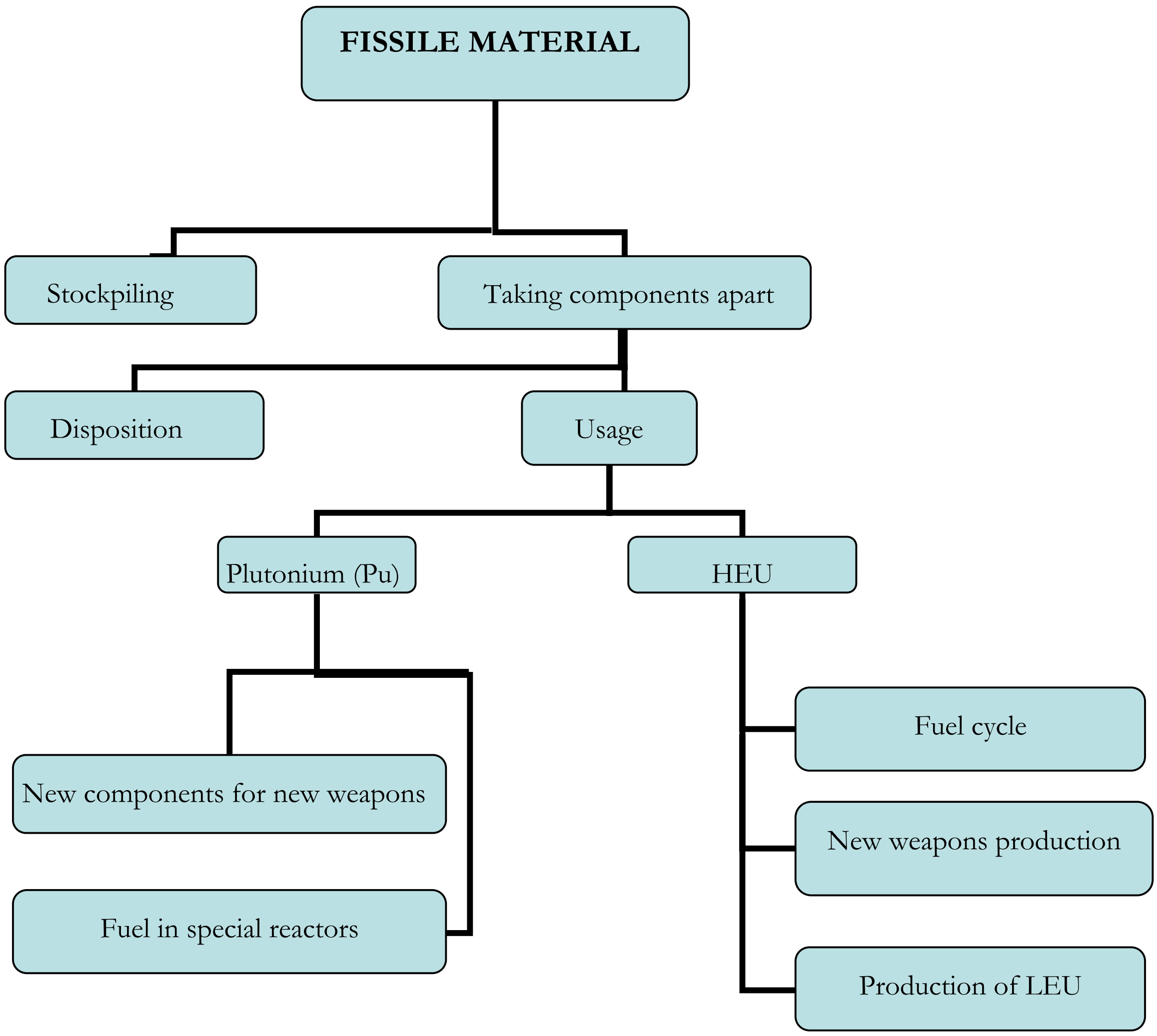
First Stage – De-launching of the Weapon: First of all, the weapon is removed from its launcher (ICBM/SSBN/SLBM/Bomber) or from its storage position. After that the weapon is placed in a special shipping device and transported to MINATOM's dismantlement installations.

Second Stage – Warhead Decomposition: After the warhead was taken from the weapon, it is transferred to the weapons production facility (where it was built) to be taken apart. As a result of this, a number of fissile material components are produced.

Third Stage – Fissile Components Handling: The third stage is the most important from the point of proliferation risks and deserves a more detailed consideration. After the warhead has been taken apart, MINATOM is left in possession of the fissile material components. There are two possible ways of handling these components: either to stockpile them as they are, or to take them apart («below pit-level dismantlement»). In case of the latter, the components are taken back to the facility where they were fabricated. The components consist of bulk fissile material, which can either be disposed of or used in several ways.

Plutonium can be used to fabricate new components for new weapons, or as fuel in special reactors. HEU can be used in a variety of different HEU fuel cycles, or as the raw material for new weapons production, or blended with natural uranium to produce LEU for conventional power-generating nuclear reactors. The methods of fissile material disposition are presented in Chart 3.

Chart 3 Fissile Material Disposition



5.2. Safety and Security of Fissile Material at Russian Facilities

A multi-stage process of production and dismantlement of nuclear warheads (Charts 1, 2 and 3) demonstrates at how many points material is in danger of being diverted. Moreover, the disposition of fissile material by any of the options presented in Chart 3 requires transportation of warheads and material between and within the nuclear facilities. Transportation of material is considered to be one of the "weakest links" for material diversion.[260]

The Russian Ministry of Atomic Energy (MINATOM) has the capability of both producing fissile materials and extracting them from the dismantled nuclear weapons. Other producers of fissile material are Russian nuclear power-generating reactors, which fall under control of MINATOM. Additional amounts of fissile material can be found at the research institutes and labs. Moreover, there are thousands nuclear weapons still residing at MOD sites with the material still trapped inside them, which potentially can be dismantled adding more volumes of fissile material.

The degree of potential leakage varies depending on the nuclear material custodian. It is widely believed that the safest stockpiles of nuclear weapons belong to the Ministry of Defence. The weakest in terms of safety and security arrangements are the stockpiles, which belong to research institutes and non-standard fuel cycle facilities.[261] In most cases, the amount of fissile material stored and used at these facilities is considerably smaller than at all the other sites, however, even that small amount poses a significant risk if smuggled.

The U.S. National Intelligence Council declared in its February 2002 report that security varies widely among the different types of Ministry of Atomic Energy (MINATOM) facilities and other Russian institutes:

> "Russian facilities housing weapons-usable nuclear material – uranium enriched to 20 percent or greater in uranium_{235} or uranium_{233} isotopes and any plutonium containing less than 80 percent of the isotope plutonium_{238} –

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260 Telephone interview with Oleg Bukharin, Princeton University, Washington D.C., 01.04.03

261 Allison, Coté, Jr., Falkenrath, Miller, eds., *Avoiding Nuclear Anarchy*, op. cit., p. 21

> typically receive low funding, lack trained security personnel, and do not have sufficient equipment for securely storing such material."[262]

5.2.1. Safety and Security of Fissile Material at the Ministry of Defence (MOD) Sites

MOD nuclear weapon and material storage facilities are believed to be quite satisfactory in terms of nuclear safeguards. However, there is a growing concern about safety of nuclear weapons and material under custody of the Defence Ministry. There are several reasons for that. First of all, in the aftermath of the Communist collapse Russia no longer has access to Eastern European and former Soviet facilities. Three non-Russian republics (Belarus, Kazakhstan, and Ukraine) made a decision to join the NPT as non-nuclear states, and as such had to eliminate all the nuclear stock and move it to Russia. It is assumed that sometimes Russia is forced to use conventional weapons storage sites for keeping its nuclear weapons, which are not suitable for these purposes.

Second, it is alarming that Russian military and security forces remain the principal source of arms becoming available to organised crime groups, participants in regional conflicts, and corrupt state officials engaged in the black, grey, and legal arms markets in their various dimensions.[263] Finally, corruption is dangerous not only at the level of highly placed military officials, but also at the level of regular members of Russian military. They are facing dramatic economic hardships and are going through a time of political and social crisis; all these factors cause a deterioration of the morale in the Russian army and often are a pre-requisite for crime from within the military establishment.

5.2.2. Safety and Security of Fissile Material at MINATOM's Sites

MINATOM stores weapons-usable nuclear materials in over 300 buildings at over 40 facilities across the country, according to an assessment by the U.S. National

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262 'Annual Report to Congress on the Safety and Security of Russian Nuclear Facilities and Military Forces', National Intelligence Council, February 2002, text available at http://www.cia.gov/nic/pubs/other_products/icarussiansecurity.html retrieved on 30.05.02

263 Graham Turbiville, Jr., 'Weapons Proliferation and Organized Crime: the Russian Dimension', INSS Occasional Paper 10, Proliferation Series, June 1996

Intelligence Council.[264] The safeguards applied to MINATOM's facilities are less strict than the ones used by MOD. In the mid-90s, almost each and single site under the control of MINATOM had inadequate MPC&A, did not meet the strict nuclear safety and security regulations and as such represented a potentially great risk:

> "MINATOM appears to be somewhat less strict in managing nuclear stockpiles that its military counterpart [MOD], although this relative laxity applies more to nuclear materials outside the nuclear weapons complex – that is, nuclear materials under MINATOM control produced for and by nonweapons activities in the research, commercial power, and military sectors." [265]

One of the main vulnerabilities of MINATOM is its inability to deal with insider thefts. During the Soviet time all the nuclear custodians relied heavily on reliability of the members of its vast nuclear complex. The Soviet nuclear safety and security systems were designed to counter threats from outsiders, but safeguards systems were not developed to confront insider threats.

It is considered that the stockpiles controlled by MINATOM represent a steadily growing risk due to the dismantlement process (fissile material extracted from dismantled weapons is transferred from the MOD to custody of MINATOM) and MINATOM's lack of appropriate storage facilities. Even MINATOM officials themselves had to acknowledge that interim storage facilities for plutonium from dismantled weapons «are not very safe» and are not adequately guarded and there is a shortage of trained personnel and modern equipment, inadequate transport control procedures, and the lack of storage and processing facilities.[266]

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264 Annual Report to Congress on the Safety and Security of Russian Nuclear Facilities and Military Forces, February 2002, National Intelligence Council, http://www.cia.gov/nic/pubs/other_products/icarussiansecurity.html retrieved on 30.05.02

265 Bruce G. Blair 'Russian Control of Nuclear Weapons' in George Quester, ed., *The Nuclear Challenge in Russia and the New States of Eurasia,* M. E. Sharpe, Armonk, New York, London, England, 1995, p. 70

266 William C. Potter 'Post-Soviet States and Nonproliferation' in Quester, ed., *The Nuclear Challenge in Russia and the New States of Eurasia,* op. cit., p. 26

5.2.3. Safety and Security of Fissile Material at the Research and Other Fuel Cycles

It is acknowledged that research and other fuel cycles are the weakest category among all nuclear facilities in terms of vulnerabilities to nuclear theft and material misplacement. Different research installations, naval fuel cycles, and non-standard fuel cycles all have a certain amount of fissile material, and this material is stored under conditions that do not come close to meeting desired standards of nuclear custody. [267]

Oleg Bukharin of Princeton University confirmed that research reactors represent a "significant vulnerability".[268] As shown in Appendix 1, some of the sites do not even fall under custody of MINATOM – there are several under the jurisdiction of civilian ministries, which have no expertise in managing nuclear materials. According to U.S. specialists, small civilian research sites in Russia are the biggest threat.[269] It is evident that the amount of fissile material in Russia is overwhelming, its security is less than adequate, and there are apparent reasons for concern of the world community and policy decision-makers.

5.3. Types of Threats

There are several types of threats for material smuggling that can be identified: the group insider threat, the outsider threat, and the high-level insider threat.

5.3.1. The Group Insider Threat

A group of insiders, who feel economically desperate, can pose the most serious threat. Workers in the Russian nuclear complex found themselves in a quite desperate situation in the early 90s. Financial difficulties and, as a result, low morale became the worrisome characteristics of the formerly privileged social group. Through its own resources and with a significant help of cooperative threat reduction funds, Russia was able to improve the working and living conditions for nuclear scientists, who faced major economic challenges in the early 90s. It should be noted that many in the West

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267 Allison, Coté, Jr., Falkenrath, Miller, eds., *Avoiding Nuclear Anarchy*, op. cit., p. 42

268 Telephone interview with Oleg Bukharin, Princeton University, Washington D.C., 01.04.03

269 Interview with a DOE official, Washington D.C., April 2003

praise former Soviet nuclear scientists for being highly professional and patriotic about security interests of their country, and remaining loyal to the state interests even in the conditions of severe hardship.

However, the possibility that interested parties can exploit poor economic conditions in order to "buy in" knowledge of the desperate nuclear workers or use their access to fissile material in order to illegally obtain some of it - still remains (Chapter 7 discusses challenges faced by the Russian nuclear complex workers and potential proliferation threats associated with economic hardships).

5.3.2. Outsider Attack

Some of the Russian facilities, especially, the smaller ones can be subjected to an outsider attack with the goal of obtaining fissile or radioactive material. Events such as the seizure of a theatre in the heart of Moscow in 2002 by Chechen fighters proved that Russian law enforcement forces are not prepared to prevent such attacks. [270]

The level of protection varies from site to site. Sites under the authority of the Defence Ministry believed to have a better level of physical security that any other sites, where nuclear weapons and/or materials are stored. There is a debate in Russia on changing the way MINATOM sites are being protected. At the moment, MINATOM sites are guarded by the forces of Russian Ministry of Internal Affairs (MIA). The Russian government suggested that MINATOM should find its own resources to protect its facilities.[271] If MIA forces no longer guard MINATOM's facilities, it will put additional pressure on MINATOM.

In Russia there are many civilian research institutes, where some work was done involving dangerous material, but since such work stopped, nobody has comprehensive information on where such material is still left and in what condition.[272] Such places are usually completely unprotected.

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270 In May 2002 a group of armed Chechens held hostage several hundred people in one of Moscow's central theatres. The Russian Special Forces stormed the theatre and used the gas to re-gain control of the theatre. Many people died as the result of the operation.

271 Interview with Eduard Kryuchkov, Moscow Engineering and Physics Institute, Moscow, June 03, 2003

272 Discussion with Eduard Kryuchkov, Moscow Engineering and Physics Institute, Moscow, June 03, 2003

5.3.3. High-Level Insider Threat

The possibility of highly placed insider being involved in a security breach is not formally discussed either in the U.S. or in Russia. Nevertheless, such a scenario came up in several informal conversations with the U.S. non-proliferation experts.[273] It remains highly unlikely that high-level security personnel or facilities' managers would voluntarily get involved in an illegal operation connected with fissile material. One of the reasons for that is the remaining high professionalism and patriotism of the nuclear complex workers in Russia and the severe legal punishment in case such a breach is discovered. However, there are plausible scenarios of such an eventuality. For example, if higher level insiders were subject to blackmail, and forced to ignore a security breach, the theft of nuclear material might occur. This threat is probably the most difficult to counter.

5.4. Fissile Material Smuggling

5.4.1. Smuggling Fissile Material: The Level of Risk

The following section discusses how it can be possible for terrorists/nuclear black market dealers/and even for members of the Russian nuclear complex community (if they choose to do so) to acquire fissile material. Specialists confirm that some health or other risks associated with nuclear material smuggling are nothing more than myths.[274] The following facts suggesting that smuggling is not that difficult and demonstrate why it is important to secure material at the source.

First of all, the transportation of weapons and fissile material does not contribute a major challenge. Many nuclear weapons are easily transported by ordinary means of transportation – cars, trucks, aircraft. It is even easier to transport fissile material (in amounts enough for a simple nuclear weapon) – it can be carried by any person without danger to his/her health.

Secondly, handling of fissile material is not necessarily a hazardous activity. Plutonium and HEU can be carried out of Russia with little or no danger to the person

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273 Interviews with the U.S. non-proliferation experts, Washington D.C., March-April 2003

274 Interviews with U.S. and Russian physicists conducted in Washington D.C. and Moscow and Allison, Coté, Jr., Falkenrath, Miller, eds., *Avoiding Nuclear Anarchy*, op. cit., p. 44

carrying them. Stealing the material is not a hazardous activity because, especially, uranium is not dangerous at all. Handling fissile material is more of a problem: plutonium processing does require special precautions and safety measures.[275]

Thirdly, the amount required for a nuclear device is quite small. Both plutonium and HEU are very dense and compact; therefore, the volume associated with a large weight is very small (the size of a Coke can).

Therefore, nuclear smuggling is not a difficult challenge for those who might choose to acquire nuclear material.

5.4.2. Acknowledged Cases of Smuggling

There are numerous reports of theft and the smuggling of nuclear materials from the territory of Russia and ex-Soviet Republics. Some of them failed to be officially proved, but there were some cases, which clearly demonstrated a growing number of attempts to smuggle fissile material. It has to be noted that those cases (where the theft/smuggling) was discovered may possibly represent the tip of an iceberg and are publicly known only because unsuccessful smugglers were caught by luck. It is only left to imagination how many attempts of the nuclear smuggling have been implemented successfully by the criminal elements, and how the nuclear dangers for the world community have increased. The material already smuggled from Russia may well be sitting in the hands of rogue states/organisations waiting to be used in illegally produced weapons.

The U.S. National Intelligence Council assessed that 'undetected smuggling has occurred', although the extent or magnitude of undetected thefts is unknown.[276] According to David Kyd of the IAEA, there have been 175 known cases of attempts to smuggle nuclear material out of former Soviet Republics.[277] A new database of lost, stolen and misplaced nuclear material (Database on Nuclear Smuggling, Theft and Orphan Radiation Sources) compiled at Stanford University after September 11th has

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275 Telephone interview with Oleg Bukharin, Princeton University, Washington D.C., 01.04.03

276 'Annual Report to Congress on the Safety and Security of Russian Nuclear Facilities and Military Forces', op. cit.

277 'Uranium Theft Raises Nuclear Fears', BBC News, http://news.bbc.co.uk/hi/english/world/europe/newsid_1697000/1697000/1697907.stm retrieved on 06.10.03

revealed some serious facts. According to Lyudmila Zaitseva, a visiting fellow at Stanford University, over the past 10 years at least 88 pounds (40 kg) of weapons-usable uranium and plutonium had been stolen from the facilities in the former Soviet Union. Most of this material was subsequently retrieved, but at least 4.4 pounds (2 kg) of HEU stolen from Georgia still remains missing.[278]

One of the major problems of the post-Soviet period is the dramatic increase in state corruption, and the deterioration of the professional morale among the members of military and security forces. Vulnerability to insiders is the weakest spot of the Russian nuclear complex, while there is a growing demand for fissile material on the world black market, which according to the principles of business creates supply. The terrorist attacks of 9/11 and subsequent declarations from Osama Bin Laden that Al-Qaida would not hesitate to use WMD aggravated concerns about unprotected material in the former Soviet Union.

Table 5 demonstrates some acknowledged cases of nuclear smuggling, which originated from the territory of Russia and former Soviet Union.

278 Andrew Quinn, 'Data Show World Awash in Stolen Nuclear Material', Yahoo News, March 8, 2002, at http://www.mindfully.org/Nucs/Stolen-Nuclear-Material8mar02.htm retrieved on 08.03.02

Table 5 Some Cases of Nuclear Materials Smuggling from FSU[279]

December 2001	**Russian police arrested seven men trying to sell more than one kilogram (2.2 pounds) of suspected weapons-grade uranium. It was reported that the criminals were trying to sell the uranium for $30,000 to another gang. It is thought that the capsule could have come from a nuclear research centre or a production plant.**
July 2001	In Georgia police arrested three men attempting to sell 1.7 kilograms (3.751lbs) of $Uranium_{235}$ to buyers in Turkey.
1999	CIA confirmed that the material seized by Bulgarian authorities was weapons-usable. The material - four grams of HEU - likely originated in Russia.
1998	Although not independently confirmed, reports of a theft from an unnamed enterprise in Chelyabinsk Oblast are of concern, believes CIA. According to MINATOM's Viktor Yerastov, the amount stolen was «quite sufficient material to produce an atomic bomb».
1994	3.0 kilograms of 90% enriched weapons-grade uranium were stolen in Moscow.
June 1994	800 mg of HEU enriched to 87.7% (probably originating from Obninsk) was obtained from a Slovakian trader in Germany.
August 1994	On August 10, 1994 German police at the Munich airport seized almost a pound of near-weapons-grade plutonium (87% Pu_{239}). The material was brought into Germany from Moscow.
May 1994	On May 24, 1994 German police found 5.6 grams of super-grade plutonium (99.78 percent Pu_{239}) in the garage of Adolf Jäckle in Tengen, Germany. It was believed that the material originated from Arzamas-16.
July 1993	1.8 kilograms of HEU enriched to 36% in the form of two fuel rods was stolen two naval servicemen at a naval base storage facility of the Northern Fleet Andreeva Guba, Murmansk region.
Mid-1992	During a three-and-a-half month period in mid-1992 an engineer Smirnov working for Luch Scientific Production Association (Podolsk) stole approximately 3.7 pounds (or 1.5 kilograms) of HEU (90% enriched).

279 'Uranium Theft Raises Nuclear Fears', op. cit., 'Annual Report to Congress on the Safety and Security of Russian Nuclear Facilities and Military Forces', op. cit., Bluth, *The Nuclear Challenge*, op. cit., Allison *et al*, eds., *Avoiding Nuclear Anarchy*, op. cit.

Apart from the cases involving fissile material, attention should be paid to other incidents, which did not involve neither Plutonium nor HEU, but where leakage occurred from a facility possessing large volumes of material. One of the examples was the case, when four tonnes of beryllium were taken from one of the institutes outside of Moscow. The material was shipped to Yekaterinburg, then – Vilnius, where it was finally discovered. It was reported that the head of the institute and security people were involved. The institute in question stored tonnes of material.[280]

This list is far from comprehensive and includes only some cases of the acknowledged incidents of nuclear material smuggling from the territory of the Russian Federation and former Soviet republics. Some of the cases were confirmed by the Russian authorities, in some the exact origin of the material remains in doubt, and how it found its way to the market. The important questions are: how difficult is it to illegally obtain nuclear material from Russian facilities, how real is the demand, who are the potential buyers, and what is the real scope of the problem.

There are no doubts about the dangers of illegal nuclear material proliferation. The Russian government, in the first place, as well as the world community, have to be extremely vigilant about potential threats of nuclear smuggling. It is apparent that the problem of safeguarding nuclear material in Russia is dramatic. Neither authorities, nor observers can deny the fact that it is possible to obtain nuclear material from the Russian territory if such an intention exists.

5.4.3. Potential Smugglers and Buyers of Fissile Material

The high number of cases (both confirmed and unconfirmed) demonstrates that demand exists for smuggled nuclear material. At the same time, some of the cases can not provide a straightforward answer to the main question: who are the buyers and whether there is a relevant (not exaggerated) view on the number and determination of potential smugglers and buyers. The case of material seizure in Munich airport is one of the best examples of controversy surrounding this problem.

It is believed that the operation carried out by the German authorities in Munich airport in 1994, which resulted in the seizure of more than 0.5 kg of MOX

280 Interview with Thomas Cochran, Natural Resources Defence Council (NRDC), Washington D.C., 03.04.02

(containing 363 g of plutonium close to weapons-grade material), was especially set up. It was revealed that it had been a 'sting operation' by the German Intelligence Service.[281] In that case, it is highly likely that the 'supply' was artificially created by the 'demand' of the intelligence services. This incident does not provide any evidence as to whether a market exists. Nonetheless, the majority of cases involving nuclear smuggling were not set up and provide evidence of existing demand for smuggled nuclear material. The case also suggests that the demand for material can be met at 'black' nuclear market.

Who are the real potential buyers of smuggled material? The first most common and logical assumption is: they are the threshold countries, in other words, the states, which are one step away from creating their own nuclear warhead and this remaining step to be taken is to obtain necessary material. The countries, like Iraq (before the recent war) or Iran, for example, might want to use this opportunity and become buyers of smuggled nuclear material. However, it should be noted that threshold states willing to become nuclear would prefer to manufacture material themselves rather than rely on the occasional supply from the illegal nuclear market. Having said this, an incentive for threshold states is present and cannot be ruled out. A purchase of already produced fissile material can considerably reduce the timeframe for an acquisition of a nuclear weapon.

Another group of potential buyers is – sub-state, terrorist organisations. In the aftermath of September the 11th events in the U.S., the danger of Al-Qaida and other well-established terrorist organisations trying to obtain Russian fissile material in order to produce nuclear weapons is more significant than ever. Already existing stockpiles are probably the only source for terrorists to obtain fissile material. The production of fissile material is an extremely sophisticated process, which requires a complex infrastructure and state support. Currently, no terrorist organisation is believed to be capable of producing nuclear material. At the same time, it could possible for organisations like Al-Qaida to produce a nuclear weapon (or at a minimum a radiological weapon) if they acquire the necessary amount of material. Therefore, an incentive for this group to illegally obtain it from nuclear states is high and poses a serious security risk to the world community.

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281 Bluth, *The Nuclear Challenge*, op. cit., p.168

There have been acknowledged attempts of Al-Qaida members to acquire nuclear material from the former Soviet Union and other countries. In 1993 an Al-Qaida operative was instructed to attempt a purchase of HEU in Sudan, in 1998 the senior Al-Qaida deputy Mamdouh Mahmud Salim was arrested in Germany and charged with an attempt to obtain HEU in mid-1990s, and there were credible but unconfirmed reports of Al-Qaida attempts to purchase nuclear materials in Kazakhstan and Ukraine.[282]

Although, there is no established functioning black market for fissile material, there are all the prerogatives for having one. There are those, who are willing to buy such material, and there are those, who might be capable of getting and willing to sell it. If buyers manage to link to sellers there could be a significant leakage of nuclear and radioactive material from unsecured sites. With the danger of fissile material smuggling being so apparent, the U.S.-Russian cooperative threat reduction involving MPC&A Programme to improve material safety and security is extremely important.

5.5. Material Protection, Control and Accounting (MPC&A) Programme

5.5.1. Background of the Problem

The shortest path for terrorists or rogue states to acquire nuclear capability is to get hold of nuclear material. Russia possesses 800-1,200 tonnes of HEU and about 130-200 tonnes of Plutonium[283], which is dispersed all over the country at the numerous military and civilian sites without adequate safeguards. According to 2001 estimates of the U.S. Defence Department, 603 metric tons of HEU and Plutonium out of this amount are at risk of nuclear theft. This material can be used directly in a nuclear

282 Mclound and Osbourne 'WMD and Usama Bin Laden', Benjamin Weiser 'U.S. Says Bin Laden Aide Tried to Get Nuclear Weapons', *New York Times*, 26.09.1998, Marie Colvin 'Holy Warrior with U.S. in His Sights', *Times* (London), 16.08.1998 – all cited in Bunn, Wier, Holdren, 'Controlling Nuclear Warheads and Materials', op. cit., pp. 14-15

283 Refer to sources listed in footnotes 257 and 258

weapon without further enrichment or reprocessing. This amount is enough to produce almost 40,000 nuclear warheads.[284]

In the current circumstances, Material Protection Control and Accounting Programme (MPC&A) in Russia is without exaggeration the most vital prerequisite for a safer world. A comprehensive MPC&A system is the most basic requirement for any nuclear state, which recognises its responsibility in the face of its own population and the world community.

At the moment, in Russia and the other former Soviet republics (which still have nuclear material left on their territory from Soviet times) MPC&A is far from adequate. The unsatisfactory conditions, in which material is stored, makes one wonder how until now there has been no major disaster connected with the misuse of this material. There is a documented evidence of some fissile material storage sites left unguarded and unprotected for various reasons - lack of resources, severe socio-economic crisis in Russia, and a crisis of morale in the Russian military. At one of the facilities visited by U.S. Government Accounting Office (GAO) officials, an entrance gate to a building containing nuclear material was left open and unattended by guards.[285]

The problem of accounting is a serious challenge for the Russian nuclear complex. If there is no systemic comprehensive account of material there is no chance of identifying its loss. If it is known that misplacing poorly protected material will not raise any suspicion, there is a great possibility someone will attempt to use this loophole. There can be no margin for inaccurate accountancy. The failure to account properly for even 1 per cent of material can be dangerous. A simple example: if at a site with 100 metric tons a 1 per cent margin for miscalculation is allowed, it means a metric ton of dangerous material can be unaccounted for and not identified as stolen. Taking into consideration, that only a few kilograms of weapons-grade material are needed for a simple nuclear device, even an insignificant miscalculation can lead to rather serious consequences.

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284 GAO, Report to Congressional Requesters, 'Nuclear Nonproliferation: Security of Russia's Nuclear Material Improving; Further Enhancements Needed', GAO-01-312. February 2001, p. 5

285 'Nuclear Nonproliferation: Security of Russia's Nuclear Material Improving; Further Enhancements Needed', op. cit., p. 3

Unfortunately, the Soviet system has created some paradoxical methods of accounting. Due to an obsession with over-production, it became a common practice to manipulate numbers, even of fissile material. The nuclear facilities would produce extra plutonium without it been registered in case of a short fall in production in the following years.[286]

The U.S. National Research Council (NRC) has specified the following:

> «…The Soviets maintained primitive accounting systems for direct-use material at each facility, relying primarily on handwritten documentation and only occasionally on computer-based records. The documentation was not always complete or easily retrievable […] there were significant errors in the records (e.g., in one case, supplies of HEU were recorded as low-enriched uranium)…» [287]

Such a peculiar accounting system left a problematic heritage in terms of non-proliferation. First, it is a reason for the present lack of an MPC&A culture in Russia (it is only recently that Russian authorities gradually started to appreciate importance of the comprehensive MPC&A system). Secondly, the accumulation of materials for future accounting purposes creates additional risk of diversion of nuclear material by insiders, who are aware both of certain amounts of unaccounted material and the possibility of misplacing it gradually in small amounts without being caught.

It should be noted that during the Soviet times, accounting for the nuclear material was not a priority for the state, because the nature of the state itself made theft from inside very unlikely. Due to the isolation of the Soviet state, highly secretive military nature of activities connected with nuclear weapons production, tight state control and reliance on the personal responsibility of nuclear custodians, and a lack of outside demand for nuclear material – the insider threat was not an issue during the Soviet period.

In the case of modern Russia, both types of threats - from outsiders and insiders - cannot be neglected. Therefore, the whole philosophy of how to make

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286 Jessica Eve Stern, 'Cooperative Activities to Improve Fissile Material Protection, Control, and Accounting' in Shields and Potter, eds., *Dismantling the Cold War*, op. cit., p. 314

287 Protecting Nuclear Weapons Materials in Russia, National Research Council, Office of International Affairs, National Academy Press, Washington, D.C.1999, p. 9-10

nuclear materials safe needs to change. Providing for a high level of MPC&A would be a good starting point.

5.5.2. Three Components of MPC&A

The purpose of the U.S.-funded MPC&A Programme is to rapidly reduce the threat posed by unsecured Russian nuclear weapons-usable material. The MPC&A Programme provides Russian nuclear facilities with modern safeguards, material accounting and physical protection systems; training for nuclear personnel in proper MPC&A techniques; assistance in developing a comprehensive and enduring regulatory basis for nuclear material security in Russia; and assistance in improving the physical protection of nuclear weapons-usable materials in transit.[288]

MPC&A consists of three main components: [289]

1. ***The Physical Protection System*** includes such elements as fences, multiple barriers to entry, limited access points, alarms, motion detectors, metal doors, and video surveillance. Physical Protection Systems should enable the detection of any unauthorised penetration of barriers and portals, thereby triggering an immediate response, including the use of force if necessary. The system should delay intruders long enough to allow an effective response.[290]

2. ***Material Control Systems*** include such elements as seals attached to nuclear containers that indicate tampering or theft, identification codes that make it possible to verify readily the location and condition of material, badges for personnel, portal monitors and other devices to control egress from storage sites, authorised flow paths, storage locations, secure containers for material. **Material Control Systems** should prevent unauthorised movement of materials and allow

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288 Draft of A Report Card on the Department of Energy's Nonproliferation Programs with Russia, January 10, 2000, Howard Barker, Lloyd Cutler, Co-Chairs, Russia Task Force, The Secretary of Energy Advisory Board, United States Department of Energy, p. 25

289 'Nuclear Nonproliferation: Security of Russia's Nuclear Material Improving; Further Enhancements Needed', op. cit, p. 5; Oleg Bukharin, Matthew Bunn, Kenneth N. Luongo, Renewing the Partnership: Recommendations for Accelerated Action to Secure Nuclear Material in the Former Soviet Union', RANSAC, 2000

290 Protecting Nuclear Weapons Materials in Russia, op. cit., p. 12

for prompt detection of the theft or diversion of material.[291]

3. ***Material Accounting Systems*** include inventory systems and computerised databases that allow sites to keep track of the amount and type of nuclear material in specific buildings. **Material Accounting Systems** should ensure that all material is accounted for, enable the measurement of losses, and provide information for follow-up investigations of irregularities.[292]

5.6. Origins of MPC&A Programme – the Evolution of Decision-Making

The MPC&A Programme has been modified over time. Looking at different stages of its evolution and the role of different agencies in its implementation fits well into the bureaucratic politics decision-making model chosen as a theoretical framework for this study. The role of key political actors has been crucial in how the programme developed. Other important factors include political, social and economic conditions, in which MPC&A Programme has to operate in Russia. Lack of funds in Russia, secretiveness with regard to facilities, which need security upgrades, an underdeveloped MPC&A culture and inadequate personnel training, as well as bureaucratic hurdles contribute to problems of implementation.

5.6.1. The Government-to-Government Programme

The first effort to assist the former Soviet Union in improving material protection, control and accounting began in 1992 in the form of a Government-to-Government Programme. The Government-to-Government Programme was part of Department of Defence (DOD) CTR Programme.[293] The Programme's initial legal status was based on the 'Agreement Between the United States of America and the Russian Federation Concerning Safe and Secure Transportation, Storage and

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291 ibid

292 ibid

293 NTI, 'Russia: DOE: MPC&A Program', http://www.nti.org/db/nisprofs/russia/forasst/doe.mpca.htm retrieved on 09.09.03

Destruction of Weapons and Prevention of Weapons Proliferation' signed in June, 1992 – the CTR "umbrella" agreement.

That initial period of negotiations on MPC&A was a difficult time – the Russian authorities were suspicious of U.S motives and refused to allow intrusive inspections at their sites. The first bilateral agreement on the development of national systems for physical protection, control and accounting of civilian nuclear materials was reached in September 1993 but the cooperation was limited to low-enriched uranium (LEU) only.[294]

The authors of the report 'Foreign Programs Reducing Russia's WMD Threats: Appraisals and Outlook'[295] believe that there were three main reasons for the slow pace of the Government-to-Government programme: the difficulty to reach an agreement on access to facilities with 'direct-use' material; MINATOM's reluctance to acknowledge GAN's role in supervising nuclear safety at its facilities; and a requirement imposed by the U.S. Congress to buy only American equipment and expertise. [296]

Russian authorities were adamantly opposed to the idea of allowing American specialists access to highly sensitive sites. The facilities, where most of fissile material is located, are the most sensitive sites in the Russian nuclear complex. Allowing U.S. experts to the 'heart' of the Russian nuclear establishment was seen as a serious breach of the national security interests of the Russian state. Russian legislation did not provide a clearly defined status for GAN, and MINATOM was opposed to being 'regulated'. The provision imposed on Russians to buy only American equipment and other goods was an impractical and disappointing requirement. Very often it would have been easier and beneficial for the programme to use Russian-made equipment, thus, reducing the cost, the time for delivery, and avoiding problems connected with unsuitability of American goods for Russian conditions.

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294 Bukharin, Bunn, Luongo, 'Renewing the Partnership', op. cit., p. 46

295 This report has incorporated findings of the CSIS Project 'Strengthening Cooperative Threat Reduction with Russia: A U.S.-European Initiative', The PIR-Centre, Moscow, April 15, 2002

296 'Foreign Programs Reducing Russia's WMD Threats: Appraisals and Outlook', CSIS Project 'Strengthening Cooperative Threat Reduction with Russia: A U.S.-European Initiative', The PIR-Centre, Moscow, April 15, 2002, p. 41

Although, the initial period of the MPC&A Programme (at its Government-to-Government) was rather complicated, it laid the groundwork for the unprecedented process of cooperative efforts in making Russian fissile material more secure.

5.6.2. The Lab-to-Lab Programme

The year of 1994 was a turning point for the MPC&A Programme. That year the U.S. Department of Energy (DOE) launched a separate parallel programme called Laboratory-to-Laboratory. The main idea was to introduce cooperation between the U.S. and Russian nuclear scientists, on a more informal, less politicised level. It was one of the best solutions to the problems encountered by the initial DOD's Government-to-Government Programme. At the time, when bureaucrats had difficulty to overcome the legacies of the Cold War and make the extra effort required to restructure the mechanisms of how their government organisations worked, scientists and production workers were more open to cooperation.

The success of the lab-to-lab programme can be explained by the theories of influence of transnational movements, which assign an important role to the epistemic communities in developing international cooperation.[297]

Even during the height of the Cold War, the nuclear scientists were not as hostile to each other as the systems they were representing. There are some good examples taken from anthropological studies of American nuclear labs and Soviet scientists' autobiographies, which demonstrate this.[298] The American and Russian scientists have always been interested in each other's work and after the collapse of the Soviet Union were prepared to work on projects of mutual interest Several years before the Lab-to-Lab Programme was officially established by DOE, scientists had already

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297 Risse-Kappen, 'Bringing Transnational Relations Back In: Non-State Actors, Domestic Structures, and International Institutions', op. cit.

298 Some examples include: Hugh Gusterson, *Nuclear Rites: a Weapons Laboratory at the End of the Cold War*, University of California Press, 1998; Roald Sagdeev, *The Making of a Soviet Scientist: My Adventures in Nuclear Fusion and Space From Stalin to Star Wars*, John Wiley & Sons, 1994

established strong informal ties. They began to discuss joint work on projects such as pulsed power, hot magnetised plasmas, and soft X-rays.[299]

The two main nuclear laboratories: U.S. Los Alamos National Laboratory (LANL) and the Russian major nuclear lab in Sarov (Arzamas-16) - developed extremely productive ties and in this way put a firm ground for a more structured cooperation proposed by the Lab-to-Lab Programme. The initial steps of the Lab-to-Lab Programme included a demonstration of MPC&A technologies in Sarov and implementation of pilot projects for MPC&A upgrades at Sarov, the Kurchatov Institute, and the Institute of Physics and Power Engineering (IPPE).[300] Among participants of the Lab-to-Lab Programme were the All-Russian Scientific Research Institute of Experimental Physics (VNIIEF), the All-Russian Scientific Research Institute of Technical Physics (VNIITF), Siberian Chemical Combine (SCC), the Bochvar All-Russian Scientific Research Institute of Inorganic Materials (VNIINM), the All-Russian Scientific Research Institute of Automation, and the ELERON company.[301]

The lab-to-lab initiative played a crucial role in the process of trust-building between Russia and the United States. As a result, the Russian authorities began to allow access to some of the facilities with HEU and Plutonium. In 1994 the first reciprocal visits to plutonium storage facilities were exchanged, and the first contracts for rapid MPC&A upgrades were issued.[302] The Lab-to-Lab Programme has been praised for its effectiveness. Several factors determined its success: the time frame; the elimination of suspicion; the bottom-up approach in moving forward cooperation; and the reduction of the "brain-drain" threat.

The process of the implementation of projects was simplified because there was no need to negotiate and sign state-level agreements. Laboratories on both sides could arrange direct straightforward contracts, which were not subject to congressional

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299 NTI, 'Lab-to-Lab Program', http://www.nti.org/db/nisprofs/russia/forasst/doe/labtolab.htm retrieved on 15.04.02

300 ibid

301 'Sotrudnichestvo vo imya global'noi bezopasnosti' ('Cooperation for the Global Security'), op. cit, p. 94

302 Bukharin, Bunn, Luongo, 'Renewing the Partnership', op. cit., p. 46

approval and restrictions. The American and Russian scientists involved in the Lab-to-Lab initiative established personal ties and built trust throughout the years of scientific cooperation. The fact that they shared a common understanding of what was important and necessary, what needed to be done at first place, and the ways of how to do it had a positive effect on bringing two sides closer.

Once the nuclear scientists on both sides defined the priorities in cooperative threat reduction initiatives, they could influence the officials, state agencies and government in their countries from 'bottom-up'. In the case of the Russian bureaucracy, especially, an understanding of nuclear safety and security needs and an appreciation of cooperation with the U.S. demonstrated by Russian scientists played a major role in moving forward decision-making at state level. U.S. observers acknowledged that Russian scientists simply 'know better' how to deal with the mechanisms of the Russian bureaucracy, and therefore, can prove to be an important tool in influencing the government.[303] Involvement of Russian scientists in the lab-to-lab initiative projects also contributed to lessening of the 'brain drain' problem (the problem of 'brain-drain' is further discussed in Chapter 7).

The main shortcoming of the lab-to-lab programme was that it was only limited to the U.S. and Russia,[304] and did not include other former Soviet republics, which could have benefited from such cooperation. Until 1996 the MPC&A initiative was implemented on two levels: the government-to-government programme (under auspices of the DOD) and the lab-to-lab programme (under the auspices of the DOE).

The lab-to-lab programme in its early years escaped bureaucratic problems, while the process was much more ponderous in the government-to-government programme.[305] However, in terms of programme goals there was a little difference between the two programmes.

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303 Interviews with the U.S. non-proliferation experts in Washington D.C., March 2003

304 'Foreign Programmes Reducing Russia's WMD Threats', op. cit., p. 42

305 Interview with the U.S. senior national lab official, Washington D.C., 02.04.03

5.6.3. Consolidation and Expansion of MPC&A-related Activities

In 1996 Department of Energy received funding responsibilities for all MPC&A activities. In this way, MPC&A efforts of the DOD and the DOE (the Government-to-Government and Lab-to-Lab Programmes) were managed as separate programmes, although the funding was coming from one source – the Department of Defence. The two programmes were coordinated by the laboratory experts brought to DOE headquarters under the supervision of the Director of the Office of Arms Control and Non-proliferation.[306]

The period of 1995-1996 was a time of rapid expansion of MPC&A activities: the number of sites, where MPC&A upgrades were implemented grew dramatically. However, there was a setback to that process of acceleration - by late 1995 the Russian FSB became concerned with the number of American visits to the nuclear sites in Russia, which resulted in the imposition of more formal controls over the U.S.-sponsored MPC&A activities.[307] By 1995-1996 labs lost decision-making authority. In February 1997 DOE consolidated its Government-to-Government and Lab-to-Lab Programmes into the Material, Protection, Control, and Accounting (MPC&A) Programme. The MPC&A Programme is now under the auspices of DOE's National Nuclear Security Agency.[308] From the Russian side the main partners are the Ministry of Atomic Energy (MINATOM) and Gosatomnadzor (GAN). Additionally, U.S. DOE signed agreements on cooperation with the Russian Navy and several Nuclear Centres.

There are varying opinions on the reasons behind the consolidation of the two programmes, and on its effect on the MPC&A work in Russia. Some believe that it was necessary to consolidate management, and the process of work remained the same.[309] At the same time, another group of experts saw a negative trend in consolidation, which, in their opinion, resulted in diminishing role of the lab-to-lab cooperation.

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306 Bukharin, Bunn, Luongo, 'Renewing the Partnership', op. cit., p. 46

307 ibid

308 NTI, 'Russia: DOE MPC&A Program', http://www.nti.org/db/nisprofs/russia/forasst/doe/mpca.htm retrieved on 12.04.02

309 Interview with the U.S. senior national lab official, Washington D.C., April 2, 2003

Bukharin et al. note:

> "The lab experts who had led both parts of the effort were forced out, management was taken over by federal officials, and the role of both the U.S. and Russian experts in general was substantially de-emphasized."[310]

Although current MPC&A managers give credit to the Lab-to-Lab efforts in preparing the ground for negotiations that were difficult for the governments, they would not want MPC&A activities to be shifted to labs again. They consider that if there is government support for certain projects, it is better to build on the agreement already achieved by the governments, and that the "labs not necessarily reflect bigger strategy views of the government".[311] The fact that the labs do not reflect the larger strategy and policy of the government might be exactly why the lab-to-lab initiative was successful in avoiding politically-induced impediments experienced by all the other CTR projects. The lab representatives operate from the basis of the interests of their respective labs (i.e. interest in joint scientific, non-proliferation projects; funding appropriated to labs for these projects).

Due to the rapid expansion of the programme some new ways of implementing the programme's activities were introduced: an improved computer-based financial and status monitoring of all projects was instituted, and the new guidelines on the standards for the upgrades were defined.[312]

In March 1999 the MPC&A Programme was expanded (as a part of the Expanded Threat Reduction Initiative) to include some new projects: The Material Conversion and Consolidation Programme (MCC) and The Site Operations and Sustainability Programme. The MCC Programme is designed to reduce the number of sites, buildings, and former Soviet republics, where fissile material is located (it is planned that by 2010 weapons grade nuclear material will be moved from 50 buildings located at 5 facilities).[313] Currently, there is an MCC pilot programme at the facilities of Luch (near Moscow) and at the Scientific Research Institute of Atomic Reactors (NIIAR)

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310 Bukharin, Bunn, Luongo, 'Renewing the Partnership', op. cit., p. 46

311 Interview with the DOE official, Washington D.C., April 2003

312 Bukharin, Bunn, Luongo, 'Renewing the Partnership', op. cit., p. 46

313 'Sotrudnichestvo vo imya global'noi bezopasnosti' ('Cooperation for the Global Security'), op. cit., p. 99

(in Dmitrovgrad). The projects involve blending down 24 tons of HEU to LEU at these sites, which can no longer be used in production of weapons.[314] The focus of the MCC Programme is less on the *quantity* of materials, but on the *number* of sites.[315] Currently, the MCC Programme has stalled due to a number of reasons. MINATOM is not prepared to provide a list of sites, from which material can be removed, until a separate agreement is in place on material consolidation activities. Another reason is the unwillingness of the managers of the facilities to give up material stored at their sites. They see the presence of nuclear material as a guarantee that U.S. funding will be allocated to their facilities for MPC&A upgrades.[316]

The Site Operations and Sustainability Programme is designed to provide the basis for the long-term sustainability of MPC&A activities.[317] This programme involves establishing training facilities in Russia and developing regulatory standards for MPC&A. Every team at each site focuses on ensuring that the results of their work will be sustained over time, and the policy objective is to lessen Russia's reliance on U.S. funding.

In the spring of 1999 responsibility for the non-Russian NIS was transferred from the MPC&A Programme to DOE's Office of International Safeguards, leaving MPC&A concentrate solely on Russia.[318] In October 1999 Russia and the U.S. signed a government-to-government agreement that extended U.S.-Russian MPC&A cooperation, established a Joint Coordinating Committee, and authorised the development of alternative measures to resolve issues of access to Russian facilities.[319]

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314 ibid

315 Interview with John Gerrard, DOE, Washington D.C., March 2003

316 'Sotrudnichestvo vo imya global'noi bezopasnosti' ('Cooperation for the Global Security'), op. cit., p. 100

317 NTI, 'Russia: DOE MPC&A Program', http://www.nti.org/db/nisprofs/russia/forasst/doe/mpca.htm retrieved on 27.02.02

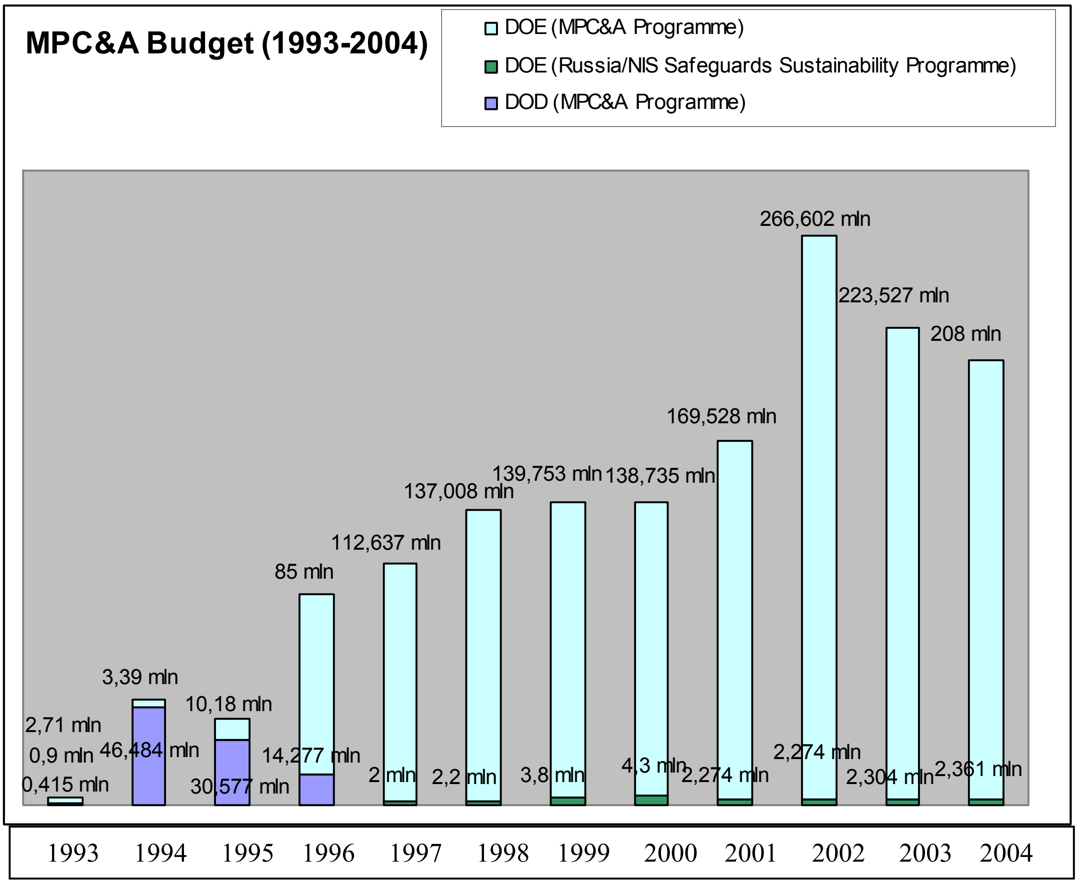
318 Nuclear Status Report', op. cit., p. 58

319 NTI, 'Russia: DOE MPC&A Program', http://www.nti.org/db/nisprofs/russia/forasst/doe/mpca.htm retrieved on 27.02.02

5.7. MPC&A Programme Implementation

The Figure 2 presents the MPC&A budget during the period of 1993-2004.

Figure 2 MPC&A Budget (1993-2004)[320]



There are 59 major nuclear sites in Russia, 31 of which are nuclear production/reprocessing facilities and nuclear research centres, and 27 are naval bases and shipyards. The analysis of the upgrades already implemented or planned can help to evaluate the pace of the DOE-funded MPC&A assistance to Russian nuclear facilities. The analysis is based on the information provided in Appendix 2. The most recent comprehensive data available in the open sources is of 2001.[321] Out of 31 nuclear facilities in Russia: MPC&A upgrades were completed at 13; work began but was not completed at 12; work has not begun or was suspended at five of them; and one facility

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320 Source: Bunn, Wier, Holdren, 'Controlling Nuclear Warheads and Materials', op. cit., on-line companion, at http://www.nti.org/e-research/cnwm/stabilizing/mpca.asp#budget retrieved on 03.02.04

321 Data in Appendix 2, which provides basis for this section was generated from Nuclear Status Report, op. cit.

was determined to be in no need of MPC&A upgrades.

The situation with the MPC&A upgrades at the naval facilities is different from the other nuclear facilities. The amounts of fissile material kept at the naval sites are smaller, and the type of their storage (nuclear fuel is confined inside a submarine reactor) poses a lesser proliferation risk. Out of 27 naval sites in Russia – nine do not require MPC&A assistance because the nuclear fuel in a submarine reactor is considered to be safe once the reactor is operational. It is not clear whether three other sites do not have MPC&A upgrades for the same reason. Nine naval sites have undergone MPC&A upgrades and the work at those sites has not been completed. At two sites the work is believed to have started but it is not known whether it has been completed or not according to the latest available data published in 2001. At the remaining nine sites – DOE is considering implementing MPC&A upgrades and is negotiating it with either Russia's MINATOM or GAN. At one of the sites (Olenya Naval Base) the MPC&A upgrades were completed at the PM-12 fuel-transfer ship, which also operates at Nerpa Shipyard.

MPC&A achievements at Navy facilities are an illustration of a very successful cooperation. Ninety-five percent of the Russian sites suggested by Navy as requiring assistance have had MPC&A upgrades.

5.8. Analysis of Each Component of MPC&A Upgrades

The information available on MPC&A upgrades in Appendix 2 demonstrates some general trends on how the programme works and what are the most common measures to improve material protection control and accounting systems in Russia. It is apparent that the MPC&A programme had to prioritise its activities. First, the upgrades had to be implemented at those buildings at numerous Russian sites, where the potential proliferation risk was the greatest and to which U.S. experts could have been granted access. Among such buildings were reactor, critical assembly and storage facilities, where the amount of fissile material was the largest.

MPC&A upgrades implemented at the Russian nuclear facilities can be generally summarised in accordance with the three defined levels: physical protection, material control system, and material accounting system.

Improving physical protection is the first priority of MPC&A improvements at any of the Russian sites. Although, historically, physical protection from outsider threats was highly advanced, nowadays it needs enhancement. Adam Bernstein believes, the necessary physical infrastructure in Russia (guard forces, secure perimeters) is either already in place or could easily be put into place given the necessary financial resources.[322] Among the upgrades often implemented are the following measures: installation of hardened doors, metal detectors, video surveillance, alarm systems and a physical protection control centre; area wide physical protection upgrades include vehicle and pedestrian portal monitors and metal detectors at key points of the facilities.

It is hard to evaluate the overall progress of physical protection upgrades at the Russian facilities due to the different level of the work done at the different sites. It is believed that the physical protection of nuclear material is extremely good at some of the facilities, while some others raise concern in terms of proliferation risk:

> "…Whether due to Russian efforts and the influx of U.S. and other foreign assistance, Russian physical protection has become a mixed bag of old and new practices and attitudes, and of outdated and up-to-date equipment, both at relatively stable and economically strapped facilities…"[323]

The upgrades of the material control system have become an important part of limiting the risk of the external and internal thefts. Material control system improvements implemented by the MPC&A programme in Russia include the following measures: installation of access controls, implementation of a computerised badging system, construction of a centralised MPC&A control station, development of a tamper-indicating device programme, bar codes, provision of special nuclear-material portal and hand-held monitors, the use of electronic scales, tags and seals, equipment for nuclear material management.

The lack of adequate material accounting in Russia is one of the main deficiencies of its MPC&A system. As was discussed earlier, the lack of accurate accounting of fissile material can lead to its gradual leakage without being noticed by the controlling authorities. Therefore, the improvement of the material accounting

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322 Adam Bernstein, Russia: The Scale of the Nuclear Materials Protection and Accounting Problem in Russia, January 1998, NTI, at http://www.nti.org/db/nisprofs/russia/reactor/mpca/ff_rumpc.htm retrieved on 10.09.02

323 ibid

system is another important task of MPC&A programme in Russia. The main measures to improve the material accounting system include the following: measured physical inventory of nuclear materials, computerised material accounting systems, the use of methods for automated material accounting.

Due to the absence of a sound material accounting culture in Russia, the process of completing an inventory of nuclear material will take a long time. First of all, it is a pain-staking process of re-measuring all the existing material given the inaccurate accounts left from the Soviet times. Secondly, an even harder task is to introduce a whole 'culture' of material accounting – to make sure the Russian nuclear custodians are aware of the vital importance of accurate inventories.

5.9. The Key Players

As with all the other major CTR programmes, certain key players had an important role in shaping the implementation of the programme. Throughout the development of the MPC&A Programme, responsibility for its implementation shifted between different U.S. agencies. The transfer of programme authority from a military organisation (U.S. Department of Defence) to a civilian agency (U.S. Department of Energy) has eased some of the tension in carrying out the projects.

Initially, funding for MPC&A projects was coming from the Department of Defence budget, as a part of the Cooperative Threat Reduction Programme. Even when the funding was coming from DOD's budget, the actual implementation was undertaken by DOE experts. From 1994, when DOE launched its separate Lab-to-Lab Programme, U.S. national labs came to the forefront of the MPC&A activities in Russia. The role of the labs was decisive in moving forward the programme, especially since initial government-to-government programme stalled due to bureaucratic obstacles. Since 1996 DOE has become the main player on the U.S. side in the implementation of the MPC&A Programme, when it received the funding authority. By 1995-1996 the role of the labs started diminishing, and by 1997 – when the government-to-government and lab-to-lab programmes were consolidated – the role of the labs was formally reduced. At the moment, MPC&A Programme is managed by DOE's National Nuclear Security Administration (NNSA).

On the Russian side, U.S. DOE has two main partners: the Ministry of Atomic Energy (MINATOM) and GAN. Cooperation with MINATOM includes implementing

MPC&A upgrades at MINATOM's sites. GAN has a different role as a controlling agency. DOE provides GAN with necessary equipment and training to carry out MPC&A-related inspections of nuclear facilities.

5.10. Problems of Implementation

5.10.1. The Problem with Access

The MPC&A Programme is a peculiar mixture of unique achievements in the U.S.-Russian cooperative threat reduction and serious problems resulting from limitations in the bilateral relations. The MPC&A programme can be characterised as the most intrusive of all non-proliferation initiatives ever agreed on between the two countries. The achievement of its objectives requires intrusion into the most sensitive areas of Russia's nuclear complex – to the actual production, development and testing sites of the country. In order to ensure an adequate evaluation of the upgrades required at each site, to make sure they are put in and sustained correctly, the implementation team needs access to these facilities.

It is generally understood among MPC&A managers that Russian security services closely monitor activities connected with the programme implementation. However, DOE officials refer to the progress, which has been made over time, especially, with the Russian Ministry of Defence in receiving access to the Russian sites. It is believed that DOE's status as a civilian organisation plays a positive role in overcoming issues of access.[324]

The events of 9/11 drew a lot of attention to the safety of nuclear material in Russia. Some U.S. programme managers believe that the momentum should be used to resolve the access issue. In 2001 an agreement on access was signed, which formalised the already existing procedures. The agreement stipulates a 45-day waiting period before permission for access can be granted. It establishes a list of approved U.S. personnel, who are subject to a shorter waiting period of 30 days. However, according to U.S. programme managers, that agreement did not resolve the problem. Four Russian warhead production/dismantlement facilities under MINATOM's jurisdiction are on the list of the facilities, to which American specialists will likely never get access. However, two of them were supposed to be closed altogether in 2003, according to

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324 Interview with the DOE official, Washington D.C., April 2003

MINATOM's Deputy Minister Lev Ryabev.[325]

The lack of reciprocity with regard to access has a negative effect on the implementation of the MPC&A Programme – as in the case of all the other CTR programmes, which require unprecedented cooperation from the Russian security services and nuclear facilities, while similar facilities in the U.S. remain closed to Russian experts. The Russian side does not feel encouraged to provide better access to its nuclear sites for MPC&A upgrades, since the U.S. is reluctant to open its own facilities to Russians, even in order to demonstrate how MPC&A standards should be maintained. Even some American officials and experts acknowledge the need of reciprocity in this case.[326]

5.10.2. Historical Legacy – Russia's Suspicion and Bureaucratic Bottlenecks

Decades of hostility between America and the Soviet Union during the Cold War left a legacy of suspicion and lack of trust. The nuclear establishments of the two countries were geared up to work against each other and more than four decades years of antagonism resulted in some major trends in the organisational culture. The theoretical Model of Organisation Culture (briefly presented in Chapter 1 and further discussed in Chapter 3) demonstrates the importance of the organisational interests and values of the main participants in the state decision-making process. During the Cold War period the military and nuclear industries were developing and thriving on the necessity to override the opposite side in terms of quantity and quality of the nuclear weapons. The end of the Cold War changed the foundation of the international security system and the necessity to perfect nuclear capabilities no longer exists; however, this new reality is still not fully apprehended by some of those closely involved in the nuclear industry.

Russia feels it is still necessary to guard the secrets of the nuclear industry and has a need to secure the weapons and materials. Russia is under pressure to strike the right balance between useful cooperation and the protection of the country's most sensitive information.

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325 'Sotrudnichestvo vo imya global'noi bezopasnosti', ('Cooperation for the Global Security'), op. cit., p. 96

326 Interviews with several U.S. non-proliferation experts, Washington D.C., April 2003

Some aspects of the MPC&A work are complicated by the bureaucratic procedures on the Russian side, like, for example, travelling to Russia. Currently, before any American expert can travel to Russia he has to overcome some obstacles. In order to receive permission for such a trip an application to the Russia's Federal Security Service (FSB) should be made. An application for proposed travel should be made 6 weeks before the trip for it to be reviewed by the FSB[327], and there is no guarantee access will be granted.

5.10.3. Lack of Mutual Transparency and the U.S. Bureaucracy

Both the suspicion and the bureaucratic bottlenecks are not limited to Russia. There is a general lack of mutual transparency of the nuclear inventories, the work done at the nuclear facilities and other aspects of the nuclear establishments. Suspicion towards the U.S. presence at the Russian nuclear sites results from a lack of reciprocity on the American side and the overall lack of transparency in the nuclear field. Many Russian experts believe they have grounds to oppose the American presence at some of the most sensitive nuclear facilities due to interests of national security.

There are several bureaucratic problems on the American side. Both the Department of Energy and the State Department considerably delay the trips of U.S. experts to the Russian facilities. The U.S. DOE has an almost equally complicated process of allowing its own experts to receive permission to travel to Russia as does the Russian FSB. After the scandal with the Chinese espionage the DOE imposed rigorous restrictions on contact with foreigners from the so called «sensitive countries» – Russia was included in that list. As for the State Department, it has the power to approve «country clearances», which it regularly delays for various reasons.[328] (Refer to the role of the State Department discussed in Chapter 3)

It is not surprising that with the bureaucratic obstacles coming from both sides, the progress of the programme becomes dependent on the organisational behaviour of certain state agencies. The situation when each state agency involved in the process, is trying to guard its interests (as well as the interests of its country, as they believe) serves a good practical example for the theory represented by the Organisation Process Model (Chapters 1 & 3).

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327 Bukharin, Bunn, Luongo, 'Renewing the Partnership', op. cit., p. 51

328 ibid

Several measures can be taken in order to resolve or lessen the problems of access, secrecy and travel. First of all, the Russian experts should be allowed adequate level of access to the U.S. facilities. Allowing Russian specialists to see similar facilities in the U.S. as those they work for in Russia can serve several useful purposes. It can be a good way for Russian nuclear custodians to learn advanced MPC&A techniques from their colleagues' experience. Moreover, a policy of openness from the American side can be a confidence-building exercise and can dramatically improve the spirit of partnership between two countries. For the Russian authorities, it is important to remember that the U.S. Government is assisting Russia with securing its weapons and materials (even though the U.S. Government does it for its own national security reasons). It is also vital for the success of the programme, for the organisations involved to work as a team, not as single representatives of the state. The bureaucratic hurdles obstructing several aspects of the implementation track, including the access to the facilities and problem of travelling for the American experts to Russia, should be eliminated (in an ideal scenario) or at least lessened.

5.10.4. MPC&A is Hostage to Problems in U.S.-Russian Relations

The U.S.-sponsored non-proliferation assistance programmes in Russia are hostage to a whole spectrum of other issues in the bilateral relations. Problems in the implementation of MPC&A Programme and CTR-related projects are determined by the existing disagreements on issues of foreign policy in Russia and the United States.

Russia's nuclear sales to Iran, the Chechen war, and the war in Kosovo all contributed to the MPC&A Programme being undermined, either in terms of delay in its implementation or projects being scrapped all together. It was not the case that particular events had specific implications for a particular project; rather, changes in the climate of U.S.-Russian relations had an indirect effect on cooperation in unrelated areas such as MPC&A. In this way, the interdependence of the various developments in the bilateral relations plays an important role in determining the fate of the programme.[329]

329 An opinion expressed by several U.S. non-proliferation experts, interviews, Washington D.C., March-April 2003

5.10.5. The 'Buy-American' Clause

The Buy-American clause was always a serious obstacle to the implementation of the non-proliferation projects in Russia. In its early years, MPC&A Programme was affected by this condition attached more than any projects. The initial Government-to-Government part of the MPC&A Programme was funded by the Department of Defence, therefore, it was covered by original CTR "umbrella" legislation requiring the use of American contractors and equipment whenever possible.

The constraints imposed by this requirement to buy American goods and expertise had a negative effect on the programme. First of all, it gave Russian authorities a wrong idea of the reasons behind U.S. willingness to assist with the nuclear security upgrades at its facilities. The Russian side was questioning whether it was the readiness to share the burden of dealing with a critical situation or a means of boosting the U.S. economy.

The second reason behind the discontent of the Russian authorities and nuclear custodians with the idea of a Buy-American clause was its impracticality. The implementation of a number of projects was delayed because of the waiting period for when the equipment would arrive from the United States. Moreover, in some cases it was better to use locally produced equipment due to easier maintenance and suitability for the needs of the Russian nuclear facilities. Last, but not the least, the cost of the equipment purchased and shipped from America added up to the expenses of the programme's budget; that meant that the money, which could be spent on further nuclear upgrades were not spent in a most rational way. Overall, it was noted that Buy-American policy 'drastically diminished the motivation of the economically stressed nuclear sites to cooperate with the Program'.[330] Since the programme was moved from the Department of Defence to the Department of Energy, there no "Buy-American" clause has been attached. The DOE was not obliged to follow conditions outlined in the original CTR legislation, and could work out its own terms with the Russian MINATOM, GAN and Navy.

The MPC&A Programme is a positive example of the U.S. government proving to be more flexible with the terms of providing assistance. Currently, most of the equipment going for MPC&A upgrades is produced and bought in Russia. Exceptions

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330 Frank von Hippel, 'Fissile Material Security in the Post-Cold-War World', p. 2, at http://www.ransac.org/new-web-site/pub/reports/fissilesecurity.html retrieved on 06.06.02

include pieces of equipment, which Russia simply does not produce, such as CCTVs. There was an understanding that since the sites, where MPC&A upgrades are required, are so sensitive, the programme should rely more on Russian equipment provided it has some advantages in terms of price, operation and other aspects.[331] The change in practice of implementing MPC&A projects was a very positive development.

5.10.6. Management Problems and the Lack of Russian Participation

There are two major problems in how MPC&A is currently managed. First of all, a constant shuffling of the U.S. experts working at the Russian sites undermined the possibility of fruitful cooperation based on the long-term commitment of American experts and their Russian colleagues. It was reported that the frequent change of the U.S. team leaders at the nuclear sites was a source of annoyance for the Russians. This can be an issue of cultural differences, since it is a regular practice for U.S. officials to be transferred from one position to another more or less frequently, while Russians find it hard to adjust to it.

Bukharin et al. note that:

> «…Each site was constantly having to accommodate itself to new team leaders with new approaches...»[332]

Russian policy experts from Moscow's PIR Centre characterise this problem in the following way:

> "…It [frequent change of American personnel] has a negative impact on the competence and level of personal responsibility of employees responsible for that or another area of work. Moreover, it is exactly the frequent personnel changes that are quoted by many Russian programme participants as the main reason for unsolved problem of access – since they hamper establishing trusting working relations between the partners. Russian working groups at nuclear sites do not change for several years, while changes in the American teams happen several times a year…"[333]

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331 Telephone interview with Oleg Bukharin, Princeton University, April 1, 2003

332 Matthew Bunn, Oleg Bukharin, Kenneth Luongo, 'Renewing the Partnership: One Year Later', p. 5, at http://www.ransac.org/new-web-site/primary/secure/mpca/inmm-2001-mpca-paper.html retrieved on 13.01.02

333 'Sotrudnichestvo vo imya global'noi bezopasnosti' ('Cooperation for the Global Security'), op. cit., p. 104

Another shortcoming in the Programme's management was the limited (almost non-existent) participation of the Russian scientists after Lab-to-Lab and Government-to-Government programmes were merged. An important precondition for any successful project is a spirit of partnership between its participants. In case of the MPC&A programme, this spirit was almost lost, when the Russian specialists found themselves practically excluded from the programme's management process.

It is apparent that a lack of attention to and respect for the opinions of the Russian specialists is not only undermining the idea of cooperative threat reduction, but also wastes a unique chance of influencing the policies of the Russian government from the bottom-up. It is apparent that the Russian scientists motivated to advance co-operative threat reduction programmes would be more successful in overcoming the hurdles of the Russian bureaucracy rather than anyone from the outside. Therefore, it is vitally important for the American authorities to implement the MPC&A Programme in full partnership with their Russian colleagues. It has to be noted that there was progress in addressing these issues recently; however, they are still not resolved.

5.10.7. The Economic Crisis in Russia/The Crisis of Military Morale

The early 1990s in Russia are associated with severe disruption of the socio-economic system. The living and working conditions have deteriorated dramatically prior and after the collapse of the Soviet Union. Moreover, the economic crisis of August 1998 severely damaged an already weak economy. In such conditions, the Russian state alone is not capable of making any considerable changes in the enhancement of the safety and security of its nuclear materials. A strong foreign participation in the form of an existing MPC&A Programme is a vital tool in making Russian fissile material safer.

Having said this, it should be noted that the Russian government is upgrading security systems at its nuclear installations, although this work is considerably constrained by a lack of financial resources. The Federal Special Programme 'Nuclear and Radiation Safety of Russia for 2000-2006' incorporates a programme on the 'Creation of the State System for Control and Accounting of Nuclear Materials and the State System for Control and Accounting of Radioactive Substances and Waste'. However, the funding approved by the Russian Government for the implementation of this programme[334] is only about 70 million rubles for 7 years - approximately 30 times less than actually needed.[335] These numbers demonstrate the critical economic condition, in which the Russian authorities are trying to maintain their nuclear complex safe and secure. The lack of financial resources has a direct detrimental effect on the morale of the military and contributes to the problem of the safety and security of nuclear material at Russian facilities. Military personnel and workers in the nuclear complex live in a constant state of anxiety about their financial survival, which is bound to affect the way in which they regard and carry out their day-to-day duty in a job that does not pay them enough to live. (Chapter 7 discusses this problem in detail)

5.10.8. The Lack of an MPC&A Culture

As was discussed in the introduction to this chapter, due to legacies of the Soviet times the institutional culture and the working practices in the nuclear facilities in modern Russia are not appropriate to the establishment and maintenance of an adequate MPC&A system. There have been numerous incidents when the equipment supplied to Russian facilities as part of MPC&A assistance was used inappropriately. The reason for this is a lack of experience in operating modern equipment, and an immature "safety culture" among workers dealing with the nuclear materials. Very often employees at nuclear facilities do not wish or are not trained to follow the necessary procedures, and pay not enough attention to the safety of nuclear material.[336]

Even more worrying is the fact that the managers of nuclear facilities managers do not see establishing adequate MPC&A systems as a priority. On most occasions they are not prepared to invest the resources of their own facility on upgrading MPC&A. This factor raises a serious question about the sustainability of what has been done with the help of U.S. assistance. There is also a lack of legal norms and rules for MPC&A procedures in Russia.

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334 Approved by the Government Decree #149 of February 2000

335 Press Release #743 of the Press Centre of the Government of the Russian Federation, September 28, 2000 as quoted in CSIS Project Report 'Foreign Programmes Reducing Russia's WMD Threats', op. cit., p. 39-40

336 'Sotrudnichestvo vo imya global'noi bezopasnosti' ('Cooperation for the Global Security'), op. cit., p. 98

5.11. The Overall Effectiveness of the MPC&A Programme

MPC&A upgrades can be divided into two phases: "quick fixes" ('rapid' upgrades) and comprehensive upgrades. At the inception of the programme, the threat was immediate and extensive. It was important to try and secure as many facilities as possible in the shortest possible time. At many sites, the focus was on "quick fixes", on providing basic safety and security measures to secure fissile material. The next level is to provide comprehensive security upgrades, which result in much more sophisticated protection of nuclear material.

Initially, the MPC&A Programme identified 252 buildings at 40 sites in Russia that required MPC&A upgrades: by the end of FY2002 (8 years since the Programme's inception), 37% of nuclear material in Russia have had 'rapid' upgrades, and only half of that number – have had 'comprehensive' upgrades.[337]

The effectiveness of the implementation of the programme varied during its course and was different in different areas. Thus, for example, MPC&A upgrades at Russian Navy sites were swift and comprehensive (about 95% Navy facilities have had MPC&A upgrades). Cooperation between the U.S. MPC&A managers and Russian Navy officials was more productive than with some other Russian agencies. The U.S. side was more apprehensive of the needs of the Russian Navy, and therefore, there were fewer controversies on the type of upgrades.[338]

Apart from solving the technical and logistical issues of the programme's implementation, it is vital to define the overall objective of the MPC&A. The obvious goal is to secure nuclear material and provide better control and accounting for it. However, there is a larger question of what is the final goal of the MPC&A Programme in Russia and how the effectiveness of the programme can be evaluated.

It is impossible to achieve a total security of the nuclear material in Russia, but it is possible to have a certain state of security – when it is difficult to illegally obtain any fissile material and when any loss will be immediately detected. In this respect, achieving this highest possible state of security in the shortest amount of time is imperative. No matter how many sites have been upgraded in terms of MPC&A, if there is still at least one site that lacks adequate control and protection the objective of

337 'Controlling Nuclear Warheads and Materials', on-line companion, at http://www.nti.org/e_research_cnwm/securing/mpca.asp retrieved on 21.11.03

338 Interview with the former Russian senior military official, Moscow, May 2003

the entire programme, i.e. the prevention of unauthorised access to weapons-grade nuclear materials, is at risk. It was discussed in this chapter how little fissile material is needed to construct a nuclear warhead. For example, just 10 kg of unprotected material falling into the wrong hands can be disastrous. One way of improving the efficiency of the programme in terms of the time it takes to upgrade individual sites is to increase the funding available for the implementation of the projects.

Like any other important non-proliferation initiative, the MPC&A Programme would only benefit if the funding allocated for its implementation was to be increased. The MPC&A Programme was praised for its achievements and the work already done, however, there is a lot which remains to be implemented. It is important to remember that this Programme deals with today's nuclear threats and anything not done today might turn into a nuclear disaster tomorrow. The authors of the CSIS Report 'Managing the Global Nuclear Materials Threat'[339] see the allocation of increased funding for the cooperative MPC&A Programme as a means to consolidate vulnerable nuclear material stockpiles at fewer locations and to improve the sustainability of security and accounting upgrades, without reducing the pace of installing security and accounting upgrades and providing training that was achieved in the previous years. The amount proposed to be added to the annual MPC&A budget is approximately $20 million - $165 million per year.[340]

The authors of another influential policy report[341] also single out the MPC&A programme (among few others) as a programme, which ought to receive additional funding. They note that this programme is well established and has embarked on new tasks (material consolidation work with the Russian Navy and MINATOM), and as such «is in a good position to receive additional funding commensurate with its expanding scope).[342]

However, in the course of interviews conducted for this research it became

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339 'Managing the Global Nuclear Materials Threat: Policy Recommendations', A Report of the CSIS Project on Global Nuclear Materials Management, CSIS, January 2000

340 'Managing the Global Nuclear Materials Threat, op. cit., pp.- 5-6

341 Draft of A Report Card on the Department of Energy's Nonproliferation Programs with Russia, January 10, 2000, Howard Barker, Lloyd Cutler, Co-Chairs, Russia Task Force, The Secretary of Energy Advisory Board, U.S. DOE

342 Draft of A Report Card on the Department of Energy's Nonproliferation Programs with Russia, op. cit., p. 36

apparent that MPC&A managers are more worried about getting more money than they can spend than current level of funding, according to DOE sources. According to one of the DOE's officials, the MPC&A Programme receives budget it needs, while having money appropriated but not spent would mean more criticism from the outside.[343] It seems that solving the problems of implementation, which limit the scope of cooperation, is an answer. If an agreement can be reached on a larger number of sites to be upgraded and the U.S. government allocates more human resources to the implementation of MPC&A Programme, spending larger amounts of money would not be problematic.

5.12. Conclusion

Apart from some purely logistical issues surrounding a swift and efficient implementation of the MPC&A projects in Russia, there are larger, more complicated questions. For example, what are the standards the MPC&A Programme is trying to achieve? At the moment, the DOE-sponsored MPC&A Programme is bringing Russia's MPC&A systems closer to what is present practice in America. There are some disagreements between the Russian and the American specialists on what the system should be like. According to American experts, Russian specialists are more concerned with the outside/perimeter threats, while the U.S. sees insider threats as equally important. American MPC&A managers say they design a security system best suited for each individual site they go to. Although, they not always agree with the Russians, the work remains a collaborative process. Ultimately, the design is produced by MINATOM, and the DOE specialists make changes through a negotiating process, which became easier over time.[344]

There are some technical peculiarities in the processes involving fissile material. The isotopic composition of the material can change and the mass is not conserved in nuclear process. This means net losses of the material are anticipated and this factor plays a role in how the material is accounted. In order to eliminate the inconsistencies in the balance sheet that arise as a result, managers might be tempted to conceal them by not registering the exact correct amount of the material used in the nuclear process

343 Interview with the DOE official, Washington D.C., April 2003

344 Interview with the DOE official, Washington D.C., April 2003

(a practice followed in Soviet times). This creates additional complications in having "absolute" volumes of the material.[345]

More importantly, the MPC&A Programme represents a completely different kind of an international agreement. By its nature, the main indication of its success is the technical viability, the safety and security of *all* nuclear sites and facilities in Russia. The MPC&A Programme will become irrelevant if these goals are no longer considered the ultimate aim. In this respect, this Programme as well as other CTR projects represents a new, **'absolutist'** form in arms control.

During the Cold War, arms control had political objectives in addition to the 'technical' objectives that were as, if not more important. The 'technical' objective of an arms control might be to limit the acquisition of certain types of weapons, exclude the development of certain types of weapon technologies or even reduce military arsenals. The political objectives usually were a reduction in tension and the establishment of apolitical dialogue. Often the political objectives were achieved even when strictly speaking the technical objectives were not. Non-proliferation differs from other kinds of strategic arsenal agreements in so far that the 'technical objectives' are of paramount significance, and the whole objective of non-proliferation fails unless they are achieved in full. The same applies to MPC&A, which is one aspect of non-proliferation. Thus, securing fissile material at every but one site can be considered meaningless. Only when **all** material is secured and as sustained as such one can consider MPC&A's goal to be achieved. The MPC&A objectives also put under the question how further dismantlement of nuclear weapons relates to the overall sense of nuclear security, since material extracted from the weapons is a more serious proliferation threat than the weapons themselves. It is a technically demanding process to retrieve the material from the warhead. Therefore, fissile material is relatively safer when trapped inside the weapons. These factors call for looking at broader implications of denuclearisation process on cooperative threat reduction. In other words, decisions taken on how many weapons to keep and how many to dismantle will influence the scope of what MPC&A Programme should achieve. In this case again, there is an obvious link between questions of a strategic nature (i.e. how many weapons to keep and how many to dismantle) and the scope of the MPC&A Programme, the goals it should try to achieve.

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345 During the secret operation on retrieving HEU stocks from a nuclear plant in Kazakhstan it was discovered that the actual amounts of material did not correspond to the records, source: William Potter, 'Project Sapphire: U.S.-Kazakstani Cooperation for Nonproliferation', in Shields and Potter, eds., *Dismantling the Cold War*, op. cit., p. 356

The MPC&A Programme is part of a larger cooperative threat reduction process, the role of which should be re-defined in the wake of international terrorism since 9/11. Since the terrorist attacks on the Twin Towers in America the threat of international terrorism seeking means of mass destruction is no longer perceived to be hypothetical. Before there was the perception of an elusive nuclear threat of rogue states or terrorist organisations seeking to acquire nuclear material or weapons, plenty of which was unprotected in Russia. Now the nuclear material is still largely unsafe in Russia and international terrorism has demonstrated its determination to cause casualties on a large scale.

The post-9/11 international security environment should have given a new perspective to the U.S. government on the importance of the non-proliferation, in Russia, in first place – a country with the largest numbers of unsecured nuclear material. In reality, the Bush administration seems to be distracted by political actions in other parts of the world.

The importance of the MPC&A Programme for cooperative threat reduction is two-fold. It is one of the most 'progressive' areas of cooperation. The implementation of MPC&A upgrades requires intrusion into the most sensitive nuclear sites in Russia and thus gradually extends the boundaries of what is possible in cooperative threat reduction. At the same time, the MPC&A Programme is the quintessence of limitations in U.S.-Russian cooperation, it brings out various constraints in bilateral partnership. Cooperation in the MPC&A framework became possible because the danger of nuclear material proliferation in the disintegrating Soviet Union was unprecedented. The political leadership in the U.S. and Russia realised the scope for potential disasters stemming from the fact that Russia was not able to provide safety and security for its nuclear material.

An analysis of the problems of implementation of MPC&A projects leads to the following conclusions. Given the severity of the risks of the diversion of nuclear material and the objectives of the programme that was created to address this threat, its practical implementation conflicts with the stated goals and the urgency of the problems. A 'rational actor' model is therefore not adequate to explain how MPC&A was handled. In line with the original hypothesis, the Bureaucratic Politics Model is appropriate to explain the problems of the programme's implementation the central objectives of which have so far only been partially achieved.

The political actors in both countries vary in degree of their support to cooperative threat reduction process. The organisational culture is one of the major factors determining the role the political actors play. Security and military establishments both in the U.S. and Russia are holding the most traditional views on international security and have been the slowest in accepting new reality of the post-Cold war security environment.

Nuclear scientists have been the most liberal group in terms of their views and ability to work together and have been instrumental in moving the MPC&A Programme forward (Lab-to-Lab Programme), where governments could not succeed. The successful example of the involvement nuclear scientists' involvement in the cooperative threat reduction process deserves special attention and should be seen as one of the ways to by-pass bureaucratic and political constraints.

The legislative branches – the U.S. Congress and Russian State Duma – sometimes hold MPC&A Programme, as well as other CTR programmes, hostage to unrelated problems in U.S.-Russian relations. At the same time, both Congress and Duma provided crucial support when it was vital for the take-off of the Programme, i.e. they authorised establishment of the most intrusive cooperative threat reduction programme.

The organisational culture of key political actors reflects the conditions in which they operate. The sensitivity and secrecy of nuclear facilities and decades of U.S.-Soviet antagonism contribute to the problem of access and other limitations in cooperation. U.S.-Russian cooperation in the area of nuclear safeguards is a completely new phenomenon, and both parties are still in the process of adjusting to it.

Chapter 6
Preventing the Proliferation of Fissile Material: Plutonium Disposition Programme and Highly Enriched Uranium (HEU) Agreement

While material protection, control, and accounting is essential to safeguard nuclear materials and prevent their proliferation, the risk will be much reduced if weapons grade nuclear material can be disposed of. This chapter discusses technical aspects of the disposition of highly enriched uranium (HEU) and plutonium. It discusses the U.S.-Russian Programmes dealing with each material separately - the Plutonium Disposition Programme and the HEU Purchase Agreement (HEU Deal). Both of these programmes are an important part of the cooperative threat reduction process, and there is a need for their consistent and efficient implementation.

The examination of Plutonium Disposition Programme and HEU Purchase Agreement contributes to the explanation of why CTR programmes have succeeded in some areas, while failing in others. The Bureaucratic Politics Model is used to evaluate how individual and organisational interests have shaped the implementation track of these two programmes. Apart from factors of a bureaucratic nature, programmes, which deal with disposition of fissile material, are complicated by technical issues, the sensitivity of the sites of where the projects have to be implemented, and by the overall state of U.S.-Russian relations.

6.1. Plutonium

6.1.1. Background of the Problem

A nuclear weapon typically requires 3-5 kilograms of plutonium.[346] The amount of weapons-usable plutonium stockpiled in Russia is not publicly known, estimates vary between 130 and 200 tonnes[347], and according to the former President Yeltsin Russia

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346 'Fissile Material Basics', op. cit.

347 As identified in Chapter 5

had 50 metric tonnes of excess Plutonium (not required for security needs) as of the year 1997.[348]

According to some estimates, Russia produces 1.5 tonnes of weapons-grade plutonium annually, and separates one additional ton of reactor-grade plutonium per year.[349] Weapons-grade plutonium is enriched so that it contains more than 90% Pu_{239}, reactor-grade plutonium contains only 60-70% Pu_{239}. Even reactor-grade plutonium can be used to produce nuclear weapons.[350] The U.S. has produced 111 metric tonnes of plutonium, and in 1995 President Clinton announced over 50 metric tonnes to be excess of the U.S. national security needs.[351]

Plutonium along with HEU is one of the main components of the fissile material used in nuclear weapons. There are technical problems with the disposition of plutonium; it is much harder to get rid off plutonium than of HEU. Plutonium can be blended with U_{238} to make fuel usable in ordinary power reactors, but this process is extremely costly, and the final product (Mixed Oxide (MOX) fuel) is not economically competitive with Low Enriched Uranium (LEU). Another problem is that it is easier to recover weapon-usable material from MOX than HEU from LEU. The recovery process only requires chemical separation techniques.[352] Therefore, the disposition of weapons-usable plutonium is a more challenging task than the disposition of HEU.

In order to evaluate the nature of the problem, we should look at the possible ways to utilise/dispose plutonium used in weapons. Both the U.S. and Russia see transforming weapons-usable plutonium into a form that meets the *spent-fuel standard* as a goal of plutonium disposition. In this form, plutonium is still recoverable for the use

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348 Nuclear Status Report, op. cit, p. 65

349 Allison, Coté, Jr., Falkenrath, Miller, eds., *Avoiding Nuclear Anarchy*, op. cit, p. 108

350 Matthew Bunn, John P. Holdren, 'Managing Military Uranium and Plutonium in the United States and the Former Soviet Union (excerpts)', at http://www.ransac.org/new-web-site/pub/reports/bunnholdren1.htm

retrieved on 02.07.02

351 'Russia: Plutonium Disposition Overview', at http://www.nti.org/db/nisprofs/russia/fissmat/plutdis.puovervw.htm retrieved on 07.07.02

352 Final Report of the U.S.-Russian Independent Scientific Commission on Disposition of Excess Weapons Plutonium, June 1, 1997, p. 7 It should be noted, however, that the chances that someone would try to extract plutonium from MOX are low. Nonetheless, technically such possibility exists.

in nuclear weapons, but it is no easier to utilise than civilian plutonium produced by nuclear power reactors.[353]

6.1.2. Two Approaches to Plutonium Disposition

There are two approaches to re-using Plutonium and reducing its weapons-usability to the spent-fuel standard: by converting it into MOX fuel and with the help of an immobilisation technique.

The MOX/current reactor approach[354]: using plutonium in mixed oxide (MOX) fuel for burning once-through in currently operating nuclear power reactors. The prerequisites for the MOX approach are: the presence of facilities for fabricating plutonium oxide in MOX fuel and reactors capable of safely handling MOX fuel. [355]

Vitrification-with-wastes approach (Immobilisation or 'Can-in-canister')[356]: vitrifying the Plutonium together with fission products in glass logs of the type planned for use in immobilising high-level radioactive wastes from the defence production complex.

There was an important difference of view on the viability of these two methods between the Russian and American governments. While the U.S. initially considered both methods of Plutonium disposition equally acceptable, the Russian leadership viewed the immobilisation option as undesirable from the very beginning. Russia believes plutonium is an important nuclear energy product and can be used in power reactors.

In recent years, the position of the U.S. on plutonium has changed. If previously the U.S. government was the main opponent of the MOX option, it now has changed its policy and declared that it is not going to use immobilisation. In March

353 Nuclear Status Report, op. cit, p. 65

354 Final Report of the U.S.-Russian Independent Scientific Commission on Disposition of Excess Weapons Plutonium, op. cit.

355 Bunn, Holdren, 'Managing Military Uranium and Plutonium in the United States and the Former Soviet Union (excerpts)', op. cit.

356 Final Report of the U.S.-Russian Independent Scientific Commission on Disposition of Excess Weapons Plutonium, op. cit.

2001 a discussion started in the U.S. circles on the grounds that the U.S. has to do something because Russia would only use the MOX option.[357]

Both methods met a certain degree of scepticism from their opponents.

6.1.2.1. Criticism of the MOX Option

Specialists point out several reasons why the MOX option is dangerous and undesirable. Among them: the MOX option does not eliminate entirely the danger of re-using plutonium in weapons; it is an expensive, economically not viable way of disposition, using MOX fuel in reactors can be dangerous, Russia does not have the facilities to implement the MOX disposition of plutonium, and finally, producing MOX fuel can increase proliferation risks. Each of the above arguments against MOX option is discussed below:

1) The MOX option does not eliminate entirely the danger of re-using plutonium in weapons

In ideal conditions, the amount of plutonium in MOX fuel after irradiation is only 30 per cent less than before the «burning up» of weapons grade plutonium in reactors, however, in practice, this amount will be even greater. It is believed that in real terms, «a light-water reactor (LWR) loaded with a conventional one-third core of MOX fuel would discharge only about one per cent less plutonium than was contained in the MOX fuel originally loaded. The remaining 99 per cent will remain weapons usable».[358]

However, some experts dismiss such statements as least credible among all the criticisms of MOX option. For example, Oleg Bukharin of Princeton University believes that nobody “in his right mind” would try to extract plutonium from MOX to re-use it in weapons,[359] which is a difficult, costly and dangerous process.

2) MOX option is expensive and economically not viable

A joint U.S.-Russian government study concluded that a MOX-fuel plutonium disposition option will cost Russia up to $2.5 billion.[360] In current economic conditions

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357 Interview with Mary Beth Nikitin, CSIS, Washington D.C., 02.04.03

358 ‘Disposal of Weapons Plutonium in the U.S. and Russia: Issues and Options for the G-8’, Nuclear Control Institute, Washington D.C., July 17, 2000

359 Telephone interview with Oleg Bukharin, Princeton University, Washington D.C., 01.04.03

360 ‘Disposal of Weapons Plutonium in the U.S. and Russia: Issues and Options for the G-8’, op. cit.

Russian government in no scenario would be able to implement such a resource-demanding task without external help.

3) Using MOX fuel in power reactors is dangerous

One of the main concerns for specialists is the safety risks associated with using MOX fuel instead of LEU (low-enriched uranium) in nuclear reactors. There are technical reasons for these concerns and broadly they can be divided into 2 categories:

1. The probabilities of certain severe accidents may increase when MOX is used.
2. The consequences of a severe accident will be greater if MOX fuel is used.[361]

4) Russia does not have facilities to implement the MOX disposition of Plutonium

Apart from financial constraints, Russia does not possess the technical capabilities to use the MOX option. Russia's MOX-fuel fabrication planned to begin in 2007 could not start without the export of the Hanau MOX plant equipment from Germany – the facility was suspended due to opposition from the environmental movements.[362] However, the German government is not prepared to support the export of the Hanau MOX plant equipment to Russia.[363]

The idea was that Germany would give the plant to Russia or sell it for a nominal price. The problem was that the company (Siemens) wanted to recoup some of the cost of the facility. It is also believed that the German government did not want MOX option to be used elsewhere outside of Germany. Exporting the Hanau MOX plant to Russia looked like an opportunity, but it does not look like an option now. The assumption is that Russia is going to use French technology (Demox) – the same technology U.S. is planning to use for fabricating MOX.[364]

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361 Edwin S. Lyman, 'The Safety Risks of Using Mixed-Oxide Fuel in VVER-1000 Reactors: an Overview', Nuclear Control Institute, Washington, D.C., May 20, 2000, http://www.nci.org/e/el-russiamox.htm retrieved on 07.10.02

362 Vladimir Rybachenkov, 'O mezhdunarodnom sotrudnichestve Rossii v oblasti utilizatsii izbytochnogo oruzheinogo plutoniya' ('Russia's International Cooperation in the Field of Disposition of Excess Weapons Plutonium'), Yadernyi Kontrol, #6, November-December 2000, p. 53

363 Nuclear Fuel, June 26, 2000

364 Telephone interview with Oleg Bukharin, Princeton University, Washington D.C., 01.04.03

5) MOX fuel can increase proliferation risks

The G-8 nations believe that if Russia chooses to go for a MOX-fuel fabrication option, it can further increase proliferation risks.[365] First of all, the chemical composition of MOX fuel (a relatively high amount of plutonium not weapons-grade, but still usable in weapons) makes it possible for both Russia and/or third parties to reverse the process and turn the fuel into dangerous fissile material again. More importantly, Russia reserved the right to use the MOX-fuel fabrication plant to manufacture civil MOX fuel after the disposition programme is completed. MOX fabrication will encourage MINATOM to get into commercial sphere, which will increase material proliferation risks.[366] At the same time 'considering the huge quantities of separated plutonium that exist already and the diminishing opportunities on the fuel market, any motivation for additional reprocessing is highly unlikely'.[367]

Second, the process of fuel-fabrication can present a proliferation danger in itself due to the difficulties of safeguarding it effectively and unavoidable long-distance transportation.

From the aforementioned, it is evident that the MOX-option for plutonium disposition is probably not the best option. According to the Nuclear Control Institute, the U.S. Department of Energy persistently understated the dangers of the MOX option when talking about its plans to use the new Savannah river site in South Carolina for MOX production. Initially, DOE denied the existence of a risk to the public in running plutonium MOX fuel, but now it 'reluctantly acknowledges' that up to 15 per cent more people would die of cancer in case of a severe accident with MOX fuel compared to conventional uranium fuel.[368] The figures will be even worse for Russia because its reactors are even less safe.

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365 'Disposal of Weapons Plutonium in the U.S. and Russia: Issues and Options for the G-8', op. cit. There is no small degree of irony here given that Russia and the U.S. are both members of the G-8

366 Interview with Thomas Cochran, NRDC, Washington D.C., 03.04.03

367 Annette Schaper, 'Plutonium Disposition', Remarks at Panel Discussion, June 19, 2001, Carnegie Endowment for International Peace at http://ceip.org/files/nonprolif/prolif2001/assets/schaper.html

retrieved on 05.05.02

368 Paul Leventhal, President of Nuclear Control Institute, 'Plutonium Dangers Denied', Lead Letter to the Editor, *The Washington Post*, Sunday, August 29, 1999, page B06

Nevertheless, the Russian leadership has its own reasons to favour the fabrication of MOX fuel from plutonium used in weapons rather than immobilising it completely. Russia considers plutonium to be a very important source of energy and cannot easily agree to get rid off the material it considers to have considerable economic value. It is evident, however, that Russia has neither the financial, nor technical capabilities to pursue the MOX approach of plutonium disposition. Having said that, the MOX option remains the only potentially viable option. Interviews conducted with Russian policy experts and physicists demonstrated that is the only option considered by Russia for plutonium disposition.[369]

6.1.2.2. Criticism of the Vitrification (Immobilisation) Option

Immobilisation also has some technical disadvantages: the initial proposal to dilute plutonium in highly radioactive glass raised doubts - specialists believe that the criticality problem cannot be solved without extreme costs.[370] Another method of 'can-in-canister' in technical terms also fails to be perfect[371] - it is not clear whether plutonium after this method immobilisation will meet the *spent-fuel standard* required by the U.S.-Russian Plutonium Disposition Agreement.

Vitrification is clearly a cheaper option to dispose of plutonium, and from the proliferation point of view, it appears less dangerous. Nonetheless, the political considerations of the Russian government to use material and not destroy it make the vitrification option an extremely unlikely alternative to MOX option. Vitrification technology is immature, and has not been done on a large scale.[372] Therefore, the 'immobilisation' approach is not an ideal way to dispose plutonium, and will not be used by Russia. The fundamental problem of the disposition of weapons-grade plutonium is that the available options do not fully meet the goals of safe and secure disposition. It is a relative choice between two options, neither of which is ideal.

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369 Interviews were conducted in Moscow, May-June 2003

370 Schaper, 'Plutonium Disposition', op. cit.

371 ibid

372 Telephone interview with Oleg Bukharin, Princeton University, Washington D.C., 01.04.03

6.1.3. Facilities Involved in Plutonium Production and Disposition

There are three main reactors involved in production of weapons-grade plutonium in Russia: two of them are located in Tomsk-7 (Seversk), and one – in Krasnoyarsk-26 (Zheleznogorsk). They are reactors ADE-4, ADE-5 and ADE-2.

Table 6 Plutonium Reactors in Russia[373]

ADE-2 (Krasnoyarsk-26) began operating in 1964, began supplying the underground facility and closed city with electricity and steam heat in 1965, and is still operating as a dual-purpose reactor. **ADE-2** is the main source of heat-supply to the city of Zheleznogorsk
ADE-4 (Tomsk-7) began operating in 1965 and is still operating.
ADE-5 (Tomsk-7) began operating in 1968 and is still operating.
ADE-4 and ADE-5 provide 30-35% of the heating of Tomsk, and 50% of the heating of Seversk

These reactors also supply heat and electricity for the near-by cities – this creates complications for shutting them down. Initially, all three reactors were to be shut down in 2000. That was agreed by Al Gore and Viktor Chernomyrdin in June 1994. In 1997 the deadlines were postponed. According to the Agreement signed by Russia and the U.S. in 1997, the breeding of surplus plutonium at these reactors was supposed to be terminated in 2002 (for ADE-4 and ADE-5 in Seversk) and 2003 (for ADE-2 in Zheleznogorsk).

The deadlines for the shut-down were extended again in 2001. In August 2001 the Russian government approved a draft protocol submitted by MINATOM to modify the U.S.-Russian agreement from September 1997 on cooperation on plutonium breeder reactors. The bottom line of the new protocol is that it prolongs the active period of these three reactors. According to the protocol, ADE-4 and ADE-5 will continue working until December 31st, 2005 and ADE-2 until December 31st, 2006.[374] However, pending budget allocations from the U.S. government, two reactors

373 Thomas B. Cochran, Robert S. Norris, and Oleg A. Bukharin, *Making the Russian Bomb: From Stalin to Yeltsin*, Westview Press, Boulder, San Francisco, Oxford, 1995, p. 152, p. 138 and Rashid Alimov, 'Russia Reviews Terms of Pu Reprocessing Reduction', 2001-08-31, Bellona Foundation web-site, at http://www.bellona.no retrieved on 10.05.02

374 Alimov, 'Russia Reviews Terms of Pu Reprocessing Reduction', op. cit.

in Seversk (ADE-4 and ADE-5) will be shut down by 2008, and reactor ADE-2 in Zheleznogorsk – by 2011.[375] In March 2003 U.S. and Russia signed a modified agreement under which the three plutonium reactors are to be replaced with fossil energy plants.[376] The following is the list of Russian facilities involved in plutonium and MOX-related production processes.

375 Bunn, Wier, Holdren, 'Controlling Nuclear Warheads and Materials', op. cit., p. 68

376 'Plutonium Production Reactor Shutdown' at http://www.nti.org/e_research/cnwm/ending/plutonium.asp#_ftn2 retrieved on 22.11.03

Table 7 Facilities Involved in Plutonium and MOX-related Production

Bochvar All-Russian Scientific Research Institute (Moscow) is involved in the development of MOX-fuel fabrication technology[377] and the production of experimental MOX fuel and fuel rods[378]
Mayak Production Association (Ozersk, formerly Chelyabinsk – 65) used to produce plutonium for use in nuclear weapons. Recently it launched a pilot production of MOX fuel pellets[379]
Mining and Chemical Combine (MCC) (Zheleznogorsk, formerly Krasnoyarsk-26) has one operational plutonium production reactor, two nonoperational plutonium production reactors, which were shut down in 1992, and a plutonium oxide storage facility[380]
Scientific Research Institute of Atomic Reactors (NIIAR) (Dimitrovgrad, Ulyanovsk Region) is conducting research on the conversion of excess weapons-grade plutonium into MOX fuel, and has MOX fuel-fabrication and experimental reprocessing facilities[381]
Siberian Chemical Combine (SCC) used to produce plutonium for use in nuclear weapons, has two operational plutonium production reactors, three non-operational plutonium production reactors (shut down between 1990 and 1992), and plutonium-pit fabrication facilities[382]

6.1.4. Plutonium Disposition Agreement

In July 1998 the U.S. and Russia had signed a Scientific and Technical Cooperation Agreement[383] to conduct tests and demonstrations of proposed plutonium

377 Cochran, Norris, and Bukharin, eds., *Making the Russian Bomb*, op. cit., p. 50

378 Nuclear Status Report, op. cit., p. 83

379 Cochran, Norris, and Bukharin, eds., *Making the Russian Bomb*, op. cit., p. 92

380 Nuclear Status Report, op. cit., p. 107

381 Nuclear Status Report, op. cit., p. 114

382 Nuclear Status Report, op. cit., p. 120

383 The formal name: «Agreement between the Government of the United States of America and the Government of the Russian Federation on Scientific and Technical Cooperation

disposition technologies.[384] The Plutonium Disposition Agreement is one of the main U.S.-Russian regulating mechanisms to dispose of both countries' excess plutonium. The Plutonium Disposition Agreement was signed in September 2000. [385] It stipulates the intention of each country to dispose off 34 metric tonnes of weapons-grade plutonium. The initially planned amount of 50 metric tonnes each for disposition was reduced due to Russia's insistence on the fact that 16 metric tonnes declared by the U.S. are not weapons-grade and cannot be re-used in weapons anyway. According to the Agreement, the U.S. and Russia are required to put in operation industrial-scale facilities no later than December 2007 and dispose two metric tonnes a year. [386]

The Agreement also provides for monitoring and inspection throughout the disposition process, and allows for equivalent IAEA verification measures in lieu of bilateral monitoring activities, as may be agreed by the U.S. and Russia.[387] According to terms of the Agreement, the U.S. side was to fabricate and irradiate 25.6 metric tonnes of weapons-grade plutonium into mixed-dioxide (MOX) fuel and immobilise 8.4 metric tonnes in ceramic forms and later dispose of them in canisters containing vitrified high-level radioactive wastes. This was supposed to be processed at the Defence Waste Processing Facility at the Savannah River Site.[388]

Although, the U.S. expressed its commitment to pursue a 'dual-track' policy of disposition and specified its intention to immobilise 8.4 metric tonnes of plutonium in ceramic forms, the plans of the American government have changed. In March 2001

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in the Management of Plutonium That Has Been Withdrawn From Nuclear Military Programs»

384 Draft of <u>A Report Card on the Department of Energy's Nonproliferation Programs with Russia</u>, op. cit., p. 28

385 A formal name of the bilateral agreement is: «Agreement between the Government of the United States of America and the Government of Russia Federation Concerning the Management and Disposition of Plutonium Designated as no Longer Required for Defense Purposes, and Related Cooperation»

386 Nuclear Status Report, op. cit., p. 66

387 'Disposition of United States and Russian Federation Weapon-Grade Plutonium', White House Factsheet, July 21, 2000, at http://www.ceip.org/files/projects/npp/resources/USRussiaG8Summit.htm retrieved on 19.05.02

388 Edwin S. Lyman, 'The Future of Immobilization Under the U.S.-Russian Plutonium Disposition Agreement', Nuclear Control Institute, Paper presented at the 42nd Annual Meeting of the Institute of Nuclear Materials Management, Indian Wells, CA, July 18, 2001

the National Nuclear Security Administration (NNSA) ordered to immediately suspend all immobilisation activities. NNSA has also ordered the dismantlement of an almost completed Plutonium Ceramification Test Facility at Lawrence Livermore National Laboratory, which was designated for processing weapons-grade plutonium into ceramic pucks. [389] Although, the official reasoning behind that decision was said to be prompted by financial/budget considerations, and was meant to be temporary, it could have far-reaching consequences for the future of the Plutonium Disposition Agreement, in particular, and for the whole immobilisation technology, in general.

Russia, in its part, accepted an obligation to dispose of the same amount of weapons-grade plutonium (34 metric tonnes), but by using only the MOX option. It is worth noting that the Russian government was ready to immobilise one metric tonne of plutonium contained in a low-assay sludge, but the U.S. insisted that only high-assay materials are covered by the Agreement. Some analysts believe that 'it was a tactical mistake, because a Russian commitment to pursue immobilisation technology and build an immobilisation plant would itself have been a far more important achievement than a specific commitment to immobilise high-assay material'.[390]

It is apparent that this is a long-term operation requiring serious financial resources. According to some preliminary estimates, the amount of money required for Russia's disposition programme is $1.7 - 1.9 billion over twenty or more years.[391] According to other sources (DOE's Task Force), that amount is even higher - approximately $2.1 billion for the disposition of the initial 34 metric tonnes of Russia's excess plutonium.[392]

In this light, the Russian government is in a difficult situation of finding the resources for its disposition programme. The situation is further complicated by the criticism surrounding the MOX option of plutonium disposition. Generally, the MOX option is not welcomed by the international community, which means foreign

389 Lyman, 'The Future of Immobilization Under the U.S.-Russian Plutonium Disposition Agreement', op. cit.

390 ibid

391 Disposition of United States and Russian Federation Weapons-Grade Plutonium, White House Factsheet, op. cit

392 Draft of A Report Card on the Department of Energy's Nonproliferation Programs with Russia, op. cit, p. 28

governments would not be willing to provide financial assistance for building MOX fabrication facilities in Russia. The U.S. government is providing some assistance; however, the supporters of financial aid for Russia's disposition efforts are confronted with the criticism that U.S. funds are helping Russia to create a fuel-cycle.

The lack of financial resources for the construction of MOX facilities is the major problem of the implementation of the agreement. Experts say that Russians understand it quite well, and they are not going to start the physical construction of facilities until there is a firm commitment to provide funding.[393]

One of the possible scenarios of resolving the plutonium disposition problem for Russia would be to produce MOX fuel and to sell it to Western Europe. That could provide significant revenue and provide funding for the operation of the MOX facility. Eventually, Russia would be taking that fuel back, because they produced it. Such a scheme can provide a very strong incentive for reactor operatives. However, that option is also subject to many problems of implementation, including finding initial funding for fuel fabrication.[394]

Another problem will arise from the complications resulting from the U.S. decision to suspend its immobilisation programme. If the U.S. government does not re-instate its obligation to immobilise more than 8 metric tonnes of weapons-grade of plutonium, it will mean that either the U.S. will have to agree to use the MOX option for the disposition of the total of 34 metric tonnes (the same as Russia), which is highly unlikely, or all the volumes and conditions of disposition will have to be re-negotiated, which will result in a considerable delay of the implementation of the agreement..

Safeguarding and verification

The opponents of the agreement also point out the unresolved issues of liability and monitoring arrangements for processing and using plutonium as fuel in Russian nuclear reactors (when Russia will use the MOX option). The U.S. Nuclear Control Institute called the agreement 'premature' and warned about the danger of plutonium disposition not proceeding in either of the countries due to the problems, which will arise due to unresolved issues of liability in case of a MOX-fuel accident, safeguarding

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393 Telephone interview with Oleg Bukharin, Princeton University, 01.04.03

394 Telephone interview with Oleg Bukharin, Princeton University, Washington D.C., 01.04.03

and monitoring of disposition, and financial assistance arrangements.[395] The warning proved to be justified when the technical agreement on plutonium disposition was allowed to expire in July 2003 and was not extended due to disagreements over the language relating to liability.

The U.S.-Russian Plutonium Disposition Agreement, which is the main legally binding international document - is criticised for the 'failure to resolve important problems of liability and monitoring arrangements for processing and using this plutonium as fuel in Russian reactors'.[396]

It is believed that the Agreement does not resolve questions related to liability in case of a MOX-fuel accident, safeguarding and monitoring of disposition, and financial assistance arrangements.[397] The technical agreement on plutonium disposition signed in 1998 included liability provisions, which were at the time seen as adequate to the scale of cooperation on research and development outlined by the Agreement (a formal Plutonium Disposition Agreement was signed in 2000). The liability clause did not include provisions of immunity to the U.S. and its contractors in case there was an accident, and it was *intentional*. Legislation freeing U.S. and its contractors from any responsibility has been embedded into original Department of Defence CTR "umbrella" agreement. The original CTR agreement was signed in the early 1990s in a general mood euphoria in U.S.-Russian relations and with a lot of concessions from the Russian side.

Both U.S. Department of Energy and Russian Ministry of Atomic Energy were willing to extend the Agreement without imposing changing liability conditions, but the State Department insisted that the Plutonium Disposition Technical Agreement would not be extended until Russians agree to the same liability language as was used in the original CTR legislation.[398] The cooperation continues on the contracts, which were

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395 'U.S.-Russia Weapons Plutonium Disposal Agreement is «Premature and Dangerous», Says NCI', Press Release, Nuclear Control Institute, Friday, September 1, 2000, at http://www.nci.org/pr/pr9100.htm retrieved on 06.04.01

396 'U.S.-Russia Weapons Plutonium Disposal Agreement is «Premature and Dangerous», Says NCI', op. cit.

397 ibid

398 Matt Bunn, 'Reducing Excess Stockpiles: Russian Plutonium Disposition', an on-line companion to 'Controlling Nuclear Warheads and Material', op. cit., available at http://www.nti.org/e_research/cnmw/reducing/rpdispose.asp retrieved on 22.11.03

signed prior to Technical Agreement's expiration. However, the liability issue will have to be resolved in order to begin construction of the plutonium disposition facilities.

Matt Bunn from Harvard's Managing the Atom Project believes:

> "Neither bilateral U.S.-Russian nor multilateral talks have made much headway in devising an approach to liability that is acceptable to the Russian government, the U.S. State Department, contractors that might participate in the project […], and other countries that may contribute. It has become clear that Russia is absolutely unwilling to again agree to language that would leave the Russian government liable for intentional sabotage by U.S. contractors, while the U.S. is unwilling to accept liability language that left the determination of what was intentional sabotage solely up to Russian courts…"[399]

The dilemma of plutonium disposition

The conceptual controversy surrounding the whole issue of plutonium disposition concentrates on the following: What is the non-proliferation value of disposition if the production of plutonium continues?

In August 2001, the Russian government announced its decision to prolong a lifespan of its three nuclear plutonium breeder reactors in order to solve heating problems of several towns. Although, the civilian plutonium produced for energy purposes is not as dangerous as weapons-grade, the fact that stockpiles are not reducing but growing is more than worrying. As of late 2003, Russian plutonium reactors were to continue working until 2011.

Another issue in the dilemma of plutonium disposition is the interdependence of arms reduction treaties and disposition. The decision by the U.S. and Russia to reduce nuclear weapons to much lower levels is a welcome move. However, the rapid dismantlement of more and more weapons puts additional pressure on the disposition activities. As was noted before, the disposition process is no less expensive and complex as the production itself. It can even be argued that the material secluded inside the weapons is not as dangerous as when it has to be extracted and stored until it can be disposed of. In this light, the U.S. and Russia are in a double trap: they have to dismantle their weapons fulfilling their denuclearisation pledges and at the same time they have to face an ever growing problem of how to dispose of material from the

399 ibid

weapons dismantled. Overall, Plutonium Disposition Agreement in its current form does not have very enthusiastic support among non-proliferation experts.

Kenneth Luongo from RANSAC believes:

> "…Plutonium disposition is taking too long, it's too expensive, and we don't have enough money for that, the time frame is enormous for a small amount of plutonium."[400]

Alexander Pikayev of the Carnegie Endowment noted that the "political value of this Agreement is not high […] the price of it is too expensive…"[401] The small amounts of plutonium to be disposed of defined by the Agreement raise scepticism as well[402] – 34 tonnes constitute only about 15% of all Russian plutonium stocks. Taking into consideration that Russia is still producing plutonium, the volume of the material to be disposed of as a percentage of the entire stock will be even smaller.

6.2. Highly Enriched Uranium (HEU)

6.2.1. Background of the Problem

Highly Enriched Uranium (HEU) is one of the two (along with plutonium) main materials used for nuclear weapons. About 15-20 kilograms of HEU are sufficient to make a nuclear warhead without plutonium.[403] At the moment 51 facilities in Russia possess small and large amounts of HEU (see Appendix 1 for a full list of facilities storing HEU). The production of HEU in the former Soviet Union ceased in 1989.[404] The estimates of the amount of HEU accumulated by the Russian nuclear complex vary from 800 to 1200 tonnes: by DOE's estimates, Russia has more than 1,000 metric tonnes of HEU[405]; according to some other estimates, it is about 1,200 metric tonnes.[406]

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400 Telephone interview with Kenneth Luongo, RANSAC, Washington D.C., 08.04.03

401 Interview with Alexander Pikayev, Carnegie Endowment for Peace, Moscow, 26.05.03

402 Interview with Thomas Cochran, NRDC, Washington D.C., 03.04.03

403 'Fissile Material Basics', op. cit.

404 Albright, Berkhout, and Walker, *World Inventory of Plutonium and Highly Enriched Uranium 1992*, op. cit., p. 53

405 Draft of A Report Card on the Department of Energy's Nonproliferation Programs with Russia, op. cit., p. 14

It is believed that 45 tonnes of HEU are added annually to the stockpile due to the dismantlement process.

HEU is very inert and has a very low radioactive signature, which makes it hard to detect. Specialists acknowledge that 'outside a few feet, even the most sophisticated passive radiation detectors would fail to detect HEU'.[407] There are some alternative approaches available to detect unshielded HEU involving bombarding it with an active radiation source in order to induce fission and in this way detect neutron emissions. However, this approach is not considered to be safe and, therefore, is not practical. As a heavy metal, HEU can be detected by X-rays but taking into consideration the amount of metal objects going through X-ray detectors (in the airports, for example), it is very unlikely that HEU would be detected if smuggled. The fact that HEU is hard to detect, if smuggled, makes the problem of its safe and timely disposition a very important one. As well as plutonium, HEU can be an attractive product for rogue states or international terrorists. The best solution to reduce the threat of nuclear smuggling is to provide all the necessary safety and security measures for the material stockpile and to make HEU unattractive for the terrorists by downblending it to forms not usable in weapons.

First of all, it is important to explain the process by which HEU can become less dangerous in terms of nuclear proliferation. An evaluation of the technical process of HEU downblending demonstrates the possibilities and limitations for the U.S. - Russian HEU Deal.[408]

6.2.2. The HEU Downblending Process

Table 8 presents an HEU downblending process which consists of the following stages: weapons dismantlement, material extraction and transportation, production of Low Enriched Uranium (LEU).[409]

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406 Protecting Nuclear Weapons Material in Russia, Office of International Affairs, National Research Council, National Academy Press, Washington, D. C., 1999, p. 7

407 Allison, Coté, Jr., Falkenrath, Miller, eds., *Avoiding Nuclear Anarchy*, op. cit., p. 67

408 The HEU Purchase Agreement (The HEU Deal) – an agreement stipulating purchase of Russian uranium by the U.S. is discussed in detail in the following sub-section

409 This table is generated from the description provided in Nuclear Status Report, op. cit., p. 64

Table 8 HEU Downblending Process

1. **Weapons Dismantlement**
   - At this stage weapons are dismantled at four of Russia's warhead production facilities at Lesnoy (Sverdlovsk-45), Trehgornyy (Zlatoust-26), Avangard in Sarov (Arzamas-16), and Zarechnyy (Penza-19)

2. **Material Extraction and Transportation**
   - After the weapons have been dismantled, the fissile material extracted, in this case, uranium, is shipped to the Siberian Chemical Combine (Seversk) and the Mayak Production Association (Ozersk). At these facilities HEU is ground into metal chips, converted to oxide, and chemically treated to remove impurities

3. **Production of LEU (Low Enriched Uranium)**
   - Purified uranium is first combined with fluorine to produce Uranium Hexafluoride (UF_6) at the Krasnoyarsk Electrochemical Plant (Zelenogorsk) and then it is blended with uranium enriched to only 1.5% U_{235} to produce LEU (this process takes place at Seversk, Zelenogorsk facilities and at the Ural Electrochemical Integrated Plant (UEIP) in Novouralsk).

Ideally, the process of HEU downblending in Russia should be stimulated by the U.S.-Russian 'HEU Deal'. The conditions of this agreement envisage the purchase by the United States of HEU from dismantled Russian warheads. However, in reality, the implementation of this agreement is flawed due to a number of reasons and the process of HEU downblending was not going according to plan in Russia. In order to analyse the reasons for such setbacks, this chapter presents an overview of the agreement, its terms, key players and key events surrounding this Deal.

6.2.3. HEU Purchase Agreement (HEU Deal)

6.2.3.1. Overview

One of the major initiatives to prevent the proliferation of fissile material is the U.S.-Russian 'HEU Deal' (HEU Purchase Agreement). The terms of this bilateral agreement create a ground for ensuring that HEU from dismantled Russian nuclear weapons is only used for peaceful purposes. According to the outline of the agreement, the U.S. government will purchase 500 metric tonnes of HEU extracted from dismantled warheads over a period of 20 years.[410]

The HEU Deal can theoretically be one of the most successful non-proliferation projects, given both the incentive it creates for Russia to dismantle its warheads and the fact that extracted fissile material is transferred to safer locations in the U.S. Moreover, LEU - downblended from HEU - has a real economic value, and as such, is a valuable market product. In perfect circumstances, such a deal would mean that Russia is motivated to follow its arms reductions obligations, the U.S. market receives a valuable energy product, and the threat of nuclear material proliferation is considerably reduced. However, in reality, the HEU Deal turned out to be a promising project with a disappointing implementation track.

In order to comprehend the nature of the problems encountered by the HEU Deal, the following section introduces the main conditions of the deal, the interests of key players involved in the process, and provides an account of political and economic events, which played a crucial role in it.

6.2.3.2. Origins, Terms, and Current Status of the HEU Deal

The HEU Agreement was signed on February 18th, 1993 in Washington D.C. The commercial implementing contract was signed by the executive agents in January, 1994 in Moscow. Under the HEU Deal, the U.S. is purchasing approximately 500 metric tonnes of HEU removed from Russia's dismantled nuclear warheads with an average assay of 90% or greater of the uranium isotope 235 (U_{235}). The material is converted to LEU[411] before shipment to the U.S., where it is then used in the civilian power reactors. The total value of the programme was estimated as $12 billion.[412]

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410 Text of Russian-U.S. HEU Agreement, NTI, http://www.nti.org/db/nisprofs/russia/fulltext/heudeal/heufull/htm retrieved on 07.07.02

411 LEU is uranium enriched to less than 20% in the isotope 235

412 *USEC*, at http://www.usec.com/v2001_02/HTML/Megatonnes_FAQ.asp retrieved on 13.06.02, Text of Russian-U.S. HEU Agreement, op. cit, and Testimony of Leonard S. Spector Before the Subcommittee on International Security, Nonproliferation, and Federal Services, U.S. Senate Committee on Governmental Affairs, November 2001, at http://cns.miis.edu/pubs/other/latest.htm retrieved on 30.11.02

As of September 2003, 193 metric tonnes of weapons grade HEU was converted to 5,705 metric tonnes of LEU power plant fuel. This means that nuclear material equivalent to the fissile material required for 7,733 nuclear warheads has been eliminated.[413]

Several important events and policy decisions preceded the signing of the agreement and unfolded during its evolution. It is important to evaluate the political and economic environment surrounding the origins of the agreement in order to understand its initial goals, framework of implementation and serious limitations encountered along the way.

The most comprehensive account of the HEU Deal complexities available in existing literature was presented by Richard A. Falkenrath.[414] The end of the Cold War saw unprecedented reductions in the nuclear forces in the United States and the former Soviet Union, thereby reducing the nuclear dangers. However, at the same time new concerns have arisen from the fact that more and more fissile material was extracted from the dismantled weapons. The world community has faced a new set of nuclear threats: a stockpile of the dangerous material accumulated in the former Soviet Union kept on growing, while the conditions of transportation and storage kept on deteriorating.

In this set of circumstances, the idea proposed by Thomas Neff (from the Massachusetts Institute for Technology (MIT)) to buy part of this material from the ex-Soviet Union was reasonable and timely. Neff proposed for the U.S. to buy excess HEU from the Soviet dismantled weapons. Not long after the idea started circulating, the Soviet government made the same proposition. Soon after that the Soviet Union collapsed - that event only added reasons for the U.S. government to support the idea of buying excess HEU from a country, where the nuclear custodial system was deteriorating.

The other two major developments, which were taking place approximately at the same time, played their role in HEU Deal as well, but in a completely different way. The dramatic rise in the U.S. imports of Soviet uranium (1988-1991), which caused a

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413 *USEC*, at http://www.usec.com/v2001_02/HTML/megatonnes_fact.asp retrieved on 12.05.03

414 Richard A. Falkenrath, 'The HEU Deal', Appendix C in Allison, Coté, Jr., Falkenrath, Miller, eds., *Avoiding Nuclear Anarchy*, op. cit., p. 229

fall in global uranium prices and provoked an anti-dumping campaign against any uranium imports, and the privatisation of the sole HEU Deal executive agent on American side - *USEC* - both had a negative effect on the terms and conditions of the agreement, and also on the way it was destined to be implemented.

After announcing several preliminary findings of «material injury» occurred as a result of the alleged Soviet uranium dumping, on May 29, 1992, the U.S. Department of Commerce put an immediate levy of 115.82 per cent duty on uranium imports from the former Soviet Union. In exchange for the duty to be lifted Russia, Kazakhstan, Kyrgyzstan, Uzbekistan, and Ukraine had to agree to sign the so-called «suspension agreements», which set a quota for uranium imports that was linked to the price of uranium. In other words, as the price rose above $13 per pound, each republic would have a progressively larger import quota. The market price at that time was $10 per pound and was not expected to rise, which meant that no import from FSU was allowed unless it would go above $13.[415]

The Suspension Agreements played an important role for the HEU Deal due to two major factors explained by Falkenrath:

1. The Department of Commerce decided to include HEU in the scope of the Suspension Agreement with Russia, so that the same quota limitations applied. This decision was actively opposed by the Russian side, because the purpose of the export of HEU was not commercial, but rather the prevention of proliferation. As a result, Russian HEU or blended-down HEU from Russian dismantled weapons was excluded from the quota.

2. The Suspension Agreements complicated the HEU Deal in another way too: the Suspension Agreement with Russia limits its exports of uranium to the U.S. As a result it had to be stipulated that *USEC* can buy only SWU (single working units) in LEU and natural uranium part (feed) had to be returned to Russia.[416] That constraint put into jeopardy the whole HEU Deal: Russia could not sell the returned uranium (feed) due to import quotas. That problem was later resolved by the U.S. Congress agreeing to pay for the feed component for the years 1997 and 1998, and in 1999 three

415 Falkenrath, 'The HEU Deal', op. cit., p. 253

416 The price for the LEU comprises of two parts: for the SWU (single working units – measurement for work required to enrich it) and natural uranium components (feed)

companies - Cogema, Nukem, and Cameco - received an option to buy 72% of the Russian feed.[417]

Another key event, which influenced in a significant way how the HEU Deal developed, was the privatisation of the U.S. sole executive agent for HEU Deal - *USEC*. By making *USEC* a purely commercial company, the U.S. Government limited its own leverage in the HEU Deal and made the agreement a 'business' deal rather than an important cooperative threat reduction initiative.

6.2.3.3. The Key Players

The role of the key players involved in the implementation of any policy is important, in the case of the HEU Deal, it especially applies to the U.S. side. The two executive agents appointed by their governments to implement the HEU Purchase Agreement are *Tenex* - Russia's foreign trade company for nuclear services and *USEC Inc.* - the U.S. Enrichment Corporation. The role of *Tenex* - a MINATOM business subsidiary - is straightforward in this agreement – *Tenex* oversees deliveries of LEU to the U.S. However, the participation of *USEC* as the sole US executive agent in the HEU Deal has important implications for the agreement's implementation.

Tenex carries out the export of goods and services produced by enterprises of MINATOM. It is a 100% MINATOM-owned enterprise, and in this way its status is different from *USEC*, which now represents a completely separate and independent entity from the U.S. government.

At the time when the agreement was signed by Russia and the United States, the HEU Deal was overseen by the U.S. Department of Energy (DOE). In mid-1992 a decision was taken to privatise DOE's civilian enrichment enterprise and create a U.S. Enrichment Corporation *(USEC)*. *USEC* inherited two civilian enrichment plants (in Portsmouth and Paducah) and in July 1998 became a private corporation.

At the moment *USEC* is no longer a U.S. government corporation, nor is it chartered by the government. The U.S. government holds no financial shares in the company.[418] Monitoring *USEC's* progress in the implementation of the HEU Deal is a

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417 Nikhil Anand and Mary Byrd Davis, Report on the U.S. Enrichment Corporation Privatization and the Russian HEU Agreement, at http://www.earthisland.org/yggdrasil/usec.htm retrieved on 28.06.02

418 *USEC*, at http://www.usec.com/v2001_02/HTML/Megatonnes_FAQ.asp retrieved on 04.05.02

responsibility of an Enrichment Oversight Committee under the authority of the National Security Council (NSC). However, according to the report of the General Accounting Office (GAO) of December 30, 2001, the named Committee has been «largely passive».[419]

Giving an entirely commercial entity such as a privately-owned *USEC* responsibility for the implementation of a non-proliferation initiative was bound to create complications. It was not an accident that a commercial company became an executive agent for the HEU Deal though. The privatisation of *USEC* was discussed well before the initial Deal was signed. The idea was to put the HEU Purchase Deal on a sound commercial basis in order to ensure its implementation by both sides. However, the experience has proved that a business framework for what was supposed to be a non-proliferation initiative was not exactly suitable. It became apparent that *USEC's* commercial interests and U.S. Government's political objectives of reducing the threat of nuclear proliferation were at conflict.[420]

419 'U.S. GAO Report: Government Oversight of HEU Deal Lacking', press release, December 30, 2001

420 The sub-section 6.2.4.1 discusses in detail the problems of implementation deriving from the fact that it is not in *USEC*'s interests to implement the HEU Deal on other than the profit-oriented conditions

6.2.3.4. Facilities

The facilities involved in the implementation of the HEU Deal are presented in Table 9.

Table 9 Facilities Involved in Implementation of the HEU Deal[421]

Russian facilities involved in blending down HEU into LEU:
Electrochemical Plant (Zelenogorsk)
Mayak Production Association (Ozersk)
Siberian Chemical Enterprise (Seversk)
Ural Electrochemical Integrated Plant (UEIP) (Novosibirsk)
U.S. Facility receiving LEU from Russia:
Portsmouth Gaseous Diffusion Plant
U.S. Facilities converting Russian LEU into commercial power reactor fuel:
Westinghouse Nuclear Fuel, Columbia, SC
Global Nuclear Fuel - Americas, Wilmington, WC
Framatome Cogema, Lynchburg, VA
ABB Combustion Engineering, Hematite, MO
Siemens Power Corporation, Richland, WA

6.2.4. Problems of Implementation

6.2.4.1. *USEC* and the HEU Deal: the Clash of Interests

The technicalities in the process of Russian HEU downblending and conditions of the U.S. uranium market play an important role in how *USEC* wants to see the HEU Deal being carried out. One underlying controversy in the whole HEU Purchase Agreement is: it is not profitable for *USEC* to buy an agreed amount of Russian HEU with all its components unless the price paid to Russia is well below the market price for uranium. *USEC* insists it faces an estimated $200 million in losses from

421 *USEC*, at http://www.usec.com/v2001_02/HTML/megatonnes_stepbystep.asp retrieved on 16.04.02

implementing the contract.[422] As a sole executive agent of HEU Deal on the U.S. side and as a privately-run company responsible for maintaining a profitable business, *USEC* is understandably trying to protect its legitimate commercial interests.

The way *USEC* has being implementing the agreement was in conflict with the initial goals of the U.S. government, which saw the HEU Purchase Agreement as an important non-proliferation enterprise. The purchase of 500 metric tonnes of HEU is meant to create an important incentive for the Russian government to dismantle its nuclear weapons and at the same time to bring vitally needed hard currency into the Russian nuclear complex. The money received by Russia for the HEU sent to the United States is supposed to be spent on the improvement of safety and security at the Russian nuclear installations. In other words, the smoother the Deal can be implemented, the higher the chances are for the important non-proliferation initiative to be successful.

An analysis of the U.S. uranium market shows why having a private monopoly company managing a state-level non-proliferation programme means putting limitations on its implementation. Currently, there seems to be no realistic alternative to the current arrangement of how HEU Deal is implemented, and in recent years *USEC* managed to strike a balancing act with Russia on the conditions of the Deal. However, *USEC*'s controversial role in the HEU Deal was a source of serious disagreements between the U.S. and Russia.

6.2.4.2. The U.S. Uranium Market, *USEC* and Russian LEU

The HEU Purchase Agreement in schematic terms works in the following way: HEU extracted from dismantled weapons is ground into metal chips, converted to oxide, and chemically treated to remove impurities; then purified uranium is first combined with fluorine to produce hexafluoride (UF_6) and then it is blended with uranium enriched to only 1.5% U_{235} to produce LEU; LEU is shipped to St. Petersburg port to be transported to the U.S., where *USEC* fabricates it into fuel assemblies; after that *USEC* sells LEU components to utilities and utilities burn LEU fuel in their reactors, producing energy and spent fuel.

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422 *USEC*, http://www.usec.com/v2001_02/HTML/Megatonnes_FAQ.asp retrieved on 04.05.02

Russian SWUs versus *USEC*s production

The price for the Russian LEU bought by *USEC* is determined by two components: the natural uranium and the work required to enrich it measured in separative work units (SWU).[423] This two-part price composition is important in two ways:

1. *USEC* does not pay Russia for the natural uranium component (feed), it pays only for the SWU component. The amount of natural uranium that would have been needed to produce a received quantity of low-enriched uranium is then supposed to be returned to Russia (according to the Suspension Agreement).[424] Due to Suspension Agreement, Russian natural uranium component cannot be sold directly on U.S. market, therefore, Russia was (initially) not compensated for the full value of its blended-down HEU.[425]

Until February 2002, the arrangement was that *USEC* was supposed to send an amount of natural feed equivalent to the feed component in Russian HEU received by the U.S. Given that *Tenex* could not sell the feed on the world market at the appropriate price, HEU supplies from Russia were suspended three times. U.S. DOE intervened and saved the deal by buying out the feed.

The new pricing agreement reached in February 2002 solved this problem (details of the new pricing arrangement reached are discussed later in this chapter).

2. By buying Russian SWU as a component of LEU, *USEC* would go against its own commercial interests. Until 2001 *USEC* had two gaseous diffusion plants - in Portsmouth, Ohio and in Paducah, Kentucky. The annual production of those two plants together could be 19.3 million SWU. However, due to the oversupply of the world SWU market, the plants have been producing only 13 million SWU per year.[426] In 2001 *USEC* closed down the plant in Portsmouth. Being one of the few SWU

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423 Thomas L. Neff, 'Decision Time for the HEU Deal: U.S. Security vs. Private Interests', Arms Control Today, June 2001

424 ibid

425 Falkenrath, 'The HEU Deal', op. cit., p. 269

426 Falkenrath, 'The HEU Deal', op. cit., p. 278

producers in the world *USEC* is trying to underpay Russia for SWU from Russian LEU to compensate for higher costs of production of its own SWU - *USEC's* costs of SWU production have risen because the production cost had to be spread over smaller amount of produced volume. That factor also drove *USEC* to use some trade action manipulations to secure its high profits.

***USEC* - a monopoly**

As was mentioned earlier, by being a private company with no obligation to fulfil the government's policy objectives, *USEC* is not trying to aim for a 'budget-neutral' HEU Deal as was assumed by the U.S. government, but rather to secure high profits from this deal.

Thomas Neff of MIT outlines two actions the company has taken to better its financial situation, and which demonstrate that *USEC* as a private company is often in conflict with the policy objectives of the HEU Deal: *USEC* is seeking to get a monopoly power over the U.S. nuclear fuel supply and it is trying to establish even lower prices for Russian LEU. [427] In 2000 *USEC* filed a trade action against two European companies - Urenco and Eurodif - the only competitors to *USEC* on the American uranium market. Specialists correctly predicted an outcome favourable to *USEC* (because U.S. Department of Commerce usually takes decisions favourable to American producers). As a result, duties were imposed on both European companies.

USEC itself does not consider itself a monopolist. *USEC*'s representative Charles Ulish believes the idea of *USEC* being a monopolist on the American U.S. market is created by its competitors. According to Ulish, *USEC* has 60% of the market, and only has a monopoly over Russian HEU.[428]

In November 2001, the U.S. government authorised *USEC* to conclude negotiations on contract terms with the Russian executive agent *Tenex* for the calendar year 2002 and beyond.[429] Media reports indicated that *USEC* was trying to lower the

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427 Neff, 'Decision Time for the HEU Deal' op. cit.

428 Telephone interview with Charles Yulish, *USEC*, 02.04.03

429 *USEC* Press-Release, Statement by *USEC* Inc. 'Status of the Russian HEU Purchase Contract - Terms Reached for Future Implementation of the Megatonnes to Megawatts Program', February 26, 2002 at

current price by 15 per cent.[430] The initial reaction of MINATOM was negative and it was reported that MINATOM officials were not offering to reduce the price of uranium that it supplied to the U.S. under the HEU Purchase Agreement. However, it was announced later that Russia agreed to sign the new contract and the shipments were resumed in March 2002.

The amendment was signed by *USEC* and *Tenex* in February 2002 in Moscow. In June 2002 the two governments approved implementation of the contract amendment for the remaining 12 years of the programme. The new pricing terms went into effect in January 2003.[431] The new price conditions state the price would fluctuate with the markets annually and would be based on a three-year average.[432] The danger of this lies in the possibility of undermining Russia's willingness to participate in the programme. *USEC* as a sole agent of HEU Deal can dictate unfairly low prices to Russia. Russia although unwillingly accepting unfavourable terms, might lose the incentive to continue with the HEU Deal, or domestic support for this deal in Russia could be severely undermined.

It should be said, that for the moment, Russia is satisfied with the current conditions. Russian MINATOM Deputy Minister Vinogradov believes that both sides have made 'reciprocal concessions' and the new arrangement meets interests of both – the U.S. and Russia. In his words, U.S. power generation cannot operate without Russian uranium, and Russia will receive a steady inflow of funds for up until 2013 and has secured a presence on American uranium market (albeit more political rather than market-based).[433] The market uranium prices are currently (as of 2003) quite high, and the HEU Deal secures a relatively high inflow of hard currency. However, this market price-based approach can prove to be unstable considering possible fluctuations on the

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http://www.usec.com/v.2001_02/Content/News/NewsFiles/02-26-02.htm retrieved on 04.03.02

430 'Russia not planning to lower price of uranium shipped to U.S.', Moscow Interfax, 01/02/2002, FBIS-SOV-2002-0122

431 *USEC*, http://www.usec.com/v2001_02/HTML/Megatonnes_FAQ.asp retrieved on 04.03.02

432 Nancy Zuckerbrod, 'Deal Reached on Key Security Program', Associated Press, February 22, 2002

433 'Russian Deputy Nuclear Minister Interviewed on U.S. HEU-LEU Contract', FBIS document, ID: CEP20020308000043, 03.08.02

world uranium market. Experts from the Russian policy think-tanks believe that the price *USEC* pays Russia is miniscule, but that the deal is still welcomed since it secures vitally needed revenue. [434]

6.2.5. Verification: the HEU Transparency Implementation Programme

Verification is an important part of any international arms control/non-proliferation enterprise. In case of the HEU Deal, both sides agreed on establishing a so called HEU Transparency Implementation Programme. The initial Protocol on HEU Transparency Arrangements was signed by U.S. Vice-President Gore and Russian Prime Minister Chernomyrdin on March 18, 1994 in Washington. On June 30, 1995 U.S. Energy Secretary O'Leary and Russian MINATOM Minister Mikhailov signed a Join Statement on Transparency Arrangements in Moscow. Initially, MINATOM resisted the Transparency Agreement, but the economic incentives played their role. U.S. proposed an advance of $100 million in exchange for expediting transparency measures.[435]

The programme seeks to ensure the following requirements are met: HEU is extracted from dismantled Russian nuclear weapons, this same HEU is converted to LEU, and the LEU shipped to the United States is fabricated into fuel for commercial nuclear reactors.[436] Among the tools used by American monitoring specialists are physical observations, measurements, accountability documents, monitoring information. Technical experts (monitors) conduct regular visits to all the four Russian uranium processing plants: the Siberian Chemical Enterprise, the ElectroChemical Plant, the Mayak Production Association, and the Ural Electrochemical Integrated Plant (UEIP). The first three facilities are visited six times a year by teams composed of 5 to 10 scientists.[437] At the fourth facility (UEIP) DOE established a Transparency Monitoring Office with a permanent presence of monitoring staff. The office specialists

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434 Interviews conducted in Moscow, May-June 2003

435 Telephone interview with Oleg Bukharin, Princeton University, Washington D.C., 01.04.03

436 Chart 'Highly Enriched Uranium Transparency Implementation Program', National Nuclear Security Administration, Office of Defence Nuclear Non-proliferation, 21.03. 01

437 Environmental Assessment Division (EAD) web-site: http://www.ead.anl.gov retrieved on 23.07.03

are provided with daily access to monitor the material and certain process activities related to the conversion process.[438]

The technical application used to determine HEU assay in Russian containers is the Portable Non-Destructive Assay (NDA) Instrumentation. The Blend Down Monitoring System (BDMS) is used to confirm the traceability, flow and enrichment assay of HEU being blended into LEU.[439] Continuous enrichment monitoring equipment involves a radiation detector on the pipe, where HEU is downblended. There is a continuous monitoring of the enrichment process: the specialists monitor the HEU stream, the blend stocks stream, and the product stream.

Such continuous enrichment monitoring system is highly praised by experts, and as such represents one of the examples of non-intrusive verification mechanisms.

Oleg Bukharin from Princeton University commented on the enrichment monitoring:

> "…It works very well, it's a very unique kind of element of this [HEU Transparency] Agreement, it is much more advanced if you compare it to other transparency initiatives […] and it is routinely implemented on the operational level…"[440]

6.2.6. The Overall Effectiveness of the HEU Deal

The HEU Deal passed through several stages of evolution, and for the moment, has reached a working arrangement more or less satisfactory for Russia and the U.S. Privatisation of *USEC* in the earlier years of HEU Deal, brought a completely new complexity: the deal had to be justifiable on economic grounds. Although, the choice of *USEC* as an implementing agent for the Agreement does not have unanimous support, it seems like the only realistic option. *USEC* has all the relevant expertise, and there are no other entities to be considered as better agents for the Deal.

MINATOM and *USEC* managed to agree on a market-based approach of establishing a price for Russian uranium. Current conditions more or less satisfy Russia,

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438 Environmental Assessment Division at http://www.ead.anl.gov/project/ retrieved on 23.07.03

439 Chart 'Highly Enriched Uranium Transparency Implementation Program', op. cit.

440 Telephone interview with Oleg Bukharin, Princeton University, Washington D.C., 01.04.03

although the arrangement is not particularly stable. If market prices fall considerably, Russia will be less happy to go on with the deal. It is apparent that an interim compromise was found, but it is widely believed in Russia and the U.S., that this compromise is rather weak.

6.2.7. Conclusion

The problem of fissile material disposition is linked to its production. While Russia stopped production of HEU in 1989, it continues to generate plutonium and will continue to do so until, at least, 2011 (see the section on problems associated with shut-down of plutonium reactors) Another aspect of the disposition problem is the dismantlement of existing weapons, which generates additional volumes of loose material. These two aspects of fissile material disposition relate to two separate sets of issues: the question of safety and security, and strategic issues (such as the question on whether to maintain fissile material, whether to produce new material for new weapons, etc.)

The issue of safety and security of fissile material discussed in detail in Chapters 5 & 6 generates questions on strategic issues connected with the larger process of determining a role for nuclear weapons in the post-Cold war international security system and of restructuring of U.S.-Russian relations. While it is perceived by the U.S. and Russia that maintaining substantial levels of nuclear weapons is necessary, demands for fissile material production and/or use of existing stockpiles to build new weapons will remain.

There was a trend pointing at cessation of new weapons production during early 1990s but with the change of power in the U.S. this process has been in reverse. There was a sharp transition from Clinton to Bush administration. Clinton administration officials were trying to be as absolutist as they could and saw taking nuclear weapons out of international politics as a part of a larger process of restructuring U.S.-Russian relations. The Bush administration re-emphasised the role of nuclear weapons and demonstrated a general disbelief in arms control. The differences in attitude to arms control and denuclearisation of Clinton and Bush administrations had a direct impact on the process of cooperative threat reduction. (see the discussion in Chapter 2)

The problem of the safe storage and disposition of fissile material will remain at the forefront of non-proliferation agenda since it is unlikely that the volume of fissile stockpile will diminish dramatically (in the light of the current state of the U.S.-Russian strategic relations).

On the programme level, Plutonium Disposition Programme and HEU Purchase Agreement have been an important tool of the cooperative threat reduction process. They encountered problems of implementation, which are endemic to all the CTR programmes.

The Plutonium Disposition programme suffers from two fundamental problems. One is that there is no technically flawless method of disposition that fully meets the proliferation concerns. The other, even more important issue is that Russia still continues to produce plutonium, and while this continues, the question of disposition appears to be moot. There are also bureaucratic obstacles, such as the lack of funds and the lack of agreement over liability of contractors.

The case with expiration of the Technical Agreement for Plutonium Disposition proves that Bureaucratic Politics Model is relevant when used to explain the cooperative threat reduction process. As was discussed in this chapter, the Technical Agreement for Plutonium Disposition was not extended because U.S. State Department insisted on changing the liability provisions for the U.S. contractors. The U.S. Department of Energy, which implements the project, and Russian MINATOM were ready to extend the agreement, but the State Department was not ready for compromise. The fact that two U.S. agencies – the Department of Energy and the State Department – have varying views on the programme implementation – results from their organisational interests. The Department of Energy is willing to continue the implementation of the programme, which it considers important, for which it has expertise, and for which it received additional funding from the federal budget. The State Department is more concerned with the principles and procedures that govern U.S.-Russian relations, rather than the objectives of CTR in themselves.

The experience of the HEU Deal constitutes another example of how the interests of the key player – *USEC* - (in this case, of a commercial entity with a political role) determined the way the programme developed. *USEC's* commercial interests have interfered with the implementation of the HEU Deal. Although, after years of disagreements on pricing arrangements, the compromise has been reached, there is no guarantee that it will be stable.

Chapter 7
The 'Brain-Drain' Threat: the Human Factor in Downsizing of Russia's Nuclear Complex

7.1. Introduction

The collapse of the Soviet Union prompted the severe deterioration of its nuclear complex. The poor economic and socio-political conditions resulted in a crisis inside the former Soviet nuclear complex. The potential «brain-drain» of former and present nuclear scientists, who can be tempted to work abroad, raised serious concerns. Moreover, the deterioration of morale among the nuclear complex employees could result in undermining of safety and security of nuclear weapons and materials. Desperate nuclear workers and those involved in maintaining nuclear safety and security, who are not paid for months can not be expected to carry out their duties as normal.

This chapter addresses the problem of the human factor – as one of the components of the proliferation challenges of the post-Soviet period. The political and economic turmoil in the disintegrating Soviet Union created two major nuclear proliferation threats, associated with the 'human factor'. Firstly, many weapon scientists lost their jobs, and secondly, those left faced grim working and living conditions. These developments had potentially dangerous consequences; experts with critical knowledge of weapons could have been tempted to sell their expertise to rogue states or feel discouraged and deceived by the system and compromise on keeping nuclear weapons and materials secure. Therefore, the 'human' dimension of proliferation risks in Russia is significant. The following chapter, first, introduces the phenomenon of "closed" cities in Russia – where most of the nuclear scientists and engineers live. The specific lifestyle typical for these cities during the Soviet time (the inhabitants enjoyed better welfare than any other Soviet citizens) made the financial and economic problems of early 1990s an even greater challenge for the nuclear complex employees.

In this respect, it is important to assess achievements and failures of the programme, which was specifically designed to address the problems of Russia's "closed" nuclear cities. The Nuclear Cities (NCI) programme provides interesting insights into the priorities of U.S. in non-proliferation assistance to Russia. The experience of the last few years shows that NCI does not have great support on Capitol Hill because of the specific goals of the programme, which do not yield immediate results and do not in any obvious way reflect the interests of American tax payers. Another programme, which deals with the human aspect of nuclear threats, is the Initiatives for Proliferation Prevention (IPP). Similar to NCI, its focus is on the nuclear scientists, and the goal is to prevent a possible "brain-drain" from Russia by funding commercially viable projects. IPP has been looked on more favourably in the United States since cooperation between American and Russian scientists brings mutually beneficial commercial profits, while fulfilling an important non-proliferation task.

An establishment of the International Science and Technology Centre (ISTC) was another attempt to prevent the "brain-drain" from the former Soviet Union. Unlike NCI and IPP, ISTC is a multilateral effort. ISTC provides former Soviet nuclear scientists with civilian research opportunities. Initially, ISTC experienced problems, but at the moment, it receives good feedback from the experts. Nonetheless, ISTC methods of work are undergoing major changes, which reflect the changing U.S. policy to non-proliferation assistance to Russia. The focus is shifting towards encouraging self-sustainability of Russian nuclear institutes.

The evaluation of the problems of implementation and of overall effectiveness of the programmes dealing with the human factor in Russian nuclear complex provides some interesting conclusions about the U.S.-Russian cooperative threat reduction. The problem of downsizing of the Russian nuclear complex is interlinked with the problem of decisions to be taken by the Russian government on what its nuclear forces should be like. The size and composition of Russian nuclear forces will determine the size of the complex necessary to maintain them and a number of personnel required for the nuclear complex.

7.2. 'Closed' Cities

In Russia there are ten cities, known as 'closed' nuclear cities. The total population of these cities is more than 756,000 people. The majority of them are nuclear scientists engaged in the development, testing and production of nuclear weapons and materials. In total, the Russian nuclear weapon complex has some 17 industrial enterprises and scientific research institutes, the majority of which are situated in these 10 cities.[441] (Table 10)

Table 10 "Closed" Cities in Russia[442]

Name (Former Name)/Activities	Nuclear Facilities	Population
SAROV (Arzamas-16) Weapons R&D Warhead Assembly/Dismantlement Research Reactors	All-Russian Scientific and Research Institute of Experimental Physics (VNIIEF) Avangard Electromechanical Plant	83,000
SHEZHINSK (Chelyabinsk-70) Warhead Design Prototype Warhead Fabrication Research Reactors	All-Russian Scientific and Research Institute of Technical Physics (VNIITF)	48,000
TREKHGORNY (Zlatoust-36) Final Warhead Assembly and Dismantlement	Instrument-Making Plant	33,000
LESNOY (Sverdlovsk-45) Final Warhead Assembly and Dismantlement	Elektrokhimpribor Combine	58,000
ZARECHNYI (Penza-19) Component Fabrication Warhead Assembly and Disassembly	START Production Association (PO START)	64,000
ZELENOGORSK (Krasnoyarsk-45) Uranium Enrichment LEU Production	Electrochemical Plant (EkhZ)	67,000
OZERSK (Chelyabinsk-65) Plutonium and Tritium Production Reactors, Reprocessing MOX Fuel Production Warhead Component Production	MAYAK Production Association (PO MAYAK)	88,000
NOVOURALSK (Sverdlovsk-44) Former HEU for Weapons Production Site LEU Production	Urals Electrochemical Combine (UEKhK)	96,000
ZHEZNOGORSK (Krasnoyarsk-26) Plutonium Production Reactor Spent Fuel Reprocessing	Mining and Chemical Combine (GKhK)	100,000
SEVERSK (Tomsk-7) Plutonium Production Uranium Enrichment, Reprocessing Dismantled Weapons Storage	Siberian Chemical Combine (SKhK)	119,000

The idea of 'closed' cities appeared in the 1940-50s, when the Soviet government started creating them far away from the major cities in the isolated, remote areas. Ten

441 Lev Ryabev, 'The Role of the NCI in Meeting Russia's Nuclear Complex Challenges', paper delivered at the 7th Carnegie International Non-Proliferation Conference, January 11-12, 1999

442 Spector Leonard, Webb Gregory, McDonough Mark, *Tracking Nuclear Proliferation: A Guide, Maps and Charts: 1998*, The Brookings Institution, 1998, pp. 45-47

nuclear cities out of 42 closed cities in Russia have the legal status of Closed Administrative-Territorial Formations (ZATO). Each closed nuclear city was known by its secret name composed of its postcode and the name of the nearest big town and was not marked on the map. It was not until the early 1990s that the outside world and Russian population learnt the exact location of those cities, where ideas related to nuclear weapons were born, implemented and tested. However, even nowadays the nuclear cities and surrounding areas are protected by double fences and the perimeters are patrolled by armed guards of the Ministry of Internal Affairs. Access is restricted and controlled by the FSB.[443]

Those cities had literally a life of their own - the state provided for the population of the 'nuclear' cities to be fully supplied with all the commodities (supply was significantly better than in any other parts of the Soviet Union). Nuclear scientists, the majority of whom lived in those 'closed' cities, enjoyed a number of privileges, including paid vacations, heavily subsidised apartments, access to special stores, free medical care and a dacha (summer retreat house).[444] Soviet nuclear scientists and their families occupied an elite position in the society. However, there were restrictions on their movement (outside the 'closed' cities) due to the nature of their work. The phenomenon of 'closed' cities better than anything else demonstrates how the Soviet nuclear complex was operating independently from the rest of the country. It was a 'state-inside-a-state'.

The end of the Cold War, the collapse of the Soviet Union, and the deterioration of economic situation in Russia caused major problems for the nuclear complex. The 'closed cities' were especially affected. From being well-provided, exclusive parts of the country they turned into cities struggling for the survival of their inhabitants – skilled nuclear scientists and engineers.

The country's military men, as well as the scientists, faced severe economic setbacks. The Strategic Rocket Forces and the 12th Main Directorate of the Ministry of Defence (GUMO) suffered from wage arrears as well as shortages of food and housing allowances. In 1997, the 12th GUMO closed a nuclear weapons storage site due to hunger

443 Matthew Bunn, Oleg Bukharin, Jill Cetina, Kenneth Luongo, Frank von Hippel, 'Retooling Russia's Nuclear Cities', Bulletin of Atomic Scientists, September/October 1998, Vol. 54, #. 5

444 Michael Dobbs, 'Collapse of Soviet Union Proved Boom to Iranian Missile Program', *The Washington Post*, Sunday, January 13, 2002, Page A19

strikes by the workers; in 1998, families of several nuclear units protested over wage and benefit arrears.[445]

The majority of specialists living in the 'closed' cities have a relatively low salary – it is not lower than the average state-funded salary in other cities, but dramatically lower in value terms in comparison with the levels before the Soviet collapse.

Valentin Tikhonov in his comprehensive sociological survey of migration and other related problems in the 'closed' cities gives the following numbers:

> «The level and structure of pay (in US dollars) received today is practically the same as in 1992, although the cost of living has risen considerably since then. About **60 per cent** of surveyed specialists receive monthly pay equivalent to less than **US$50**, and only **3 per cent** receive **US$100 to US$125**».[446]

It is even more worrying that more than half of the specialists employed by the Russian nuclear complex do not treat their regular pay as being sufficient for their needs, and therefore look for other sources of income. It was found that 60% of specialists supplement their salaries by outside work. Around 90% of respondents of Tikhonov's survey confessed that their financial situation has deteriorated, and 80% of surveyed experts expressed their will to work in the military industry of a foreign country.[447]

Bunn *et. al* in 'Controlling Nuclear Warheads and Materials' cite two reports: 1) in October 2000 Russia's Security Council reported that Taliban envoys attempted to recruit at least one Russian nuclear expert. While that particular expert did not agree to work for the Taliban, three of his colleagues had left his institute to live abroad and Russian officials do not know where they are. 2) In 1998 an employee of a nuclear weapons laboratory in the 'closed' city of Sarov attempted to sell documents on advanced conventional weapons to the Taliban and Iraq. The FSB official reported that there were other similar cases of attempted spying and that it was a consequence of the 'very difficult financial position' of workers at defence enterprises.[448]

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445 ‹Russia's Nuclear Risks', Carnegie Issue Brief, Vol. V – No. 2 February 28, 2002

446 Valentin Tikhonov Russia's Nuclear and Missile Complex: The Human Factor in Proliferation, a Report by the Non-proliferation Project of the Carnegie Endowment for International Peace, 2001, p. 9

447 Tikhonov, Russia's Nuclear and Missile Complex, op. cit., pp. 9-10

448 Bunn, Wier, Holdren, 'Controlling Nuclear Warheads and Materials', op. cit., p. 18

The statistics presented by Tikhonov in his survey of nuclear workers reiterates the danger posed by the conditions, which are compelling the nuclear specialists to look for other jobs. However, it should be noted that until now there have been no proven cases of former Soviet scientists in possession of top secret information working for any of the rogue states. The «brain drain», caused by worsening economic conditions in the nuclear sector, is, nonetheless, a potential security threat. As of 1999, those 10 cities had 18,000 unemployed who were not even registered.[449]

The mid-90s was the lowest point for the "closed" cities. The federal budget was failing to pay its nuclear complex workers on time, and the pessimism of Director of Avangard plant in Sarov (the leading plant of nuclear industry) could well have been spoken out by any of the workers of all of the "closed" cities:

> "In the first nine months of this year [1995] the federal debt to the plant totalled 12.5 billion rubles. Furthermore, the federal budget still had a debt of R5.3 billion left over from 1993. And there is no hope now that we will get this money, although leaders at every level have promised to help. It would be rash to rely on the federal budget alone."[450]

At that time, the workers of "closed" cities set up the Association for Assistance to Citizens of Closed Administrative Territorial Formations of the Russian Federation Ministry of Atomic Energy. They decided to focus more on conversion projects and organised an exhibition called "Festival of Russia's Closed Cities". In some ways that exhibition highlighted the problems with the attempt of "closed" cities to fight for their own survival. For many years the workers were isolated from the rest of the country, from the rules of market economy. It remains difficult to find conversion projects that would suit the profile of the former weapons facilities.

The desperate situation characteristic of Russian nuclear complex in mid-1990s culminated in personal tragedies. One of such examples was the suicide committed by the Director of former Chelyabinsk-70 Vladimir Nechai in 1996 (Chelyabinsk-70 is one of Russia's two nuclear design centres). Nechai's suicide note reportedly said that he could no

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449 Ryabev, 'The Role of the NCI in Meeting Russia's Nuclear Complex Challenges', op. cit

450 Anatoliy Pokrovskiy, 'Don't Play with Nuclear Fire. The Open 'Wounds', <u>*Moscow Pravda*</u>, December 2, 1995, pp. 1-2

longer bear the fact that his life-long work was falling apart and his workers were not paid for months and months.[451]

In the early spring of 1998 regional legislators from Chelyabinsk oblast (where several nuclear facilities are situated) appealed to the State Duma to consider the dire situation in the Russian nuclear complex. Some defence-related facilities appealed directly to President Yeltsin pointing out the arrears of wages.[452]

The financial crisis of August 1998 in Russia aggravated the abysmal situation in the Russian nuclear complex. It served as a wake-up call for the U.S. government, which realised the necessity to assist Russian nuclear personnel for the sake of its own national security interests. The threat of the 'brain-drain' and the potential consequences of deteriorating conditions of Russia's nuclear custodians prompted proponents of the CTR process in the U.S. to develop a new programme, which could address their growing concerns. The financial crisis of 1998 served as an impetus for the U.S. to establish the Nuclear Cities Initiative (NCI).

The problem of 'closed' cities highlights the necessity to define Russia's new security philosophy. The research and military complex concentrated in the 'closed' cities was developed in the time of the Cold War with the sole purpose to match the nuclear capabilities of the adversary state, and if it was possible, to surpass them. In the changing security environment there is less need for intensive large-scale nuclear research and production becomes less and less relevant. Consequently the future existence of those cities is in doubt. Unfortunately, downsizing the Russian nuclear complex is a double-edged sword. On the one hand, the reduction in activity related to the development and production of nuclear weapons is in line with the new international security environment. It is desirable both in terms of Russia's relations with the United States and as a general contribution to a reduced role of nuclear weapons in international politics and non-proliferation. On the other hand, a decrease in the levels of nuclear research and production leaves thousands of specialists with unique knowledge of nuclear production without a job. In such a way, it increases the possibilities of a misuse of nuclear knowledge. The economic hardships can be an incentive for the Russian weapon specialists to sell their

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451 News Chronicle, at http://www.nasledie.ru/hronica/1996/10/31/htm retrieved on 11.07.03

452 'Obraschenie Zakonodatel'nogo sobraniya Chelyabinskoi oblasti "K Federal'nomu Sobraniyu Rossiiskoi Federatsii o polozhenii v yadernom komplekse Rossii"', 'Obraschenie trudyaschihsya gorno-khimicheskogo kombinata k Prezidentu Rossii', Yadernyi Kontrol, #3, May-June 1998, pp. 31-32

skills to foreign countries, including rogue states. This also applies to materials to which they still have access.

It is projected that MINATOM will reduce defence employment in the Russian nuclear complex from approximately 75,000 to 40,000 by 2005, and most of these reductions will take place in the closed nuclear cities.[453] According to some estimates, about 20-25,000 people working in weapon/material production and warhead R&D will be laid off in the next 10 years.[454] This number refers to second-tier workers (those who might not have critical knowledge like weapon scientists but who have practical knowledge of certain stages of weapon production). Adding first-tier WMD workers, who eventually will lose their jobs due to downsizing, will produce an even higher overall number. The Russian Government is on the track of downsizing its nuclear complex, which is far too large for Russia's requirements in the post-Cold war security environment. Several conversion projects have been implemented, including the following: the uranium-enrichment plants have been converted from producing HEU for weapons to producing LEU for nuclear power plant fuel; ten of thirteen plutonium-production reactors have been shut down; the annual production of nuclear weapons has declined by a factor of 10 or more; production of new weapons has ended at two out of four warhead assembly/disassembly facilities (the Avangard plant in Sarov and PO Start in Zarechny); manufacturing of fissile weapons components has ended at one of two sites (Seversk); at some facilities weapon activities were consolidated at a smaller number of shops.[455]

However, by not taking good care of its nuclear scientists and not being able to provide opportunities for their work, Russia can seriously undermine both its domestic atomic energy security and international security regime. The Russian government is facing a major dilemma of how to deal with the problem of human factor in the process of restructuring the country's nuclear complex. The problem is that Russia lacks the financial resources to deal with this problem adequately. The assistance provided by cooperative

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453 Ryabev, 'The Role of the NCI in Meeting Russia's Nuclear Complex Challenges', op. cit.

454 Oleg Bukharin, 'Second-tier Workers: Assessing the Problem', presentation at RANSAC Russian Transition Initiative Workshop 'Strategies for Russian Nuclear Complex Downsizing and Redirection: Options for New Directions', Washington D.C., 25.03.03

455 Oleg Bukharin, Harold Feiveson, Frank von Hippel, Matthew Bunn, William Hoehn, Kenneth Luongo, 'Helping Russia Downsize its Nuclear Complex: A Focus on the Closed Cities', Report of an International Conference held at Princeton University, March 14-15, 2000, Princeton University, June 2000; Ryabev, 'The Role of the NCI in Meeting Russia's Nuclear Complex Challenges', op. cit.

threat reduction programmes is of great importance in dealing with problems of re-employment and conversion in Russian nuclear sector.

7.3. Nuclear Cities Initiative (NCI)

The Nuclear Cities Initiative (NCI) was launched by the U.S. Department of Energy in 1998 with the goal to reduce the proliferation risks created by the poor economic conditions in the 'closed' cities. By promoting the development of private industry in these cities, NCI seeks to prevent a 'brain drain' of Russian nuclear experts to nuclear threshold countries.

There are two major objectives set by the NCI Programme: helping Russia downsize its nuclear complex and creating civilian jobs for scientists, engineers, and technicians. NCI also tries to assist in community and infrastructure development in nuclear cities and works to engage U.S. and international agencies and organisations in projects in nuclear cities. NCI is a relatively new programme in the range of non-proliferation assistance programmes carried out with the help of the U.S funds. Unlike the older programmes of IPP and ISTC, which focus on scientists still engaged in the Russian nuclear complex, NCI focuses on providing assistance to scientists as they lose their jobs in the nuclear labs, institutes, and facilities.[456]

The original concept of NCI was born in September 1997 following a proposal from the Russian-American Nuclear Security Advisory Council (RANSAC). DOE adopted RANSAC's proposal, and shortly afterwards MINATOM and DOE began talks on the matter of establishing a cooperative programme in order to help Russian nuclear cities. In March 1998 both agencies have expressed their support for the plan and on July 24, 1998 they issued a Joint Statement on U.S.-Russian Cooperation to Implement the Nuclear Cities Initiative. In September 1998 President Clinton and President Yeltsin approved the basic concept of NCI during the summit in Moscow. Finally, on September 22, 1998 Secretary of Energy Richardson and head of MINATOM Adamov signed an Agreement on the Nuclear Cities Initiative (NCI). Agreement designated Russian MINATOM and U.S DOE as executive agents, and established a U.S.-Russian Steering Committee.

The following principal areas for the cooperation were defined: sharing experience in diversification of production; facilitating the selection of promising projects for

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456 Full text of the 'Agreement Between the Government of the United States of America and the Government of the Russian Federation on the Nuclear Cities Initiative'

production diversification and creating the conditions that will enable them to be implemented; developing entrepreneurial skills in employees displaced from enterprises of the nuclear complex, training them in how to write a business plan, and facilitating the development of such plans; facilitating the creation of the conditions necessary for attracting investment in the «nuclear cities» for purposes of implementing the projects within the framework of the agreement; facilitating the search of investors for production diversification projects, market analysis, and the marketing of products and services produced as a result of the implementation of those projects; facilitating access to existing investment mechanisms for the funding of projects under the agreement.[457]

It was decided that pilot projects would be undertaken in three cities: Sarov, Snezhinsk, and Zheleznogorsk. As of the end of 2003, NCI continues to operate only in these three cities, while the remaining seven continue to struggle on their own with unemployment and other challenges of an economic and social nature.

Sarov is the birthplace of the Soviet atomic bomb, and it became a "closed" city in 1946. It is located in the Nizhny Novgorod Oblast (about 255 miles southeast of Moscow and 90 miles south of the city of Nizhny Novgorod). Sarov is home to one of the main nuclear research institutes – the All Russian Scientific Research Institute of Experimental Physics (VNIIEF). The most important facility situated in Sarov is the Avangard Electromechanical Plant.

Snezhinsk is home to one of Russia's largest nuclear research centres, its formal name is the Russian Federal Nuclear Centre. Snezhinsk also has a Technical Institute of Physics (VNIIETF), one of the country's two principal warhead design centres. About 80% of the adult population is employed by either the Nuclear Centre or the Institute of Physics. The existence of the institute and the city was not made public until 1992.[458]

Zheleznogorsk is one of the largest "closed" cities in Russia with a population of 100,000 people. It is situated in Central Siberia. The main facility in Zheleznogorsk is the Mining and Chemical Combine (MCC or GKhK in Russian abbreviation) with a workforce of 8,300 employees. It took years to carve MCC into a mountain so deep that it was thought that plutonium production could continue even after a nuclear strike. The

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457 Full text of the 'Agreement Between the Government of the United States of America and the Government of the Russian Federation on the Nuclear Cities Initiative', Article 3

458 Sandia National Laboratory, at http://www.sandia.gov/ASCI/russia/snezhinsk.html retrieved on 26.01.04

plutonium reactor in Zheleznogorsk provides heat and light for the city, and this is one of the reasons for the delays in shutting down the reactor. It is now planned that it will be shut down in 2008. For the moment, there is enough plutonium production for 100 nuclear warheads annually.[459] MCC currently has 9,500 workers, and 6,000 of them will be displaced. This creates a necessity for serious NCI involvement in helping Russian government to deal with the downsizing.

7.3.1. The Key Players

The Russian-American Nuclear Security Advisory Council (RANSAC) was the originator of the NCI concept. The idea was then taken to Department of Energy (DOE), where with the instrumental support of Rose Gottemoeller (then Assistant Secretary of Energy) it was developed further and introduced to the Congress.

The practice demonstrated that Congress was not ready to cope with the sudden appearance of another non-proliferation assistance programme. The specific nature of the programme, which was designed to deal with the social and economic problems in the Russian nuclear complex met with a cool reception Congress as it was not a disarmament measure, but rather could serve to keep the Russian nuclear complex running. The supporters of NCI among Representatives of Congress include Ellen Tauscher (D-CA), Senator Pete Domenici; however, there are many others, who do not see NCI as an important non-proliferation tool.

The programme is managed by the DOE's National Nuclear Security Administration (NNSA). In Russia NCI works with the city administrations and heads of facilities and institutes located in the three "closed" cities of Sarov, Snezhinsk, and Zheleznogorsk. Successes of NCI often depend on the personalities involved – i.e. on how politically powerful the heads of the facilities are (what is their leverage in persuading FSB in necessity of cooperation), and how city administrators perceive the programme.

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459 George Pomeroy, 'Zheleznogorsk: RTI Success Stories and Future Plans', presentation at RANSAC Russian Transition Initiative workshop 'Strategies for Russian Nuclear Complex Downsizing and Redirection: Options for New Directions', Washington D.C., 25.03.03

7.3.2. Problems of Implementation and the Overall Effectiveness

«Closed» cities are very different from ordinary towns in Russia. At the moment, the specific nature of the nuclear cities creates certain complications and, to a limited extent, advantages for the operation of the NCI. There are some economic and socio-political privileges in the nuclear cities. These include a more highly developed social infrastructure (healthcare, education, commodities), which to some extent has been preserved, and a lower rate of crime.

Moreover, there was a temporary tax exemption for all ten nuclear cities. An amendment to Article 5 of the Law on ZATO of November 1996 established a special tax protection regime – allowing the closed cities to use taxes collected for their own budget. The deficit of the budget was to be covered by direct state subsidies. Moreover, the amended law allowed closed cities to establish tax-free zones, in other words, the companies registered within the city could do so on a tax-free basis.[460] In a 1998 Amendment to the Law *On Closed Territorial Administrative Entities* the Russian government allowed nuclear cities to keep tax revenues instead of turning them over to the federal government.[461] All those innovations were meant to increase investment attractiveness of the «closed» cities and help them maintain economic stability.

However, the new tax regime provided a loop-hole for companies, which registered for the tax exemption but did not contribute to the cities' development. As a result, the federal budget incurred losses and ruled to tighten the rules for tax exemption. From April 1999 the administration of the closed city can provide tax breaks only to companies who meet the following criteria: 90 per cent of permanent assets and 70 percent of their employees are located within the closed cities.[462]

7.3.2.1 The Economic and Financial Situation in Russia

The undeveloped economic and financial systems and corruption have a direct negative impact on what can be achieved by NCI projects. "Oligarchs" – a small group of influential extremely rich people in Russia – damage the state economy. Oligarchs and the

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460 Anatoli S. Diakov, 'Russia's Closed Nuclear Cities: Social and Economic Conditions', paper given at a conference 'Helping Russia Down-Size Its Nuclear-Weapons Complex', Princeton, 14-15 March, 2000

461 Elena Sokova, 'Russia: The Nuclear Cities Initiative', NTI, at http://www.nti.org/db/nisprofs/russia/forasst/doe/closcity.htm retrieved on 18.07.03

462 Diakov, 'Russia's Closed Nuclear Cities: Social and Economic Conditions', op. cit.

integrated business groups they control - always have their own banks, thereby weakening the state financial system. Russian people do not trust banking systems, and there is no culture of savings in the post-Soviet period – that factor also has an impact on the state of financial institutions. The Soviet legacy of the central economy and concentration of resources in certain industries (like the defence military complex) continues to affect the Russian economy, although a process of moving towards a Western-type of economic and financial system is underway. Since the financial crisis of August 1998, Russian economy has been gradually improving, however, the main economic indicators still fluctuate (Table 11).

Table 11 Selected Macroeconomic Indicators in Russia (1991-2001)[463]

Year	91	92	93	94	95	96	97	98	99	00	01
GDP growth (%)	-5.0	-14.5	-8.7	-12.6	-4.1	-3.4	0.9	-4.9	5.4	9.0	5.0
GNP ($ billion)	569	469	412	343	333	348	383	331	256	246	253

Until the economy is stable, it will be hard to attract foreign private investment. A still 'wild' Russian market economy coupled with the problem of getting access to 'closed' cities leaves not much for providing incentives for foreign investors. Another problem is that Russian private business has not participated in investing into 'closed' cities. Russian oligarchs prefer to keep their assets outside Russia in foreign banks. As in the case of Western investors, Russian businessmen have little incentive to channel resources into the deteriorating nuclear complex. Private investment is crucial for Russia's nuclear complex and 'closed' cities, in particular. There is a very limited state support due to a lack of government funds, at the same time, the commercialisation and conversion of former weapon facilities is crucial for the cities' survival.

7.3.2.2 The Problem with Access

There is a whole list of factors contributing to the problems of implementation of the NCI Programme. First and most important is the secrecy still surrounding nuclear cities

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463 Gianni Zanini, *Assisting Russia's Transition: An Unprecedented Challenge*, Washington D.C., The World Bank, 2002, p. 3

in Russia, which results in a serious problem of access. Most of the closed nuclear cities are located far away from any regional centres or big cities and have several levels of physical protection. The cities are surrounded by double fences, and the perimeter around them is guarded by the troops of Ministry of Internal Affairs.

Bukharin provides the following description:

> "Inside the restricted area is a town for the facility work force, large wooded areas, and several isolated technical areas that house primary research and production facilities, testing areas, and a support infrastructure. Technical areas within the restricted area are surrounded by their own double or triple fences patrolled by armed guards."[464]

Although access control to the nuclear cities was slightly eased in 1950s, it still remains extremely tight, especially for foreign nationals. The residents of the closed nuclear cities can now travel in and out of the city provided they carry a special pass. The strict access regime for foreigners poses one of the main obstacles for the implementation of the NCI and some other U.S.-funded non-proliferation programmes. The American side has complained about the long process of obtaining permission to visit cities participating in the programme and has drawn up a long list on instances when access was denied altogether. During the period from spring 1999 till February 2001 there were 25 instances of denied access.[465] DOE officials have noted that some requests were denied more than once, while a significant number of requests were approved at a later date. It is a rule that the application for entering a «closed» city should be filed 45 days before expected travel. One of the specific requirements applied to foreigners visiting «closed» cities is that they must be escorted at all times, with a few exceptions in some cities where foreigners are allowed to move on their own within a limited area in the city's centre.[466]

It is apparent that the problem with access is hampering the implementation of the NCI and other projects in the «closed» cities. A complicated process of obtaining permission to visit the cities also has a negative psychological effect on American

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464 Oleg Bukharin, Appendix 3: What are Russia's Closed Nuclear Cities?, in 'Helping Russia Downsize its Nuclear Complex: A Focus on the Closed Nuclear Cities', Report of an International Conference held at Princeton University, March 14-15, 2000, Princeton University, June 2000, p. 74

465 GAO Report to Congressional Requesters, 'Nuclear Nonproliferation: DOE's Efforts to Assist Weapons Scientists in Russia's Nuclear Cities Face Challenge', GAO-01-429, p. 45

466 Bukharin, Appendix 3: What are Russia's Closed Nuclear Cities?, op. cit., p. 74

participants of the programme. Although, the Agreement on NCI states «timely access for those involved in coordinating and implementing to nuclear cities and sites where activities related are performed»[467] as a means to the effective implementation of the programme, an access issue still remains a stumbling rock in the NCI process.

However, these restrictions of access to nuclear cities are not entirely irrelevant to guarding Russia's national security. The example of America itself shows that it is a normal code of practice to try and limit the number of those allowed to sensitive sites in the country. Nevertheless, a balanced policy should be established in order to boost the implementation of NCI and other projects in Russia's nuclear cities. Both Russia and the United States are trying to resolve the access issue. On 27 September 1999, the U.S. and Russia signed a memorandum of understanding under the auspices of the NCI to work to improve U.S. access to Russia's closed cities.[468] In September 2001 Russia and the U.S. signed an agreement on access for NCI projects. The agreement gave some political leverage to the Russian nuclear site managers, but it did not resolve the issues of access in a significant way.

To the credit of NCI managers, they find ways to by-pass strict access rules: one of the good examples of how a compromise can be found is the idea of establishing NCI-funded civilian production facilities just outside of the "fence" – for example at the Avangard facility in Sarov, some of its buildings are located outside of the "city" area. In this way, inhabitants of "closed" cities do not have to move out of Sarov and do not need to commute to a far-away regional centre to work.

7.3.2.3 The Allocation of Funds and Their Effectiveness

According to the stated aims of the NCI programme, its primary goal is to *assist* Russia in its struggle with dealing with the human aspect of nuclear complex downsizing. In ideal terms, this determination to help should first of all be reflected in straightforward numbers: the amount of funds allocated to be spent in Russia itself and the number of civilian jobs created with the direct assistance of NCI. These two indicators demonstrate the real-life effectiveness of the NCI programme.

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467 Full text of the 'Agreement Between the Government of the United States of America and the Government of the Russian Federation on the Nuclear Cities Initiative', Article 6

468 'U.S., Russia Working to Improve Access to Closed Nuclear Cities', Nuclear Weapons & Materials Monitor, 27 September 1999, p. 9

The percentage of funds allocated to Russia is very low in comparison with the amount of money spent in the U.S. Overall, 70% of all NCI programme expenditure (up until December 2000) was incurred in America: 67% by national laboratories and 3% - by DOE headquarters. The remaining 30% was spent in Russia.[469] DOE officials admit their concern regarding the amount of money spent by the U.S. national laboratories, but note the importance of their involvement at the initial stage of the programme. It is believed that these costs will be reduced over time as businesses invest their own capital in the nuclear cities.[470] Russian authorities have criticised the amount of NCI funds spent in Russia.[471]

Another major task taken on by NCI is the creation of civilian jobs for Russian nuclear scientists, engineers, and technicians. The severity of the job problem varies from city to city. There are nuclear cities (Novouralsk, Zelenogorsk, Ozersk), which are doing better than others, often thanks to joint projects, such as the implementation of the HEU Agreement. According to MINATOM officials, 1,500 jobs have to be created annually in the nuclear cities. In 1999 MINATOM itself undertook a $50 million job creation effort, using the funds obtained from the revenues Russia received from the U.S.-Russian HEU Agreement.[472] NCI has helped to employ 400 people as of April 2003.[473] It is obvious that the progress made by the programme has not been entirely satisfying. Such an unsatisfactory performance can be a result of several factors – both within the programme's management itself and external circumstances. The GAO Report on DOE's assistance to nuclear cities[474] criticised the NCI programme on several counts. It should be stressed that those directly involved in the implementation of NCI projects perform an

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469 'Nuclear Nonproliferation: DOE's Efforts to Assist Weapons Scientists in Russia's Nuclear Cities Face Challenge', GAO Report to Congressional Requesters, op. cit., p. 9

470 'Nuclear Nonproliferation: DOE's Efforts to Assist Weapons Scientists in Russia's Nuclear Cities Face Challenge', op. cit., p.11

471 'Nuclear Nonproliferation: DOE's Efforts to Assist Weapons Scientists in Russia's Nuclear Cities Face Challenge', op. cit., p. 12

472 Oleg Bukharin, Frank von Hippel, Sharon K. Weiner, 'Conversion and Job Creation in Russia's Closed Nuclear Cities', an Update based on a Workshop held in Obninsk, Russia, June 27-29, 2000, p. 4

473 Interview with Raphael Della Ratta, RANSAC, Washington D.C., 03.04.03

474 'Nuclear Nonproliferation: DOE's Efforts to Assist Weapons Scientists in Russia's Nuclear Cities Face Challenge', op. cit.

extremely important and difficult task, and some of the programme's shortcomings should be rectified at a higher level of decision-making. The GAO report identified three major flaws in DOE's implementation of NCI in Russia: the DOE's lack of standardised reporting procedures, which affected its ability to monitor NCI's expenditures; DOE's limited oversight over laboratories' expenditures; DOE's failure to develop a cost estimate or time frame for the programme's future scope and direction.[475]

In January 2001 the DOE issued new guidance for the NCI programme with more detail on the project selection and approval process. The GAO obviously would welcome this new development; however, it might be controversial from the non-proliferation point of view. Prior to the adoption of new guidelines in January 2001, the projects implemented under NCI did not require partners in industry or demonstrate their commercial viability. This might mean that from then on some projects would be stopped at initial stage only because they would be considered not viable commercially.

Such guidelines could contradict the main goal of NCI to prevent a «brain-drain» and help laid-off nuclear scientists by engaging them in non-weapons projects. While a certain project can be considered commercially unprofitable, it can be vitally important in helping Russia to deal with the problems of downsizing its nuclear complex. One should think in larger terms when considering this; especially knowing that another DOE's programme – Initiatives for Proliferation Prevention (IPP) – is aiming to develop commercially beneficial projects in the nuclear cities.

7.3.2.4 Limited Amounts of Funds Allocated to NCI and Duplication of Efforts

The objectives of NCI are similar to the ones of the two other U.S.-funded programmes working to provide possibilities for the Russian nuclear scientists. These are: the Initiative for Proliferation Prevention (IPP) and the International Science and Technology Centre (ISTC). It is often the case that there is a lack of coordination between the programmes, resulting in duplication of effort and a fight for the funds available in the federal budget. The non-proliferation assistance programmes are usually criticised for their low effectiveness caused by a lack of coordination between the implementing agencies and different programmes.

The U.S. Senator Pete Domenici who plays an important role in promoting co-operative efforts dealing with nuclear proliferation, has stated:

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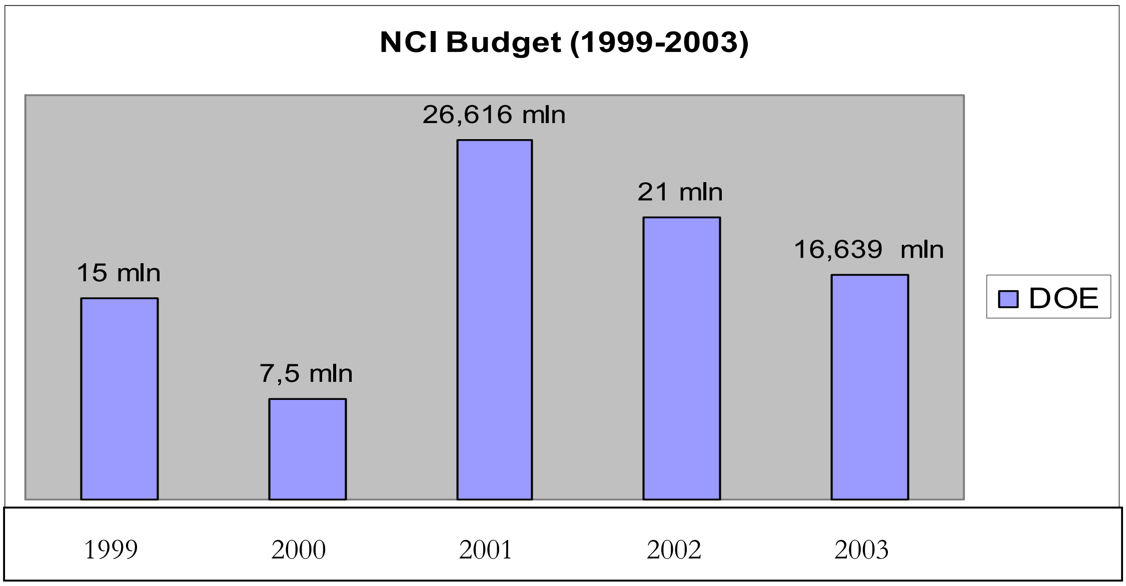
475 'Nuclear Nonproliferation: DOE's Efforts to Assist Weapons Scientists in Russia's Nuclear Cities Face Challenge', op. cit., p. 13

> "Each program has reasonable goals, but they aren't integrated into one coherent thrust led by a focused and committed Administration. In some cases, programs share similar goals."[476]

Throughout the years, NCI has been allocated funds much lower than the amounts requested. In 1999 NCI received $15 million; in 2000 $30 million was requested, only $7.5 million was appropriated; in 2001 $27.5 million was requested, and only $26.6 million appropriated. The process requesting and allocation of funds in 2002 demonstrated a reduced commitment to non-proliferation assistance programmes by new U.S. administration. DOE has submitted an initial request for $30 million (made under the Clinton administration). With the new administration in the White House, the DOE has revised its request to $6.6 million. The House of Representatives increased NCI funding to $10 million. The Senate increased NCI funding to $21.2 million. The final allocation was confirmed by the Energy and Water Development Appropriations Act for FY2002, which provided $41 million for NCI and IPP combined.[477] Figure 3 presents the historical budget for NCI since 1999.

Figure 3 NCI Budget (1999-2003)[478]



[476] Pete Domenici, 'Congressional Interest and Concern for the Nuclear Cities', paper given at a conference 'Helping Russia Down-Size Its Nuclear-Weapons Complex', Princeton, 14-15 March, 2000

[477] Elena Sokova, 'Russia: The Nuclear Cities Initiative', op. cit.

[478] Source: Bunn, Wier, Holdren, 'Controlling Nuclear Warheads and Materials', op. cit., on-line companion, at http://www.nti.org/e-research/cnwm/stabilizing/nci.asp#budget retrieved on 03.02.04

7.3.2.5 The Attitude of Congress Towards NCI

For several reasons the way U.S. Congress perceives NCI is not favourable. Such attitude of the American legislators can be blamed on problems both within the Congress itself, and within the programme management. There is an underlying conflict between the NCI objectives and Congress values and interests.

Representative Ellen Tauscher (D-CA) of the U.S. Congress noted:

> "There are still some in Congress who have not awoken to the reality of this new nuclear threat and see no reason to adjust Cold War policies. Some of my colleagues don't like the idea that the Cold War is over. They were very comfortable with the idea that we hated the Russians and that they were bad – you've got to have an enemy out there. How do you build up a strong defense if you don't have an enemy out there? As a result, funding for the NCI and other programs such as Initiatives for Proliferation Prevention is in doubt."[479]

First of all, NCI tries to address a very complicated set of issues, which include problems of social, political, and economic nature experienced by the Russian nuclear complex. The idea that U.S. money is spent on improving economic conditions of foreign scientists does not find appreciation it deserves in the U.S. Congress. Although, it is obviously in the long-term interest of the U.S. to keep Russian scientists in their home country, it is hard to explain it to some the critics of the programme. There can be no immediate results for a programme like NCI, and therefore, it is very hard to demonstrate the achievements reached. Because of that, NCI programme managers did not succeed in "selling" their programme on the Capitol Hill.

Another factor, which contributed to the limited support NCI has secured was the way it was introduced. NCI was an emergency initiative, designed as a response to a financial crisis in Russia in August of 1998. At this time, the potential "brain-drain" of the Russian nuclear workers, as well as all the potential proliferation threats connected with the economic crisis inside the nuclear complex – became even more critical. Therefore, the NCI ideologists presented the Programme to Congress without much political groundwork. It was an unexpected initiative, for which Congressmen were required to allocate money at short notice – and that did not add to the support on the Hill. The

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479 'Representative Tauscher on Winning the Post-Cold War', Proliferation Brief, Vol. 2, No. 16, October 4, 1999

mismanagement of the NCI Programme for the first few years also contributed a lot to the negative attitude from Congress.

In September 2003 the Nuclear Cities Initiative (NCI) Agreement expired, and it was not renewed due to unresolved issues of liability (the same as in the case of the Plutonium Disposition Agreement). Although, the U.S. implementing agent – DOE – declared that it is ready to continue with the cooperation on projects that are already under way, the failure to renew the agreement means that no new projects can be started.

7.4 Initiatives for Proliferation Prevention (IPP)

Another programme administered by the National Nuclear Security Administration (NNSA) of the Department of Energy (DOE) is known as the Initiatives for Proliferation Prevention (IPP). The goal of IPP is to identify and develop sustainable, non-weapons-related work for scientists, engineers, and technicians in order to prevent a «brain-drain». The U.S. Industry Coalition, Inc. (USIC) is facilitating cooperation between the representatives of U.S. companies, national labs and NIS institutes. USIC represents 160 American companies, most of which have partners in NIS. Unlike NCI, which is doing similar work, IPP is looking for projects with commercial potential and its work is not limited to the closed cities.

The IPP programme - formerly known as the Industrial Partnering Programme - was established in 1994 following «The Foreign Operations, Export Financing and Related Programmes Appropriations Act, 1994», which made available funds for cooperative programme between the DOE's labs and former Soviet nuclear institutions.[480] The programme carries out work in Russia, Ukraine, Belarus, and Kazakhstan, with the bulk of it done in Russia (about 80 per cent of projects).

There are three main players implementing the IPP programme on the American side: DOE, USIC, and U.S. labs. On the Russian side, there is no government agency playing an implementing role. USIC and U.S. labs work directly with Russian partners.

480 'Nuclear Nonproliferation: Concerns With DOE's Efforts to Reduce the Risks Posed by Russia's Unemployed Weapons Scientists', op. cit., p. 14

7.4.1 How the IPP Operates

The programme operates in the following way:

Stage 1 - Establishing contacts, defining potential projects

The U.S. companies approach DOE, USIC, or a national lab with a certain proposal. Sometimes, NIS institutes seek Western partners themselves. A draft proposal initiated by either a U.S. lab or company should be certified by the lab, and the technology has to be validated. USIC participates in a company/lab review process.

The Inter-Laboratory Board (ILAB), which consists of representatives of 10 U.S. DOE labs and the Kansas City Plant, makes contact with NIS institutes in order to locate potential projects which will engage former Soviet nuclear experts and are potentially commercially viable. The proposed projects are reviewed by ILAB for compliance with the dual-use and export control requirements.

Stage 2 - Initial evaluation of capabilities and technologies

ILAB implements initial evaluations of capabilities and technologies of the particular institution.

Stage 3 - Evaluation of commercial viability of projects

USIC evaluates the commercial viability of proposed projects. USIC promotes those projects that have the potential to be cost-effective to implement, that are attractive to investors, and would be commercially viable.[481]

Stage 4 - Final decision on projects to be implemented

DOE headquarters has the right of final decision on all projects. If the project is selected, the U.S. government pays for existing R&D of the Russian lab or institute. Prior to granting an approval, the DOE evaluates proposals in terms of policy analysis, and does a check on dual-use.

Stage 5 - Development of project conditions

In the course of approximately 3 months – a statement of work is developed. It is called a Cooperation Research and Development Agreement (CRADA).[482] Formally, the

481 'IPP Program', http://ipp.lanl.gov/ippext.nsf/Approach?OpenPage retrieved on 24.07.03

U.S. company would have the exclusive right over the final product; at the same time, the company works out the 'real' terms with the Russian institution.

Stage 6 - Project implementation

At the final stage, the work starts at the Russian facility or institute, and its progress is tracked by U.S. experts.

The IPP projects are classified into three different categories: Thrust 1, Thrust 2, Thrust 3. **Thrust 1** projects are funded by DOE and involve the identification of commercially feasible technologies. **Thrust 2** category deals with projects, for which a U.S. industry partner is found who agrees to share with DOE the costs associated with the development of potential technologies. **Thrust 3** projects are expected to become self-sustained business ventures, and there should be no involvement of the U.S. government.

7.4.2 Problems of Implementation and the Overall Effectiveness

As of spring 2003, there were 120 IPP projects, with 108 out of this number moving towards Thrust II.[483] As of March 2003, 130 projects in total were completed, 13 have made to Thrust III, and another 20 projects are expected to reach Thrust III in one or two years.[484] In FY2002 IPP spent \$18 million, and USIC contributed \$25 million. Overall, the companies raised more than \$80 million as of 2003. The budget of IPP is presented in Figure 4.

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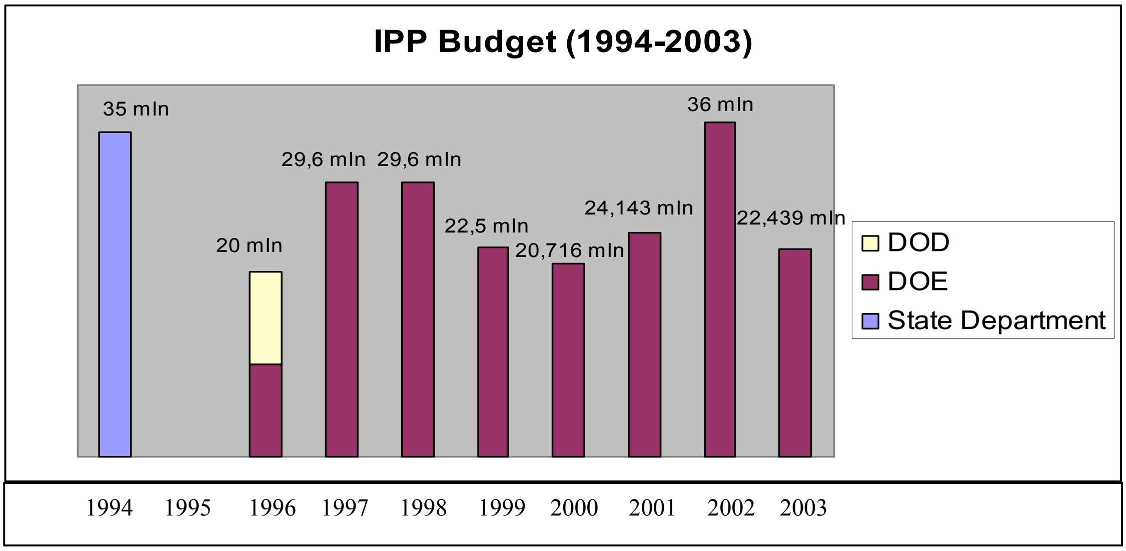
482 Interview with Victor Alessi, President of USIC, Washington D.C., 10.04.03

483 Interview with Victor Alessi, Washington D.C., 10.04.03

484 Interview with Victor Alessi, Washington D.C., 10.04.03

Figure 4 IPP Budget (1994-2003)[485]



The IPP programme faces some problems similar to the ones experienced by the other non-proliferation programmes in Russia. At the same time, there are specific aspects of the programme, which are seen as potentially harmful to the U.S. interests.

There are two main issues of concern for some U.S. observers: first, the fact that U.S. funds are used to subsidise former Soviet nuclear scientists, who are still involved in weapons production, and second, the possible damage to U.S. national security due to Russian access to some dual-use technologies shared in some IPP projects.

A GAO report of February 1999 examining the IPP progress[486] considered those two issues to be of significance for U.S. interests. The report found that some scientists working on a part-time basis on IPP projects were still engaged in nuclear research activities. It implied that IPP was subsidising nuclear weapons development in Russia.

In response to criticism, DOE has stated:

> «…the fundamental goal of the IPP Program is to keep weapons specialists working in their home countries - in the face of grim domestic employment prospects - rather than selling their services to foreign states or organizations of proliferation concern...These scientists, and those who have been dismissed, are

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485 Bunn, Wier, Holdren, 'Controlling Nuclear Warheads and Materials', op. cit., on-line companion, at http://www.nti.org/e-research/cnwm/stabilizing/ipp.asp#budget retrieved on 03.02.04

486 'Nuclear Nonproliferation: Concerns With DOE's Efforts to Reduce the Risks Posed by Russia's Unemployed Weapons Scientists', op. cit.

> the proper targets of the IPP Program, because these are the individuals who are most likely to be tempted to sell their services abroad...»[487]

Another concern of the GAO is that «information learned during the course of the project could unintentionally provide useful defense-related benefits to Russian and other NIS scientists».[488] DOE has noted that the projects with potential dual-use implications brought to attention by GAO date from the earlier period and, «at worst, might have provided only incidental military benefits to Russia - and not to its weapon of mass destruction or missile programs».[489] DOE officials reiterated their commitment not to support dual-use technologies.

These particular issues of concern expressed by the GAO are important for this study because any programmes, which are seen as harmful to the interests of the U.S. will have difficulties obtaining the necessary funding. It should be stressed that the IPP is not regarded as working against American interests overall, but some of its aspects were seen by the GAO as potentially being against U.S. interests. The importance of effectively responding to such criticism is hard to overestimate. DOE has been instrumental in doing it so far.

Problems of another kind are associated with the implementation process as such. The GAO has identified several shortcomings of the IPP implementation in Russia. The following aspects have received the major criticism: Russia receives a smaller fraction of the total IPP funding (approximately 30-40%); there is no clear data on how much reaches the Russian scientists (due to deductions of taxes, overhead charges, institutional charges, etc.); the targets of the IPP are unclear (the GAO considers IPP might be not targeting the prime institutions and personnel in Russia); the long-term goal of the IPP is far from being achieved (only few projects have reached Thrust 3 stage).[490]

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487 Appendix VII, Comments from the DOE, 'Nuclear Nonproliferation: Concerns With DOE's Efforts to Reduce the Risks Posed by Russia's Unemployed Weapons Scientists', op. cit., p. 97

488 'Nuclear Nonproliferation: Concerns With DOE's Efforts to Reduce the Risks Posed by Russia's Unemployed Weapons Scientists', op. cit., p. 44

489 Appendix VII, Comments from the DOE, 'Nuclear Nonproliferation: Concerns With DOE's Efforts to Reduce the Risks Posed by Russia's Unemployed Weapons Scientists', op. cit., p. 97

490 'Nuclear Nonproliferation: Concerns With DOE's Efforts to Reduce the Risks Posed by Russia's Unemployed Weapons Scientists', op. cit., p. 3

7.4.2.1. Funds Received by Russia

Until recently, IPP was criticised for inadequate amounts of IPP funds being spent in Russia (approximately 30-40%). The overall allocation of IPP funds throughout the years has demonstrated that the larger part of the resources are spent in the U.S. with the U.S. national labs being the main recipients of the programme's money. The funds are spent for scientific research related to IPP projects, developing or monitoring the projects, and other various kinds of administrative charges. Although largely justified these expenses create a dubious situation: a programme devoted to assist Russian nuclear workers is paying their American colleagues. The uneven distribution of funds might appear to be due to different levels of pay in the U.S. and Russia. In monetary terms, the work of 30-40 Russian scientists is equivalent to the pay of one American scientist. According to the President of USIC, Victor Alessi, that particular problem was dealt with through legislation, and now 65% of IPP funds should go to ex-Soviet scientists.[491]

7.4.2.2. The Uncertainty of Data Relating to Funds Received by Russia and on the Participants of the Projects

The major deficiency of the information available on the allocation of funds in Russia is the lack of clear data on several aspects: how much money Russia receives from the U.S., how much the Russian institutions are spending out of this amount on taxes, overheads and other charges, and what portion of these funds in the end reaches the scientists, who are the target of the whole programme.

It can be argued that the following factors contribute to the existing problem. First, the IPP management lacks clear records itself on the amount of funds going to Russia. On some occasions the GAO determined that the DOE's information was inaccurate and laboratory officials did not know how much went to the institute.[492] Secondly, the American side has most probably failed to lay down strict requirements for the Russian side to provide clear information on the distribution of funds allocated. Thirdly, the Russian institutions spend a certain amount of money on general expenses, such as paying off taxes and overhead charges, and therefore, only the remainder of these funds can be allocated to the scientists themselves. More importantly, the projects'

491 Interview with Victor Alessi, Washington D.C., 10.04.03

492 'Nuclear Nonproliferation: Concerns With DOE's Efforts to Reduce the Risks Posed by Russia's Unemployed Weapons Scientists', op. cit., p. 31

participants are often not identified by the IPP management. The GAO believes it is important to have background information on the institutions and scientists participating in the IPP programme in order to make sure the most important of them are covered by the programme. GAO rightly believes those scientists with the most important direct WMD knowledge should be targeted first.

DOE has special guidelines outlining the necessity of obtaining information on the background and experience by DOE labs' investigators. However, some of them believe that doing this in Russia would be «too intrusive», would have a negative impact on the relationships between the U.S. labs and Russian institutes and is not necessarily relevant to the implementation of the projects.

7.5 The International Science and Technology Centre (ISTC)

7.5.1 Background

The International Science and Technology Centre was a multilateral effort of the European Union (EU), Russia, the United States and Japan when it was established in 1992. Those countries agreed that it was necessary to provide employment opportunities to former Soviet nuclear scientists. Two centres were set up - one in Moscow, another in Kiev (Ukraine). Later on ISTC was joined by Norway and South Korea, and by Armenia, Belarus, Georgia, Kazakhstan and Kyrgyzstan as recipient countries. More recently, ISTC was joined by Tajikistan.

The Agreement establishing the ISTC stated two main objectives:[493]

> (1) to give weapons scientists and engineers, particularly those who possess knowledge and skills related to weapons of mass destruction or missile delivery systems, in the Russian Federation and, if interested, in other states of the NIS and Georgia, opportunities to redirect their talents to peaceful activities;
>
> (2) to contribute thereby through its projects and activities to the solution of national or international technical problems, and to the wider goals of reinforcing the transition to market-based economies responsive to civil needs, of supporting basic and applied research and technology development, *inter alia*, in the fields of environmental protection, energy production, and nuclear safety, and of promoting the further

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493 Text of 'Agreement Establishing an International Science and Technology Center', http://www.istc.ru/istc/website.nsf/fm/z01AgreementE retrieved on 17.02.02

integration of scientists of the states of the NIS and Georgia into the international scientific community.

The ISTC was always viewed as a short-term, temporary solution until the economies of Russia and NIS would be able to support these scientists in non-weapons work. However, the realities of the former Soviet Union turned it into a more long-term programme. It is only recently that ISTC vision managers started looking for options to reduce government funding in areas, where there is no proliferation risk.

The U.S. government is now looking for an "exit" strategy, which would stimulate moving former Soviet scientists and the institutions they represent towards sustainability. It is believed, that the ISTC will continue for another 10 years. Qualitative changes in the programme strategy demonstrate some important shifts in U.S. priorities. It is apparent that with the new strategy U.S. is trying to encourage ex-Soviet institutions to be more competitive and rely less on external help.

7.5.2 How the ISTC Operates

The ISTC operates through two major programmes: the Partner Programme and the Science Project Programme. The Science Project Programme solicits project proposals from the institutes throughout the NIS and provides funding and logistic support to project teams, which in turn develop and implement the project with the assistance of foreign collaborating organisations.[494] In other words, the Science Programme is funded by the government entities represented on the Board of Directors. Projects going through the Partner Programme are supposed to be funded by the private sector, but in real terms, many government entities act as partners.

Through its Partner Programme the ISTC is playing the role of a broker by establishing links between the partners (companies, scientific institutions, and government and non-government organisations) interested in collaboration and NIS institutions. Any partner who is willing to engage a NIS institution in a research project benefits by doing it through the ISTC in a number of ways. The most important of them is the facilitated

494 'Science Project Program', ISTC, at http://www.istc.ru/istc/website.nsf/fc/ScProjProgram retrieved on 17.02.02

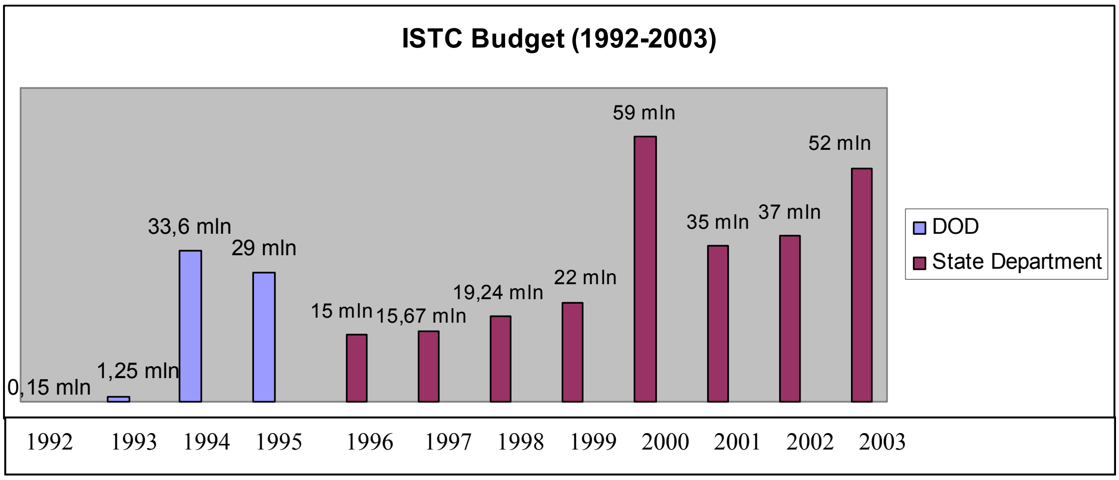
process of cooperation, involving tax-free direct payments to NIS project teams and duty-free import of project equipment.[495]

The Governing Board meets twice a year (in the spring and winter) to allocate funding, and there is a special allocation of funding in July. The purpose of the meetings is to announce which projects will be funded.

7.5.3 Problems of Implementation and the Overall Effectiveness

The main problems in the implementation of ISTC projects were identified as follows: funding is insufficient (Figure 5 outlines the ISTC funding); the multilateral framework of ISTC programme can sometimes cause delay in its operation; the ISTC agreement is still not ratified by the Russian State Duma, which means the programme has an uncertain legal status.

Figure 5 ISTC Budget (1992-2003)[496]



The lack of funding available for ISTC projects is the largest impediment to having more weapons scientists doing civilian research and thereby reducing the risk of proliferation. The number of projects proposals submitted to the ISTC amounted to 3,600 (as of March 2003), and only half of them were actually funded.[497]

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495 'Partner Program', ISTC, at http://www.istc.ru/istc/website.nsf/fc/PartnerProgram retrieved on 17.02.02

496 Bunn, Wier, Holdren, 'Controlling Nuclear Warheads and Materials', op. cit., on-line companion, at http://www.nti.org/e-research/cnwm/stabilizing/istc.asp#budget retrieved on 03.02.04

497 Interview with John Crowley, State Department, Washington D.C., 11.04.03

The ISTC is a multinational effort, and the multilateral work has both advantages and disadvantages. With regard to every decision the Board of Governors has to reach a consensus. In the case of the EU, the approval of all 15 states has to be received before funding for a certain project can be approved at all. The process of formal approvals from all the parties to ISTC does cause some delay.

The fact that the ISTC agreement has not been ratified is a very good example of the limitations of U.S.-Russian relations, and the bureaucratic shortcomings of the cooperative threat reduction process. Initially, the ISTC agreement was not submitted for the Duma's consideration because the situation in the Russian parliament was not considered 'favourable' for that. The reason for such a precaution was the dominance of 'right' wing in the State Duma in 1999. The composition of the Duma has changed since then and the communists forces, which were the main obstacle to putting a document forward for ratification, are in the minority. Nonetheless, no state agency considered the issue of the ISTC agreement to be a priority, and it still remains not ratified.

Currently, ISTC is considered to be one of the more successful cooperative threat reduction programmes. Both Russian and American scientists are enthusiastic about the opportunities created by the ISTC to work collaboratively. For Russian scientists, it represents a chance to work on most new projects, and the American scientists appreciate the advanced level of Russia's fundamental sciences – all these factors contribute to fruitful cooperation.

As of the end of October 2002, the United States made the largest funding contribution to ISTC Projects (35% of the total funding). The European Union has contributed 26.3%, Japan - 12.2%, Korea - 0.4%, Norway - 0.4%, and 25.7% was received by ISTC from the various Partners.

As of March 2003, the ISTC in Moscow had 150 permanent staff. Most of them were Russians nominated by MINATOM. The number of scientists engaged numbered over 51,000, the majority being weapons scientists. The total funding provided to ISTC in Moscow up to 2003 amounted to $519 million.[498] A smaller science centre in Kiev founded by the U.S., Ukraine, Sweden, and Canada had 60 permanent staff as of March 2003. The total number of weapons scientists involved in the work of Kiev's ISTC was 8,000 people, and the funding up to 2003 amounted to $68 million.[499] The main areas of scientific and

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498 Interview with John Crowley, Washington D.C., 11.04.03

499 Interview with John Crowley, Washington D.C., 11.04.03

technological cooperation include biotechnology and life sciences (largest share of funding allocated, 23%), environment, physics (including fission reactors, non-nuclear energy and materials).[500] During 1994-2002 the ISTC Programme funded 1,700 projects for the total amount of $490,743,687 (total numbers for all NIS countries, although the bulk of it was spent in Russia).[501]

A Qualitative change in the approach of ISTC

Starting from 2003, ISTC vision managers started redesigning the approach to how the programme operates in Russia and other NIS countries. The qualitative shift in how ISTC operates demonstrates some major changes in U.S. policy towards non-proliferation assistance in Russia.

The reorganisation within the ISTC Programme brought one fundamental novelty. From 2003 senior ISTC managers are no longer involved in improving the proposals. When ISTC receives a proposal from a NIS institution, it carries out an initial proposal screening to identify whether it is coherent. If the quality of proposal submitted to ISTC is satisfactory, ISTC registers it and submits for review by the funding parties.

The new approach demonstrates that the ISTC programme is now focusing on developing the self-sustainability factor among NIS institutions. Previously the idea was to spend as many grants as possible – it reflected an attempt to mitigate a critical situation in the first years after Soviet collapse. Now the policy has shifted towards bringing the former Soviet institutions to a level of self-sufficiency. The ISTC is attempting to stimulate development of business and marketing skills among institutions of the WMD complex.

The ISTC is clearly looking for an "exit" strategy. Programme managers expect to stay in Russia and NIS for another 10 years, however, in order to achieve their goal of phasing out Western assistance they need to ensure sustainability of the work carried out.

7.6. Conclusion

The collapse of the Soviet Union created a whole set of challenges for international security. These included the potential "brain-drain" of former Soviet scientists, the deterioration of nuclear safety and security due to dramatic economic hardships experienced by Russia's 'nuclear' cities, which remain to be very serious issues.

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500 ISTC Projects by Technology Area, ISTC, at http://www.istc.ru retrieved on 04.07.03

501 'ISTC – Annual Report of 2002', ISTC, p. 32

The CTR programmes designed to confront the potential "brain drain" and to improve economic and social conditions in the 'closed' cities had an ambitious non-proliferation agenda. In a way, the three directions taken by the different programmes – NCI, IPP, and ISTC – complement each other and should together form a strong defence against the proliferation risks associated with the socio-economic conditions inside the nuclear complex. Although, it is hard to evaluate numerical value of what programmes have achieved, it is evident that they have played a highly positive role in the threat reduction process. At the same time, the potential of these programmes has not been realised, and the failure of the Russian and American governments to do so results from problems endemic to the overall CTR process.

An examination of the NCI Programme and its achievements and failures leads to the following conclusions. The underlying concept of the NCI, which aims to assist former weapons scientists, does not always find appreciation among the U.S. legislators. Although, approved by Congress in 1998 in the aftermath of the financial crisis in Russia, NCI has never been popular on Capitol Hill. For the majority of the U.S. legislative branch it remains a question of how NCI relates to U.S. national interests. The non-proliferation value of the programme aiming at providing jobs for nuclear scientists, who, otherwise, might sell their expertise to rogue states, is self-evident. However, there are those in the U.S. policy-making circles, who see NCI as humanitarian aid to Russia. The fact that 'humanitarian aid to Russia' is seen as an unfavourable act by some groups in the U.S. indicates some of the problems in U.S.-Russian relations.

The specific conditions in Russia's 'closed' cities, resulting from the secrecy surrounding them, are another major factor to why the programme has faced various obstacles. A lack of trust, as evident from the problem of access, is harmful to the CTR process. The FSB's concerns over the protection of Russia's national security interests have resulted in a limited and complicated access of foreign experts to nuclear cities. Apart from the programme managers, it is the private investors, who are discouraged from visiting these cities and exploring business opportunities. In this respect, the problem of access to 'closed' cities has two major detrimental effects: 1) the implementation of the programmes is delayed and complicated; 2) it makes it difficult to attract private foreign investment vitally needed by nuclear cities.

The IPP Programme has a more favourable position on Capitol Hill, since IPP projects can be commercially beneficial for the U.S. labs and the overall economy. The programme has been criticised for managerial oversights in the past and for the fact that an insignificant number of projects have reached self-sustainability. The implementation framework of IPP projects also raised concerns about the possible damage to U.S. national security as a result of sharing technology and expertise with Russian nuclear experts. It is evident that both sides have concerns of each other's motives on almost every single CTR programme.

Another concern was triggered by the fact that the IPP is designed to provide additional work opportunities for the weapons scientists still working for the Russian nuclear complex. It reduces the incentive for Russian scientists to sell their expertise abroad, but at the same time by subsidising current nuclear complex workers it keeps the industry afloat. This is seen as unfavourable for U.S. interests by some policy-makers. U.S. concerns of such nature are another evidence of lack of trust present in the U.S.-Russian relationship in the post-Cold War security environment.

Currently, the ISTC Programme is the least controversial programme among all CTR activities. The ISTC experience is another example of how direct cooperation between scientists is less prone to political and bureaucratic setbacks. It also helped that ISTC kept a relatively low profile during the years. The main problem with ISTC is that it does not receive enough funding and human resources to fund all project proposals.

The ISTC programme is a multilateral effort of several countries, and because of that it is less dependent on bilateral relations between the U.S. and Russia.

Overall, programmes designed to deal with the 'human factor' in the disintegrating Russian nuclear complex, had ambitious goals at their start. They were a timely reaction to potential proliferation threats created by dramatic political, economic and social problems in Russia. It is evident that bureaucratic impediments, Russia's unstable economy, the secrecy surrounding Russian nuclear cities, insufficient funding, and mutual sense of suspicion on the both sides have considerably reduced the potential of these programmes.

Chapter 8
Conclusion

8.1. The CTR Process: a Laboratory Study of U.S.-Russian Strategic Relations

The goal of this thesis was to use cooperative threat reduction programmes as a case study of U.S.-Russian relations in the post-Cold war environment.

The sudden collapse of the Soviet Union marked the end of a seemingly stable and balanced world system of international relations. The period of the «Cold War» or, as some IR theorists called it, the «Long Peace»[502], had ended, and the states were faced with a dramatically new distribution of power in the world.

The end of the Cold War marked a decisive shift in the international system, and the United States and Russia as the successors to the Cold War superpowers sought to reconstruct their security relationship on a completely new foundation. While the end of the Cold War suggested the end of the strategic nuclear confrontation and the removal of the threat of a global war of total destruction, at the same time new and unprecedented dangers emerged, as the tight control that the Soviet Union had exercised over its vast nuclear arsenal slipped due to the break-up of the state and the changing social and economic conditions.

The United States had a very limited opportunity to influence the nuclear dangers, which appeared after the break-up of the USSR. Diplomatic persuasion, sophisticated nuclear strategies or binding bilateral arms control agreements were not enough anymore. The American government could not count on its vast experience of dealing with the Soviet leadership. The situation had changed dramatically, and the ex-Soviet leaderships were confronted with nuclear dangers that were hard to estimate and they did not know how to control. In the early 1990s the West was concerned about the possible misuse of nuclear weapons by the governments of the former Soviet republics, whose character was largely unknown, as well as the potential loss of physical control over weapons and nuclear materials. There was a lot of speculation about the increased danger of possible nuclear attacks either against the U.S. itself, or the use of weapons in the course of conflicts on the

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502 John Lewis Gaddis, 'The Long Peace: Elements of Stability in the Postwar International System' in International Security, Vol. 10, No. 4, 1986, pp. 99-142

post-Soviet territory. The experience of the last decade has confirmed that the main source of danger was and remains not from the official leaders of the ex-Soviet republics, but the potential illegal use of nuclear weapons, technology, materials, and expertise by either the criminal elements inside the former Soviet Union or by the third parties (e.g. threshold countries, terrorists).

The tragic events of September 11, 2001, have created an even greater need for a timely and effective constraint of the spread of weapons of mass destruction. Non-proliferation assistance to Russia must inevitably be an important part of any effective new non-proliferation policy of the U.S. government. It is extremely important for the governments of both the U.S. and Russia to acknowledge the fact that they share a common interest in jointly confronting the same dangers and threats. This is an obvious fact, but, in reality, it is still a controversial process for both countries - to act genuinely as partners is still a challenge. It is natural that Russia and the U.S. feel the pressure of more than four decades of mutual antagonism. It is a challenge for them to leave behind the ways and methods of dealing with each other and the sceptical attitudes that prevailed in the past, in a short period of time.

In this respect, CTR is a truly remarkable process, which can be treated as an indicator of the changing nature of strategic relations between Russia and the States. The CTR process vividly represents a larger picture of the complexities of transformation the nature of their relations, especially in terms of the security aspects. The adaptation to the new international security environment, combined with the complex internal changes in the former Soviet space, will take much longer than a decade. Moreover, the collapse of the Soviet Union and disappearance of one of the two superpowers are not the only developments on the international scene.

The prospect of a major war has receded, and inter-superpower antagonism is no longer a determining factor in the system of international relations.[503] Neither U.S., nor Russia views the other as a political enemy. However, the sophisticated state mechanisms (e.g. military-industrial complexes) still present in both countries were created to serve the perceived strategic requirements during the Cold War. The military thinking has not properly adapted to the new political realities. To implement a major transformation inside the internal organisations and institutions is simple in principle, but difficult in practice. The two erstwhile superpowers found themselves in the situation where the international

503 Lawrence Freedman, *The Evolution of Nuclear Strategy*, Macmillan in association with the International Institute for Strategic Studies, 1983

system and their security relations had changed so completely in a very short period of time that long-established requirements for international security that had dominated the security and military establishments of both countries for decades had suddenly become obsolete. The political leaders sought to move quickly to adapt their relations to the new realities, but given the rapidity of the changes and the uncertainty of the nature of the evolving international system and the future requirements for the security of either country, the national security establishments of both countries were slow in absorbing the 'new thinking'.

The CTR process, in essence, belongs to 'new thinking' in trying to promote the transition to a new state of relations. There were two principal reasons for the CTR process to be established, at first place: a desire to move to a new international order, where the role of nuclear weapons would be considerably reduced (ideas of cooperative denuclearisation advocated by Ashton Carter – Chapter 2) and a fear of an inadvertent nuclear war due to the abundance of nuclear weapons both in the United States and Russia (due to technical dangers described in Chapter 2). The CTR process is more than a simple technical process dealing with safety and security of nuclear weapons; it was meant to lay the foundation for a new type of relationship between the United States and Russia, which would reflect a new international system without the Cold War.

The ideas of cooperative denuclearisation were not accepted, and the reason for a lack of understanding of the changing world system may be explained by the still on-going process of transition. The old world order has undergone considerable transformation, but the new order has not been fully re-established, although the international system has settled into some interim equilibrium state.

8.2. The CTR Process in the Context of an Emerging New World Order

The reasons why this study was worth undertaking are two-fold. It provides a new contribution to the existing literature on the subject of the threat reduction by presenting an explanatory model of all the major CTR programmes and analysing problems of implementation, which hamper the process. The U.S.-Russian CTR process is gradually growing into a larger process: in June 2002 the G-8 leaders launched a Global Partnership Against the Spread of Weapons and Materials of Mass Destruction, which would deal with proliferation threats on a global scale and will not be limited to Russia only. The original CTR legislation, which formed a basis for the U.S. non-proliferation assistance, will soon be extended to cover regions outside of the former Soviet Union. That means that that the

CTR framework designed for Russia will be applied to other countries. Therefore, now is the right moment to understand what was right and wrong about the CTR mechanism before it is used in other parts of the world.

More importantly this study demonstrates that the processes happening in the international security system below the surface and which might not be so obvious at a glance can be absolutely important for the future of the international system. The CTR process is worth understanding because it represents a mechanism, which can be used to build a new international system, where the role of the nuclear weapons becomes more and more obsolete.[504] Looking at why the CTR programmes went a long way, but were not used to their full potential, helps to understand at what stage the transition to this new international system is located.

There is an obvious fundamental constraint on how countries re-orient their security policies after the Cold War. After the initial ambitious agenda of dramatically changing the relations between the former superpowers, which would have meant a consequent change in the way the international system operated, it became obvious that the countries were not ready to proceed with such radical developments. There was unwillingness on behalf of the political elites to adjust fully to the new political reality, and that is evident from the empirical data and analysis presented throughout this work.

The example of the CTR process tells us how the societies deal with the risks, which are uncertain (as is the threat of nuclear proliferation), and when actions which are required to meet these risks involve high political stakes. That example showed that the societies are able to deal with this kind of risks, but the level of commitment present is not enough for the kind of potential dangers these risks entail. The reasons why there was not enough commitment and why the initial CTR agenda was only partially fulfilled are to a large extent the consequence of the internal political and bureaucratic problems in the United States and Russia, and the inability of political establishments to adapt to the new emerging world order.

The institutions, especially military and national security establishments, cannot conceive of the new international system, which requires an approach different to that of during the Cold War. The CTR process can be understood as part of an effort to eliminate these last vestiges of an anarchic system – the heritage of the inter-state conflict agenda of

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504 That idea is developed by Krepon, *Cooperative Threat Reduction, Missile Defense, and the Nuclear Future*, op. cit.

the Cold War era. In a way, CTR can be used as a tool of dealing with this heritage and also as a mechanism to move the countries beyond transition towards the new international order.

The CTR framework has the potential to go beyond the technical goals of securing nuclear weapons and materials. It contains the seeds of a comprehensive approach towards safeguarding stockpiles of nuclear materials, the disposal of weapons-grade HEU and plutonium, the cessation of future production of such materials and the reduction of stockpiles of nuclear warheads to minimal levels. In other words, the full implementation of the concepts underlying CTR would lead to cooperative denuclearisation – a process, which would reflect the emerging new world order, an international system, which moves towards normalisation of inter-state relations. Given the importance of the CTR process in shaping the new international system we should look at what lessons the decade of its existence can offer and why the United States and Russia have failed so far to realise it to a full degree.

8.3. Testing the Research Arguments

It was assumed that some major problems of implementation of CTR programmes lie in bureaucratic politics – i.e. the reluctance of organisations to engage in sensitive cooperation due to organisational values and interests. It was also assumed that the problems on the bureaucratic level are linked to larger political problems in U.S.-Russian strategic relations. The initial conceptual framework for assessing the political climate of the U.S.-Russian strategic relations with focus on the role of nuclear weapons proposed four possible scenarios as the envisaged final outcome of CTR (as presented in Table 1 in Chapter 1): Scenario 1 - complete disarmament (no nuclear arsenals retained by the U.S. and Russia); Scenario 2 - cooperative denuclearisation (very low level of nuclear arsenals not on alert); Scenario 3 – strategic arms reductions (reduction within the START framework); Scenario 4 – strategic confrontation (retention of large nuclear arsenals).

The political decision-makers in the United States and Russia have not been very explicit about how they envision their strategic nuclear relations in the future. One of the tasks of this thesis was to identify the scenario with which the objectives that the U.S. and Russia pursue in the bilateral strategic relations is most compatible and how the CTR process fits into existing relations. Currently, the force postures and the state of alert do not reflect the likely military contingencies which the United States and Russia are facing. The current military contingencies involve conflicts with small states, sub-state or ethnic conflicts, or international terrorism and insurgencies. The military instruments required involve rapidly deployable forces with non-strategic weapons. However, two countries still adhere to strategic nuclear postures, which although at lower levels still resemble those of the Cold War period. Therefore, we can suggest the existence of a "Strategic Paradox"[505] – the nuclear postures and doctrines of the United States and Russia do not reflect political conditions or the requirements of national security. The objectives that the two countries seek to achieve with the CTR process fall somewhere in between Scenarios 2 & 3 and can be a part of strategic arms reductions or cooperative denuclearisation, since so far the two states have not moved towards the full-fledged cooperative denuclearisation.

The analysis presented in Chapter 2 on the state of the U.S. and Russian nuclear postures has identified the following: the composition and state of alert ('hair-trigger') of Russian and the U.S. nuclear forces still represents Cold War perceptions of threats; both Russia and the U.S. plan their forces balancing against the other side as though the possibility of an all-out nuclear war is still present; even the most recent arms reduction agreement (i.e. Strategic Offensive Reduction Treaty (SORT)) does not change fundamentally the nuclear postures of two countries; current nuclear postures contribute to the dangers of an accidental nuclear war (due to the significant numbers present, their state of alert, presence of vulnerable components, such as land-based ICBMs and other factors).[506] In the early 1990s (Chapter 2) the Harvard scholars envisaged large reductions in nuclear weapons as part of a programme of rendering nuclear weapons more secure, on the premise that fewer nuclear weapons and a reduction in the number of storage sites would be an essential part of an effort to provide for the safety and security of nuclear warheads.[507] This idea did not in the end play a major part in either CTR or arms control.

The presence of significant numbers of nuclear weapons in the U.S and Russia has been a stumbling block in the further development of global non-proliferation regimes, notably the NPT which involves a commitment by the nuclear powers to disarm. If the major nuclear custodians (the United States and Russia) were to demonstrate an understanding of the dangers associated with the presence of such vast nuclear arsenals and engage in cooperative denuclearisation it would strengthen the 'nuclear taboo' and contribute to constraining proliferation.

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505 First introduced by Bluth, *Nuclear Challenge*, op. cit.

506 Blair, *The Logic of Accidental Nuclear War*, op. cit.

507 Campbell, Carter, Miller, and Zraket, eds., *Soviet Nuclear Fission*, op. cit.

The technical expertise presented in the existing literature[508] shows that despite the rhetoric of de-targeting and de-alerting, Russian and American nuclear forces still are practically on 'hair-trigger' alert and can be re-programmed to target the opposite side in a matter of seconds.

The evaluation of the U.S. Nuclear Posture Review and Russian Military Doctrine (Chapter 2) has demonstrated that since 1999 there has been a shift in the policies of the two countries towards assigning nuclear weapons an important role in their strategies. Nuclear weapons are once again seen as a major tool of deterrence and de-escalation of conflicts. The important shift, which has been identified in Russian and American nuclear policies, is that the use of nuclear weapons is not ruled out in non-nuclear conflicts. The U.S. Nuclear Posture Review of 2001 presents a lowered nuclear threshold – it blurs the distinction between conventional and nuclear weapons. The Russian Military Doctrine of 2000 and a recent policy document of the Ministry of Defence (2002) show that the Russian government would consider the *use* of its nuclear weapons against non-nuclear states under circumstances, which can be perceived as threatening to Russia's national security. The reasons of this shift in the strategic policies of the United States and Russia are quite different. In the United States, this shift can be explained by the 'realist' strategic outlook of an administration that seeks to transcend restrictions on the freedom of action of the United States imposed by international regimes and conventions. It is paradoxical that this shift of attitudes should occur at the time when for all practical purposes the United States has become a superpower on the basis of its conventional military capabilities alone and has no practical requirement for the use of nuclear weapons either as a deterrent or as military instrument.

Russia, on the other hand, is in the precise opposite situations. Its conventional forces have deteriorated to the point that they may not be adequate to prosecute a large-scale high intensity military engagement. It is this weakness that creates the requirement of nuclear weapons as an 'existential deterrent'. However, official Russian pronouncements about the 'lowering of the nuclear threshold' also seem to have no relevance to the military threats and contingencies that Russia faces. Nuclear weapons have no role in ethnic conflicts, crisis management or peace-keeping. For Russia, nuclear weapons provide a political leverage as it is the only country, which is hypothetically able to destroy the United States.

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508 Blair, *The Logic of Accidental Nuclear War*, op. cit.

Despite the new security environment, which does not call for retaining significant numbers of nuclear arsenals, the United States and Russia accord nuclear weapons a central place in their strategic policies. The nuclear planning in the U.S. and Russia reveals that nuclear forces, their composition and posture are still determined by considerations of deterrence of the opposite side.

The most recent arms reduction treaty – SORT (signed in Moscow in 2002) – failed to introduce any substantial changes to the nuclear postures of the two countries. Although, positive nonetheless as a declaration of the intent of the U.S. and Russia to continue with strategic arms reductions, its value for arms reduction is limited due to several factors. Although, the number of strategic weapons will be reduced, the composition of the nuclear forces on both sides will remain the same: it is still a triad (air-, land-, sea-based missiles). The real number of warheads, which will remain after the Treaty is implemented (1,700-2,200 on each side), is higher than what is proclaimed because the U.S. has a capability of uploading warheads back on the delivery vehicles, and can decide to do so should relations with Russia deteriorate. Therefore, even after the implementation of announced reductions, the U.S. will have a potential capacity of approximately 5,000 warheads.[509] The Treaty lacks explicit verification and transparency mechanisms and reflects the intensified trend of unilateralism favoured by President Bush - the U.S. side originally was not interested in signing any binding agreement on arms reductions and expressed the view that each side should unilaterally determine reduction levels for its forces.

The existing nuclear postures contribute to instability in several ways. First of all, the presence of large nuclear arsenals, a substantial part of which is on 'hair-trigger' alert for launch-on-warning, raises the danger of an accidental nuclear launch. It is especially dangerous due to deteriorating early warning systems in Russia. There is a possibility of false warning due to failure in the system. The presence of land-based missiles (ICBMs), which are vulnerable to a first strike, has a further destabilising effect. The knowledge that a substantial part of forces will not survive the first attack might influence the decision-makers to treat the false warning as a real one, since risks can not be taken. In this respect, ideas of cooperative denuclearisation proposed by members of the Clinton Administration could have reduced these particular dangers (Chapter 2).

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509 Sokov, "START III": An End or Beginning of Negotiations', op. cit.

Secondly, the presence of significant numbers of nuclear weapons and materials increases the danger of their illegal use. The possibility of diversion is greater when the numbers are higher.

Thirdly, on a psychological level, the presence of thousands of nuclear weapons at a high state of alert cannot possibly contribute positively to the process of building a true partnership between the U.S. and Russia.

There was a possibility for the U.S. and Russia to engage in cooperative denuclearisation, however, that political 'window of opportunity' was not used. Both the political environment of general euphoria in the bilateral relations in the early to mid-1990s and the political will of proponents of cooperative denuclearisation provided a unique set of conditions to achieve more ambitious goals in U.S.-Russian post-Cold War nuclear relations. Several individuals who were instrumental in developing ideas of cooperative denuclearisation and cooperative threat reduction before joining the government were brought into the Department of Defence during the Clinton administration. The ideas of Ashton Carter and other supporters of dramatic changes in nuclear postures of the two countries were never fully implemented. Carter was proposing the elimination of land-based missiles, since they represented the destabilising part of the nuclear triad due to their vulnerability to a first strike. He also promoted de-alerting nuclear forces and attempted to sell the idea of complete U.S. engagement in cooperative denuclearisation with Russia. Carter's ideas were met with stern opposition from the side of the military, supported by certain members of Congress.

The proposals for nuclear reductions beyond START were opposed by both states, and such opposition was especially apparent from the side of state organisations with traditionally more conservative political views (military establishments).

The new Bush administration has revised U.S. foreign policy, and although, rhetorically, support for processes such as CTR and arms reductions is expressed, the political environment for CTR programmes and arms reduction treaties has changed in a dramatic fashion. The Bush administration has abandoned most of the components integral to Clinton's strategic policies, such as the fundamental commitment to non-proliferation regimes, building down nuclear arsenals through strategic arms control, the strategic relationship with Russia, the preservation of the ABM Treaty, the ratification of the Comprehensive Test Ban Treaty (CTBT) and the strengthening of the nuclear taboo.

The changes in U.S. strategic policies and aversion to multilateral security cooperation (that includes the relationship with Russia) had a direct impact on the implementation of the CTR programmes. All programmes had gone through a critical review process, which failed to identify any major faults with how the programmes operate. Since the Bush Administration came into power, the budget for CTR efforts has constantly been at risk of being reduced. The events of 9/11 should have provoked a reemphasis on cooperative threat reduction due to increased concerns over possible use of WMD by some terrorist groups. The terrorists have demonstrated a determination to impose significant human and material destruction, but it did not prompt any substantial changes in how the CTR programmes are perceived by the U.S. leadership.

8.3.1. The Findings on the Problems of Implementation

It was important to identify the problems on the implementation level that were hampering the CTR process. If the CTR process can be treated as central to the U.S.-Russian strategic relations and as a potential mechanism for moving towards a new emerging international system, it is worth understanding the constraints that prevent it from moving beyond the current limitations. The fact that the CTR process exists is an important determinant of the U.S.-Russian strategic relations in the post-Cold war period. However, the process was hampered by various problems of implementation.

The research carried out has identified the following problems of implementation endemic to most of the CTR programmes. Among some typical problems are conflicting organisational interests and values at different levels of implementation, bureaucratic procedures, which cause delay in the implementation of projects, lack of coordination between the agencies, lack of trust resulting in problems with access, and differing perspectives of Russia and the U.S. regarding the importance of specific projects.

The empirical evidence gathered on major CTR programmes suggests that the underlying reasons for problems in implementation can be traced to factors of a bureaucratic and political nature. This result confirmed the initial assumption about the nature of the problems (Chapter 1). However, the study has also found that not all problems can be attributed to the inability of bureaucracies and political systems to adapt to a changing international environment: there is also a set of other conditions, which complicated the implementation of the non-proliferation projects in Russia (i.e. technical problems of fissile material disposition, conceptual issues related to material disposition (production vs. disposition), economic conditions and the investment climate in Russia (which prevents private investment in Russian 'closed' cities)).

The chosen research design, which employed the Bureaucratic Politics Model as an analytical tool to analyse the CTR process and developed a conceptual framework of four scenarios of the U.S.-Russian strategic relations turned out to be appropriate. The nature of some typical problems of implementation could be explained on the grounds of the Bureaucratic Politics Theory. The conceptual framework of different scenarios of the U.S.-Russian strategic relations provided a useful structure for testing empirical data on nuclear policies to define the state of the current relationship. Nonetheless, both the Bureaucratic Politics Model and the conceptual framework of U.S.-Russian relations did not yield all the explanations to the issues uncovered by the research. The study has shown that additional theories and analytical models would have to be employed to understand the nature of the CTR process. One of the examples was the evidence suggesting that the non-government participants in the CTR process behave differently to the state agencies, and their behaviour does not fall into patterns described by the Bureaucratic Politics Model. The Theory of Transnational Movements, which is not central to this particular work, can probably contribute to the understanding of the success of the non-state actors in the CTR process. The evidence suggests that the scientific communities play a positive role in the restructuring of U.S.-Russian relations and this insight should be employed for further studies on how this positive role can be utilised.

The analysis of some typical problems of implementation on the bureaucratic level has shown that they partly represent the unresolved issues in U.S.-Russian relations, the failure of formerly antagonistic powers to fully adjust to a new security environment. In a way, the slow adjustment of organisational behaviour to 'new' thinking necessary for the implementation of CTR projects reflected the still confused state of U.S.-Russian strategic relationship. An evaluation of major problems in the implementation of CTR programmes has provided evidence that the legacy of Cold War thinking is still strong in the mind-set and procedural operations of the state organisations.

The majority of bureaucratic problems hampering the smooth implementation of threat reduction programmes result from a lack of trust and of a solid foundation for a genuine partnership. Problems with access (at the level of security services), delays in issuing visas (at the level foreign office establishments), scepticism of the other side's motives and actions hampering the implementation of projects due to unrelated problems in bilateral relations (at the level of legislative branches) – demonstrate that the CTR process is closely linked with the political environment in which it operates.

Although the U.S. and Russia have re-evaluated their relationship after the end of the Cold War, their policies on the strategic level still fail to reflect the new security environment they found themselves in. In this respect, the analysis of the role of nuclear weapons has been important since nuclear weapons have always been one of the major determinants of their bilateral relations. The composition and numbers of weapons are balanced against each other, and not any other countries. Although, U.S. and Russia have been engaged in arms reductions, the reductions have not altered dramatically the postures, i.e. the triad (air-, land-, sea-based) and destruction capabilities have not been changed dramatically. To an extent, the failure to adopt a radical restructuring of strategic postures and implement CTR to its full potential reflects the incomplete reintegration of Russia into the international community and the partial transition of Russia from a former adversary to a strategic partner.

The question of the role of nuclear weapons is important because it defines the constraints under which the CTR must operate. Depending on how central nuclear weapons are to Russian and U.S. security needs (as perceived by countries' governments), the CTR process will either be expanded and will dominate the relationship based on cooperative denuclearisation or it will be constrained to a limited reduction of weapons. If nuclear weapons continue to play a dominant role in the strategic relations between the two countries and are perceived as a force of deterrence this will limit the scope of the cooperative threat reduction process: the limits will be determined by Russia's unwillingness to expand cooperation and allow access to its nuclear complex and by altering the end goals for CTR (i.e. complete denuclearisation will not be the goal). There will be larger psychological implications on CTR if the posture of nuclear forces remains the same: the sincerity of the partnership will be questioned and such doubts on both sides will continue to overshadow organisational perceptions on bilateral cooperation in the nuclear field. Therefore, CTR will continue to be a limited process unless the role of nuclear weapons is re-considered on both sides.

The technical issues with fissile material disposition are also closely linked with the plans on how the two countries view the future of nuclear weapons. The question is whether they will proceed with the development and construction of new nuclear weapons, for which fissile material is required (then the value of MPC&A Programme will have to be re-considered) or they will commit to banning the production of new weapons, and in this case, the MPC&A Programme will have an end point by which all stockpile in Russia is secured and no new material is produced.

One of the major problems for all CTR programmes is the problem of access. The issue of access of U.S. experts and officials to sensitive Russian facilities has been identified as a serious limitation of the CTR process.[510] Practically all programmes designed to improve nuclear safety and security and prevent a "brain-drain" from the Russian nuclear complex require a certain degree of access to 'closed' cities or facilities storing nuclear weapons or/and materials. The data available in the existing literature and interviews with the U.S. and Russian officials has shown that the governments of Russia and the U.S. have different views on the issue of access. The U.S. has pushed for unprecedented access to Russian facilities, since relevant verification and transparency measures otherwise cannot be carried out. The Russian government is adamant in not allowing U.S. personnel access to certain facilities, which are considered to be highly sensitive.

The U.S. General Accounting Office (GAO) has found in March 2003 that 'the Departments of Defense and Energy have made slow progress in helping to improve the security of sites in Russia with weapons of mass destruction against the theft or threat of diversion because Russia is not providing needed access to many sites."[511] The GAO report concluded that the situation was unlikely to change in the future.

Russian officials have made clear that access to certain sites would never be granted to U.S. personnel. By March 2003 the U.S. Department of Energy – working mostly on MPC&A projects – had not been able to access 74 per cent of the buildings in Russia's nuclear complex, and the agreement on access signed in 2001 between the DOE and Russian Ministry of Atomic Energy (MINATOM) has failed to make a substantial difference.[512] The U.S. Department of Defence was granted very limited access by the Russian Ministry of Defence. A new agreement between the two military establishments was signed in February 2003; however, further delays were anticipated by U.S. experts given previous experience.[513]

The problem with access has underlying political motivations. The reluctance of Russians to grant unlimited access to nuclear sites results from a lack of reciprocity from the U.S. side and mutual lack of trust. Both the U.S. and Russia still perceive nuclear

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510 Discussion in on problems of implementation in Chapters 4, 5, 6, and 7

511 'Weapons of Mass Destruction: Additional Russian Cooperation Needed to Facilitate U.S. Efforts to Improve Security at Russian Sites', GAO report, GAO-03-482, March 2003

512 'Weapons of Mass Destruction: Additional Russian Cooperation Needed to Facilitate U.S. Efforts to Improve Security at Russian Sites', GAO report, op. cit., p. 7

513 'Weapons of Mass Destruction: Additional Russian Cooperation Needed to Facilitate U.S. Efforts to Improve Security at Russian Sites', op. cit., p. 8

weapons industry as highly sensitive, and there are reservations on both sides to fully reverse the Cold War practices of guarding nuclear secrets.

The organisational culture and traditional values held by agencies involved in the CTR programmes plays a substantial role in aggravating the issue of access. Military, security and weapon-building establishments are generally less flexible in changing their routine procedures. As far as these are precisely the type of state agencies involved in the CTR process, it is hard to anticipate more rapid progress. When access is not denied altogether by the Russian side, a different set of bureaucratic complications come into play, and they are prompted by both sides. The Russian FSB and U.S. State Department have elaborate time-consuming procedures of granting access and issuing visas respectively. The common procedure of reviewing applications for access to a Russian facility takes 45 days (in some cases the period is reduced to 30 days). The State Department has been criticised for bureaucratising procedures for giving permission to U.S. personnel to travel to Russia and has been taking time to scrutinise visa applications from the Russian experts travelling to the U.S. for CTR-related visits and training.

The bureaucratic setbacks are prompted by lack of inter-agency coordination inside the countries and between the two sides. The problem of inter-agency rivalry is common for Russia in terms of struggle for CTR funding. The U.S. participating agencies have been criticised for a lack of coordination of their CTR efforts in Russia.

The example of the Lab-to-Lab Programme (which was a part of MPC&A Programme) provided evidence that with a reduced involvement of state organisations, more progress can sometimes be made (Chapter 5). During its existence, the Lab-to-Lab initiative was able to move beyond the bureaucratic bottlenecks on the government level and had provided the foundation for cooperation in the most sensitive area of securing fissile material in Russia. The Lab-to-Lab initiative was one of the important examples of how nuclear scientists, engineers and other experts 'on the ground' relate to each other at the level of experts and are less prone to be slowed by bureaucratic mechanisms of state organisations.

Some of the conditions attached to cooperation have dramatically delayed the implementation of major CTR projects. One of the most inconvenient conditions attached to projects falling under the CTR umbrella agreement (the original legislation establishing the CTR Programme) is the requirement to buy only American equipment and expertise. The "Buy-American" clause applies to the DOD-administered CTR Programme and constrained the MPC&A Programme for several years until it was moved from the auspices of the Defence Department to the Department of Energy. The persistence of the U.S. Congress requiring the use of U.S. goods and expertise only has left an unfavourable impression on the Russian participants of the programmes affected by the 'Buy-American' clause. It was both impractical and controversial in terms of the message sent to Russia.

Another condition stipulating that the U.S. equipment provided to Russia for dismantlement purposes cannot be used for any other purposes (e.g. defence conversion) had also a negative impact on how the CTR process was perceived by people implementing the projects 'on the ground'. The movement of equipment, such as excavators and cranes, was monitored by the U.S. side and their use for other than strictly limited purposes was not welcomed.

There is an important 'cultural' aspect to problems in the U.S.-Russian cooperative threat reduction process. The 'Western' ways of doing business are not necessarily adopted well by Russians. One of the examples is the dissatisfaction of Russian side with the fact that the U.S. personnel working on programme implementation in Russia has been rotated frequently. While a normal practice for the U.S. government employees, it is seen by Russians as harmful to the building of trust and a stable relationship between teams of the two countries.

This research suggests that the separation of bureaucratic and political factors influencing CTR implementation is not clear-cut. It can be argued that the problems on the organisational level are heavily influenced by the political environment, and it is difficult to differentiate between purely bureaucratic constraints and the impact of the political limitations of the U.S.-Russian relationship. However, it is possible to identify the primary and the secondary factors in the problems of CTR: the political environment of the U.S.-Russian strategic relations seems to be the primary factor, while bureaucratic politics is more of a secondary factor, since it is influenced by the political conditions. It should be noted that even if there were no political constraints, there would still be problems connected with the bureaucratic 'pushing and pulling' of different organisations involved in a complex decision-making and implementation process – such as CTR. However, in the case of the CTR process, political constraints *aggravate* even further the already existing bureaucratic conditions for slow implementation of the programmes. In other words, if the U.S. and Russia would adapt their strategic relations more closely to the conditions of the contemporary security environment, in which they are no longer enemies, it would have a direct positive impact on the bureaucratic environment for implementation of CTR programmes. [For example, the process of issuing visas (in both countries) and access permits (by Russian security services) is already a bureaucratised process, but due to a degree of suspicion towards cooperation in CTR area, that process is subjected to even further delays].

Although, problems of a bureaucratic and political nature were identified as major factors in the slow pace of CTR programmes, some other problems of a technical and conceptual nature became evident as a result of this research. This observation especially applies to programmes dealing with the disposition of fissile material. These programmes are hindered by the lack of technically flawless methods of disposition, and their value is questioned by the continuing production of fissile material.

The disposition of plutonium is complicated by the absence of an ideal method of disposition. The two possible options - immobilisation and converting plutonium into MOX fuel – have limitations from either economic, technical or proliferation points of view. The immobilisation option has never been done on a large scale and is considered to be a technically 'immature' method of plutonium disposition. There are doubts on whether the final product would meet the *spent-fuel standard* required by the U.S.-Russian Plutonium Disposition Agreement. In any case, the Russian government made it clear that it is not considering immobilising its plutonium as an option to dispose of the material it considers of economical value.

The MOX option, which is currently more favoured by both – the U.S. and Russia – is even more criticised for its limitations. Among them: the MOX option does not eliminate entirely the danger of re-using plutonium in weapons; it is an expensive, economically not viable way of disposition, using MOX fuel in reactors can be dangerous, Russia does not have facilities to implement MOX disposition of plutonium, and finally, producing MOX fuel can increase proliferation risks.

There is also the issue of on-going plutonium production in Russia. The remaining three plutonium reactors in Russia were not shut down as was scheduled due to the fact they provide heat and electricity to the near-by town. Their operation is, therefore, critical for a significant number of residential and industrial facilities. In March 2003 U.S. and Russia signed a modified agreement under which the three plutonium reactors are to be replaced with fossil energy plants.[514] Noting previous agreements on reactor shut-down, which were not carried out due to lack of financial resources, leave room for doubt whether the work of the three plutonium reactors would be suspended in the near future.

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514 'Plutonium Production Reactor Shutdown' at http://www.nti.org/e_research/cnwm/ending/plutonium.asp#_ftn2 retrieved on 22.11.03

The HEU Purchase Agreement, which provides a framework for the U.S. purchase of Russia's HEU converted into LEU, is also hindered by factors beyond the bureaucratic or political sphere. Apart from the organisational interests of *USEC* – a private company aiming to have commercial profit from the deal, the state of the world uranium market has important consequences for the viability of the deal. The current agreement between *USEC* and the Russian government has set a price for Russian LEU, which would fluctuate in accordance with the world prices for uranium. Such arrangement can potentially cause problems should the prices drop dramatically. In this respect, putting a non-proliferation project on a purely commercial basis cannot be seen as an ideal solution.

The issue of the disposition of fissile material in CTR has important wider implications for the end point of the CTR process, which are discussed later in this chapter.

8.3.2 Going against the Odds: Accounting for the Establishment of the CTR Process

At the core of this research is the question: How can we explain the establishment and the outcomes of the CTR process? The identification of conditions which resulted in its creation, the factors that mitigated against CTR and constrained the process, and those that made it possible to overcome those obstacles, at least to an extent, can provide a glimpse of the core of the U.S.-Russian strategic relationship in the post-Cold War. This relationship can be characterised as 'constrained' partnership, an ambiguous relationship which has seen unprecedented cooperation with the some of the features of the Cold War thinking and policy-making still lingering.

The process of cooperative threat reduction emerged through the implementation of the Cooperative Threat Reduction (CTR) Act, a unique U.S.-Russian effort to deal with the unprecedented nuclear dangers. The imminent collapse of the Soviet Union and the complete uncertainty about what would happen to nuclear weapons and material in the disintegrating country motivated an attempt to design methods of dealing with the nuclear dangers and threats whose full extent could not be estimated on either side. There was a mutual realisation in Russia and the U.S. that the dramatic political, social, and economic changes resulting from the dissolution of Soviet Union might prompt an unauthorised use/launch of nuclear weapons, leakage of nuclear materials and expertise to rogue states, smuggling of weapons and materials and attempt to use them by sub-state actors.

Nevertheless, Cooperative Threat Reduction was a process that was so contrary to the political culture of national security establishments and hence faced so many fundamental obstacles that it requires an explanation of how it could ever come in to existence at all.

First of all, it was not at all clear that the nuclear dangers and threats in the disintegrating Soviet Union outlined by the Harvard study in *Soviet Fission*[515] and taken on as reasons for establishing the CTR Programme by Senators Nunn and Lugar constituted a real and present danger to the United States. There was no evidence of an imminent loss of control nuclear weapons or materials. Neither the imminence nor the magnitude of the risk was certain. Governments have difficulties in prioritising resources to deal with threats that are unquantifiable, and that may or may not be real. The situation has changed after the terrorist attacks in September 2001, however, even in the new circumstances it is easier to justify funds for military action in Taleban-ruled Afghanistan, which was harbouring Al-Qaida, since it can produce immediate obvious results rather than persuade the U.S. Congress to spend money on securing Russian weapons and materials, which can possibly, but not necessarily be acquired by Al-Qaida. It was even harder to defend 'soft' programmes, such as providing jobs for former Soviet scientists, since again, the threat of 'brain-drain' represented an uncertain, unquantifiable risk, and it was problematic to demonstrate a direct relation between the money spent on grants provided to nuclear scientists and the reduction of threat of the U.S. being attacked by weapons, which could have been possibly designed with the help of Russian expertise.

Secondly, CTR programmes required collaboration on matters, which were deemed to constitute the most sensitive security secrets. All CTR-related programmes require to a different extent access to Russia's sensitive nuclear sites. For example, Material Protection, Control and Accounting (MPC&A) Programme is the most intrusive programme of all, since it requires to facilities storing fissile material (information on composition of fissile material is the most classified information in the nuclear weapons field). Nuclear Cities Initiative (NCI) requires frequent travel of the U.S. officials and other experts to the 'closed' cities, which historically were protected from any presence of outsiders, let alone foreigners. An implementation of all CTR programmes was complicated by a necessity to receive access to Russia's nuclear facilities. The fact that nuclear weapons remain central to Russian and American strategic planning is another factor of the remaining secrecy surrounding nuclear weapons complex.

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515 Campbell, Carter, Steven, and Zraket, eds., *Soviet Nuclear Fission*, op. cit.

Thirdly, initially there was a strong opposition within the U.S. to providing assistance to Russia. The founding Nunn-Lugar legislation (which provided the basis for the CTR Programme) was initially rejected. The most common concern voiced by some representatives of the Pentagon and the U.S. legislative branch was that by assisting Russia to deal with its dismantlement and nuclear safety and security needs, the U.S. would be freeing Russia's own resources for its strategic modernisation. Strategic modernisation was not a hypothetical issue, because START II required Russia to replace most of its existing ICBM force with new single-warhead missiles. This kind of concern was not eradicated with the adoption of the CTR Programme. The possibility that the U.S. might be 'subsidising' the Russian military complex remains an issue for critics of the CTR process, who question the wisdom of providing non-proliferation assistance. Some programmes, such as the Nuclear Cities Initiative (NCI) designed to provide additional incomes for Russian scientists, are criticised because they allegedly keep the Russian nuclear complex 'afloat' by sustaining expertise, which can be used against U.S. interests should the international situation change.

Fourthly, the opposition within certain circles of the Russian political elite was no less strong. For reasons of the culture of secrecy outlined earlier, CTR was a hard 'sell' in Russia too. The fierce debates in Russian parliament preceded ratification of the CTR 'umbrella' agreement. The concern was that the U.S. might 'steal' Russian secrets or take control over Russia's strategic arsenal.

Last but certainly not the least, as this study has revealed, bureaucratic politics strongly influenced the CTR process. The organisational culture and values held by individual bureaucrats impacted on the way the CTR process developed. On the negative side, it was a frequent occurrence that problems were encountered on the organisational level because the state establishments were not adapted to the pressing needs of the new security threats stemming from Russia's inability to secure its weapons and materials. Large organisations generally do not deal well with innovative practices, and CTR was certainly one. The uncertainties of the general direction of U.S.-Russian relations, especially with regards to the strategic relationship, further complicated the implementation on the bureaucratic level as unambiguous political leadership was often absent.

Given the many political and other constraints that mitigated against a programme such as CTR, it is remarkable that it was nevertheless established, and Russia and the U.S. found a way to engage in an unprecedented cooperative security endeavour. We can adduce the following factors that help to explain the phenomenon of CTR:

First of all, although there was some debate about the urgency and the scope of the threat, the threat was perceived to be real by key actors in the U.S. political elite. If it was uncertain that sub-state actors or rogue states would take advantage of Russia's nuclear weapons and materials, it was understood that if they decided to do so, they would have all conditions to succeed. Although, the perception was that the weapons were relatively well protected in Russia (for the time being), there was a great concern over the nuclear material since there were reasons to believe that nuclear materials were at risk. More importantly, the West was highly concerned about nuclear warheads left in non-Russian republics. The political environment in the former Soviet Union (including the Russian Federation) was highly unstable. Given the uncertainty with regard to the character of the governments in the newly independent states and issues of safety and security it was agreed that denuclearisation of three former Soviet states (Belarus, Kazakhstan, and Ukraine) was a priority, and CTR funds played a critical role in this process.

Secondly, the role of key individuals (as suggested by Graham Allison in his Bureaucratic Politics Model) was important. There was a fortuitous combination of scholars from Harvard University who were the first to undertake a fundamental study on arising nuclear threats in the disintegrating Soviet Union (*Soviet Nuclear Fission)* and Senators Sam Nunn and Richard Lugar who had the political vision and will to found the Nunn-Lugar (CTR) Programme, which initiated the process of the cooperative threat reduction. Even more important was the fact that the same scholars who were instrumental in developing ideas of cooperative denuclearisation and cooperative threat reduction (Ashton Carter, Graham Allison and others) were brought into the U.S. Government during the Clinton administration. Their values and perceptions were a decisive factor in shaping the CTR process.

Thirdly, President Yeltsin was attempting to forge a strategic relationship with the U.S. and transform the Russian nuclear arsenal in line with the limited financial resources of the Russian Federation and the perceived need to eliminate the dependence on missile factories outside Russia. The CTR programme fitted well into this framework, especially as part of the programme would assist with the costs of dismantling strategic nuclear vehicles. There was a more general interest on the Russian side in the financial benefits to be brought by the CTR projects. The Russian economy of the early and mid-1990s was going through a dramatic period of turbulence, and any external funding was seen vital.

To summarise: The research has established quite clearly that there were two distinct sets of driving forces that account for the CTR process. One was the deep-seated concern of key figures for the nuclear risks that resulted from the end of Communist rule and the break-up of the Soviet Union. This concern evolved into a larger agenda for cooperation in stemming the risks of proliferation world wide. The other was the endeavour to construct a post-Cold War international system that was based on different principles, a New World Order. The U.S.-Russian relationship was to play a central role in this envisaged transformation of the international system by removing any vestiges of the bipolar Cold War structure. These two sets of policy objectives were given sufficient political momentum by key figures in the political elite, including the presidents of Russia and the United States, to overcome the systemic obstacles to an innovative programme like CTR.

8.3.3 Assessing the Achievements of CTR: Implications for Arms Control and International Security

The most tangible achievement of the CTR Programme was the denuclearisation of three non-Russian republics of Belarus, Kazakhstan and Uzbekistan. At the moment of the Soviet collapse, four republics including Russia, had strategic nuclear weapons stationed on their territories, which meant an appearance of four potential nuclear powers on the former Soviet space (instead of one). The denuclearisation path chosen in the end by all three non-Russian republics was not entirely the result of the availability of funds for denuclearisation from the CTR Programme. However, the CTR Programme played a substantial if not critical role in the decision made by the governments of Belarus, Kazakhstan, and Ukraine to transfer all nuclear weapons from their territory to Russia. The two most successful projects under the initial CTR legislation were assistance for the dismantlement of START-accountable weapon systems and the enhancement of the security of transportation for nuclear weapons and materials. The denuclearisation of non-Russian republics and helping Russia to meet its obligations under START were extremely important for the arms control process.

By far the greatest proliferation risk emanated from the storage of nuclear materials. The enhancement of safety and security of fissile material was therefore a critical part of the cooperative threat reduction process. The Material Protection, Control and Accounting (MPC&A) Programme has reduced the amount of unprotected nuclear material, that is at risk of diversion. By the end of FY2002 the MPC&A programme had implemented 'rapid' upgrades of 37% of vulnerable nuclear material in Russia and half of that number – have had 'comprehensive' upgrades.[516] Most sites with nuclear material under the authority of the Russian Navy (95% of them) have had MPC&A upgrades. In addition to MPC&A, CTR has secured nuclear material through disposition. As of September 2003, the HEU Purchase Agreement succeeded in converting 193 metric tons of bomb grade HEU to 5,705 metric tons of LEU power plant fuel, which means that weapons grade material equivalent to 7,733 nuclear warheads was eliminated.[517] As far as plutonium is concerned, Russia cannot provide for its disposition without external help. Although, the overall effectiveness of the Plutonium Disposition Programme is debated and practical results are yet to be achieved (no plutonium has been disposed of with the help of U.S. funds), the programme highlighted the problems associated with plutonium disposition in Russian and provided a framework for addressing them.

The achievements of CTR in the area of fissile material will have a direct impact on the future of arms control. The CTR programmes have come as far as having an agreement that no new fissile material should be produced (the Plutonium Reactor Shut-Down Agreement), and that the extracted material cannot be re-used in weapons. The only next step to take would be an agreement on what to do with the fissile material already stockpiled. If the United States and Russia would agree that the material already produced cannot be used in weapons, it would practically mean the end of the nuclear programmes and would commit Russia and the United States to a path leading to the gradual elimination of nuclear arsenals. The role of CTR programmes in paving the way for a potential denuclearisation of two countries is enormous. It is true that although in the Clinton/Yeltsin period much progress was made in this direction through CTR and various international non-proliferation regimes, the two countries shied away from the last step of committing themselves to the end of fissile missile production. Under the Bush administration any progress in this direction has been suspended and in fact reversed as some of the links in the chain of the nuclear warhead production process that had been cut have now been reinstated. But there remains the opportunity that this process toward denuclearisation will be resumed in future through an invigorated, multilateral process of Cooperative Threat Reduction.

The potential proliferation risk associated with the potential "brain-drain" was recognised, and programmes dealing with the human factor in the downsizing of Russian

516 'Controlling Nuclear Warheads and Materials', op. cit., p. 78

517 *USEC*, at http://www.usec.com/v2001_02/HTML/megatonnes_fact.asp retrieved on 12.05.03

nuclear complex can claim a certain degree of success in confronting this threat (Chapter 7).

The progress of CTR reveals that the United States and Russia were able to overcome bureaucratic and political obstacles, albeit with mixed degree of success and there was political will on both sides to implement an unprecedented type of cooperation. It also shows that the type of security threats that the states face in the aftermath of the Cold War requires cooperation between the states to confront them. The problems of implementation they encountered has demonstrated that the CTR process can be seen as being ahead of its time – it relies on trust and requires a depth of partnership in sensitive areas, which are not yet typical for the current U.S.-Russian strategic relations. The CTR process has also confirmed that Russia's transition to being an equal partner representing common values and goals in the international security system would take a longer time than initially anticipated.

The current research suggests that some important problems in the implementation of CTR programmes are of a bureaucratic nature. However, bureaucratic factors are aggravated by the political factors stemming from the fact at the national security policies of the U.S. and Russia are still in part based on concepts and strategies adopted during the Cold War period. This is particularly relevant with regard to the role assigned to nuclear arsenals by both countries.

In this respect, it would be interesting to look at the question of what the role of nuclear weapons *should* be in the post-Cold War security system. At the conceptual level, it is evident that nuclear weapons should be gradually taken out of the U.S.-Russian relationship, that their role should be reduced to reflect changes in the security environment, i.e. lack of a mutual threat, and the changing nature of conflicts, which do not require large arsenals of nuclear weapons either as means of deterrence, or as war-fighting weapons. However, the question is how that new role can be defined in practical terms? What should be the posture, size, and state of alert of nuclear weapons in order to meet new security needs? If complete denuclearisation seems unrealistic for the next few decades due to the existence of other nuclear powers and rogue states aspiring to acquire nuclear capabilities, what kind of forces are needed to deter existing threats and how can the U.S. and Russia achieve more appropriate force postures?

As long as confusion in the strategic objectives of the U.S. and Russia persists, the end point of the CTR process remains unknown because the final point of arms control and strategic reductions is uncertain.

As a result of the study of the CTR process and of the larger issues in which it is embedded (such as the role of nuclear weapons), the following tentative suggestions can be made: a change of policy on the part the United States (which may follow a change in leadership) can bring back some of the ideas of cooperative denuclearisation of the early 1990s onto the international agenda. A decade of CTR removed certain barriers in the U.S.-Russian strategic relations. If the political leadership in the United States and Russia adapts more fully to the emerging international system and shows its willingness to act upon new security realities without holding on to the 'old thinking', it would give a tremendous boost to the transition towards a new world order. The CTR process should be used as part of an effective mechanism of such transition.

Appendix 1 – Amount of Fissile Material at Russian Sites/Facilities[1]

Name of Site/Facility	*Supervising Agency*	*Amount of Separated Plutonium*	*Amount of weapons-usable Uranium (HEU)*
RUSSIAN CIVILIAN AND MILITARY NUCLEAR FACILITIES			
All-Russian Scientific Research Institute of Experimental Physics (VNIIEF)	MINATOM	More than 1,000 kg	More than 1,000 kg
All-Russian Scientific Research Institute of Technical Physics (VNIITF)	MINATOM	More than 1,000 kg	More than 1,000 kg
Avangard Electromechanical Plant (AMZ)	MINATOM	More than 1,000 kg	More than 1,000 kg
Beloyarsk Nuclear Power Plant	MINATOM	no	More than 1,000 kg

[1] Source: Nuclear Status Report, op. cit

Bochvar All-Russian Scientific Research Institute of Inorganic Materials (VNIINM)	MINATOM	Less than 1,000 kg	Less than 1,000 kg
Electrochemical Plant	MINATOM	no	More than 1,000 kg
Elektrokhimpribor Combine	MINATOM	More than 1,000 kg	More than 1,000 kg
Elektrostal Machine Building Plant (MSZ)	MINATOM	no	More than 1,000 kg
Institute of Medical and Biological Problems (IMBP)	Ministry of Health	no	Less than 100 kg
Institute of Physics and Power Engineering (IPPE)	MINATOM	More than 1,000 kg	More than 1,000 kg
Institute of Theoretical and Experimental Physics	MINATOM	no	Less than 1,000 kg
Instrument Making Plant	MINATOM	More than 1,000 kg	More than 1,000 kg
Joint Institute of Nuclear Research (JINR)	Independent Government Institute	Less than 10 kg	Less than 100 kg
Karpov Scientific Research Institute of Physical Chemistry	Ministry of Economics	no	Less than 100 kg
Khlopin Radium Institute, St. Petersburg Branch	MINATOM	Less than 5 kg	Less than 5 kg
Khlopin Radium Institute, Gatchina Branch	MINATOM	Gram quantities are kept in hot cells at this site	Gram quantities are kept in hot cells at this site
Kurchatov Institute, Russian Research Centre	Independent Government Institute	Less than 1 kg may be on site	More than 1,000 kg
Luch Scientific Production Association (NPO LUCH)	MINATOM	no	More than 1,000 kg
Mayak Production Association	MINATOM	More than 1,000 kg	More than 1,000 kg
Mining and Chemical Combine (MCC)	MINATOM	More than 1,000 kg	More than 1,000 kg

Moscow Engineering and Physics Institute (MEPHI)	Ministry of Education	Small amount for research	Less than 100 kg
Novosibirsk Chemical Concentrates Plant (NCCP)	MINATOM	no	More than 1,000 kg
Petersburg Institute of Nuclear Physics	Russian Academy of Sciences	no	More than 100 kg
Scientific Research Institute of Atomic Reactors (NIIAR)	MINATOM	At least 100 kg	More than 1,000 kg
Scientific Research Institute for Instruments	MINATOM	no	More than 1,000 kg
Scientific Research and Design Institute of Power Technology (NIKIET), Moscow Branch	MINATOM	no	Less than 10 kg
Scientific Research and Design Institute of Power Technology (NIKIET), Yekaterinburg Branch	MINATOM	no	More than 100 kg
Siberian Chemical Combine (SCC)	MINATOM	More than 1,000 kg	More than 1,000 kg
START Production Association	MINATOM	More than 1,000 kg	More than 1,000 kg
Tomsk Polytechnical University	Ministry of Education	no	Less than 100 kg
Urals Electrochemical Integrated Plant (UEIP)	MINATOM	no	More than 1,000 kg
RUSSIAN NAVAL FACILITIES, NORTHERN FLEET			
Ara Bay Naval Base (Ara Guba)	MOD	no	An unknown amount of HEU is located in fuel on active duty and decommissioned submarines
Atomflot	Ministry of Transportation	no	More than 500 kg of HEU is located on the service ship *Immandra* and in the reactors of active icebreakers

Gadzhiyevo Naval Base	MOD	no	An unknown amount of HEU is located in fuel on active-duty submarines, on decommissioned submarines, and in spent fuel
Gremikha Naval Base	MOD	no	An unknown amount of HEU is located in low-irradiated and spent fuel on decommissioned submarines and on site in spent-fuel assemblies
Nerpa Shipyard	Russian Shipbuilding Agency	no	Approximately 1,000 kg of HEU is located on the PM-12 fuel-transfer ship
Northern Machine Building Enterprise	Russian Shipbuilding Agency	no	More than 1,000 kg of spent fuel is located on site and the PM-63 service ship
Olenya Naval Base (Olenya Guba)	MOD	no	More than 1,000 kg of HEU i located in active dut submarines and in fresh an spent fuel on the PM-1 service ship
Pala Bay Submarine Repair Facility (Pala Guba)	MOD	no	An unknown amount of HEU is located on board docked submarines
Severomorsk Naval Base	MOD	no	More than 1,000 kg of fresh and spent fuel is located at Site 49; and fresh fuel on board battle cruisers

Sevmorput Naval Shipyard No. 35	MOD	no	Am unknown amount of HEU is in low-irradiated and spent fuel on decommissioned submarines
Shkval Naval Yard No. 10	MOD	no	An unknown amount of HEU is in low-irradiated and spent fuel in decommissioned submarines
Zapadnaya Litsa Naval Base	MOD	no	An unknown amount of HEU is located on active duty submarines and in spent fuel
Zvezdochka State Machine Building Enterprise	Russian Shipbuilding Agency	no	An unknown amount of HEU is located in low-irradiated and spent fuel on decommissioned submarines and on the two service ships
RUSSIAN NAVAL FACILITIES, PACIFIC FLEET			
Amurskiy Zavod	Russian Shipbuilding Agency	no	An unknown amount of HEU is located in fuel in the reactor of the partially completed submarine
Cape Sysoeva	MOD	no	An unknown amount of HEU is located on site in spent fuel

Chazma Ship Repair Facility	MOD	no	More than 2,000 kg of fresh and spent fuel is located at Site 34, on board the PM-74 service ship, and in low-irradiated and spent fuel in decommissioned submarines
Gornyak Shipyard	MOD	no	More than 1,000 kg of HEU is located in fresh and spent fuel on the PM-74 and possibly on the decommissioned PM-32 service ship
Pavlovsk Bay	MOD	no	An unknown amount of HEU is located in fuel on the active-duty submarine and nuclear-powered ships, as well as in low-irradiated and spent fuel in decommissioned submarines
Razboynik Bay	MOD	no	An unknown amount of HEU is located in low-irradiated and spent fuel in decommissioned submarines
Rybachiy Nuclear Submarine Base	MOD	no	There is an unknown amount of HEU located in fuel on active-duty and decommissioned submarines

Zavety Ilyicha	MOD	no	An unknown amount of HEU is located on low-irradiated and spent fuel in decommissioned submarines
Zvezda Far Eastern Shipyard	Russian Shipbuilding Agency	no	An unknown amount of HEU is located in spent fuel on decommissioned submarines
OTHER RUSSIAN NAVAL FACILITIES			
Admiralteyskiye Verfi Shipyard	Russian Shipbuilding Agency	no	Possibly in fresh fuel and in critical assembly
Baltic Shipyard	Russian Shipbuilding Agency	no	An unknown amount of HEU is stored at this site in fresh fuel
Central Physical-Technical Institute (TsFTI)	MOD, 12th Directorate	no	At least 5-10 kg of fresh fuel, approximately 90% enrichment
Experimental Machine Building Design Bureau	MINATOM	no	There is an unknown amount of HEU at a military-controlled location on site
Krylov Central Scientific Research Institute	Ministry of Economics	no	Less than 100 kg of HEU

Appendix 2 MPC&A Upgrades at Russian Facilities[2]

Name of the site/facility	*Time framework*	*MPC&A Status*
All-Russian Scientific Research Institute (VNIIEF) http://www.vnieief.ru/english	Work begun: 1994 Not yet completed	• Initial cooperation was limited to a few sites within the VNIIEF complex. • In 1997 cooperation expanded to all sites that process or store HEU or plutonium • 1998 – upgrades completed at the Pulse Research Reactor facility[3]
All-Russian Scientific Research Institute of Technical Physics (VNIITF) http://www.vniith.ru	Work begun: 1995 Not yet completed	• Cooperative MPC&A work with DOE at the pulse research reactor (PRR) facility. Upgrades included the installation of hardened doors, metal detectors, video surveillance, alarm systems and a physical protection control centre. A new system at PRR commissioned in May 1998 • Areawide MPC&A improvements: vehicle and pedestrian portal monitors and metal detectors were installed at key points throughout VNIITF • installation of access controls, implementation of a computerised badging system, construction of a centralised MPC&A control station, development of a tamper-indicating

[2] The following table is generated from the Nuclear Status Report, op. cit. The data is based on the most recent information in open sources (2001)

[3] See Disarmament Diplomacy, Issue No. 26, DOE-MINATOM Nuclear Security Arrangements, http://www.acronym.org.uk/26doe.htm

		device programme • VNIITF is completing a measured physical inventory of all its nuclear materials, plans to develop a complex-wide computerised material control and accounting system. • In July 2000 - physical inventories were under way in two of the building of PRR facility and the same procedure was planned for several other sites • Consideration to construct a new fissile-material storage building to consolidate material from three sites • 1999 - access problems slowed the work
Avangard Electromechanical Plant (AEP)	Work not yet begun	• work scheduled for 1998 but access to sites was denied although some portal monitors and other equipment was sent • 1999 - DOE's policy not to continue any work until access issue is resolved
Beloyarsk Nuclear Power Plant http://insp.pnl.gov/?profilebeloyarsk.be	Work began in 1996 Work completed in 1998	• physical protection upgrades: central alarm station; improvement of fresh- and spent-fuel vault areas (access, video surveillance, electronic sensors); hardening of the vehicle and personnel portals; provision of a guard communication system • provision of equipment for nuclear-material measurement; provision of a underwater video camera and recorder for verification of spent-fuel serial numbers; and a computer network for material accounting • VNIITF is working with Beloyarsk NPP on the development and implementation of a computerised accounting system
Bochvar All-Russian Scientific Research Institute of Inorganic Materials (VNIINM)	Work began in 1995 Not yet completed	• 1994 - GAN ordered to shut down certain activities for 6 months owing to lax measures for protecting plutonium • improvement of VNIIM's current methods for measuring bulk nuclear materials • VNIIM is working with DOE to develop a general MC&A

		plan for the entire institute (including a computerised accounting system) • DOE and Germany provided physical protection assistance
Electrochemical Plant http://www.ecp.ru	Work began in July 1996 Not yet completed	• upgrades focused on the HEU storage facility, the intermediate storage and fluoridation facility, the uranium downblending area, and the facility perimeter • The plant upgraded access controls around the facility and DOE provided video surveillance equipment, metal and nuclear material detectors, and X-ray machines • structural hardening and the installation of alarms and sensors • upgrades to the Central Alarm station; communications equipment provided to the guard force • scales for material measurement, bar codes, tamper-indicating devices, hardware and software for a computerised material accounting system
Electrokhimpribor Combine	Work has not begun	• work scheduled for 1998 but access to sites was denied although some portal monitors and other equipment was sent • 1999 - DOE's policy not to continue any work until access issue is resolved
Elektrostal Machine Building Plant (MSZ)	Work began in 1994 Work suspended	• 1994 - this facility was a 'test' facility for MPC&A programme • 2 specific sites within the LEU line were chosen for full upgrades. Attention on fast-breeder fuel production line situated in the same building as the LEU production line. Assistance included: enclosing and separating the fast-breeder line within the building, adding access controls, an enhanced alarm system, portal monitors, sensors and perimeter fencing • LEU line: installation of hardware and software for computerised material accounting and the delivery of equipment for nuclear material measurements

		• 1997 - a new MPC&A system commissioned at building 247 • After a few years the full fast-breeder fuel-fabrication line (uses HEU of 26% enrichment) was to the DOE MPC&A. September 1999 - all work was ended by DOE due to access problem
Institute of Medical and Biological Problems	no plans for MPC&A upgrades	
Institute of Physics and Power Engineering (IPPE) http://www.rssi.ru/IPPE	Work began in September 1994 Not yet completed	• IPPE one of the first to participate in MPC&A programme • 1994 – first basic agreement between IPPE and LANL[4] • 1995 - work began at the fast critical assembly facility • 1996 - work extended to the fuel-fabrication laboratory and the old central storage facility. • Upgrades at all three facilities include: physical protection, improved access control, video surveillance of nuclear materials, implementation of nuclear material measurement techniques, use of methods for automated material accounting, development of local networks for computerised material accounting, and the development of procedures for taking physical inventories. Many of these upgrades will be extended to the entire IPPE site • 1996 - IPPE decided to create a «nuclear island» consisting of the fast critical assembly (BFS) facility and a new central storage facility. One physical protection will be developed for the «nuclear island», which will house 80-85% of the IPPE's weapons-grade nuclear materials • 1995 - The RMTC was established by the Russian government

[4] See http://www.rssi.ru/IPPE/MPCA/prot.html

		to teach basics of MPC&A
Institute of Theoretical and Experimental Physics http://www.heron.itep.ru	Work began in 1996 and completed in 1998	• provision of instruments for nuclear material measurements and software for computerised material accounting • physical protection includes: establishment of a central alarm station in the area where fissile material is located, access control, intrusion detection, video assessment, delay elements, and a guard communication system
Instrument Making Plant http://www.npz.sol.ru	Work has not begun	• work scheduled for 1998 but access to sites was denied although some portal monitors and other equipment was sent • 1999 - DOE's policy not to continue any work until access issue is resolved
Joint Institute of Nuclear Research (JINR) http://www.jinr.ru	Work began in May 1996 and was completed in February	• improved access controls, intrusion sensors, a hardened fresh-fuel vault, personnel portals, upgrades to the central alarm station, upgraded inventory-taking procedures, and a computerised material accounting system • DOE follow-up team has visited the site as part of DOE sustainability programme
Karpov Scientific Research Institute of Physical Chemistry (Obninsk Branch) http://www.nifhi.ru/institut.html	Work began in February 1996 and was completed in February 1998	• physical protection upgrade includes access controls, alarms, sensors, and physical barriers • other upgrades: tags, seals, and computers for computerised material accounting • DOE follow-up team has visited the site as part of DOE sustainability programme
Khlopin Radium Institute, St. Petersburg Branch http://www.atom.nw.ru/RIE/INDEX.HTM	Work began in 1996 and was completed in May 1998	• hardened storage vault and improved access control at the central storage facility, computerised material accountancy system
Khlopin Radium Institute, Gatchina Branch	Work began in May 1996 and	• improved access control at the main entrance to this facility

http://www.atom.nw.ru/RIE/INDEX.HTM	was completed in May 1998	
Kurchatov Institute, Russian Research Centre	Work began in 1994 Not yet completed	• 1994 - assistance began as a part of lab-to-lab programme focusing on Building 116 where substantial amount of HEU are located - completed in 1995 • November 1996 - upgraded security at central storage facility • 1997-1998 - Building 106, where several research reactors and critical assemblies are located, and Building 135, where three critical assemblies are located • physical protection include: access control systems, physical barriers, and alarms and sensors • computerised MC&A system called KI-MACS, which includes bar coding, tamper-indicating devices, and electronic scales (5 buildings equipped) • February 2002 – U.S. Congressmen visited the facility to examine the physical protection of the building 135[5]
Luch Scientific Production Association (NPO Luch) http://www.fas.org/spp/civil/russia/luch.htm	Work began in 1996 Not yet completed	• mid-1998 - Luch consolidated HEU from 28 separate locations to four sites (with DOE's MPC&A assistance) • central storage facility (CSF) - highest priority • building modifications, improved access controls, and the installation of alarms, sensors, video surveillance, and metal and radiation detectors • tamper-indicating devices, bar codes • U.S. equipment for nuclear-material measurement • computerised database for the location and identification of

[5] See http://www.kiae.ru/eng/new/usa-2of.htm

		nuclear items • upgrades at the three HEU processing buildings • May 1999 - MCC Programme's pilot project at Luch • November 1999 - DOE's MCC Programme and Luch signed an agreement to continue consolidation work
Mayak Production Association	Work began in June 1996 Not yet completed	• two Mayak plants were allowed for MPC&A upgrades: RT-1 spent-fuel facility and Plant 1, where the HEU oxidation and purification facilities are located • RT1: repairs to and installation of metal and nuclear-material detectors, upgrades to the central alarm station, upgrades to the interim and long-term plutonium dioxide vault and storage areas, and the provision of a physical inventory laboratory to help update inventory records of plutonium dioxide. Improvement of nuclear material measurements, the accuracy and timeliness of nuclear material accounting, and the computerisation of data gathering. Under way: a computerised nuclear-material accounting network; upgrades to the existing badging and access control systems are being negotiated • Plant 1: 1999 - Mayak submitted reports on the current status of Plant 1. May 1999 - a joint U.S. - Mayak team toured the plant. MINATOM has not approved yet (2000)
Mining and Chemical Combine (MCC) http://www.nuclearno.com/text.asp?312	Work began in January 1996 Not yet completed	• Initial focus on the plutonium oxide storage facility (POSF). Upgrades include: increased access control, material surveillance equipment, sensors, and tamper-indicating devices • a new computerised material accountancy system • equipment for nuclear-material measurement and for taking physical inventories • future projects: the reactor complex, and the new plutonium oxide storage areas

		• 1999 – a Gkhk's Plan[6]: 1. a facility description and the division of GKhK into MBAs (Material Balance Areas) 2. creating an MPC&A staff and management organisational structure 3. descriptions of the accounting and inventory systems at GKhK 4. the creation of an in-house accounting programme to confirm and verify fissile material quantities 5. a material control system
Moscow Engineering and Physics Institute (MEPHI) http://www.mephi.ru	Work began in 1996 and was completed in June 1998	• upgrades implemented at the research reactor building, the nuclear training facility, and the nuclear material storage centre. Upgrades include: building and minor perimeter modifications, access control, internal and external video systems, and sensors, improvements to guard posts • MC&A upgrades: computerised material accounting and the provision of instruments for improved nuclear material measurements • DOE follow-up team has visited the site as a part of the DOE sustainability programme
Novosibirsk Chemical Concentrates Plant (NCCP) http://www.nccp.ru	Work began in January 1996 and was completed in November 2000	• highest priority given to the central storage facility, where HEU was consolidated from four buildings to only one. • A storage building annex was constructed, several measures put into place: structural modifications to the building, the installation of sensors, cameras, and radiation detectors, and improved access controls.

[6] See Russia:Zheleznogorsk (Krasnoyarsk-26), http://www.nto.org/db/misprofs/russia/fissmat/pukras26/kras26.htm

		• automated accounting system and nuclear material measurements • a new central alarm station is being built • upgrades are planned for the HEU processing facilities (to be completed by the end of FY2003)
Petersburg Institute of Nuclear Physics	Work began in 1996 and was completed in May 1998	• video-monitored, double-fenced perimeter with a vehicle portal and crash barrier • a new entry control station on the perimeter includes video surveillance, a pedestrian portal monitor, metal and radiation detectors, and a badging system • physical protection upgrades to the VVR-M reactor building: building modifications, video monitors, sensors, access control, and a hardened HEU vault (fresh fuel for all reactors and critical assemblies is stored at the VVR-M facility) • new computerised MC&A system is working in «real time». The system tracks the movement of nuclear materials and assists with computerised nuclear material inventory
Scientific Research Institute of Atomic Reactors (NIIAR)	Work began in February 1996 Not yet completed	• Initial focus on the central storage facility (CSF), the MOX fuel facility, and the BOR-60 fast-reactor facility (these buildings handle the largest amounts of HEU and plutonium) • December 1996 - Building 106, which houses two of seven reactors, was added to the DOE Programme • July 1997 - NIIAR agreed to include all remaining buildings with appreciable amounts of HEU and plutonium in the programme • December 1998 - significant upgrades at CSF were completed. They incluge: modifications to the interior and exterior of the building, the installation of alarms, and the installation of several MC&A technologies, including bar coding, electronic

		scales, tamper-indicating devices, and computerised accounting • specific improvements at the MOX fuel facility and Building 106: relocation and enhancement of the central alarm station, the installation of vehicle portals, the use of hand-held radiation monitors, and the use of various nuclear-material measurement equipment • development of a sitewide MC&A system • November 1999 - DOE MCC Programme signed an agreement with NIIAR to consolidate app. 250 kg of HEU and downblend it to LEU (by the end of October 2000)
Scientific Research Institute for Instruments	Work began in July 1997 Not yet completed	• July 1997 - site added to DOE list • October 1997 - work began; slow progress • 1999 - as part of MCC programme a significant amount of HEU was moved from the Institute to NPO Luch for storage
Scientific Research and Design Institute of Power Technology (NIKIET), Moscow Branch	Work began in February 1996 and was completed in 1998	• physical protection upgrades at a new fresh-duel vault at NIKIET headquarters: fresh fuel was moved from its previous storage place at Bauman University to the new vault, facility hardening, access control, video monitors, sensors, improved guard communications, alarms, and a central alarm station • minimal physical protection upgrades at the critical assemble facility at Bauman University • MC&A upgrades: tamper-indicating devices and a basic computerised material accounting system
Scientific Research and Design Institute of Power Technology (NIKIET), Yekaterinburg Branch	Work began in May 1996 and was completed in May 1998	• improved protection at the fresh- and spent-fuel vault, equipment for nuclear-material measurement, tamper-indicating devices, and hardware and software for computerised nuclear material accounting
Siberian Chemical Combine (SCC)	Work began in 1995	• installation of more than 27 pedestrian portal monitors and metal detectors at principal access control points within the

	Not yet completed	SCC • by mid-2000 - total of 17 vehicle and 31 pedestrian portal monitors delivered and installed • sitewide communications computer network to link access control at al SCC facilities, an upgraded radio communications system, and delivery of a transport truck with a fissile-material vault for transporting fissile materials between facilities within the SCC • the reactor plant - the highest priority. Upgrades: upgrades to the 4.5-km perimeter and to the interior of the plant (variety of alarms and sensors). The access control system to be completed in 2000 • ISTC grant to develop a plan for a new MC&A system at the reprocessing plant. Project completed in 1997. The developed plan includes the provision of bar codes and other equipment for nuclear-material measurement and inventory and equipment for computerised nuclear-material accounting. Physical protection upgrades have also been made to the reprocessing plant
START Production Association	Work has not begun	• work scheduled for 1998 but access to sites was denied although some portal monitors and other equipment was sent • 1999 - DOE's policy not to continue any work until access issue is resolved
Tomsk Polytechnical University	Work began in April 1996 and was completed in July 1998	• physical protection upgrades to the reactor building, where both the reactor and the fresh-fuel storage vault are located: bricking up windows, replacing doors, hardening the roof, and the installation of an electronic access control system, a central alarm station, video cameras, and sensors. • MC&A upgrades: the provision of a tamper-indicating device system, a non-destructive assay system, a special nuclear-

		material portal monitor, and hand-held monitors
Urals Electrochemical Integrated Plant (UEIP)	Work began in January 1996 Not yet completed	• January 1996 - site added to the DOE MPC&A list • September 1997 - work began • enhanced radio communications; video surveillance along the perimeter of the site and at buildings that store or process HEU; an access control system with portal monitors, metal detectors, and X-ray machines; equipment for nuclear material measurement; and hardware for computerised accounting

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