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Moving Right Along: Developments in Nuclear Disarmament Regimes After the Cold War

By ***George A. MacLean***

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INTRODUCTION: THE POST-COLD WAR ERA AND NUCLEAR RESTRAINT

In many ways, multilateral cooperation[1] in the field of nuclear disarmament is the most important dynamic in the post-Cold War era. Indeed, the end of the rhetorical hostilities between East and West has allowed for a more constructive dialogue among significant actors regarding arms control, disarmament, and the general security of the international system. However, while this new "order" has to its credit successes, such as the indefinite renewal of the Nuclear Non-Proliferation Treaty in April 1995, it also has been marked by setbacks, including the initial failure of the Comprehensive Test Ban Treaty (CTBT) talks in Geneva, Switzerland (later successfully negotiated in the General Assembly of the United Nations).[2] Varying degrees of success, then, have led to inevitable questions about the structure and scope of strategic issues as we move further away from the Cold War period.

This article examines the effects of collaborative efforts (particularly those of the US and Russia) to reduce the threat of nuclear materials diversion, and their general implications for the process of nuclear disarmament and non-proliferation. These initiatives are indicative of the next logical dimension of the nuclear restraint regime, referred to here as "nuclear materials elimination." These developments in international security regimes, and particularly those relating to materials non-proliferation, are couched in burgeoning cooperative relations between the US and Russia that have precipitated and established a broader multilateral relationship for disarmament and non-proliferation. The article uses as its central framework the theory of "regimes" in international relations, demonstrating that the empirical evidence of the broadening scope of nuclear disarmament initiatives illustrates the utility, if not activation, of regime theory. Furthermore, placed in a historical context, the article suggests that the current development of nuclear disarmament demonstrates the cumulative effect of efforts during the Cold War. Using regimes as a methodological device, then, this article concludes that recent bilateral Russo-American initiatives in the field of nuclear weapons controls represent a true watershed in international relations and international security, with important implications for multilateralism, particularly with regard to the prospects for broadening the nature and scope to include many more states.

In some respects the incremental effect of several distinctive regimes, detailed later in this article, has created something of a paradigm for international security studies. That is to say, the developmental aspects of these regimes reflected, and reflect today, the

normative ideas or beliefs about the restraint of weapons of mass destruction. In short, the initiatives themselves were responsive to a perceived need to keep nuclear weapons technology in check. Hence, several interdependent regimes served to formulate a paradigmatic way of conceptualizing nuclear restraint.

Importantly, cooperation in the area of nuclear controls between the former Soviet Union and the United States constitutes a unique opportunity for confidence-building and security assurances. The impetus for this new cooperation emanates both from the domestic sphere of what commonly is referred to as the "national interest" of these countries, and the international structure of relative power and state-to-state relations.

Overall, the conclusions here contribute to our understanding of order and change in the international system as they pertain to security concerns, and the specific relationship between the United States and Russia. Developments in the post-Cold War era between East and West are representative of new thinking in strategic relations. In light of emerging and particularly post-Cold War security challenges, it is necessary to reexamine the security climate of our contemporary system in order to best understand both the context and the direction of change. Understanding this new era in strategic arms control presents an example of an activated non-proliferation regime for academic studies, on the one hand, and a political and diplomatic attempt to attend to the very nub of nuclear arms control and disarmament (that is, fissile material), on the other.

REGIME ANALYSIS IN INTERNATIONAL RELATIONS

"Regimes" have been used in international relations as a manner of classifying and ordering behavior in the international system since Stephen Krasner gave formal definition to the term in 1982.[3] Krasner defined regimes as "principles, norms, rules, and decision-making procedures around which actor interests converge in a given issue-area."[4] Though the concept was criticized as being "faddish,"[5] regime theory embedded itself in the academic literature, leading one scholar in 1986 to refer to it as a "hot" topic in the study of international relations.[6] Indeed, regime theory has come to be accepted as one of the central frameworks for understanding events in the world arena. It has been adapted for interpretative uses by realists, neo-realists, neo-Marxists, neo-structuralists, and Groatians.[7] In this light, then, regime theory has a certain *cachet* that extends beyond normative perspectives of international relations, permitting divergent interpretations and explanations of behavior of actors.

In simple terms, regime theory has been used by varying perspectives because it attempts to explain, in a fairly flexible manner, how international actors seek to coordinate behavior. More directly, regime theory incorporates a decidedly *structural* interpretation with a degree of attention to the *process* of activity among actors. On a structural level, regime theory provides a basis for understanding the manner in which states seek power in the international system, either through the extension of interests, or the functional allocation of capabilities. Regimes are indeed normative, since they govern - and often entrench - the fundamental beliefs and attitudes of primary actors in international relations. This inevitably leads to a matter of choice, based on the differentiation of

power by the actors involved. That is to say, the interests of dominant actors tend to frame the regimes themselves.

Regimes are also concerned with process, including the decision-making procedures, the rules, and the norms that regulate states in the international system. There is a subjective, as well as an objective, dimension in this context. Objectively, rules and decision-making procedures establish a framework for state interaction that may be interpreted in a definitive manner. Operating through tribunals, adhering to international codes and treaties, creating institutional limitations and responsibilities all represent mechanisms that may be utilized in a common manner by participants. However, principles, norms and rules may be highly value-based, often reflecting the interests of the most portentous actors involved. This leads to inevitable subjective biases and interpretations; "norms," for instance, may not be as categorical as, say, conditions for entry into a regime, or the division between the autonomy of member states and institutional independence.

Regime theory, therefore, is a flexible alternative for analyzing international relations, and has come to occupy a generally accepted level of frameworks. As Ernst Haas has suggested, regimes have utility in international relations because they seek to provide a method of understanding human interaction.[8] Regimes are social institutions, created and maintained as a way of conceptualizing and operationalizing the inevitability of human sociability. In this way, regimes are both responsive and "proactive." They are responsive because we tend to use them to clarify phenomena in the international system, classifying and distinguishing patterns of behavior and their corresponding effects; "proactive" because regimes are considered as more than an explanatory device, but also as a tool that may be used to anticipate or govern sets of relations or behavior.

Regimes create a more nuanced method of understanding state behavior. As Krasner has argued, regimes dismiss the simplistic "billiard ball" interpretation of international relations, where states are the only actors in the international system, operating in a zero-sum environment where the accumulation of power through non-cooperation is the modus operandi of actors. Instead, regime theory seeks to account for relative shifts in capability among actors themselves, and maintains a far more dynamic nature, allowing for change within and without individual regimes. Krasner argues that regimes may "assume a life of their own . . . [o]nce a regime is in place, it may develop a dynamic of its own that can alter not only related behaviour and outcomes but also basic causal variable."[9]

It is for this reason that regimes are particularly useful in the analysis of nuclear non-proliferation efforts, and particularly recent strategic relations between the United States and Russia. Regimes, as social institutions, are forms of management for international relations,[10] seeking to reduce uncertainty and facilitate cooperative behavior. As argued later, there is no doubt that the tradition of instilling and maintaining nuclear restraint taken on by the superpowers since the early 1960s represents a form of international management that has contributed to the reduction of tensions between the two countries, and the institutional mechanisms responsible for facilitation. In brief, the extension of nuclear restraint regimes during and after the Cold War era represents a form of

cooperative behavior, which is both purposeful and calculated;[11] as argued later in this article, this cooperative behavior mandates policy coordination, envisioning the wishes of the other side, and fundamentally adjusting one's undertakings to match those of the other side, as well as the regime itself.

NUCLEAR RESTRAINT REGIMES: THE COLD WAR AND BEYOND

The Cold War nuclear arms race and its accompanying restraint treaties was primarily responsive to its two main actors, the United States and the Soviet Union, and was predicated on the control and manipulation of military atomic energy. America's use of the atomic bomb in the war with Japan marked the beginning of the first period of the arms race and the introduction of the truly strategic side of nuclear energy. The period of American nuclear monopoly lasted until 1949; during this period of monopoly, the United States could have waged a unilateral nuclear war against the Soviet Union, with no fear of similar reprisals.[12] Although the Soviets gained nuclear capability before most analysts thought possible, the US still retained this dominance through a second stage until the late 1950s. During most of the 1960s the United States still held a first strike capability, but by the end of this decade the USSR had reached a rough balance with the US, which it maintained until the end of the Cold War.

The stages of the nuclear arms race set the conditions and established the principal actors for the accompanying disarmament process. There were other players, of course,[13] but the circumstances set by the two superpowers dominated the substance of nuclear restraint negotiations for the duration of the Cold War. Moreover, while the nuclear buildup was accompanied by other areas of arms acquisitions such as conventional, biological and chemical weapons, strategic nuclear weapons posed the greatest single threat to international peace and security.

As Lawrence Freedman has argued, nuclear arms racing during the Cold War was marked by the "importance of being first."[14] Although both sides recognized the unavoidable mutual losses that would accompany a nuclear war, it was nonetheless important to maintain, to quote Paul Nitze, "a position of nuclear attack-defence superiority."[15] The nuclear arms race of the Cold War period, therefore, was a strategic balance of terror, and a time of mutual nuclear deterrence.[16]

Forming the backbone to this time of mutual distrust and antagonism, the nuclear arms race established a seemingly intractable dynamic. A virtual state of affairs between the two nations, nuclear capability as policy underwent a series of configurations, and both sides sought to prevent any attempt by the other to obtain strategic superiority.[17] Yet as the nuclear arms race escalated, corresponding attempts to control the development of weapons continued. The arms control-disarmament initiatives were a recognition by both parties that procurement should not go unchecked; they also formed the basis for a confidence-building mechanism between the nuclear adversaries. These initiatives allowed for continued dialogue and a means of maintaining relative balance between the US and the Soviet Union, avoiding a disproportionate and therefore unstable power relationship.

Although arms control has a long and varied history,[18] it had a particularly crucial role during the Cold War. Hence, arms control is most often associated with that period. Superpower negotiations aimed at controlling or reducing nuclear weapons represent a period that has spanned over 30 years, working toward the eventual goal of complete nuclear disarmament.[19] The "process" element is significant here because it brings to bear the increasing and progressive scope of arms control agreements and treaties, moving from issues of testing and possession, to limitation and eventually reduction. The "outcome" of the process has led to the nub of the problem itself: controls and alternate uses of military fissionable material. The elimination of military fissile material, therefore, is in fact the desired "endgame" of the arms control and disarmament process since eliminating this material by definition eliminates the related nuclear capability.

Numerous arms control and disarmament treaties, multilateral as well as bilateral, were negotiated during the Cold War.[20] Reflective of the era in which they were negotiated and signed, as well as the foreign policies of those administrations involved, these treaties represent a progression in both scope and subject matter. Broadly speaking, the most significant arms control initiatives reflect five main stages of the nuclear restraint regime: testing, possession, limitation, reduction, and elimination (see Table 1 for a point form reference). Furthermore, the final stage - the endgame, as it were - reveals the importance of fissile material for the logical evolution of the regime.[21]

At the centre of new developments in nuclear restraint is the matter of control over fissile material in both multilateral and bilateral arms control efforts. Important advancements in this field include the US-Russian Highly Enriched Uranium (HEU) agreement, bilateral agreements on the cessation of plutonium production (the Gore-Chernomyrdin agreement), and the current pre-negotiation efforts toward a fissile material production ban in Geneva.[22] These developments, in concert with nuclear weapons treaties (START I and II, INF) are indicative of the possibilities for arms control and disarmament in the post-Cold War environment, yet also serve as an example for other nuclear weapons possessing states and the so-called "threshold" states (those that likely have nuclear weapons programs but have not acknowledged it officially). A logical, albeit complicated, trajectory is the incorporation of these other states into the new regime of nuclear weapons and materials controls.

The immediacy surrounding fissile material controls is reflective of a "new" international security concern that has replaced the former strategic dilemmas of the Cold War. Admittedly, while it is not entirely a new issue, it has at least increased its significance for non-proliferation efforts. This developing security dilemma involves existing inventories of fissile material that may be used in the manufacturing of nuclear weapons, as well as ongoing production of new fissile material. In many ways, this issue is of primary concern in that fissile material constitutes the most important component for the construction of nuclear weapons. With no controls over weapons grade fissile material,[23] there can be little hope of effective control over proliferation, both vertical and horizontal,[24] of nuclear weapons themselves.

THE PARADIGM IN CONTEXT: PREVIOUS RESTRAINT REGIMES

Testing

As signatories to the Limited (or Partial) Test Ban Treaty (LTBT) of 1963 (along with over 100 other nations that have signed since), the United States and Soviet Union pledged to eliminate nuclear testing in the air, under water, and in outer space. The LTBT was a milestone in the control of nuclear arms, beginning the cooperative side of the nuclear relationship between the two parties. Furthermore, it took the nearly disastrous Cuban Missile Crisis of 1962 to convince the two nations that increased communication was vital for the maintenance of security and the avoidance of first use. The initial proposals of the LTBT (still not signed by two possessing powers, China and France) have been used as a basis for a wider testing regime, most notably the efforts to institute a Comprehensive Test Ban Treaty (CTBT).[25]

Possession

Increasing the breadth of nuclear weapons controls, the Nuclear Non-proliferation Treaty (NPT) of 1968 created a decidedly asymmetrical system of possessor and non-possessor states.[26] The NPT was intended to address "horizontal" proliferation by prohibiting new states from acquiring nuclear weapons in exchange for a commitment among established nuclear powers to limit "vertical" proliferation through the reduction of their own nuclear arsenals. While the multilateral component of the NPT was obviously crucial for containing emerging nuclear weapons programs, the commitment to reduce weapons signalled the beginning of US-Soviet warhead reduction negotiations culminating in the START agreements. The May 1995 NPT renewal conference meetings in New York ended in a decision to extend the treaty indefinitely into the future. In addition, largely as a result of United States pressure, the possessing states agreed to seek a CTBT and a pledge to continue reducing warheads with an intention to eliminate them completely.[27]

Limitation

Following the success of the NPT talks in the late 1960s, nuclear weapons treaties moved from issues of testing and possession to limitation. Mounting US concern regarding the increasing vulnerability of its nuclear forces, in concert with the emerging relative symmetry with the Soviets, led to the first Strategic Arms Limitation Talks (SALT I) signed in 1972. SALT I placed a ceiling on the number of land- and sea-based strategic nuclear delivery vehicles the two sides had while negotiating a more substantive treaty (SALT II). SALT I did not preclude the development of MIRV technology,[28] but did freeze the number of offensive strategic missiles deployed or constructed for the following five years. SALT I is also important because it contained the Anti-Ballistic Missile Treaty (ABM) restricting each side to only two ABM sites one at the capital city and another elsewhere. Both sides believed that the ABM treaty protected their strategic offensive capability.[29] SALT I created a verification process through which each side could monitor the other's compliance to the agreement.

SALT II was meant to continue the "obligation" both sides had to further limit the development of strategic offensive arms. SALT II, essentially outlined at the 1974

Vladivostok talks between US President Ford and Soviet General Secretary Brezhnev, sought to limit strategic nuclear delivery vehicles, including heavy bombers, at an aggregate ceiling of 2250; limit MIRVed systems at 1320[30]; continue the ban of new land-based ICBMs; limit the development of new strategic offensive arms; and to incorporate the SALT I articles of verification. Although both sides adhered to the broad guidelines of SALT II, President Carter withdrew consideration of the treaty from the United States Senate in response to the Soviet invasion of Afghanistan. With the end of the SALT talks, nuclear weapons negotiations entered yet another phase, that of real reductions in nuclear forces.

Reduction

During the American presidential race of 1980, candidate Ronald Reagan severely criticized the content of SALT II as "fatally flawed" and a threat to US ICBM capability.[31] Nonetheless, Reagan adhered to the terms of the non-ratified agreement upon taking office while at the same time initiating a disarmament process that attended not just to simple limitation of weapons, but also sought to create true reductions in the nuclear strategic forces of both sides.[32] As an indicator of this reduction regime, the Intermediate-Range Nuclear Forces (INF) Treaty of December 1987 abolished an entire class of nuclear weapons, those with a range of between 500 and 5500 kilometres. All of these weapons were destroyed by June 1991. After the disintegration of the Warsaw Pact and the unification of Germany, first the United States then the Soviet Union (later Russia) unilaterally eliminated their short-range tactical nuclear weapons, the second time a class of nuclear weapons was destroyed.

On the strategic weapons front, negotiations continued for the better part of a decade on the START I agreement. START I was signed in January 1991, leaving each side with roughly 6000 warheads and 1600 launchers.[33] START II, which included further cuts in strategic offensive warheads to around 3000-3500 each, was signed in January 1993. START II sought to close the potential loopholes contained in START I, including warhead calculation, verification procedures, and the total elimination of MIRVed ICBMs.

Whereas the START agreements are laudable in that they create a framework for actually reducing the overall number of warheads allowed for each side, they cannot be considered irreversible.[34] This is because the main effect of the agreements is to move strategic weapons from deployed positions to storage, or reserve status. Although there is a shared view that the START agreements are part of a larger process that includes weapons destruction, the agreements do not actually contain conditions for the destruction of the missiles themselves, or the disposition of the nuclear material contained in their warheads. That stated, some dismantling of warheads and their delivery systems has taken place. For instance, the republics of Belarus, Kazakhstan and Ukraine agreed to send their nuclear weapons to Russia on the condition they be dismantled. Furthermore, a US Department of Energy led initiative to begin a joint program to dismantle weapons began in a limited manner in 1994. And the US

Congressional Cooperative Threat Reduction (CTR) program included a bilateral plan to dismantle weapons that fell under the START initiative.

However, there are no limits or conditions regarding military fissile material either contained in these (or remaining) weapons or those currently held in reserve. Furthermore, there are no agreements regarding stockpile limits for either weapons or nuclear material, and no exchange of information or data on weapons that are stored. Part of the reason here has to do with the persistent security concern in Russia regarding the inclusion of American personnel in verification exercises. American inspectors have been permitted to witness, supervise or verify Russian reduction processes in only a limited manner. This has resulted in some serious concerns about just what material is being stockpiled, and in what manner.

These concerns, which are not dealt with in the START accords, are related to the broader issue of materials control in Russia. Indeed, part of the immediacy surrounding fissile material conversion and the safety of nuclear material in the former Soviet Union is related to the threat of smuggling. Market economy reforms in Russia have not left the nuclear industry untouched. Extremely high and protracted levels of inflation and the demise of state authority resulted in wage suppressions of up to 70 percent among nuclear scientists, engineers, and plant managers.[35] Moreover, even Russia's new nuclear regulatory agency Gosatomnadzor (GAN) admitted that it was unable to track its own inventories. GAN director Yuri Vishevsky stated that GAN "would like to bring some order to the area of stockpile accountability, [but] there are too many possessors of nuclear material," leaving a full inventory practically impossible.[36]

The apparent inability of the Russian Federation to control its own nuclear stockpiles resulted in numerous reports of black market sales of strategic materials. In the summer of 1994, several accounts of nuclear material smuggling[37] illustrated the urgency surrounding institutionalizing safeguards for post-Soviet nuclear material. In response, the Russian Interior Ministry created a smuggling incident "registry" in 1995.[38] It found that most incidents involved workers in the nuclear industry, not organized crime. The Russian Foreign Intelligence Service suggested that no amounts of "usable" weapons material had been lost. However, contradictory accounts of organized crime involvement and Russian weapons-grade material seized in Germany leave questions about the Russians' ability to account for their material.[39] GAN's admission about the amount of material and its whereabouts highlights this uncertainty.

Nuclear materials smuggling is neither the main concern regarding the need to extend the restraint regime, nor is it a sidebar. Instead, it is an indicator of a problem. There is reason to be relatively confident that since large-scale black market sales have not occurred, there is therefore no current smuggling proliferation dilemma. However, the contradictory Russian accounts, and the dearth of materials safeguards, verification, and control illustrate the potential for real security threats. In addition, the issues and fears surrounding nuclear smuggling bring to light the weaknesses of the START agreements.

In sum, the achievements of the Cold War arms control and arms reduction process have been a necessary, albeit incremental, precursor for the broader goal of total disarmament. Dealing with fissile material controls during the Cold War was wrapped up in the strategic relationship of East-West relations; hence the relative lack of success regarding preceding fissile material control initiatives. The end of the Cold War, however, presents a unique opportunity to attend to the matter regarding nuclear restraint: elimination of strategically functional materials.

EXTENDING NUCLEAR RESTRAINT: MOVING TO AN ELIMINATION REGIME

Collaborative efforts (particularly those of the US and Russia) to reduce the threat of nuclear materials diversion are indicative of the next logical dimension of the nuclear restraint regime, referred to here as "nuclear materials elimination." These developments in international security regimes, and particularly those relating to materials non-proliferation, are couched in burgeoning cooperative relations between the US and Russia that have precipitated and established a broader multilateral relationship for disarmament and non-proliferation.

The START agreements are essential for bilateral weapons reduction. Moreover, they constitute, along with the INF agreement and European tactical weapons reductions, a logical progression in the advancement of nuclear restraint in the United States and Russia. But their drawback lies in what they do not cover the "multiplier effect" of associated nuclear issues. Verification, monitoring, stockpiling, in addition to conditions covering possible redeployment, maintenance and the future of the former superpowers' remaining arsenals are beyond the scope of the START agreements, as drafted and signed by the two countries.[40] However, instituting the START reduction regime mandates the next order of business: attending to related issues of nuclear materials security. This is part of the evolution of nuclear restraint, as each level introduces new and deeper disarmament and non-proliferation initiatives. Of these related issues, the future of the HEU and plutonium contained in the warheads is crucial, given their central role in weapons manufacturing.

Therefore, a fissile material "elimination" regime is something of a watershed in global non-proliferation, in a sense coming full circle in our consideration of the fissile materials issue. Eisenhower's forewarning that the spread of nuclear weapons material (and by direct association fissile material and related technology) be checked was followed by its incorporation into more limited, yet and progressive arms control initiatives of the 1960s, 1970s and 1980s. Returning to the fissile material question is crucial because dealing with fissile material (with the eventual goal of eliminating the material) is in effect the culmination of the entire nuclear restraint regime. That is, eliminating the material contributes to the overall goal of eliminating the proliferation problem (although the matter of civilian material diversion remains), as well as the associated concerns about nuclear trafficking. Though the call to abolish strategic nuclear materials, or at least to impose a more rigid form of controls, has been made by non-superpowers, implementing the elimination regime required a US-Russian initiative.

There have been some agreements between the two sides covering military material, but they are largely interim arrangements.[41] On the plutonium front, the 1994 Gore-Chernomyrdin agreement covers safeguards for reactor-produced plutonium and a long-term storage facility for weapons plutonium. On the American side, the US Department of Energy has agreed to give up its "excess" military HEU and plutonium for IAEA supervision as a demonstration of voluntary action on fissile material.[42] The problem here is that these agreements either do not eliminate the military fissile material, or they allow for large remaining military stockpiles.[43] Aside from continued stockpiling and limited verification exercises, little has been accomplished in the way of eliminating the strategic threat of plutonium. And given its toxic and volatile nature, there are few safe alternative uses for military plutonium.[44]

As a central component of nuclear weapons programs, fissile material is something of a thread that winds its way through a series of multilateral initiatives. It has maintained an important connection with the process of negotiations aimed at controlling or reducing nuclear weapons, working toward the eventual goal of complete nuclear disarmament. At the core here has been the issue of how to eliminate nuclear weapons, and in particular the manner in which that goal might be achieved. Arms controls efforts have been unable to deal with the problem comprehensively, and instead moved to a more incremental or more fragmented process. Elements of this alternate process included:

- Freezing the status quo, through the implementation of the Nuclear Non-Proliferation Treaty (NPT);
- Dealing with the matter based on environmental concerns, such as the Limited Test Ban Treaty (1963), the Outer Space and Antarctic Treaties (1959);
- Seeking weapons limitations and reductions agreements (SALT, INF, START); and
- Establishing regimes to deal with essential components of weapons programs, such as the Missile Technology Control Regime, the Chemical Weapons Convention, or the Biological Weapons Convention.

Eliminating fissile material constitutes a unique dimension in the process of arms control in that it represents on one level a form of arms control, since limits on production or stocks of fissile material would control a degree of new weapons development.[45] Yet on another level, controls over fissile material also include material either slated for weapons use or material extracted from dismantled weapons. Cultivating stable global nuclear relations, then, depends upon the expansion of nuclear restraint. As part of the general arms control process, nuclear weapons agreements are a confidence-building measure while serving to decrease the global threat of nuclear proliferation. In basic terms, the significance of the materials elimination regime may be outlined in the following manner:

- Arms control, particularly in the nuclear arena, is essential for the continuance of bilateral relations;
- Fissile material control is essential for arms control;
- As a form of arms control, fissile material elimination is also disarmament.

In sum, material controls contribute to better relations among the nuclear powers in two ways. First, the new regime seeks to ban new production, and ultimately eradicate existing stockpiles, or at least render them strategically useless. Second, the regime institutes the next stage of nuclear restraint among the nuclear powers by targeting the material used in the construction of warheads. This, then, clearly represents a strategic opportunity in the post-Cold War era to push the envelope of existing nuclear agreements.

Some developments in the field of fissile material controls also should be noted. As a result of American concerns that a bilateral Russo-Iranian agreement to build a nuclear power plant at the Bushehr site in Iran could lead to a weapons acquisition program, the United States Department of Energy was invited to participate in a joint monitoring and verification of the program.[46] In addition, the United States has been allowed verification and inspection access to the Russian Lytkarino nuclear site, previously an "unreported" site with reserves of HEU and separated weapons plutonium, and off-limits to the West; permission was given after US Energy Secretary Frederico Pena asked for access.[47] Bilateral meetings in September 1997 between US Vice-President Al Gore and Russian Prime Minister Viktor Chernomyrdin included agreements to further de-enrich HEU to LEU in the Krasnoyarsk-26 and Tomsk-7 plants, and to declare a plutonium excess at 40 tonnes.[48] And on the HEU deal front, shipments originally scheduled to be made in April 1997, but detained because of disagreements covering the feed component required for the dilution process, took place in late summer. As well, the original highly enriched uranium purchase plan involving the American government has led to subsequent deals with the international uranium dealers Cogema, Cameco, and Nukem to buy material extracted from Russian weapons.[49]

The thrust of an elimination regime would not be to simply eradicate fissile material, or the technology used in its generation. Indeed, in this case it is impossible to "put the genie back in the bottle." Rather, the elimination regime here refers to broad political, technical, and diplomatic measures employed with the overall goal of removing or converting fissile material for explosive purposes, and to initiate a process of confidence-building that would contribute to materials security. At the outset of such a new era, however, it is impossible to suggest one option for explosive fissile material disposition; in fact, there are several options, with their respective advantages and disadvantages. Safeguards and verifiable storage represents the most basic option for fissile material management, placing material under verification by either an international body such as the International Atomic Energy Agency (IAEA), or a state body with external substantiation. Though cost-effective and relatively easy to implement, safeguarded storage removes the material from an operational capacity, but does not render the material incapable of use for future explosives. Vitrification - encasing material in glass logs that are subsequently buried - provides a more expensive yet permanent extension of this option. Perhaps the most effective current option is that presented in the United States-Russia Highly Enriched Uranium Purchase Agreement (detailed elsewhere in this article). Under this scenario, bomb-grade material is de-enriched to a level usable in nuclear reactors, but not in explosive devices. This material would then be as sensitive as other reactor fuel, but would also have a new use: power generation.

In brief, the culmination of the nuclear non-proliferation process is not necessarily "complete" with the new elimination regime; that is, eliminating material slated for use, or currently deployed, in nuclear weapons will not "abolish" nuclear weaponry, or nuclear weapons technology. However, the new regime is integral for our understanding of nuclear non-proliferation, arms control, and disarmament because it is evidence of changes and developments in strategic relations among principal states particularly the United States and Russia. Furthermore, this new regime is made clearer when placed in the context of existing and previous eras of nuclear restraint (see Table 1.).

CONCLUSION

Regime analysis has been bandied about in international relations literature for some time. The purpose of this article has been to situate the extension of nuclear restraint within the regime literature, and as a definitional overview, to shed some light on the utility of the materials elimination process. There are a number of conclusions to be reached here. First, the process is highly normative; attitudes and beliefs about the "taboo" of nuclear weapons and materials in the post-Cold War era are buffeted by the anxieties surrounding the possibility of nuclear materials diversion. Second, the rules associated with some of the emerging nuclear materials agreements are couched in the language and diplomacy of the previous nuclear restraints eras. Third, the preliminary accords pertaining to nuclear materials and nuclear fuel provide the basis for institutional and deliberative fora for future and perhaps deeper measures. Finally, regime analysis lends itself well to the extension of nuclear restraint because, notwithstanding a firm history of strategic assurances in the nuclear field, the materials concern has indeed become an important "issue-area" with the close of the Cold War.

Regime terminology is particularly prescient for nuclear restraint because events and revolutionary change at the systemic level have had serious effects for disarmament and non-proliferation as a process. It has been suggested here that the impetus of systemic events was necessary to move beyond the traditional restraint methodologies; the onset of consequent nuclear non-proliferation measures was unimaginable without a significant alteration to the Cold War relationship. In this light, the title of Krasner's early work - "Structural Causes and Regime Consequences" - is telling: international structural changes (the end of the Cold War) were in fact causal forces behind subsequent regime consequences in the area of nuclear restraint.

Krasner has argued that regimes emerge in international relations for a number of important reasons.[50] First, states seek regimes in order to maximize their own self-interest, or utility function. Second, there is a degree of political power that may be gained from the regime, either the pursuance of the common good, or through achieving individualistic interests. Third, norms and principles develop as a consequence of natural relations among states, and regimes represent a form of utilizing them in an institutional or regularized manner. Fourth, usage and custom lead to standardized forms of behavior and interaction. And finally, cooperation is facilitated through the generation of new knowledge, "transcending 'prevailing lines of cleavage'" and "providing common ground" for participants. The benefits for collaborative endeavors in the arena of nuclear restraint,

it has been argued here, are vital for the activities and wishes of the United States and Russia, as well as the international community. Indeed, as "intervening variables," regimes represent a normative device, and a tangible mechanism for reducing nuclear tension and distrust. Nuclear regimes mitigate the effects of an anarchical international system, reduce uncertainty in this most immediate and present threat to international security, and demonstrate their ability to stimulate collaborative activities in a succession of related and more intricate agreements.

For contemporary studies of foreign policy, the end of the Cold War was indeed a momentous turning point. It was, however, a process predicated on several related causes rather than a single defining event. But as a relatively peaceful process, it gained momentum as each part of the old order seemed to drop off in a manner that appeared revolutionary in light of the conditions of the Cold War era. Although the real reason behind the end of the Cold War is more of a combination of factors, the sudden end to that era simply was not predicted and any analysis of its causes is necessarily post-facto.

The consequences of inaction on nuclear materials elimination are potentially detrimental. Michael Mandelbaum has reminded us in a rather ominous piece that the most important "lesson" for international security in the post-Cold War era has not yet occurred. The lesson, he argues, is the actual use of a nuclear device manufactured from materials made available at the end of the Cold War.[51] Indeed, this would be a lesson for the entire global community, given the uncontainable and calamitous effects of a nuclear explosion.

Mandelbaum's argument, which is not merely apocalyptic, is part of a cautionary post-Cold War literature that suggests the end of the bipolar nuclear stalemate has actually created a more unstable environment.[52] The initial peaceful transition from the Cold War period ushered in a time of caution, if not apprehension, as the rocky transition to democracy and market reforms in Russia coupled with domestic political instability cast a pall over the buoyancy of the early post-Cold War years.[53]

The evolution of international arms control, despite the bumps along the road, provided the necessary groundwork for final stage of restricting nuclear use and development. In turn, this demonstrates a strategic link made between the Cold War arms control process and the post-Cold War attempts to preserve the conditions that emanated from this process. Arms control initiatives and assurances are essential for bilateral cooperation after the Cold War given their direct contribution to global peace and confidence building. Importantly, this depends on maintaining the achievements of the arms control period. If war avoidance was the core doctrine of the Cold War, then confidence preservation is the substance of the emerging era.

Endnotes

Earlier versions of this article were presented at the International Studies Association Annual Conference, Toronto, Ontario, 18-22 March 1997 and the International Security

Studies Section of the International Studies Assocation Conference in Norfolk, Virginia, 24-25 October 1997. It is part of a larger research project detailing development in post-Cold War East-West strategic relations. The author would like to note the comments of Celeste Wallander, Harvard University; David Haglund, Queen's University; Paul Buteux, University of Manitoba; and officials at the Department of Foreign Affairs and International Trade Canada, and the Canadian Atomic Energy Control Board.

1. The term "multilateral" is used here to denote the various levels of nuclear disarmament and non-proliferation initiatives that have been undertaken in the post-Cold War era (more detail follows). Although this article primarily emphasizes the bilateral US- Russian relationship, it is important to account for the multilateral dimension that at times complements (or is driven by) the superpower dynamic.

2. The essential parameters of the CTBT were adopted into a United Nations General Assembly resolution calling for a comprehensive ban on testing (First Committee Draft Resolution GA/DIS/3095). However, given India's lack of support, the viability of the resolution is in question.

3. See "Structural Causes and Regime Consequences: Regimes as Intervening Variables," *International Organization*, 36 (Spring 1982).

4. Ibid., p. 1.

5. In particular, see Susan Strange, "*Cave! Hic Dragones*: A Critique of Regime Analysis," *International Organization*, 36 (Spring 1982).

6. Jack Donnelly, "International Human Rights: A Regime Analysis," International Organization, 40 (Summer 1986), p. 599.

7. Ibid., p. 601.

8. Ernst Haas, "Words Can Hurt You; Or Who Said What About Regimes," *International Organization*, 36 (Spring 1982), p. 24.

9. Stephen Krasner, "Regimes and the Limits of Realism: Regimes as Autonomous Variables," *International Organization*, 36 (Spring 1982), p. 358.

10. Haas, "Words Can Hurt You," p. 24.

11. Arthur Stein makes some important observations on the relationship between cooperative behavior and regimes in *Why Nations Cooperate* (Ithaca, NY: Cornell University Press, 1990), p. x.

12. Despite the fact that the USSR tested its first nuclear device in 1949, it did not have a delivery system capable of reaching the United States at that time, nor did it have a stockpile of weapons sufficient to wage a nuclear war.

13. Of the confirmed "Group of Five" nuclear powers, China has over 400 warheads, and Great Britain and France have 200 and 480, respectively. The unofficial nuclear capability of Israel stands at approximately 200 warheads, and the nuclear programs of India and Pakistan are suspected to number about 50 and 15, respectively. Another suspected nuclear possessing state, North Korea, has perhaps 10-25 warheads. It is still unclear at the time of this writing whether International Atomic Energy Agency (IAEA) inspections in North Korea uncovered an established nuclear weapons program. North Korea agreed to the inspections in 1995 after security assurances, the promise of closer relations with the West, and access to nuclear power reactor technology were extended by the United States. There are other possible nuclear powers, including Iran and Libya, as well as several potential nuclear powers. Iraq's covert nuclear weapons program was halted following the Gulf War; IAEA inspectors believed that Iraq was only 18 to 24 months away from constructing a crude nuclear device at the close of the war. More advanced, deliverable weapons would have followed in about three to four years by about 1995. See Roger Molander and Peter Wilson, "On Dealing with the Prospect of Nuclear Chaos," *The Washington Quarterly*, 17 (Summer 1993); David A. Kay, "Denial and Deception Practices of WMD Proliferators: Iraq and Beyond," *The Washington Quarterly*, 18 (Winter 1995).

14. Lawrence Freedman, *The Evolution of Nuclear Strategy*, 2nd ed., (Houndmills, UK: Macmillan in association with the International Institute of Strategic Studies, 1989), p. 123.

15. Quoted in Freedman, *Evolution*, p. 124.

16. A more dangerous variant of traditional balance of power, the Cold War balance of terror meant that neither side could eliminate the other's nuclear forces because neither the United States nor the Soviet Union possessed a full first-strike capability. Paul Buteux has argued that "[d]eterrence in its contemporary usage is a product of the nuclear age," given the strategic centrality of nuclear weapons during the Cold War. See Glenn Snyder, "The Balance of Power and the Balance of Terror," in Paul Seabury, ed., *The Balance of Power* (San Francisco, CA: Chandler Publishing, 1965); Paul Buteux, "The Theory and Practice of Deterrence," in David Haglund and Michael Hawes, *World Politics: Power, Interdependence and Dependence* (Toronto: Harcourt, Brace, Jovanovich, 1990).

17. See Buteux, "Deterrence," pp. 96-97. For American strategic doctrine, nuclear strategy evolved from a period of unilateral monopoly, to a policy of massive retaliation, flexible response, mutual assured destruction, extended deterrence, countervailing tactics, and finally to weapons reduction and preventative diplomacy. The USSR also held a war-avoidance strategy during the Cold War; however, *sderzhivanie* (denying the enemy a victory) and *ustrashenie* (response with punishing retaliation) were the core of the Soviet's nuclear strategy.

18. Fifth century negotiations between Athens and Sparta regarding Athenian city wall fortifications represent one of the earliest recorded attempts to reach a politico-security

accord. Although it was not an arms control agreement per se, the talks were aimed at avoiding an Athenian strategic advantage and providing a security assurance to the Spartans. See Frederic Pearson, *The Global Spread of Arms: Political Economy of National Security* (Boulder, CO: Westview, 1994), pp. 73-74. Perhaps the first significant arms control treaty was the Rush-Bagot Treaty of 1817, reducing British and American naval forces on the Great Lakes. The inter-war period spawned a series of naval agreements among the United States, Japan, Italy, and the United Kingdom controlling the development of types of ships. More broadly, the Kellogg-Briand Pact of 1928 (the Pact of Paris) called for a renunciation of war. Regarding nuclear weapons, the ambitious post-World War II Baruch Plan sought to restrain nuclear weapons development through fissionable materials control.

19. It is recognized here that this final goal is not entirely achievable, given the continued security considerations of the nuclear powers and the impossibility to "de-invent" nuclear weapons technology. It should also be noted that this article does not equate *arms control* (which seeks to manage and regulate the use and development of arms) with *disarmament* (which is a more proactive procedure involving actual cutbacks). However, disarmament is part of a larger arms control process (since reducing capability by definition manages or controls capability) that contributes to confidence building among states in the international system. In this way, one may consider arms control as the broader rubric under which disarmament *as a process* may be categorized.

20. Jan Nijman has identified at least 150 bilateral US-Soviet treaties and agreements between 1946 and 1988 in *The Geopolitics of Power and Conflict* (London: Belhaven, 1993). Furthermore, between 1959 and 1993 there were at least 30 major multilateral arms control agreements. The primary bilateral agreements (those that represent stages or shifts in the regime) are examined here. Other US-Soviet agreements include the 1963 direct communications "Hot-Line" Agreement; the 1971 Nuclear Accidents Agreement; the 1972 High Seas Agreement; the Nuclear War Prevention Agreement of 1973; the 1987 creation of Crisis Reduction Centres; and the Testing Verifications Treaty of 1990. Other multilateral treaties included the 1959 Antarctic Treaty, prohibiting military activity in the Antarctic area; the similarly-based 1967 Outer Space Treaty and 1971 Seabed Treaty; the 1972 Biological Weapons Convention and 1981 Inhumane Weapons Convention; the 1990 Conventional Forces in Europe limits; and the confidence-building 1992 Open Skies Treaty. It is beyond the scope of this article to examine each agreement. However, the most significant agreements, examined here, reflect the state of relations between the two nations.

21. Arms Control Association (ACA) President Spurgeon M. Keeny, Jr. has argued that START II represented the "endgame" of nuclear restraint. See Keeny, "START II: The Endgame," *Arms Control Today* (December 1992). However, as discussed below, the limitations of START II lead to the conclusion that it was not a "permanent" solution, and therefore not the "endgame." As significant as the elimination regime is for nuclear security, it must be seen as an outcome of the precedent set by the limitation and reduction regimes. Without these developments, elimination could not occur.

22. Under the HEU agreement, the United States agreed to buy 500 metric tonnes of enriched uranium extracted from Russian warheads to be destroyed under the START agreements, representing a clear example of converting military goods to civilian use. Russia pledged to use the proceeds from these sales (estimated at US $11.9 billion over the full term) to convert defence enterprises, increase safety in nuclear power stations, clean up polluted areas, and construct uranium conversion facilities. See Julian Steyn and Thomas Meade, "Potential Impact of Arms Reduction on LWR Fuel Cycle," conference paper given at the US Council for Energy Awareness, "Fuel Cycle'92 Conference," Charleston, SC (22-25 March 1992, p. 6; Programme for Promoting Nuclear Non-Proliferation, (PPNN) 21 (1st Quarter 1993), p. 6. The fissile material "cutoff" issue is complicated by the fact that existing inventories and current and future production are considered by many (including significant possessing and threshold states) to be separate matters, and therefore must be examined in isolation if the final goal of global nuclear disarmament is to be obtained. This is no small matter, given the range of fissile material development stockpiles and production in nuclear weapons states (NWS) and threshold, or undeclared nuclear weapons states (UNWS).

23. The materials most commonly used in the production of nuclear weapons include a) uranium with a fissile isotopic composition of greater than 90 weight percent (w/o) U-235, and b) plutonium Pu-239; however, it now appears too restrictive to limit analyses of stockpiled material to these compositions. Weapons may be constructed using other uranium isotopes such as U-233 and U-238, and some possessing states (notably the United States) have the technology to construct explosive devices using civilian reactor grade plutonium. Low enriched uranium (LEU less than 20 w/o U-235) may be enriched (or re-enriched) to bomb-grade levels, and fully one-quarter of the enrichment work is already achieved by creating LEU.

24. Vertical proliferation refers to growth in the number of nuclear warheads within nuclear weapon states (proliferation of warheads); horizontal proliferation refers to the growth in number of new nuclear possessing states (proliferation of possessors).

25. Others have suggested a middle-ground approach. Jozef Goldblat and David Cox, for example, proposed a Very Low Threshold Test Ban (VLTTB) of not more than 5 kilotonnes as a "meaningful alternative" to the CTBT. The LTBT spurred the 1974 Threshold Test Ban Treaty between the US and USSR limiting underground tests, as well as the 1976 Peaceful Nuclear Explosions Treaty (PNET also between the US and USSR) regulating nuclear explosions outside regular weapons tests. Goldblat and Cox, eds., *Nuclear Weapon Tests: Prohibition or Limitation?* (Stockholm: SIPRI in association with Oxford University Press, 1991).

26. The NPT grew out of a 1961 United Nations General Assembly resolution to pursue a treaty governing the acquisition and proliferation of nuclear arms. The 1968 Treaty also required possessing states to allow the International Atomic Energy Agency, created in 1957, to monitor their nuclear programs. The NPT allowed for continuing developments of civilian nuclear power programs.

27. The NPT Extension Review Conference adopted a set of Principles and Objectives for Nuclear Non-Proliferation and Disarmament, but was not able to adopt a Final Declaration. The Principles and Objectives included decisions regarding non-proliferation, nuclear disarmament, nuclear weapons-free zones, security assurances, safeguards, peaceful uses of nuclear energy, and increased resources for the IAEA. See Berhanykun Andemicael, Merle Opelz, and Jan Priest, "Measure for Measure: The NPT and the Road Ahead," *IAEA Bulletin*, 37 (September 1995), p. 33. Continued weapons testing by China undermines the potential for the CTBT. China recently urged a longer phase-in period for the CTBT during negotiations in Geneva. China wants the longer period in order to catch up to US and Russian technology. The United States has offered to abide by the conditions of a CTBT, but threatens to re-start testing if the other major powers do not adhere to it. Former US Arms Control and Disarmament Agency Director Gerald Smith argues that "it is difficult to conceive of any single measure that would do more to stem the spread of the nuclear scourge than a comprehensive ban on nuclear testing. See Smith, "End Testing, Stem the Bomb's Spread," *Arms Control Today*, (November 1990), p. 9.

28. This was important to both sides because MIRVed (multiple independently targeted re-entry vehicle) weapons allowed for exponential increases in warheads-per-missile.

29. The ABM treaty underwent a debate of reinterpretation under Ronald Reagan in the mid-1980s with the announcement of the Strategic Defense Initiative (SDI, or "Star Wars"). SDI appeared to abrogate a "narrow" interpretation (permitting only ABM research) of the ABM treaty. But the Reagan administration argued that a "broad" interpretation (allowing testing) or even a "broader than broad" (granting actual deployment) allowed for space-based anti-ballistic missile technology. The Soviets contested the American interpretation, arguing that Article V of the ABM treaty clearly stated that parties were "not to develop, test, or deploy ABM systems or components which are sea-based, air-based, space-based, or mobile land-based."

30. This number still allowed both sides to increase their MIRV capability by about 40 percent from the initial signing of the treaty.

31. David Cox has argued that the Reagan administration was interested in a reduction treaty in order to reduce the potential threat of Soviet SS-18s on US ICBM forces. See Cox, "Arms Control," in Haglund and Hawes, *World Politics*, p. 113.

32. The fact that the US and the Soviet Union adhered to the conditions of SALT II despite not ratifying it suggests that both sides considered it central to their security interests, and that an official ratification was put off for political reasons. See Coit D. Blacker and Gloria Duffy, eds., *International Arms Control: Issues and Agreements*, 2nd ed., (Stanford, CA: Stanford University Press, 1984).

33. These numbers were complicated by a counting system that allowed both sides to have more warheads than outlined in the cuts. The discrepancy between the "actual" and "accountable" number of warheads was addressed in the START II agreement, where

warhead numbers were counted against the overall limit. See "START II: New Thinking in an Era of Nuclear Cooperation," *Arms Control Today*, (December 1992), pp. 3-9. Ratification of START I by the Russian Federation was delayed due to its demand that Ukraine join the NPT regime as a non-possessing state. Part of the Trilateral Agreement in January 1994 required Ukraine to do so, in exchange for security assurances and remuneration in the form of reactor-grade fuel. Russia has since adhered to the START I guidelines.

34. Jonathan Dean, for example, argues the "final stage" cannot be achieved without attending to concerns regarding remaining weapons and the inclusion of other possessing nations. Dean, "The Final Stage of Nuclear Arms Control," *The Washington Quarterly*, 17 (Autumn 1994).

35. On the other hand, the Russian Strategic Rocket Forces in charge of deployed nuclear weapons have not suffered the same cutbacks. Unlike most other wings of the Russian military, the Forces maintain internal cohesion. The proliferation concern, then, is not as acute regarding deployed weapons. See International Institute for Strategic Studies, *Strategic Survey 1994-1995* (Oxford, UK: Oxford University Press, 1995), 18.

36. "Russia easy target for bomb thieves," *The Globe and Mail*, 19 August 1994.

37. Among these accounts were 300-350g Pu-239 in Munich, a similar amount of mixed-oxide (MOX) fuel with an unusually high content of plutonium, and a seizure of 10 kg LEU stolen from the Yekaterinburg plant in the Ural mountains. See "Plutonium seizure worries Germans," *Globe and Mail*, 15 August 1994; William Broad, "Plutonium smuggling global 'wake-up call," *Globe and Mail*, 18 August 1994; "Germans link Russian to plutonium smuggling," *Globe and Mail*, 16 August 1994; "Russia catches uranium thieves," *Globe and Mail*, 25 August 1994; *NuclearFuel*, 19 (29 August 1994), p. 3; *Financial Times*, 25 August 1994.

38. The Ministry reported 27 verifiable incidents in 1993, 16 in 1994, and none in 1995. *Post- Soviet Nuclear Defense and Monitor*, 31 October 1995, p. 12.

39. Programme for Promoting Nuclear Non-Proliferation, *Newsbrief*, 32 (4th Quarter 1995), pp. 14-15.

40. The necessity of reductions among other major nuclear possessing states is also a concern here.

41. Efforts to implement a fissile material ban have a long legacy, including the Quebec Agreement of 1943, the American Baruch Plan in 1946, US President Dwight Eisenhower's watershed "Atoms for Peace" speech before the United Nations General Assembly in 1953, and the creation of the International Atomic Energy Agency (IAEA), still the foremost organization in the global nuclear materials non-proliferation and regulatory regime. In 1954 Indian Prime Minister Jarwahal Nehru called for a global ban on fissile material production. As well, from 1956 to 1969 the call for a fissile material

cutoff accompanied most of the American efforts at arms control. The USSR also made proposals regarding a production cutoff in 1989 and 1990. Material controls also maintained a decidedly multilateral dimension, as the United Nations General Assembly (UNGA) continually passed resolutions calling for a freeze on nuclear weapons production throughout the 1980s. US President Clinton's first address before the UNGA in September 1993 included a call for a global production ban on fissionable materials for nuclear weapons, and precipitated a UNGA consensus resolution for a production ban on such materials (UNGA Resolution 48/75L).

42. The United States has not released a final figure of how much material it would hand over to international supervisors, nor has it stated how much would be retained for future strategic reserves. See Dean, "The Final Stage." It did announce in March 1995 that it would remove 200 tonnes of fissile material from its stockpile to be released to the IAEA. United States, White House, Office of the Press Secretary, "Briefing on Presidential Foreign Policy Speech," 1 March 1995.

43. The United States and Russia still possess roughly 220 tonnes and 200 tonnes of plutonium in either weapons-grade or spent fuel form. The United States has about 550 tonnes HEU, and Russia has 1250 tonnes HEU. David Albright, Frans Berkhout, and William Walker, *World Inventory of Plutonium and Highly Enriched Uranium 1992* (Oxford, UK: Oxford University Press in association with SIPRI, 1993). [The SIPRI study contains a much more conservative figure for Russian HEU, at 720 tonnes. Russia's Ministry of Atomic Energy, MINATOM, claims the higher amount is correct.]

44. Although mixed oxide fuel (MOX) is often touted as an alternate use for plutonium, it does not have wide appeal with uranium prices remaining low and the related security threat inherent in re-using plutonium. Aside from limited Japanese and German MOX research, there has been little acceptance of the idea. The recent stalling of construction at the Hanau MOX plant in Germany illustrates the reluctance of the nuclear industry to use MOX.

45. There is also a disarmament dimension here as some fissile material initiatives, such as the US-Russia HEU agreement, involve material extracted from dismantled weapons.

46. *International Herald Tribune*, 22 September 1997.

47. *Nucleonics Week*, 14 August 1997, p. 5.

48. *Nuclear Fuel*, 11 August 1997, p. 3.

49. *Energy Daily*, 18 August 1997.

50. Krasner, "Structural Causes," pp. 10-19.

51. Michael Mandelbaum, "Lessons of the Next Nuclear War," *Foreign Affairs*, 74 (March-April 1995), pp. 22-37.

52. See, for example, Brad Roberts, "From Nonproliferation to Antiproliferation," *International Security*, 18 (Summer 1993), pp. 139-73. Roberts argues that the "old way" of thinking about proliferation is not sophisticated enough to meet the demands of a changing and more volatile international environment that includes non-nuclear proliferation, non-superpower proliferators (unchecked by the division of spheres of influence), and a markedly different international system. The *Strategic Survey*, published by the International Institute for Strategic Studies, has made continued reference to the expanding issues of concern caused by the end of the Cold War (see, in particular *Strategic Survey 1994-95*, Oxford, UK: Oxford University Press, 1995). An admittedly incomprehensive survey would also include Lewis Dunn, "Containing Nuclear Proliferation," *Adelphi Papers*, 263 (Winter 1991), and "Rethinking the Nuclear Equation: The United States and the New Nuclear Powers," *The Washington Quarterly*, 17 (Winter 1994); Jack Spence, "Entering the Future Backwards: Some Reflections on the Current International Scene," *Review of International Studies*, 20 (1994); John Mearsheimer, "Back to the Future: Instability in Europe After the Cold War," *International Security*, 15 (Summer 1990), and "Why We Will Soon Miss the Cold War," *Atlantic Monthly*, (August 1990); Allen Lynch, *The Cold War is Over - Again*, (Boulder, CO: Westview, 1992); Brad Roberts, "Arms Control and the End of the Cold War," *The Washington Quarterly*, 15 (Autumn 1992), and "1995, and the End of the Post-Cold War Era," *The Washington Quarterly*, 18 (Winter 1995).

53. It also created some serious challenges to the tenuous relationship forged with Moscow, such as the aforementioned Communist victory in the Duma elections.