

SMUGGLING OF NUCLEAR MATERIALS IN THE FORMER SOVIET UNION

Eski Sovyetler Birliğinde Nükleer Madde Kaçakçılığı

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Özet

Sovyetler Birliği'nin yıkılması ve Doğu-Batı ilişkilerindeki ideolojik bölünmenin sonucu olarak küresel nükleer gelişmelerde yaşanan büyük değişimler, nükleer proliferasyonu uluslararası güvenlik konularının merkezine taşımıştır. Geçmişte Sovyetler Birliği, hâlihazırda Rusya'da var olan nükleer madde potansiyeli, nükleer proliferasyon, yayılma ve nükleer madde kaçakçılığı açılarından en tehlikeli sorunlardan biri olarak kabul edilmektedir. Nükleer çoğalmayı önleme rejimi açısından dikey proliferasyon, önemli bir sorundur; çünkü bu durum geçmiş Sovyetler Birliği'nde beklenmedik politika sonuçlarının ortaya çıkmasına neden olmuştur: Sovyetler Birliği'nin yıkılmasından sonra yeni kurulan ülkelere nükleer maddenin yatay yayılması ve bölgesel ve küresel nükleer madde kaçakçılığına zemin hazırlayan risklerin ortaya çıkması. Bu çalışma beklenmedik politika sonuçlarını iki bölüm altında analiz etmektedir: birinci bölüm 'nükleer çoğalmayı önleme rejimi' ve 'devlet dışı aktörler' ile ilgili literatür taraması; ikinci bölüm ise Sovyetler Birliği'nin yıkılmasından sonra meydana gelen kaçakçılık olayları ve bunun Türkiye'ye de yansımaları.

Anahtar Kelimeler: Nükleer kaçakçılık, Dikey proliferasyon, Devlet dışı aktörler, Organize suç.

Abstract

The dramatic change in global nuclear developments produced by the demise of the ideological divide in West-East relationships and the break-up of the Soviet Union has put nuclear proliferation issues at the core of international security

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policies. The threat created by the nuclear arsenal in the former Soviet Union, currently in Russia, is considered to be one of the most dangerous issues in terms of dissemination, proliferation, and illicit trafficking of nuclear materials. The vertical proliferation still has been the major concern in terms of non-proliferation regime because it caused to emerge of several unintended policy consequences in the former Soviet Union: the horizontal proliferation in newly established states and the risks to smuggle these materials globally and regionally. This study examines both policy consequences in two sections: first section encapsulates the literature review explaining conceptual components which are “non-proliferation regime” and ‘non-state actors, and the second section analyzes nuclear smuggling cases registered after the collapse of the former Soviet Union and their reflection to Turkey.

Key Words: Nuclear smuggling, Vertical proliferation, Non-state actors, Organized crime.

Introduction

Since the end of the Cold War, a new nuclear weapons black market has sprung up in Russia, Ukraine, and Kazakhstan. The growing black market has grown at an alarming rate (US Congress, 2006). Nuclear states and non-nuclear powers worry about the possible consequences of this growing black market. Violent non-state actors like organized crime groups or terrorist organizations have the opportunity of becoming nuclear powers (Nuclear Weapons and the Environment, 2009). Preventing the illicit proliferation of nuclear materials has become one of the most important national security policy issues (Marli and Lodgaard, 2007).

Before the end of the Cold War, only five states were recognized as nuclear powers. The end of the Cold War resulted in the creation of three more nuclear states - Ukraine, Belarus, and Kazakhstan- which were ill-prepared to protect weapons-grade material from potential smugglers as a result of horizontal proliferation (Nuclear Weapons and the Environment, 2009).

The vertical proliferation in the former Soviet Union led to the emergence of two unintended policy consequences: After the demise of the former Soviet Union, horizontal proliferation emerged in newly established states (NIS) such as Ukraine, Kazakhstan and Belarus because these territories possessed nuclear facilities of this country. Also,

vertical proliferation generated in Russia (US Department of State, 1997). As a result, not only neighborhood countries of the former Soviet Union have been jeopardized from nuclear smuggling but also violent non-state actors have smuggled these substances, which possibly could be used by terrorist organizations.

It is believed that this study contributes to literature about nuclear materials because there are few studies that analyze the unintended policy consequences of vertical proliferation in terms of horizontal proliferation and illicit trafficking of nuclear materials. The benefits are to shed light on the nuclear smuggling cases because similar consequences can be produced in the future from the countries that have vertical proliferation.

1. Nuclear Proliferation

The nuclear proliferation is a danger to international security and stability (Scheinder, 1994). It involves the spread of nuclear weapons, fissile material, and weapons-applicable nuclear technology and information, to nations which are not recognized as "nuclear weapon States". It has been opposed by many nations with and without nuclear weapons because of the fear that more countries with nuclear weapons may increase the possibility of nuclear warfare, de-stabilize international or regional relations, or jeopardize the national sovereignty of states (Krieger and Ong, 2004).

The build-up of nuclear armaments by the largest states, whose desire is to increase the number of non-nuclear countries, has remained closely interconnected phenomena. Therefore, any nuclear arms race is often described as nuclear proliferation (Arbatov, 2004). There are two types of proliferation: Horizontal proliferation refers to nuclear weapons states transferring nuclear weapons, technology or materials to nuclear or non-nuclear entities. Vertical proliferation refers to nuclear weapons states researching and developing new types of nuclear weapons, technology, materials and means of warhead delivery (Krieger and Ong, 2004).

1.1. Nonproliferation Regime

The awareness of the international community with regard to the proliferation of nuclear materials has increased after the Hiroshima bombing. So far policies to curb nuclear proliferation, despite the existing issues, have been considered to be successful (Soloski, 1995). After the Hiroshima bombing, the splitting of the atom and its consequent problems has been a major concern (The Campaign for International Cooperation and Disarmament, 2010).

According to Sokolski (1995), there were five different initiatives to curb the spread of strategic weapons technology. The first nonproliferation attempt was the Baruch Plan which aimed the establishment of international ownership of all dangerous strategic nuclear activities and materials. The second one was “The Atoms for Peace Program”, which shared developed nuclear technology with other nations in order to secure effective safeguards over this technology. The third one was the “Nuclear Nonproliferation Treaty”, which has tried to control non weapon states not to acquire strategic weapons. The NPT more adequately addresses horizontal proliferation than it does vertical proliferation. The fourth effort was the “Missile Technology Control Regime (MTCR)”, the “Australia Group”, which has tried to deny weapons of mass destruction technologies to proliferators. The last effort was the “Counterproliferation Initiative” which was launched to neutralize proliferation (Soloski, 1995).

Among these efforts, the NPT is considered to be the most effective one because it has been the cornerstone of the nonproliferation movement for the last decades (Drell, 2007). Currently, almost all nations have signed on as parties to the treaty, and efforts have been constantly continued to convince other states that have not signed the treaty yet.

Sixty-two states were original signatories to the NPT in 1968. Among these nations, the United States, the Soviet Union and the United Kingdom possessed nuclear weapons at the time. China and France, also nuclear powers of the late 1960s, refused to join the NPT, but they signed it in 1992 as nuclear weapon states. Despite the fact that these nations have expressed their opposition to the further proliferation of nuclear weapons, they have decided to maintain indifferent from the constraints of the NPT (Scheinman, 1990:53).

The United States delayed its ratification of the NPT until 1970, owing largely to Senate concerns over the Soviet invasion of Czechoslovakia in August 1968. Upon the request of President Nixon, nonetheless, the Senate ratified the Treaty in 1970. This delay proves one of the first instances where Superpower politics played a role in the life of the NPT (Kapur, 1990).

The party states have pledged to either abstain from developing nuclear weapons or to work to contain their spread. The Treaty's eleven articles are summarized below:

Article I: This article is related to the prevention of the horizontal proliferation. It compels states which have nuclear weapons not to transfer or sell them to states. It also commits the nuclear weapons states (NWS) not to assist the non-nuclear weapon states (NNWS) in the manufacture of a nuclear device.

Article II: The second article of the NPT commits NNWS not to obtain a nuclear weapon through indigenous development or purchase from another state.

Article III: This article requires parties to the treaty to accept safeguards over their native nuclear activities. The International Atomic Energy Agency (IAEA) was established as the legitimate guarantor of nuclear materials. This article of the NPT also covers the smuggling of nuclear materials because smuggling cases have occurred in states that fail to safeguard the nuclear potential. For example, the NIS and Russia are the central areas for nuclear materials trafficking due to fact that these countries do not adequately safeguard the nuclear potential (Johnson, 2007).

Article IV: This article, one of the most controversial parts in terms of its implementation, declares that the development of peaceful uses of nuclear energy is highly worth having. It compels states to cooperate with one another in the advancement of peaceful nuclear applications. The dilemma created by the language of this article is that setting apart what is 'peaceful' from what is not extremely problematic. Exporters of nuclear technology have tended to lean toward the side of safety and been very conservative in their dealings with other countries (Marli and Lodgaard, 2007:110).

Article V: This article, which has lost its validity due to the environmental impact of nuclear explosions, allows for peaceful nuclear explosions by the weapons and for their scientific benefits.

Article VI: This article has drawn a great deal of attention. Under its terms, the superpowers are obligated to pursue “effective measures relating to cessation of the nuclear arms race at an early date and nuclear disarmament...”. Many of the NNWS believe that the United States and the Soviet Union have failed to live up to this commitment (United States Congress, 2002).

Article VII: This article allows states to create nuclear free regions. For example, the treaty of Tlatleloco has been negotiated among several Latin American countries in an attempt to prevent nuclear weapons from being introduced into that region (Diehl and Leggold, 2003).

Article VIII: The process of amending the NPT is spelled out in this section. One controversial aspect of this article is that amendments take the unanimous concurrence of three nuclear weapon parties to be placed into force. Not surprisingly, no amendments have been passed in the history of the treaty. The difficulty of gaining the unanimity among the NWS remains a huge obstacle in the amendment process (Marli and Lodgaard, 2007:29).

Article IX: This article stipulates the procedural steps for nations that want to join the NPT.

Article X: This article establishes the right of a party state to withdraw from the treaty in case it believes that its national security is jeopardized by its membership. States that want to withdraw need to give three months notice. Article X also lays out the time frame by which a conference will be held to consider the treaty’s renewal.

Article XI: This final article gives the location where the treaty has been deposited.

1.2. Current Situation in the Nuclear Proliferation

The world is entering a fundamentally new stage in the proliferation of nuclear weapons. Following the end of the Cold War, the campaign against proliferation had several major achievements. Those years were marked by an unprecedented growth of the United Nations’ authority and

the role of its Security Council, as well as by a huge expansion of UN peacekeeping and humanitarian operations. In the early 1990s, about 40 new member countries joined the NPT. In 1995, the Treaty was extended for an indefinite time, and only five countries have remained outside it – India, Pakistan, Israel, Cuba and the Cook Islands. Seven countries gave up their military nuclear programs and the nuclear armaments they had previously possessed, while others had them removed by force (Brazil, Argentina, Ukraine, Belarus, Kazakhstan, South Africa, and Iraq) (Arbatov, 2004).

However, in the late 1990s, nuclear proliferation gained momentum after India and Pakistan made a series of nuclear tests in 1998. The tests incited serious fears over the military nuclear programs being conducted by North Korea, Iran and several other countries. Suspicions with regard to Iraq's nuclear program served as a pretext for the U.S. war against that country in 2003, although no nuclear weapons have been found in Iraq since the end of the military campaign. At the same time, North Korea declared its withdrawal from the NPT and its ability to quickly develop nuclear weapons. In Iran, facilities for enriching natural uranium were discovered which Tehran had been concealing from the International Atomic Energy Agency in violation of the NPT (Gupta, 2007:163).

On the other hand, Pakistan was engaged in an active secret trade in nuclear technologies and materials with Iran, Syria and North Korea. Furthermore, Libya was conducting a secret military nuclear program which it has now proposed to shut down in exchange for the termination of UN sanctions that have been imposed against it. Japan, South Korea, Taiwan, Syria, Egypt and several other countries keep a close watch on the conflicts involving North Korea and Iran and prefer to leave open the issue of their future nuclear status. International terrorist organizations display a keen interest in nuclear weapons and have already started blackmailing governments by spreading rumors that they have bought portable nuclear explosive devices (Gardner, 2005).

There are many reasons for the growing of proliferation process. The first one was the transfer of international conflicts to the regional level, and superpowers' decreased control over global developments and decreased involvement in regional affairs. This situation contributed to their interaction in various fields and enhanced the role of the United Nations, including the realm of nonproliferation. However, regional conflicts and the proliferation process went beyond their control when

frictions between the superpowers increased in this area of international politics and technical cooperation (Huntley vd., 2005).

The second reason was related to the effect of information revolution which caused broader access to nuclear power specialists, technologies and materials, formation of a nuclear black market, technical progress and the proliferation of dual-use technologies and materials (Karp, 2002:126).

The third reason was the special message which was used to deter other countries when states owned nuclear materials. Nuclear weapons are mostly viewed not as a weapon for use in war, but as an instrument of political pressure or deterrence. In this sense, the great powers consider nuclear weapons a very effective tool for ensuring their national security and interests. Naturally, under certain circumstances, non-nuclear countries may wish to obtain this kind of weapon as well. Nuclear deterrence always stimulates nuclear proliferation (Cimbala, 2001).

As different from the Cold War years, whereas public opinion in the U.S., Western Europe and Russia has overcome its fear of nuclear weapons and no longer worries about nuclear disarmament prospects, they are scared of possible involvement of violent non-state actors into nuclear proliferation (Lowther and Snow, 2007).

2. Non-State Actors

Non-State Actors, in international relations, are actors on the international level, which are not states. Terrorist organizations and criminal networks are regarded as non-state actors because they carry out their activities on international level.

The number of non-state actors not only has increased but also diversified depending upon the changes in globalization. Many of non-state actors have operated on the fringes of state control or under the supervisions of states that lack adequate nationally administered export control regimes (Reimann, 2006). The most known types of non-state actors are 'industrial entities', 'quasi-governmental organizations' and 'violent non-state actors'.

Among these the most threatening one in terms of nuclear proliferation is violent non-state actors composed of 'warlords and militias', 'terrorist groups', and 'transnational criminal organizations'.

Warlords are defined as actors that exercise de facto social and political control through military means in a distinct subnational geographic area. Terrorist organizations are those groups that seek to use the threat or the application of indiscriminate violence to achieve a political objective. Transnational criminal organizations operate within the violent non-state actor family, and are defined as criminal networks spanning a variety of countries engaged in illegal activities (Wagley, 2006). According to Shelley (2005), each of these actors interacts in different ways in the supply and demand side of the future WMD proliferation market. The illicit networks and criminal activities are particularly related to nuclear and radiological materials. Most nuclear smuggling incidents involve low-level radioactive materials suited for ideological devices.

The non-state nuclear proliferation market substructure includes at least four characteristics: (1) legitimate trade in dual-use items that can be used and diverted for nonconventional and nuclear weapons programs administered by states and non-state actors; (2) front companies and subsidiaries of quasi-governmental organizations in states such as Iran and Pakistan that are circumventing export controls on their indigenous nuclear programs, as well as state-run organizations that are either facilitating the selling, buying, or smuggling of WMD materials; (3) illicit smuggling networks in radioactive materials administered by states, transnational criminal organizations, and/or terrorist organizations in cases where proscribed WMD materials being transferred; and (4) servicing demand by these illicit networks from violent non-state actors that seek unconventional and conventional weapons that can be used for tactical, operational, and strategic effects (Russel, 2006).

In the last two decades, the IAEA documented 16 incidents of trafficking or other unauthorized uses of highly enriched uranium and plutonium (International Atomic Energy Agency, 2005). Only a few of these incidents involved significant quantities of weapons-grade nuclear material. There are many more cases of illicit trade in low-level nuclear and radiological materials. During the reporting period of 1993-2005, states reported 827 incidents of illicit trafficking in lower-level nuclear materials, much of which originated in Russia and the NIS. It is unclear who the customers are for these materials, and there are no indications to date in open sources that violent non-state actors are taking advantage of illicit nuclear smuggling networks to fabricate their own weapons (Russel, 2006).

Recent history suggests that violent non-state actors operate on both the demand and supply sides of the WMD proliferation market. While the overwhelming preference for today's terrorist groups is to buy existing WMD, there are disturbing trends that some carry intent on fabricating their own devices. To date, there is only one international terrorist group that successfully established a WMD infrastructure to weaponize chemical and biological agents. While the Japanese terrorist group Aum Shinrikyo spent millions in the 1990s establishing a transnational WMD production infrastructure, the group proved only partially successful in producing weaponizable chemical agents. The inherent difficulties in producing chemical, biological, and especially nuclear weapons suggest that violent non-state actors play a more important role on the demand side of the proliferation market substructure. This is true in today's environment in which Al Qaeda, for example, is rumored to have repeatedly attempted the purchase of nuclear warheads in Central Asia (Monterey Institute for International Studies, 2009).

Violent non-state actors, however, remain capable of operating on the supply side and some are still attempting to weaponize their own devices. Law enforcement and counterterrorist operations have disrupted several suspected plots by Al Qaeda-affiliated groups to use chemical and biological agents in: (1) Rome, in 2002, when authorities disrupted a plot to poison the water supply of the U.S. Embassy in Rome with cyanide; (2) London, in 2003, when the police raided what was thought to be a cell of Al Qaeda suspects intent on producing ricin poison; and (3) Amman, in 2004, when the Jordanian Intelligence Service seized six trucks wired with explosives and containing 20 tones of an unknown chemical reportedly intended to destroy the intelligence service's building, the prime Minister's office, and the U.S. Embassy (Monterey Institute for International Studies, 2009).

The ability of violent non-state actors and/or individuals to construct their own unconventional weapons cannot be dismissed. A cautionary tale is told from the still unsolved U.S. anthrax in 2001 in which a highly trained individual or group of individuals produced, weaponized, and delivered anthrax. In 2003, Texas investigators discovered a homemade sodium-cyanide bomb in the garage of William Karr, which was capable of killing inhabitants in an enclosed space the size of a small civic centre (Axtman, 2008).

The smuggling networks in Central Asia show that it is possible to move highly enriched uranium through illicit channels to meet customer demand around the world. These phenomena illustrate the many roles played by violent non-state actors in shaping the emergent proliferation market substructure (Russel, 2006).

3. Unintended Policy Consequences of the Vertical Proliferation

There exist two unintended policy consequences of the vertical proliferation in the Soviet Union. After the Soviet's break-up, the horizontal proliferation has emerged in newly established states such as Ukraine, Kazakhstan and Belarus. The second consequence is that insecure nuclear materials have smuggled from Russia and NIS to the Western Europe and the Middle East countries through neighborhood countries including Turkey.

3.1. Horizontal Proliferation in the Soviet Union

The interrelation between 'vertical' and 'horizontal' disarmament was legally sealed in Article VI of the Treaty, according to which the nuclear states undertook to "pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race... and to nuclear disarmament" (McFarland, 2000:147). Soon thereafter such negotiations began. After the conclusion of the NPT in 1968, the great powers made headway in their dialog on nuclear weapons (the ABM Treaty, SALT-1 and SALT-2, the Treaty on the Elimination of Intermediate-Range and Shorter-Range Missiles, START-1/2, etc.). However, during the same years, in the 1970s-80s, the vertical proliferation in two superpowers increased five or six times over when the Soviet Union and the United States each possessed 10,000 to 12,000 nuclear warheads in their strategic forces (Smolansky, 2001:323).

The horizontal proliferation has covered nine countries (the U.S., the Soviet Union, Britain, France, China, Israel, South Africa, India and Pakistan) for the last 50 years. The collapse of the Soviet Union produced four new nuclear states (Russia, Ukraine, Belarus and Kazakhstan). Later, three of them turned their nuclear weapons over to Russia (Kort, 1997:43).

Analysts examining the situation during the horizontal proliferation in the former Soviet Union determined three areas of danger. First, analysts questioned who was in control of Soviet nuclear forces. Second, they noted the danger that further disintegration in the republics might endanger. Third, they pointed to the consequences of Soviet military experts who, after losing their jobs, would sell their services to third world countries (Kaufman and Hardt, 1993).

Significant attention has been focused on the possibility of defecting scientists providing information to others who may jeopardize the world security. While only three hundred Soviet scientists have the expertise to design a nuclear weapon, 5,000 possess critical knowledge, and 60,000 have related skills such as rocketry or electronics. Many of these are still receiving no pay or only a limited pension (Katz, 1992). In response to this situation, an international consortium raised \$70 million to subsidize unemployed Soviet scientists (Hotz, 1994). Such assistance helped move 8,200 Russian nuclear and chemical scientists into civilian jobs (Spike, 1995).

The U.S. was reassured in 1991 that Russia would be the only Soviet Republic to retain possession of nuclear weapons, and a complex four-step process working toward this goal has been undertaken. Step one moved the warheads in Ukraine, Kazakhstan and Belarus to Russia. Step two stored the weapon-grade material in secure facilities. Step three sought to insure that scientists and engineers from nuclear fields find civilian employment. Step four was to transform weapons laboratories into nonmilitary research centers (Hotz, 1995).

While Ukraine, Kazakhstan and Belarus quickly transferred all of their tactical nuclear weapons to Russia, reaching the goal of transferring all strategic weapons was more difficult to achieve, but eventually all three transferred all nuclear weapons to Russia. However, making previous nuclear states into nonnuclear states was difficult, primarily because the scientists and technicians in these republics could not unlearn their knowledge (Hadley, 1995).

Ukraine was slowest in disarming. In 1993, the Ukrainian parliament claimed ownership of the 1,800 strategic nuclear weapons that were on its soil at the dissolution of the Soviet Union, making the third largest nation in the world. However, Russia controlled the launch mechanism of these weapons. While the Ukraine's proclamation of ownership was not a positive development, it was not as negative as it might first appear

because Ukraine was committed to becoming a nonnuclear state. The Ukrainian parliament ratified START I and the NPT in 1994 (Arms Control Today, 1994).

Another method to deal with the threat of horizontal proliferation caused by the breakup of the Soviet Union was to transfer weapon-grade material to a nuclear nation. In 1994, the U.S. received 1,000 pounds of highly enriched uranium (HEU) from Kazakhstan. This material could have been used to make 20 to 36 nuclear weapons. The operation was conducted under top-secret conditions because of fears that terrorists or another nation might attempt diversion operations during the transfer (Kayyem and Pangi, 2003:14).

The issues regarding nuclear policy in Russia have continued. Its severe economic conditions have decreased its military capability. For instance, Russia's projected military spending for 1999 was \$4 billion compared to \$260 billion for the United States. This has caused Russia to perceive itself as less secure. This increases the possibility that such material could be diverted to terrorist groups or rogue nations. Moreover, economic problems have meant that at many nuclear sites, salaries are underpaid or not paid at all. Such realities increase the likelihood of being smuggled of nuclear materials and being sold illegally (Jeffries, 2002:567).

3.2. Smuggling of Nuclear Materials in the former Soviet Union

According to May (1994), the debate that began with the emergence of nuclear weapons at the end of World War II continues today including daunting indications that a black market in nuclear-weapons materials may have sprung up. New approaches are needed for viewing nuclear weapons in the post-war era. In particular, the circumstances that influence the supply of and demand for nuclear weapons have changed substantially. The excess of weapons-grade material and the upheaval of political alliances have made some nations more and some nations less secure (May, 1994). In this process, states which are neighborhood of the Soviet Union are less secure because the number of theft and smuggling cases has increased from the Soviet Union territory.

The first nuclear trafficking case in the Soviet Union involved the theft of approximately 1,5 kilogram of highly enriched uranium (90% U 235) from the Podolsk nuclear facility in 1992. The material was stolen

by an employee in that facility. In the next three years, nine additional trafficking incidents involving HEU or plutonium occurred. In the following years until 1995, 18 cases occurred, and the materials were stolen by amateurish thieves. They failed to market the stolen nuclear material. They either attempted to find a purchaser themselves or else used personal contacts to connect with brokers. In the majority of cases, the purchasers were undercover police or intelligence agents (Potter and Sokova, 2002). Table 1 shows the nuclear material cases between 1991 and 2001.

Table 1: Proliferation Significant Incidents of Fissile Material Trafficking in the NIS, 1991-2001

Case Name & Date of Diversion	Material Diverted	Origin of Material
Russia 1992	1.5 kg of 90 percent HEU	Russia
Lithuania 1992	150 g of 50 percent HEU	Russia
Russia 1993	1.8 kg of plutonium	Russia
Germany 1993	6.15 g of plutonium-329	Possibly Russia
Germany 1993	800 mg of 87.7 percent HEU	Possibly Russia
Russia 1993	4.5 kg of 20 percent HEU	Russia
Germany 1994	560 g MOX fuel; 363 g of plutonium – 239	Possibly Russia
Czech Republic 1994	2.7 kg of 87.7 percent HEU	Possibly Russia
Russia 1994	3.05 kg of 90 percent HEU	Possibly Russia
Russia 1994	1.7 kg of 21 percent HEU	Russia
Georgia 1997	2 kg of 90 percent HEU	Georgia
Russia 1998	18.5 kg of HEU (enrichment level unspecified)	Possibly Russia
Bulgaria 1999	10 g of 76 percent HEU	Unknown
Kyrgyzstan 2000	1.5 g of plutonium	Unknown
Georgia 2000	920 g of 30 percent HEU	Unknown
Russia 2000	3.7 kg of 21 percent HEU	Possibly Russia
Georgia 2000	0.4 g of plutonium powder	Unknown
France 2001	5 g of 70-80 percent HEU	Unknown

Source: <http://cns.miis.edu/npr/pdfs/92potsok.pdf>

The period between 1995 and 1998 had no significant proliferation cases involving illicit trafficking in HEU and plutonium. The only exception was the seizure which was made in 1997. 2 kilograms of HEU were stolen from the Vekua Institute in Sukhumi. The whereabouts of this material remained unknown. In this period, proactive policies to curb nuclear materials in Russia were considered to be successful because few

cases occurred. Some scholars, however, maintained that the lack of confirmed cases did not indicate a decline in illicit trafficking, but might instead reflect more sophisticated smuggling techniques, the use of new routes, or the operation of well-organized groups of insiders' nuclear facilities (Ewell, 1998).

The period between 1998 and 2001 that had a handful of new cases demonstrated the possible presence of some of the key elements of violent non-state actors. For instance, while the earlier cases often involved disgruntled individual employees, December Russian media reports of an attempted theft of 18,5 kg of HEU indicated the involvement of an organized group of facility employees. On the other hand, while target sources were Western European countries in the 1992-1995 periods, target sources became Middle East countries in this term (Potter and Sokova, 2002).

In addition, there were indications that organized crime groups might be more inclined to accept the risks of nuclear trafficking because of financial gain. Although there was no concrete evidence regarding Russian mafia's involvement in nuclear trafficking cases, one should take note of the arrest of six members of Balashikha organized crime group who were attempting to sell over a kilogram of nuclear material in 2001. The material turned out to be nuclear fuel pellets enriched to only 2.4 percent U-235 (Potter and Sokova, 2002).

Whereas there is no indication that violent non-state actors have become involved in nuclear materials trafficking cases, the number of existing theft and seizure case in WMD materials is the indicator of ongoing potential threat. Table 2 shows some of the theft and seizures of 2007, 2008, and 2009 in the NIS.

Table 2: Selected theft and seizures among over 100 incidents occurred in the NIS in 2007 and 2008.

20 July 2009	Cesium-137: contained in a 10 mm cylinder was seized in Russia
1 September 2008	Moldova-bound train with radioactive cargo passes through Kazakh borders undetected
9 September 2008	Three individuals arrested for smuggling depleted uranium from Kyrgyzstan to China
30 May 2008	Ukrainian law enforcement officials arrest smugglers of radioactive scrap metal
14 March 2008	Truck with radioactive sand detained at Belarusian-Polish border
28 January 2008	Individual suspected of financing nuclear trafficking arrested in Russia
29 November 2007	Ukrainian police seizes mercury and cesium-137 from individual
13 November 2007	Belarusian customs officials detain trucks with elevated radiation cargo
28 September 2007	Radioactive Source Uncovered at a Scrap Metal Receiving Station in Ufa
7 September 2007	Belarusian Customs Seize Radioactive Cargo Bound for Russia
27 August 2007	Americium-241 Seizure in Dimitrovgrad

3.3. Nuclear Materials Smuggling through Turkey

Turkey does not have large stocks of weapons-useable nuclear materials. Turkey has only one operating research reactor which is located at the Turkish Institute for Nuclear Energy and is fueled by 20 percent-enriched uranium (International Atomic Energy Agency, 2000). Despite the fact that no thefts were reported from this facility, Turkey is widely viewed as a transit country for nuclear materials traffickers. Because of its geographical situation which bridges Europe and Asia, and the former Soviet Union and the Middle East, Turkey is one of the most available routes for not only drug and human traffickers but also nuclear smugglers. Drugs, weapons, small arms, gold, and illegal immigrants are smuggled through Turkey (Zaitseva, 2002).

Illicit trafficking of nuclear and other radioactive material surged as a serious international concern after the collapse of the former Soviet Union in 1991. The degradation of economic and social conditions in the newly-established states (NIS) of the former Soviet Union created a

favorable environment for nuclear theft and smuggling cases (Zaitseva, 2002). Although most of these smuggling and theft cases seemed trivial, several of them were not random and opportunistic. They were orchestrated by professionals whose well-established smuggling networks, facilitated by corruption, had the capacity to move a significant amount of diverse contraband (Shelley, 2006).

Many of WMD traffickers in the earlier cases were opportunists who mainly targeted financial benefits. Characteristically the criminal groups that involved in smuggling of WMD materials were not organized crime groups because they were not necessarily organized and represented mainly ad hoc single deal partnerships. As a result, these groups generally were composed of opportunists pursuing profit, rather than organized criminals or terrorists. (Kupatadze, 2010). Similarly, perpetrators of WMD trafficking were driven by opportunistic motives in Turkey. WMD traffickers arrested in Turkey were the parts of criminal groups which could be considered as classic opportunists (KOM 2008 Report). Turkish perpetrators also were the members of these opportunistic groups abroad. For example, one Turkish WMD trafficker was arrested in Georgia in a case registered after 2002 (Kupatadze, 2010).

Past cases demonstrated that Turkey was a significant transshipment route for nuclear smuggling from the former Soviet Union (Zaitseva, 2002). The Georgian cases in which radiological materials were seized pointed to the transit position of Turkey. For example, one Georgian WMD trafficker was arrested in 2006 in his attempt to traffic one kg of uranium, obtained in Russia, from Georgia to Turkey (Kupatadze, 2010). Furthermore, several nuclear trafficking incidents involving Turkey were reported between 1993 and 1999, confirming Turkey's important role as a transit country. These cases included both nuclear material seized in Turkey and interdicted in route to Turkey (James Martin Center, 1999).

On the other hand, as Turkey began to experience WMD cases, a new market for fraud by criminals occurred. A number of WMD cases in which the police seized osmium and red mercury were registered by the police in Turkey (KOM Report, 2009).

4. Policy Insight and Future Recommendations

It is obvious from the literature review that nuclear states which have vertical proliferation can encounter the unintended policy consequences as in the case of the former Soviet Union. For example, the vertical proliferation in the former Soviet Union led to emergence of vertical and horizontal proliferation (Gromyko, 1999). Whereas Russia has vertical proliferation, Ukraine, Belarus, and Kazakhstan have horizontal proliferation (Arbatov, 2006). As a result of these two types of proliferation, the unintended policy consequences can be either to jeopardize its neighbourhood countries or possible use of nuclear materials by violent non-state actors. In spite of these consequences and the existence of ongoing theft and seizures in the NIS, international non-proliferation regime aims to solve nuclear proliferation issues produced by North Korea and Iran. On the other hand, IAEA's policy agenda overwhelmingly includes taking precautions against North Korea and Iran rather than drawing sufficient attention on illicit trafficking of nuclear materials (IAEA, 2001).

The global world is threatened by violent non-state actors much more than state actors (Reimann, 2006). Fighting terrorism and organized crime is prioritized by world countries. Both types of crimes increasingly are considered to be the most dangerous violent non-state actors for global security (Wagley, 2006). Recent policy agendas include what need to be done when faced the possible use of nuclear materials by non-states actors (Reimann, 2006).

The viewpoint in the study is 'proliferation pessimist' because the focus is to take harsh precautions to fight illicit trafficking. It is believed that the possibility of using these materials by terrorist organizations might lead to unpredictable harms (Bunn and Wier, 2007). There are few specific treaties or articles in a convention that requires the increase of safeguards or export controls in order to fight illicit trafficking of nuclear materials (IAEA, 2007).

The NPT does not include any particular article that is about the illicit trafficking of nuclear materials. Similarly, the treaties 'START I' and 'START II' which were signed between the United States of America and the Union of Soviet Socialist Republics to reduce and limit Strategic Offensive Arms, does not emphasize any possible threat of illicitly trafficked nuclear materials in Russia (IAEA, 2007). Thus, it is highly needed either to add the fourth pillar to NPT, which is illicit trafficking,

or to make new conventions in order to increase awareness of countries regarding illicit trafficking of these materials (NATO, 2004). The rationale is the uncontrollable consequences of nuclear materials when they are used even one time (Princeton University, 2008).

On the other hand, future data base that has nuclear smuggling cases is needed to determine the amount of illicitly trafficked nuclear materials, their routes, and more importantly the source countries (UNESCO, 1997). The other recommendation is related to the importance of multilateral cooperation among countries. For example, states that are neighbored to countries which have vertical proliferation needs to have high level cooperation in order to strengthen border and export controls (Arms Control Association, 2002). Another recommendation is to enhance safeguards to prevent illicit trafficking (UNESCO, 1997).

The last recommendation is to have an accurate accounting of what exists in order to control nuclear weapons and materials. A global inventory of all nuclear weapons and materials should be established. Without exception, all states should be subject to reporting requirements and international inspections in creating such an inventory. Without such a global inventory, it is impossible to determine whether nuclear weapons or materials have been sold or stolen, or whether nuclear arsenals have increased (Nuclear Age Peace Foundation, 2004). Meanwhile, the concrete measures that are specifically needed to be taken to prevent nuclear trafficking cases are as follows:

- The international community should undertake a much more comprehensive and holistic view of how non-state actors operate in all aspects of WMD proliferation.
- All strategic border crossings and points of entry should be equipped with neutron radiation detectors.
- Customs and border patrol officers in operating radiation detection equipment should be trained on nuclear materials as well as anti-corruption efforts.
- Intelligence sharing on thefts, trafficking incidents, and suspects among law enforcement agencies should be increased.
- International investigation and research into the potential involvement of violent non-state actors should be enhanced.

Key future researches are needed to focus on to determine how nuclear proliferation in the former Soviet Union became potential threat and what has led to the failure in curbing nuclear materials from illicit trafficking (Nuclear Threat Initiative, 2004). Then each country that has vertical proliferation should be examined in terms of their having possible consequences as in the former Soviet Union case.

Conclusion

Although nuclear materials are used for either commercial or military purposes, possessing nuclear materials is considered to be risky, for there always exist the possibility of encountering unintended policy consequences. The former Soviet Union is a good example of what unintended policy consequences can states face when they have vertical proliferation.

The collapse of the former Soviet Union led to the emergence of two intended policy consequences: horizontal proliferation which occurred in newly established states such as Belarus, Ukraine and Kazakhstan, and illicit trafficking of nuclear materials which are not securely protected in newly established states and their possible use by violent non-state actors.

The challenges to fabricate nuclear weapons plays distinctive role in the activity area of violent non-state organizations. They take place either supply or demand side of the nuclear proliferation. Whereas terrorist organizations characteristically prefer to be in demand side, organized crime groups take place in the supply side. Also, ongoing theft and seizure in the NIS are the indications of potential threat. As long as there is an availability to reach nuclear materials, violent non-state organizations will be threatening for the security of states.

There is an urgent need to focus on the prevention of illicit trafficking. Equivocal statistics are misleading, and nobody knows the exact amount of smuggled nuclear materials from the NIS. Therefore, states should have multilateral cooperation in order to find out details about smuggled nuclear materials and take necessary measures. Otherwise, it can be too late to fight violent non-state actors that have the power to reach these materials and use them.

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