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Nuclear Illicit Trafficking

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1. Introduction

United States first carried out the first nuclear test codenamed "Trinity" on 16 July 1945 in the desert of New Mexico. Just three weeks later, on 6 August, the US exploded a uranium device called "Little Boy" 2,000 feet above the Japanese city of Hiroshima, killing around 150,000 people. Three days later, the US deployed a second nuclear bomb, a plutonium device called "Fat Man," that exploded above the Japanese city of Nagasaki, resulting in at least 74,000 deaths. These two terrible acts marked the start of the nuclear age, which reached its peak during the Cold War.[1]

Trafficking in nuclear and other radioactive materials has emerged as a truly international problem and an indeed dangerous threat to international security. The problem of theft or loss of nuclear materials has affected countries on all five continents proving once again the international scale of this issue.

Nuclear trafficking is an insidious consequence of the end of the Cold War. Years after the fall of the Berlin wall, symbolizing the end of the Cold War, the terror gripped the world over the threat of a nuclear war that could destroy the planet. More than a decade after the collapse of the Soviet Union, the nuclear threat has changed shape but not ended. In the former Soviet states, bombs and the makings of bombs remain in sites and stockpiles where security is lax. Pakistan and India threaten each other with nuclear warheads. Libya tried to build a bomb; North Korea says it actually has done so; and Iran won't admit to what it is widely suspected of trying to do. What is more, Osama bin Laden has clearly stated that acquiring nuclear or chemical weapons is a religious duty of any Muslim; U.S. raiders of Al - Qaeda camps in Afghanistan found rough designs for a nuclear bomb; and the father of the Pakistani bomb, A.Q. Khan, had

[1] MacDonald, R. (2005). Nuclear Weapons 60 Years On: Still a Global Public Health Threat. PLoS Medicine; Vol. 2; Issue 11.

a profitable sideline selling blueprints and machines for building bombs to anyone willing to pay the asking price.[2]

No wonder, international relations have become more complex and international safety measures with respect to nuclear and radioactive material are critical at the present time.

All nuclear fuel, including uranium, is subject to an extremely stringent system of safeguards. These are regulations issued by national and international authorities that mandate every aspect of dealing with nuclear materials, from its mining to its processing to its transportation and storage. The main objective of nuclear safeguards is to maintain an efficient, accurate, and real-time nuclear material accountancy and control system at all facilities engaged in the nuclear fuel cycle.

Concerns about nuclear smuggling resulted in the development of a new field known as nuclear forensics. So called "Model Action Plan" is composed of three parts: first, second, and third lines of defends. The first line of defense has to prevent the diversion of nuclear material; second – consists of the detection of nuclear material smuggling; third line serves for categorizing the nuclear material, for example into high- and low-enriched uranium, plutonium, etc.

Based on the information collected from the expert laboratories, different cases of illicit trafficking can be assembled in a database. A reliable database allows scientists to analyze then trends over time, region, or smuggled substances.

[2] Stone, R.(2001). *Nuclear Trafficking: "A Real and Dangerous Threat"*. Science; Vol. 292; Issue 5522.

2. 1993 – 2001: Trends based on the IAEA Illicit Trafficking Database

The IAEA's Illicit Trafficking Database (ITDB) facilitates the exchange of authoritative information on incidents of trafficking and other unauthorized activities involving nuclear and other radioactive materials. The database was established in 1995 though the collection of materials for the database started as early as 1993. Presently 82 IAEA Member States report to the ITDB. The scope of the database includes cases involving unauthorized acquisition, possession, use, transfer or disposal of nuclear or other radioactive materials, whether intentional or unintentional and with or without crossing international borders. As of September 11, 2001 over 400 incidents were confirmed to the ITDB. Roughly 50% of them involve criminal activities such as theft, smuggling, illegal sale attempts, etc.[3]

2.1 Geographical trends

According to the ITDB, the majority of illicit trafficking of nuclear or other radioactive materials in the period from 1993 to 2001 took place in Eastern Europe. This fact is attributed to the collapse of the Soviet Union and as a result weaker border controls as well as economic break down of the newly independent states which encouraged interest by terrorist groups or states to obtain nuclear materials. The percentage distribution of the confirmed cases among the regions of Eastern Europe, Western Europe, Eurasia (Turkey and Russia) and Asia looks as follow: the leader was Eastern Europe (38%), followed by Western Europe (32%), Turkey and Russia (16%), and Asia (6%), with the rest

[3] Bonny, G., Declerck, R., Flachet, F.(2004-2005). Nuclear Illicit Trafficking. Trends, Study of proliferation significant cases, and the post 9/11 era.

represented by other regions (such as Australia, Middle East, South and Norht America, Africa, etc.).

If looking at the distribution of the cases within each of the regions, one can note that in the Western Europe an outstanding number of cases occurred in Germany (Figure 2.1). However, one should not jump into conclusion that Germany was the smuggling point for nuclear materials, but take into consideration that German intelligence authorities have been proactively working often engaging in sting operations, thus creating a possibly artificial market in the country.

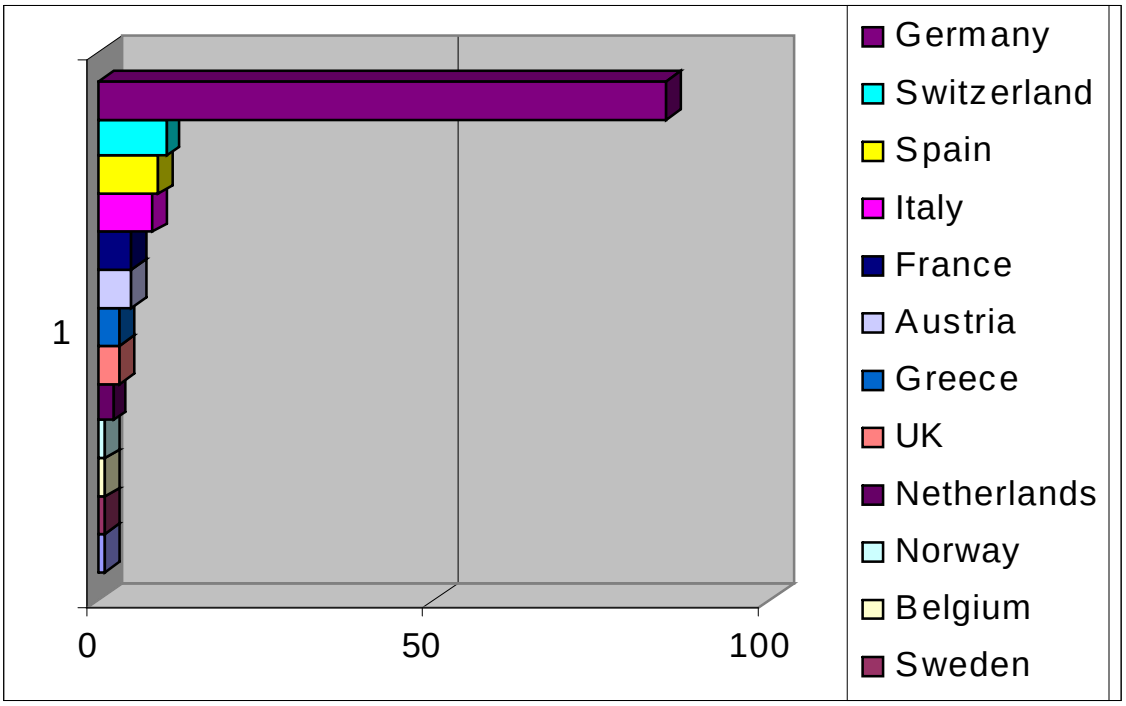

Figure 2.1: *Distribution over countries in Western Europe of nuclear illicit trafficking incidents.*

When analyzing the distribution of cases in the Easter Europe, we can see more or less equal distribution of cases across the region (Figure 2.2).

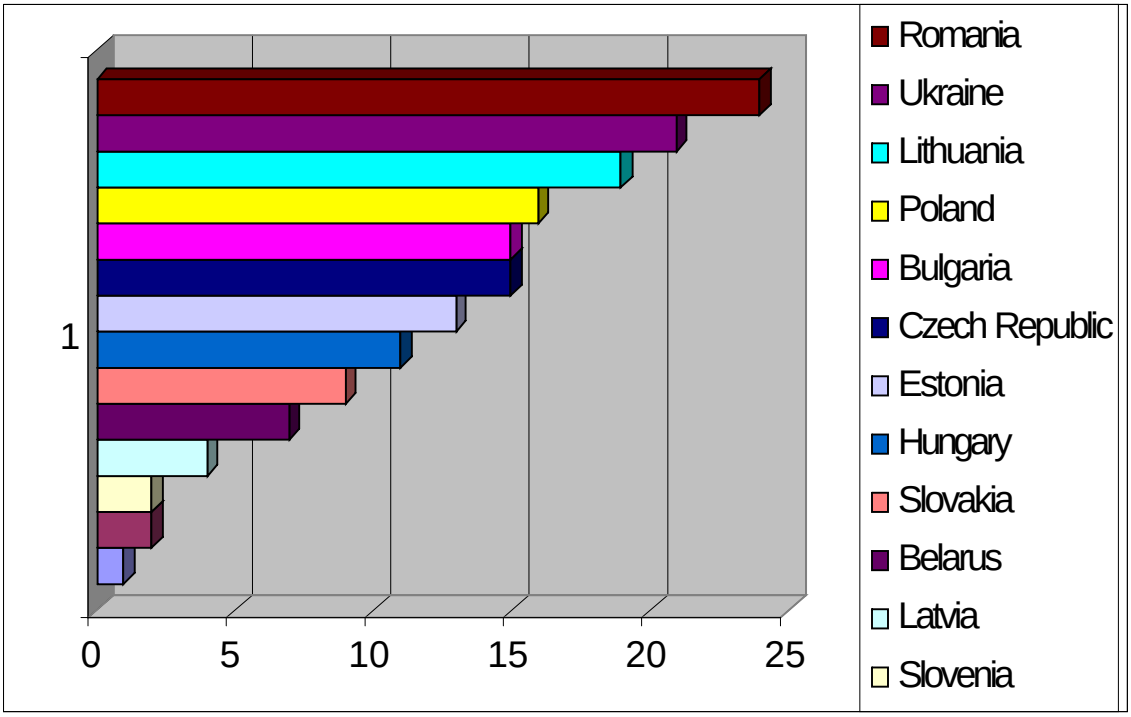

Figure 2.2: *Distribution over countries in Eastern Europe of nuclear illicit trafficking incidents.*

In the case of Russia 49 confirmed accidents occurred in the period from 1993 to 2001. It is believed, however, that Russia was unable to guard its territory plus it was unwilling to share the information with the rest of the world.

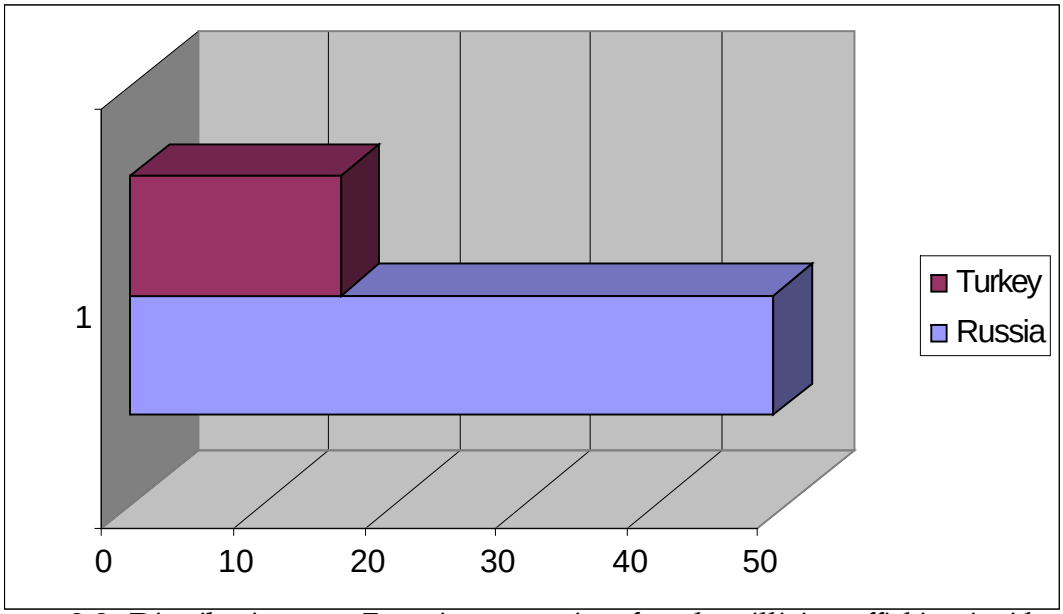

Figure 2.3: *Distribution over Eurasian countries of nuclear illicit trafficking incidents.*

As for Asia, it shows a less impressive picture in regard of the number of confirmed incidents (Figure 2.4), with the newly independent states like Kazakhstan and Georgia coming at the top of the list.

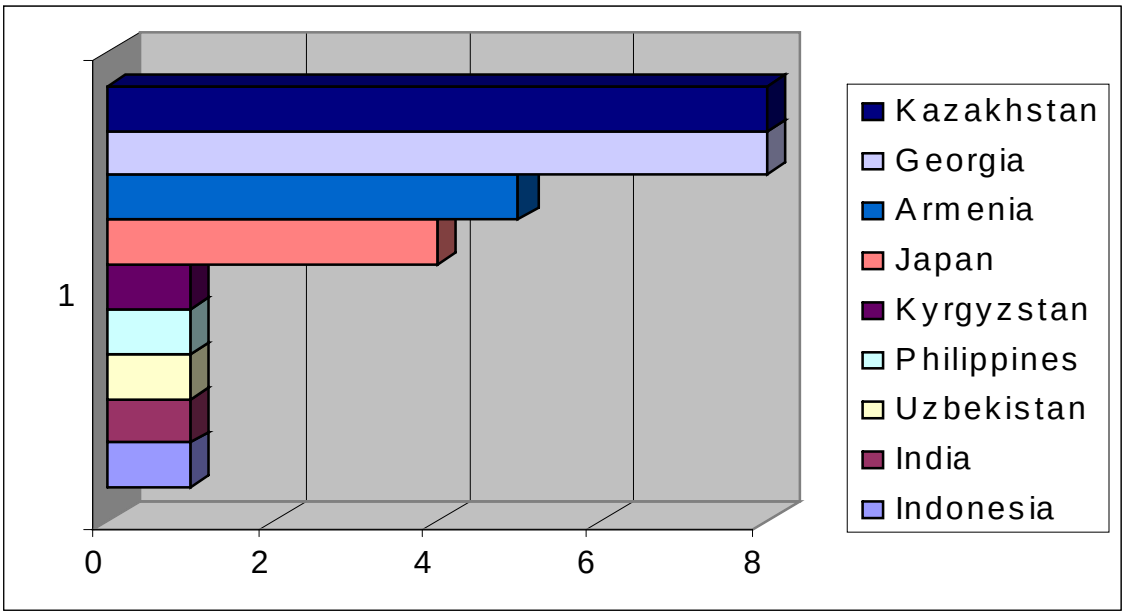

Figure 2.4: *Distribution over Asia of nuclear illicit trafficking incidents*

It is important to follow the geographical trends over time. 3 periods can be outlined as follows: from 1993 to 1995, from 1996 to 1998, and from 1991 to 2001. During the period from 1993 to 1995 a high number of illicit trafficking incidents were reported in Easter, Western Europe and Eurasian countries. Mostly the cases involved undercover police operations or intelligence agents conducted by the employees of the facilities that either produced or stored nuclear or radioactive materials.

During the second period (1996 – 1998) a considerable decline in the number of incidents involving illicit trafficking was observed. It is credited partially to the improved cooperation from the newly independent states, as well as improved border controls in many European countries. However, some expert point out that a possible decline in the number of incidents could have resulted

from the use of more sophisticated smuggling techniques, the use of new routes, or the cooperation of well-organized groups of insiders at nuclear facilities. What is more during this period a sound number of incidents occurred in Asia and South America.

Since 1198 an uprise in nuclear trafficking cases was observed. The last period, namely 1999 to 2001 is characterized by the involvement of organized criminal groups in trafficking of nuclear materials as well as stolen materials being more likely addressed to end-users in the Middle East.

2.2 Trends in types of materials

There are two types of materials involved in the cases of illicit trafficking. First, the nuclear materials, such as highly-enriched uranium (HEU) and plutonium (Pu), which may be suitable for direct use in the explosive device without much extra processing; and low-enriched uranium (LEU), depleted uranium (DU), natural uranium (NU), or thorium (Th) which require extensive and technically advanced processing to become suitable for the use in the explosive device.

Second, non-fissionable radioactive materials, such as radioactive resources used in a variety of industrial, medical and research application, which could be used in creating a radiological dispersal device. Actually, the problem of theft of these materials, since they are more widespread in the nature, has consequently affected more countries than those affected by the theft of nuclear materials. According to IAEA more than 100 countries may have inadequate control and monitoring programs necessary to prevent or even detect the theft of these materials.

From 1993 to 2001, approximately 3,7 tons of fissile materials were seized. However, only a small part of those materials were suitable for direct use in a nuclear explosive device (about 0,25% or 9,25 kg of HEU and Pu). 97% of all the seized materials were materials not suitable for direct use in a nuclear explosive device such as LEU, NU, DU and Th.

3. Closer look at most significant cases of illicit trafficking

Out of all the cases that took place in the period of 1993 to 2004, approximately 30% were committed by the employees of nuclear facilities. It is quite obvious that most of those employees involved were driven by the poor economic condition and their attempts to steal and/or sell nuclear materials were very unprofessional that lead to their quick seizure. Another 30% of incidents took place due to the undercover secret police operations. It is widely argued that due to this, artificial markets were created like in the Germany's case. Another 20% of incidents involve border police's seizure of the materials. Yet, last 20 % of cases involve discovery of materials merely by change or coincidence.

3.1 Vilnius, Lithuania, May 1993

In May 1993, Lithuanian authorities recovered 4.4 tons of beryllium in a smuggling investigation. Beryllium is a metal that is used in the production of, among other things, x-ray tubes, lasers, computers, aircraft parts, nuclear reactors, and nuclear weapons. When Lithuanian authorities seized the material, they discovered that some of the beryllium (141 kilograms) was contaminated with approximately 0.1 kilogram of highly enriched uranium. There was no evidence that the individuals involved were aware that the beryllium contained the enriched uranium. Some reports indicated that the beryllium originated at

the Institute of Physics and Power Engineering in Russia. This institute is involved in the research and development of nuclear power reactors and employs about 5,000 people and possesses several tons of weapons-usable material.

3.2 Murmansk, Russia, July and November 1993

In July 1993, two Russian naval enlisted personnel stole two fresh fuel rods from a storage facility in Murmansk, Russia. These rods were for Russian naval propulsion reactors that power submarines and contained 36-percent enriched uranium. (Uranium enriched at 20 percent or greater is considered to be weapons usable material.) The amount of material totaled about 1.8 kilograms of highly enriched uranium. Russian security officers discovered the missing material and apprehended the individuals before the material left the Murmansk area. One of the individuals arrested was a guard at the facility and was suspected by authorities after the material was missing. The two enlisted personnel who were caught implicated two Russian naval officers in the plan. However, at the ensuing trial only the two enlisted personnel were convicted and sentenced to prison terms of 4 and 5 years.

In November 1993, approximately 4.5 kilograms of 20-percent enriched uranium, intended for use in submarine propulsion reactors, was stolen from a fuel storage facility in the Sevmorput shipyard near Murmansk, Russia. Three individuals were arrested in connection with the theft, including two naval officers. The group stored the fuel rods in a garage for several months while they were looking for a prospective buyer. The three individuals were arrested and two of the men received 3-1/2-year sentences while the third person was acquitted.

3.3 Polyarny, Russia, June 1994

In June 1994 Russian authorities seized 4,5 kilograms of HEU with the enrichment level of 20% that were stolen from a submarine fuel storage bunker. However, the theft was quickly traced and the two persons responsible for the incident were each sentenced to 3,5 years in prison.

3.4 St. Petersburg, Russia, June 1994

In March 1994, three men were arrested in St. Petersburg, Russia for trying to sell approximately 3 kilograms of uranium enriched to 90 percent. The material was allegedly smuggled from the Elektrostal Production Association which is located in the Moscow suburbs. The facility produces low-enriched uranium for commercial nuclear power reactors and also has the capacity to produce highly enriched uranium for nuclear powered icebreakers and submarines. The material was smuggled out of the facility and approximately 500 grams of the material were found inside a glass jar in a refrigerator in one of individual's homes.

3.5 Baden – Wuertemberg (Tengen), Germany, May 1994

In May 1994, German police discovered a lead container containing 0.006 kilograms of highly concentrated plutonium-239 in the home of a German citizen. The material found in the container was a mixture of many components, including aluminum, silicon, mercury, zirconium, broken glass, and brush bristles as well as the plutonium. The presence of mercury in the mixture suggests that the material may have been used as part of a red mercury scam. 5 In November 1995, the German national was sentenced to 2-1/2 years in prison for violating arms control laws. The sentence was added onto a 3-year term he was already serving time for counterfeiting.

3.6 Landshut, Germany, June 1994

In June 1994, less than 0.001 kilogram of highly enriched uranium was recovered in Landshut, Germany, a city near Munich. This material, along with

120 low enriched uranium fuel pellets, was found as a result of a police undercover operation. The material was seized in an undercover police operation. Three individuals apprehended were citizens of the Slovak Republic and one was a resident of Germany. A German court sentenced several of the individuals to probationary terms but one of the group's leaders was sentenced to 2 years in prison.

3.7 Munich, Germany, July 1994

In 1994, undercover German police acting as prospective buyers intercepted approximately 0.4 kilograms of plutonium at the Munich Airport. It is believed that the material originated in Russia's Institute of Physics and Power Engineering. The institute, which is operated by Russia's Ministry of Atomic Energy, is involved in the research and development of nuclear power reactors and possesses several tons of weapons-usable material. The material was in a suitcase that had arrived on a flight from Moscow. The individuals involved in the smuggling case were from Colombia and Spain. A German court sentenced the Colombian national to almost 5 years in prison and the Spanish nationals received prison sentences of between 3 and 4 years. All of the individuals were expelled from Germany after serving half of their sentences. By February 1996, Russian authorities had arrested several Russian accomplices, including a key figure involved in the theft of the material from the institute.

3.8 Prague, Czech Republic, December 1994

In December 1994, police in Prague, Czech Republic, seized approximately 2.7 kilograms of highly enriched uranium. The material is believed to have been stolen from the Russian Institute of Physics and Power Engineering. The individuals involved included a Tajikistan national, a former Russian nuclear institute worker, and at least one Czech national. The material was brought into the Czech Republic on a train and then hidden for about 6 months while the

individuals involved tried to sell it. They were arrested after Czech authorities received an anonymous tip and a Czech judge gave several members of the group prison sentences ranging from about 18 months to 8 years. Two related incidents were reported in June 1995 and involved the seizure of highly enriched uranium in the Czech Republic. According to available information, the composition of the material and its location were linked to the 1994 Prague and Landshut incidents. In both instances, the small quantities of material involved indicated that it was a sample that could be used to attract a potential buyer.

3.9 Prague/ Ceske Budejovice, Czech Republic, June 1995

During 1995, Czech police seized 0,4g sample of HEU and recovered 20g of it in the southern city of Ceske Budejovice. The stolen material was probably diverted from Mayak Production Association.

3.10 Moscow, Russia, June 1995

On May 6, 1995 three suspects were arrested by Russian Federal Security Service agents for trying to sell 1,7 kilograms of HEU (21% enrichment level). One of the employees involved in this incident was an employee of Electrostal Production Association, who had probably diverted the material from the plan in May 1994.

3.11 Belarus, 1997

A potentially very serious and sensitive case in 1997 involves the possible seizure in Belarus of individuals possessing HEU, which Russian and Georgian officials believe came from Sukhumi in Georgia. In fact, Sukhumi was under Abkhaz control in 1997, which created difficulties for Georgian and Russian authorities in getting access to the facility to conduct the physical inventory of the fissile materials. Nor had IAEA been able to visit the site to take count. At the end of 1997, a Minatom team finally was granted access to the facility to conduct inventory, but the team found a deserted facility with no HEU at all. The

whereabouts of all the HEU from the facility remain unknown. Approximately 2 kilograms of HEU with the enrichment level of 90% simply disappeared from the Sukhumi Institute of Physics and Technology during Abkhazian-Georgian conflict.

3.12 Rome, Italy, March 1998

A uranium fuel rod was seized due to Italian paramilitary police sting operation stolen form a Kinshasa research reactor in Congo but in fact produced in the United States by U.S. company General Atomic in San Diego in 1971. It is believed that uranium involved in this case could have been transported in a diplomatic pounch by part of then-President Mobutu's entourage when the former dictator escaped from Zaire. Among those people arrested in Rome were four Sicilians with the ties to Catania Gang in ester Sicily and seven Romans with ties to the Cosa Nostra gang which reportedly obtained the uranium fuel rods after the ouster of President Mobutu from Zaire in March 1997, but investigators have still to determine how exactly they were smuggled into Italy.

3.13 Chelyabinsk Oblast, Russia, December

In December 1998, Russian Federal Security Service reported about a thwarted attempt by the employees at a nuclear facility in Chelyabinsk oblast to divert 18.5 kg of nuclear material. A Minatom official confirmed that the incident involved HEU only in 2000 according to the US academic who revealed this information to the CNS.

3.14 Rousse, Bulgaria, May 1999

In May 1999, Bulgarian customs officials at the Rousse border checkpoint seized a vial containing about 0.004 kilograms of highly enriched uranium on the Bulgarian/Romanian border. Rousse is a city that serves as Bulgaria's principal river port and is a transportation hub for road and rail traffic. The material was hidden in a shielded (lead) container inside the trunk of a car being driven by a

Turkish citizen. The driver attempted to sell the material first in Turkey and then traveled through Bulgaria on his way to Romania, where he planned to find a buyer. A Bulgarian customs agent, using standard profiling techniques, suspected that the driver was a smuggler. A search of the driver's papers revealed a document describing uranium. When the driver attempted to bribe the customs officer, his car was thoroughly inspected and the officer eventually discovered the vial containing the weapons-usable nuclear material. Bulgarian scientists concluded that the material was highly enriched uranium. Although the source of the material is not certain, it is probable that it came from the Mayak Production Association in Russia. This large complex produces special isotopes used for industrial, agricultural, and medical purposes and also reprocesses naval and civil nuclear power reactor fuel for plutonium and uranium recovery.

3.15 Kara-Batla, Kyrgyzstan, October 1999

In October 1999, two persons were arrested in the act of selling a small metallic disk containing 0.0015 kilograms of plutonium. The item was analyzed by the Institute of Nuclear Physics in Kazakhstan and the two individuals arrested were convicted and sentenced to prison.

3.16 Batumi, Georgia, April 2000

In April 2000, Georgian police arrested four persons in Batumi, Georgia, for unauthorized possession of 0.9 kilogram of highly enriched uranium fuel pellets. Batumi is a seashore resort at the Black Sea located along the Georgia-Turkey border. According to one press report, the material may have been smuggled from Russia. The pellets mass and shape, together with the reported enrichment level, suggest that the pellets were produced for use in a commercial or experimental fast breeder reactor. Another report also stated that the smugglers were detected when they crossed the Russian border into Georgia, possibly by

radiation monitoring equipment and were then trailed to the city of Batumi, where they were apprehended. It is believed that the individuals were trying to smuggle the material into Turkey.

3.17 Elerktrostal, Russia, May 2000

In May 2000, a resident of Electrostal was detained during an attempted sale of 3.7 kg of HEU. The incident was reported by Gosatomnadzor. Electrostal was named as a possible origin of the material, together with the Bochvar Institute (VNIINM) and Politech enterprise, Russia.

3.18 Tbilisi, Georgia, September 2000

In September 2000, three persons were arrested at Tbilisi airport for attempting to sell a small quantity of mixed powder containing about 0.0004 kilograms of plutonium and 0.0008 kilograms of low enriched uranium, as well as a 0.002 kilogram sample of natural uranium. According to press reports, an official in the Georgian Ministry of State Security said that two individuals arrested were Georgian citizens, and the third was from Armenia. The individuals said they had brought the uranium and plutonium from Russia and Ukraine to sell it.

3.19 Karlsruhe, Germany, December 2000

In December 2000, a worker at a closed spent fuel reprocessing plant removed radioactively contaminated items from the facility, deliberately evading radiation safety monitors. The contaminated items, described as rags and a test tube filled with aging waste material, contained a very minute amount of plutonium.

3.20 Erlangen Germany, 2000

A 74-year old laboratory assistant who had worked for Siemens company in the town of Erlangen, was accused of stealing small quantities of uranium and other radioactive materials between 1971 and 1981 and storing them at his home. The theft included 0,8 grams of HEU.

3.21 Liepaja, Latvia, January 2001

A seizure of 6 grams of plutonium on 2nd January 2001 at the Liepaja seaport in Latvia.

3.22 Thessaloniki, Greece, January 2001

In January 2001, police found a cache of about 300 metallic plates buried in a forest in northern Greece. The material in the plates was determined to be plutonium and a radioactive source known as americium. According to one report, the material had been smuggled into Greece either from one of the countries of the former Soviet Union or Bulgaria. Each plate contained a small quantity of plutonium but the total amount was about 0.003 kilograms. An official from Greece's atomic energy commission said that the quantity of nuclear material found was insufficient to build a nuclear weapon but the material posed a health hazard. A law enforcement officer speculated that the individuals who buried the metal plates were probably waiting for a potential buyer.

3.23 Paris, France, July 2001

In July 2001, police seized several grams of highly enriched uranium and arrested three suspects in Paris, France. According to preliminary reports, the enrichment level was about 80 percent, but results of laboratory analysis have not yet been reported to the IAEA. One of the suspects had recently completed a prison sentence for fraud charges, and the other two reportedly were citizens of Cameroon. According to one press account, French police found the material encased in a glass bulb that was stored in a lead cylinder.

3.24 Tbilisi, Georgia, October 2001

Georgian State Security officials seized 23 containers of plutonium from several apartments in Tbilisi. The amount of materials seized here was not specified, but it was stated that the the material had a value of 65,000 US dollars.

3.25 Perm, Russia, July 2003

An instrument containing the toxic and radioactive isotope plutonium-238 was stolen from the Chusov metal plant in Perm.

3.26 Bishkek, Kyrgyzstan, September 2004

Two men were arrested near Bishkek, Kyrgyzstan in September 2004 while trying to sell 60 "containers" with plutonium-239, BBC News Online reported on 27 September 2004. However, subsequent reports indicated that the "containers" were merely Soviet-era smoke detectors, which use a miniscule amount of plutonium. Initial media reports did not cite the quantity of plutonium involved in the incident, or describe the "containers" in detail, but on 30 September 2004, a spokesperson for the International Atomic Energy Agency reported that the "containers" of plutonium were in fact just "55 old-fashioned Soviet smoke detectors." The spokesperson, Melissa Fleming, added that Kyrgyz authorities identified the smoke detectors as having been produced 2 or 3 decades ago in the Soviet Union.

3.27 Zmeinogorsk, Russia, Ocotober 2004

A resident of Zmeinogorsk surrendered 8 containers filled with 400 grams of plutonium-238 to the local police. Subsequent media reports said that the amount of plutonium involved was much smaller totaling only 1 milligram. Recovered material was not weapons-grade but an isotope used in various equipment. The nuclear physicist decided to turn in the plutouim after reading a police announcement encouraging people to surrender weapons for a reward.

3.28 Dushanbe, Tajikistan, March 2004

Tajikistani Drug Control Agency authorities arrested an Uzbekistani citizen in Dushanbe, Tajikistan and seized a capsule containing 3 grams of plutonium on 13 March 2004, ITAR-TASS reported on 15 March 2004. The agency transferred the suspect, a 50-year-old unemployed resident of Fergana, Uzbekistan, to the

custody of the Tajikistani Ministry of Security. On 15 March 2004, Drug Control Agency authorities arrested two Tajikistani citizens who are suspected to be involved in the case. According to Tajik Television First Channel, the plutonium capsule was of Russian origin, and was intact and did not pose a health risk. According to Drug Control Agency spokesman Avaz Yuldoshev, the suspect intended to sell the plutonium to individuals in Afghanistan or Pakistan for $21,000. The Associated Press reported that the suspect was looking for Pakistani or Indian buyers. The Ministry of Security is investigating the incident, according to ITAR-TASS. A Tajik nuclear physicist told CNS on 29 March 2004 that the material involved was a "plutonium-beryllium neutron radiation source," which contains "a mix of plutonium isotopes."

4. Illicit Trafficking after 9/1

Not surprisingly, one of the most serious and dangerous threats of the beginning of the 21st century has become the trafficking of nuclear materials and nuclear terrorism. After 9/11, this risk has become a real scenario, still with low probability but with highly significant - and disastrous consequences. The attacks of September 11 were a sign that the terrorists' capacity for killing is limited only by the power of their weapons.

As of 31st of December 2004, over 650 incidents were confirmed to the IEAE's Illicit Trafficking Database. Of these, roughly 30 percent involved nuclear materials and about 60 percent other radioactive materials. In many cases they were intended for resale inside the country where the case occurred, at the same time many cases were concerned with smuggling abroad. What is more, about half of the confirmed cases involved criminal activities, such as illegal possession, theft, smuggling, or attempted illegal sale of the materials. Materials

involved range from natural uranium, depleted uranium, low-enriched uranium to plutonium and highly-enriched uranium in the case of nuclear materials. In addition, The Database included numerous cases of discoveries of uncontrolled radioactive sources, often referred to as orphan sources.

In the year 2001, 11 cases occurred, 2002 – 8, 2003 – 5, and in 2004 – 10 cases were confirmed to the IAEA. As a result it could be concluded that there was no dramatic change in the number of incidents involving nuclear materials after 9/11.

However, if one considers the trend in the cases involving other radioactive material, it is noted that the increase in the number of cases occurred during 2003. Some argue that it happened due to the improved detection techniques that are used in different countries.

It is also observed that the trafficking incidents moved from Europe towards Asia. The percentage of cases in Western Europe has declined from 32 percent to 13 percent. At the same time the percentage in Asia rose from 6 to 23 percent. The percentage of cases which happened in Russia rose as well from 16 to 25 percent. Most of the seizures of materials resulted from intelligence and police work rather than from customs or border checks which suggests inadequate border detection.

In Asia most incidents occurred in Georgia, Kazakhstan, and Armenia. In Eastern Europe majority of cases happened in Ukraine. In contrast with the analysis of the earlier period, no incidents were reported in Romania after 9/11 as well as no incidents occurred in Germany in this period. Figures 4.1, 4.2 and 4.3 give a clear picture of trafficking incidents in each of the discussed regions.

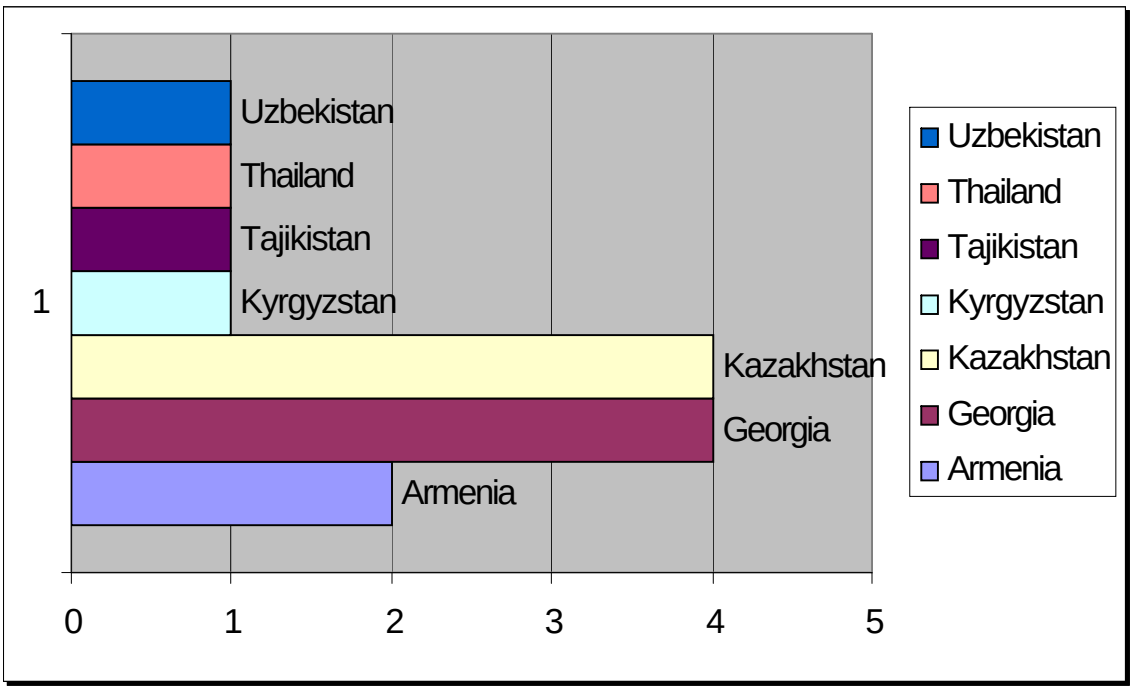

Figure 4.1: *Distribution over countries in Asia of nuclear illicit trafficking incidents after 9/11*

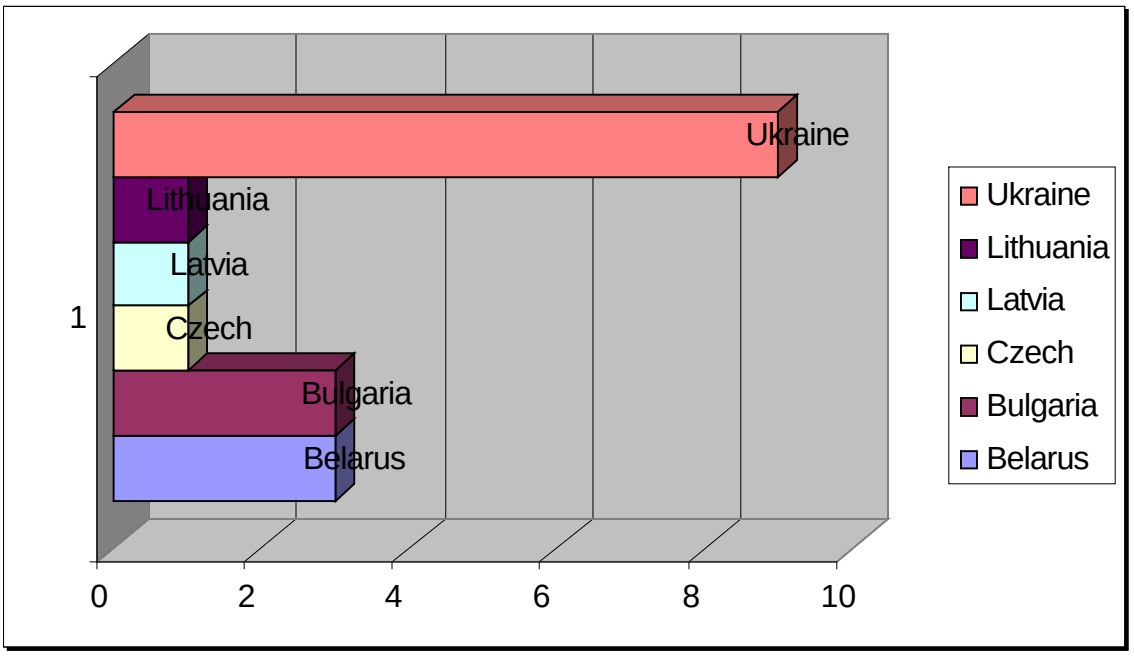

Figure 4.2: *Distribution over countries in Eastern Europe of nuclear illicit trafficking incidents after 9/11*

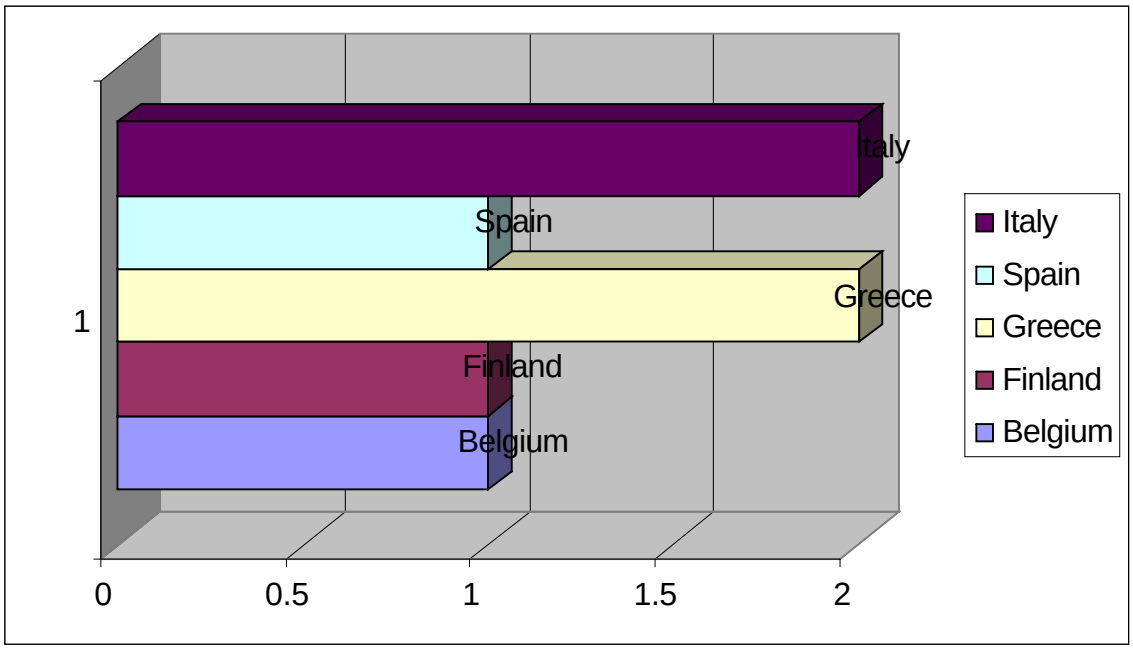

Figure 4.3: *Distribution over countries in Western Europe of nuclear illicit trafficking incidents after 9/11*

According to Vladimir A. Orlov of the IAEA: "The difficulties in adequately responding to such non-traditional challenges are not a headache for one State but for all States, and especially those that possess and must control nuclear weapons or complex nuclear enterprises. At the same time, it is obvious that the risk of illicit nuclear trafficking and unauthorized access to weapons-usable nuclear materials or nuclear weapons with terrorist purposes is considerably high in two States, namely the United States and Russia. They possess the largest stockpiles of nuclear weapons and nuclear materials, sensitive from the standpoint of non-proliferation, and they are engaged in a dynamic process of nuclear arms reduction."[4]

What is more, Britain, France and China posses sound amount of nuclear weapons. India and Pakistan are believed to have weapons as well. North Korea has recently declared that it has manufactured nuclear weapons and also Israel is generally believed to have nuclear weapons. South Africa also admitted that it

[4] http://www.iaea.org/Publications/Magazines/Bulletin/Bull461/illicit_nuclear_trafficking_2.html

has developed a small arsenal of nuclear weapons, but it dismantled this arsenal in the early 1990s.

The spread of nuclear weapons can allow aggressor nations to threaten neighbors and dictate in entire regions. In addition, nuclear weapons could be used as a hazard by a country seeking to advance a global ideological cause. They may also provide terrorist organizations, whose views they share, with nuclear weapons or materials needed to create such weapons. The problem exists and it is universal. One cannot deny, for instance, that some weapons-usable materials have been smuggled from Western Europe and North America to Pakistan and Israel.

Today, the number of countries involved in active weapons programs is increasing. A growing number of countries are lining up to join the nuclear club, increasing the chance that a nuclear catastrophe will happen somewhere on the planet. According to Greenpeace: "The Cold War may be over, but this does not mean nuclear weapons have disappeared. Far from it: There are over 30,000 nuclear weapons in the world, with more than a thousand of them ready to launch at a moment's notice, 24 hours a day, seven days a week."[5]

Moreover, several countries are eager to acquire nuclear technology and other weapons of mass destruction through whatever means possible. The lessons of Three-mile island and Chernobyl were quickly forgotten and now we are preparing to sell nuclear reactors and transfer nuclear technology to the Turkish government.

To make matters worse, Turkey is planning to build the plant near a seismic active fault line at the Akkuyu Bay. Turkey has been actively pursuing the acquisition of nuclear technology and is willing to put all its neighbors,

[5] http://www.greenpeace.org/international/campaigns/abolish-nuclear-weapons

including Israel, Italy, Egypt, Armenia, Cyprus, Syria, Greece, and Jordan at risk towards this end should an earthquake happen. What is more Turkey has been considered as a big trafficking route though the Black Sea.

The South-Asian states of India and Pakistan have also engaged in a nuclear arms race. India detonated what it called a "peaceful nuclear device" in 1974 ("Smiling Buddha") in response primarily to the development of a weapon by its neighbor China a decade before. In the last few decades of the 20th century, however, both Pakistan and India began to develop nuclear-capable rockets, and Pakistan had its own covert bomb program which extended over many years since the first Indian weapon was detonated. In 1998, both India and Pakistan tested their nuclear weapons in a tit-for-tat fashion with India claiming to have tested a hydrogen bomb as well (though the validity of this is disputed).

A rising concern in the past months has been the nuclear program of Iran being under close investigation of IAEA.

5. Nuclear Terrorism

A nuclear terrorist attack is an incident in which a terrorist organization uses a nuclear device to cause mass murder and devastation. Nuclear terrorism also includes the use, or threat of use, of fissionable radioactive materials in an attack, for example, an assault on a nuclear power plant for the purpose of causing extensive and/or irreversible environmental damage. In this case, the terrorist organization need not develop, acquire or gain control of a nuclear bomb in order to cause extensive damage. It need only use conventional weapons against one of the many nuclear reactors in the world in order to seriously damage the reactor, thus releasing radioactive matter into the atmosphere. Such an attack can endanger large population centers.

Nuclear weapons can give terrorist organizations considerable advantages, since they can inflict large numbers of casualties and command worldwide media attention. Moreover, because it is hard to assess a terrorist organization's threats to use nuclear weapons. Western countries are particularly susceptible to terrorist blackmail under threat of a nuclear strike. Decision makers have no way of knowing how likely the terrorists are to carry out their threat.

A terrorist organization may attempt to obtain fissionable material or nuclear weapons in a number of ways:

- It may purchase fissionable material on the Eastern European black market. The disintegration of the Soviet Union, the economic crisis that has gripped most of the FSU, the demoralization of the Russian army, and the deterioration of governmental control of radioactive material and nuclear bombs in some of these countries have encouraged Black-market commerce in radioactive material.
- It may purchase or obtain radioactive materials from other countries, particularly those that support terrorism. Several "revolutionary" states such as Iran, Iraq, and Libya are known to be actively and regularly assisting various terrorist organizations. These same states have considerable resources and have made massive investments toward the acquisition of nuclear capability, and are striving to develop or purchase nuclear weapons.
- It is rather unlikely that a terrorist organization would itself construct a nuclear bomb, for this requires special resources and training that terrorist organizations do not possess at the present time. However it is worth bearing in mind that such an organization may try to construct a simpler radioactive device, either by using its own scientists or by hiring scientists

on the black market (many unemployed nuclear scientists are available on the world market, having been discharged in the FSU, and are willing to sell their professional expertise and experience to the highest bidder).

- Terrorists may even seize a nuclear stockpile, one of the many stockpiles of various nuclear devices and other hazardous substances around the world.

Thus, terrorist organizations have various options for obtaining nuclear capability or a nuclear device. It is important to remember that terrorist organizations usually lack moral scruples and do not fear a nuclear response or damage to their international interests as a result of using nuclear weapons. All these factors make terrorist organizations more dangerous in nuclear terms than sovereign states.

Most prominent terrorist organization of today are Al-Qaeda lead by Osama bin Laden or Khan network, know for their interest and activities in trying to obtain and even build nuclear weapons. Bin Laden even openly declared that it was a religious duty of each Muslim to acquire such weapons. Khan network capabilities were exceptional. Much of nuclear equipment provided by the network was shipped aboard legitimate means of transport. The list of countries covered by Khan network includes Pakistan, South Africa, Turkey, Untied Arab Emirates, Japan, and a number of Western European countries. Contacts with Iran, Iraq, North Korea, Libya and Syria were made as well. Some claim that Al-Qaeda and other terrorist organizations were customers of the Khan network.

Even though there is no direct evidence that either nuclear weapons or the nuclear material needed to make one has fallen into the hands of terrorist groups, the threat is real and should be addressed at the highest level of priority.

6. Treaties and agreements guarding nuclear security

The international community has addressed the issue of nuclear security in two ways: first, the elaboration of multilateral international treaty regimes intended to prevent the proliferation of weapons of mass destruction; second, formation of non-treaty arrangement aimed at preventing the proliferation of technologies and equipment.

The **Nuclear Non-Proliferation Treaty** is a treaty, opened for signature on July 1, 1968, to limit the spread of nuclear weapons. The vast majority of sovereign states (188) are parties to the treaty. However two out of seven confirmed nuclear powers (i.e., those that have openly tested nuclear weapons) and one possible nuclear power have not ratified the treaty, and one self-proclaimed nuclear power has withdrawn.

The treaty is often summarized as having three pillars: nonproliferation, disarmament, and the right to peacefully use nuclear technology.

Here, issues of compliance are extremely essential. What is more a failure to address non-compliance in a proper manner is perceived as undermining the viability of the nonproliferation regime. All countries, signatories of NPT are obliged to place all nuclear materials and facilities using such materials under IAEA inspection. However, we have obviously seen cases where Iran, Libya, South Korea doing just the opposite.

Nonproliferation may be facing a more basic challenge: some states may believe that they need nuclear weapons to protect themselves against intervention by more powerful states. For instance, North Korea justified its development of nuclear arms as a deterrent against United States.

Australia Group, Missile Technology Control Regime, Zangger Committee and the Nuclear Suppliers Group, The Nunn-Lugar program

correspond to the non-treaty arrangement aimed at preventing the proliferation of technologies and equipment.

7. The Future

Different things can be done to combat illicit trafficking in the future. For instance, of great help and assistance would be equipping all strategic borders with neutron radiation detectors, increasing training of customs and border patrol officers. Another thing would be to assist states to begin convert monitoring by hidden detection devices and mobile radiation detection units. Increasing anticorruption efforts could make a positive impact as well. Rewards for detection and higher salary could make a difference. States should encourage and improve intelligence sharing among each other. Enhanced transparency and international cooperation between nuclear and law enforcement authorities as well as international investigation and research into the potential involvement of organized crime, existing trafficking networks, and international terrorist organizations in illicit trafficking activities could produce substantial improvements as well.

Nuclear weapons cannot be uninvented; therefore, states should strive for increasing security of its citizens and act accordingly. Continued and intensified international and bilateral cooperation is clearly necessary if the threat of illicit nuclear trafficking in the NIS is to be adequately addressed. Finally, states should mandate greater cooperation and coordination between international organizations that are responsible for addressing the threat of illicit nuclear trafficking, such as the International Atomic Energy Agency, the World Customs Organization, and Interpol.