

The Global Nuclear Smuggling Situation and its Governance

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Abstract: *Since human kind enters the nuclear age, nuclear smuggling is an important way of nuclear proliferation. With proliferation of sensitive nuclear materials and nuclear technology, nuclear terrorism has become a real threat to global security, and is included in the global nuclear security agenda. To combat nuclear smuggling has become the front-line defense to prevent nuclear terrorism. In twenty-first Century, nuclear smuggling is featured by the development situation that the global architecture is decentralized, fissile material proportion immobilized, crime team organized, and criminal activities professionalized. The international community should strengthen multi-level cooperation in various fields completely plug the terrorist channels for obtaining nuclear capability at the roots-level, and eliminate the potential security risks of nuclear proliferation.*

During March 24 to 25, 2014, the Third Nuclear Security Summit held in Hague, Holland. This summit again focused on nuclear security issues, stated that nuclear terrorism has become a real global threat, and encouraged making joint efforts in three aspects, i.e. reducing nuclear material quantity, strengthening the security of nuclear materials and deepening international cooperation to collectively respond to the challenges in the field of nuclear safety. Nuclear smuggling is an important channel for the spread of sensitive nuclear materials, the United Nations Security Council Resolution 1540 seriously concerns about the threat of illicit trafficking of Nuclear-biological-chemical weapons and their means of delivery plus related material, and calls it the increased new perspective of non-proliferation issue.¹ In twenty-first Century, nuclear smuggling is featured by the development situation that the global architecture is decentralized, fissile material

proportion immobilized, crime team organized, and criminal activities professionalized. The international community should strengthen multi-level cooperation in various fields, promote governance of nuclear issues and eliminate the potential security dangers of nuclear proliferation.

I. The Status Quo of a Global Nuclear Smuggling Problem

Since human race enters the nuclear age, nuclear smuggling is an important way for nuclear proliferation. The 9/11 terrorist attacks forced people focus on the terrorists ability to launch a WMD attack. To obtain nuclear capability by going through the normal development access, terrorists face obstacles in the capital, technology and development sites. From 1945 to 1947, the U.S. "Manhattan nuclear weapons program" consumed US\$23.7 billion, the bulk of which was used for the concentration of and purification of

fissile material². However, if terrorists resort to illegal channels to obtain nuclear materials, to possess nuclear capability is no longer an unattainable strategic goal. Manhattan plans' participant and winner of the Nobel prize in physics Luis Alvarez points out that if terrorists can get more than 90% purity high-grade uranium, they only need to divide it into two parts and collide them, which can release high equivalent explosive power.³ U.S. nuclear smuggling expert David Albright also stresses that terrorists can acquire enough nuclear material, and to develop a nuclear weapon costs only several hundred thousands U.S dollars ⁴.

After the end of the cold war, nuclear smuggling has experienced three stages. The first stage is from 1991 to 1996. During the disintegration of the Soviet Union, a large amount of nuclear materials disappeared without a trace, part of it was transferred to the illegal market, but nuclear smuggling in this period did not yet form a scale market, only in a speculative nature. Participants were inexperienced in the smuggling market, many of whom were arrested for selling nuclear materials in Western Europe. The second stage is from 1997 to 2000. Nuclear smuggling was in recession, the number of smuggling cases dropped significantly. Some smugglers realized the difficulties to break through the Western European strict security system, and decided to abandon the nuclear smuggling business, but there were also some trying to seek a breakthrough in weak export control regions. The third stage is after the event of 9/11. Countries all over the world strengthen supervision of nuclear smuggling, so the amount of intercepted nuclear materials increased. In 2003, a nuclear smuggling network established by Pakistan's nuclear bomb father A.Q. Khan was exposed, which reveals nuclear smuggling has become a global security challenge.

The twenty-first Century nuclear

smuggling presents four basic characteristics: Firstly, in terms of global layout, a posture of the Black Sea-centered distribution is formed, stretching to all continents in the world. The Black Sea region is the world's nuclear black market center, in which in recent years, most of the weapon-grade nuclear material smuggling cases occurred in the region. The Black Sea is the largest inland sea in the world, located along the coast are Russia, Georgia, Turkey, Romania, Bulgaria, and Ukraine, as well as Armenia, Azerbaijan, Moldova and Greece are also regarded as the region's heavy actors. In important ports such as Batumi of Georgia, Novorossiysk of Russia and Istanbul of Turkey along the coast of the Black Sea, smuggled nuclear materials are often intercepted.⁵ In the Black Sea region, there are three nuclear smuggling routes: The first is from Russia to Turkey via Georgia or Azerbaijan, or from Armenia to Iran. The second is from Azerbaijan to the inland area of Georgia and Turkey. The third is from Georgia to Chechnya and Turkey via Azerbaijan or Armenia, etc.⁶

Currently, the nuclear smuggling market can be found across the world on all continents, smugglers are not only engaged in illegal trade in less developed countries such as Afghanistan and the Democratic Republic of the Congo, etc., but also take the developed countries such as Germany and France as the trading market places. U.S. nuclear safety experts Kenneth Luongo has made this assessment of the current nuclear smuggling situation: security risks in Russia and the former Soviet Union are not solved, which still presents a outward-stretching trend.⁷ The nuclear security incidents cases in recent years are diversified with scope expanding. Shinkolobwe uranium mine located in Katanga Province of Congo is illegally explored and its products enter overseas markets. In November 2004, Armed robbers broke into the Palin

Darbar nuclear materials storage repository in South Africa, and in August the following year, Taliban launched the suicide attack on the armament factory building nuclear weapons in Pakistan, and the two acts failed to intercept any nuclear weapon, but fully demonstrate the destructive potential of a similar attack. On November 14, 2013, the police in Durban city of the South Africa seized 1 kilograms of uranium, this transnational crime has also attracted the attention of experts.

Secondly, in terms of proportion, the proportion of fissile material is relatively fixed while the smuggling of radioactive materials increased significantly. The smuggling database in Austrian University of Salzburg points out that, from the years 2001 to 2009, the exposed number of nuclear smuggling cases nearly doubled that of the 1990s. In the 1990s and the first decade of the 21st Century, the proportion of fissile material in the trafficking cases is basically fixed, which is about 20%, among which Fissile material for nuclear weapons accounts for 20%, and more than 20% highly enriched uranium and plutonium_239 accounted for 20% of these fissile materials⁸ The smuggling database of the IAEA notes that from 1993 to 2012, a total of 2331 illegal cases of stealing, selling and other illegally possessing radioactive materials occurred.⁹ Among them, the proportion of fissile material smuggling was rather small, only 16 cases involving illegal acquisition of highly enriched uranium or plutonium. Despite of only a dozen cases of smuggling fissile material, but it may lead to serious security consequences. The IAEA released the nuclear materials "significant quantity", which is enough to make a nuclear weapon, i.e. the equivalent of 8 kilograms plutonium, 25 kg high enriched uranium, 75 kg low enriched uranium, or 8 kg uranium_233.¹⁰

In recent years, several weapon-grade nuclear material smuggling cases occurred. In

the years 2003, 2006 and 2010, 170 grams, 100 grams and 16 grams of high grade uranium enriched up to 89% was respectively intercepted in Georgia.¹¹ In June 2011, Moldova police seized 2 kg of uranium_235. These cases are likely to be a part of the larger-scale smuggling case to be cracked. If any organization accumulates adequate weapon-grade nuclear materials to develop a nuclear weapon, and develop a simple nuclear detonation equipment, it will have the ability to instantly destroy any city in the world.

Thirdly, in terms of the crime team structure, nuclear smuggling presents organized crime tendency, and formulates a large multinational nuclear smuggling network. The core personnel of a nuclear smuggling network is often experienced nuclear professionals and project planners, and the peripheral personnel and scope are still broader and more variable, including intermediary companies responsible for transportation and sales, and people responsible for money laundering and documents forgery. Transnational smuggling networks are engaged in speculative trading, each deal has a temporary network and contacts, and keeps ready to replace the overseas trading company all the time. Iraq set up a procurement network by more than 200 companies under disguise, while South African nuclear weapons program also set up a global supplier network. Those staff engaged in sales activities often had no understanding of the network core policy, so it is difficult to assist the police to eradicate a smuggling network. With the joint efforts by the IAEA, the United Kingdom and the United States, only 10% of the Kader Khan smuggling network staff get legal punishment, some are still engaged in smuggling activities in South Asian, Southeast Asian and European and African regions.¹²

The complexity of transnational smuggling network is remarkable viewing from

the size of the A. Q. Khan smuggling network. This Network includes three transport channels on land, at sea and in the air, having used Malaysia Scomi Engineering bhd to produce centrifuge components, used the networks in Europe, the Middle East and Africa to purchase other parts, and used SMB computer company in Dubai, the United Arab Emirates as a pretext. Khurshid Khan, a Pakistani official in charge of nuclear safety, once confirmed, the main members of the network from 20 countries.¹³ The well-organized and large scale smuggling networks have the dual-use materials for nuclear weapons shipped in mixture with a large number of non-sensitive materials. The strict organizational structure increases the probability of successful trafficking. Just as experts said that a smuggling network may deceive any supply side in any country involved in the illegal sales.¹⁴

Fourthly, in terms of smuggling method, smugglers take flexible tactics, and break through the nonproliferation system vulnerable loop-holes by professional techniques. The nuclear smuggling networks are good at adjusting tactics according to the changing situation. A. Q. Khan is good at changing marketing focus in line with the changing global arms control policy. As export control policy focuses on control of uranium processing, Khan takes the turn to the production of highly enriched uranium. As Western countries generally strengthen export control, Khan has nuclear equipments exported by dismantling them into parts, and has the manufacturing nuclear equipment factory established. The recent uncovered smuggling case prove that some nuclear facilities staff has formed a community of interests with these criminal gangs. They can secretly steal nuclear materials, and know how to take them overseas, so the means of the smuggling gangs are more subtle, it is extremely difficult to detect.¹⁵

Nuclear smugglers are good at finding

loopholes of law enforcement and nuclear export control system. They use global smuggling teams to collect information of the main ports in the world. Smugglers, before transport of the smuggled goods, will first use radium radiation harmless watches to test the sensitivity of the customs detection instruments. Western customs officials hold that smugglers are more and more adapted to shielding radioactive sources, for example, using lead-packed radioactive material, fixing it onto a car, instead of carrying it. In the information age, smuggling gangs also use high-tech for committing a crime, obtaining foreign citizenship through the network, and doing money laundering in a lax-managed bank. Just as former U.S. National Intelligence Director John M. McConnell said, in the globalized economy, the days when a few countries monopoly the most dangerous technology has gone for ever.¹⁶

II. Global Nuclear Smuggling Root-causes

Former IAEA Director General Elbaradei pointed out that we cannot think for granted any more that the international community can effectively deal with the magnificent risks posed by radioactive materials, and the smuggling has fundamentally changed the previous security hypothesis.¹⁷ Nuclear smuggling has become the chronic disease of non-proliferation system. The reason why the issue cannot be rooted out due to illegal trading huge profits, demands of multiple actors to acquire nuclear capability and global nuclear security system loopholes and poor governance.

First, lucrative profits of illegal trade is a main factor of nuclear smuggling. Nuclear smuggling is a high-risk industrial trade, there is a great uncertainty whether a buyer can be found and money made. However, smugglers are willing to take a risk, for which the main reason is that the seduction of profits

unable to be resisted. Khan is a national hero in Pakistan, but still engaged in illegal nuclear trafficking, in part because of its making hundreds of millions of dollars in profit. The high price of nuclear materials also attracts a large number of criminals to get involved in this industry. In the nuclear black market, the price of highly enriched uranium is up to at least 1 gram per ten thousand dollars.¹⁸ In the depression regions, nuclear facilities staff in order to make ends meet is likely to steal nuclear material. With the proliferation of nuclear weapons and related technology, a country or non-governmental organization with strong financial resources, can spend big money to employ retired nuclear scientists to work for them, and get access to nuclear materials through smuggling. Some government officials may also be bought over to assist the nuclear smuggling. U.S. CIA former director George Tenet disclosed, in today's market, as long as one has US\$100 million, one is able to master nuclear capability.¹⁹ A transnational crime expert Louise Shelley warns that in support of adequate funding, the most serious act of smuggling may probably still be unpunished, because it is in professional operation, assisted by corrupt officials, helped with establishment of a smuggling cyber network, and is able to carry out large-scale shipment activity.²⁰

Second, demands of multiple actors to acquire nuclear capability are nuclear smuggling foundation. Some countries believe that nuclear weapons can guarantee its security, endow its great power status and regional influence, so they whole-heartedly seek to develop nuclear weapons and technology. Mark Fitzpatrick, U.S. former Assistant Deputy Secretary of State for Nuclear Non-Proliferation, in IAEA report points out that Iraq, Iran, North Korea, Libya, Israel, India, South Africa, Brazil, Argentina, Egypt and Syria tried through illegal channels to buy

nuclear materials or technology.²¹ Nuclear Non-proliferation Treaty has a limited binding on the State Party, a country in the name of the peaceful use of nuclear energy can engage in secret uranium enrichment activities, and to conceal its nuclear capabilities. In Syria the construction of a nuclear reactor was discovered at the least 5 years later; Libya's nuclear program was undiscovered until 2003 the maritime interception of shipment of uranium enrichment equipment by Khan to Libya.

Compared with states, efforts by non-governmental actors to seek nuclear capacity are even more worrying. Non-governmental actors such as terrorist organizations, transnational crime gangs, separatist movements and extremists clearly set acquiring nuclear weapons their political goals. Ben Ladin once pointed out the possession of a nuclear weapon is the Al Qaeda "religious duty". From the beginning of 1990's, Al Qaeda has tried to buy highly enriched uranium in Africa, Western Europe and the former Soviet Union. Al Qaeda personnel had consulted nuclear weapons experts in the countries such as Pakistan, even tested conventional explosives used for manufacturing nuclear weapons. Experts emphasized that Al Qaeda with the Islamic Movement of Uzbekistan may have established a dangerous nuclear terror alliance.²² Islamic Movement is responsible for finding security vulnerabilities in Uzbekistan or Kazakhstan's nuclear facilities and acquiring nuclear materials, and helping Al Qaeda assemble a simple nuclear detonating device.

Third, the global nuclear security system vulnerabilities provide opportunities for nuclear smuggling.

Firstly, the nuclear weapons and materials storage in the world still has a hidden danger. As far as nuclear weapons are concerned, the main security risks come from the lost nuclear

weapons during the USSR disintegration. Russia's former defense minister Rodionov confirmed, after the collapse of the former Soviet Union, the Russian nuclear arsenal lost 40 suitcase-type tactical nuclear warheads.²³ As far as nuclear materials go, the global high enriched uranium reserves are 1390 tons, and separated plutonium 490 tons,²⁴ and these nuclear materials scattered in hundreds of storages in more than 30 countries in the world, some facilities only take rather limited safety protection measures. At present in the world there are 130 research reactors still using highly enriched uranium as fuel, which is enough to make several hundred warheads equivalent to the U.S. nuclear bomb dropped in Hiroshima.²⁵ Criminals may attack the nuclear facilities, or intercept in the process of nuclear material transportation or transfer, diverting nuclear material into illegal trading channels.

Secondly, the existing nuclear security mechanism is still insufficient to intercept all nuclear smuggling actions. Nuclear products smuggling networks scatter in the global legal trade worth billions of dollars. To find radioactive material in the selling list of tens of thousands of products is tantamount to look for a needle in the ocean. The radioactive detection devices in the main ports cannot seize all the smuggling cases. Since weapons grade nuclear material radiation is lower than that of many radioactive materials, so only experienced customs personnel can be successful. American ABC television news team in September 2002 and August 2003, twice succeeded in taking to the border 6.8 kg of depleted uranium almost equal to highly enriched uranium. If smugglers separate certain amount of highly enriched uranium into several parts, they may smoothly pass through any country's border control. One authority official points out, even if the intelligence agencies and law enforcement departments are more successful in interception of nuclear materials, but can only intercept

60% to 70% of the smuggled nuclear materials.²⁷ This means that a certain amount of nuclear materials is in the criminals hands.

Fourth, poorly governed regions provide nuclear smuggling with trading channels.

The nuclear smuggling, drug trafficking and persons trafficking all appear in poorly governed regions. In these areas, many traditional security issues and non-traditional security issues are intertwined, making it the black holes in the global governance system. Antonio M. Costa, executive director of the United Nations Office on Drugs and Crime points (UNODC) out that the illegal smuggling tend to make use of chaotic regions as a trading place: Insecurity leads to crime, crime aggravates the insecurity, if one first draws a map of global conflict, and then draw a road map of global nuclear smuggling, one will be surprised to find that the two maps are similar. The South Caucasus region is an area of high incidence of nuclear smuggling. In Caucasus region, there is a territorial dispute between Armenia and Turkey, between Armenia and Azerbaijan and between Georgia and Russia. The chaotic border areas have become an important channel for nuclear smuggling. The Caucasus region is located at the intersection of the Balkan route and Northern path from Afghanistan to Europe used by drug traffickers. Resources competition, territorial disputes, major powers rivalry coupled with ethnic and religious strife, plus weak governance structure and weak export control system together make the region a hotbed of smuggling nuclear materials. In addition, political unrest in nuclear countries may also lead to loss of nuclear materials. For example many nuclear experts are worried that political turmoil in countries such as Pakistan will lead to the consequences of the collapsed Soviet Union, resulting in a large amount of nuclear materials into illegal channels.

III. Governance of the Nuclear Smuggling Problem

In the new situation of revival of nuclear power and proliferation of nuclear technology, nuclear smuggling has become a short-cut for states and non-governmental actors with nuclear ambitions to acquire nuclear capability. Nuclear smugglers are proficient in arms control knowledge, master advanced technology, and become good at finding loopholes in the system of arms control, to eradicate these threats face difficulties. U.S. former Assistant Secretary of Defense professor Graham Allison of Harvard University and Russian former Deputy Defense Minister Andrei Kokoshin called the global cooperation of governing WMD weapons a "new containment policy."²⁹ This new containment policy is different with American containment of the Soviet Union in the cold war, it is no longer takes the form of major powers confrontation, but needs to establish a global cooperation framework to prevent the radioactive material from proliferating. Two is that the target is more diversified, not only including states, but also other non-governmental actors such as terrorists and transnational crime gangs, etc. Three is that the non-proliferation efforts cannot expect the thorough collapse of potential rivals, and in the end, will be a long-term fight at multi-layers.

The advocate for "Cooperative Threat Reduction Program"(CTR) Richard Lugar points out that the "defense in depth" to prevent the WMD weapons proliferation includes four defense lines. The first defense line is prevention, to ensure the security of nuclear materials from the source. The second defense line is a deterrent and interception, mainly to stop the nuclear weapons and nuclear materials from being smuggled. The third line is crisis management, which means that once the situation evolves into the crisis level, quick

response is needed. The fourth line is the military defense, meaning to launch a military strike against the adversary under the necessary conditions.³⁰ The first line of defense is to control nuclear smuggling in the source, the second is to crack down on the nuclear smuggling supply lines. The international community should focus on the first two lines of defense to crack down on nuclear smuggling. If terrorists are able to break through the second line, possess a nuclear weapon or a dirty bomb, will hold an initiative position in the non-proliferation process and to detect or prevent their attack will be extremely difficult. A terrorist WMD attack may lead to a disaster shocking the world, trauma to any one country is no less than a war in the world.

As early as a few decades ago, the famous physicist Albert Einstein once pointed out that in the nuclear age, people urgently need to forsake the outdated mindset to respond to new challenges: Although atomic energy release has changed the world, our way of thinking has not changed with it. This will bring us closer to hitherto unknown disaster situation.³¹ To stop non-governmental actors such as terrorists from using WMD weapons is more difficult than to constrain the behavior of a sovereign state, because they are not subjected to boundaries and ethics standards but will resort to every conceivable means in order to achieve a political aim. Therefore, the international community must attach greater importance to the threat of nuclear smuggling, strengthen cooperation in various fields at multi-level, and strengthen the governance of nuclear smuggling from the following three perspectives.

Firstly, to take effective measures to ensure the safety of nuclear materials. The nuclear smuggling exists first of all because of the nuclear material security loopholes. The most effective means of combating nuclear smuggling is to completely cut off the supply

chain, and prevent any nuclear weapon or nuclear material from getting into the circulation channel. Do a good job of nuclear material exploration, balance keeping and the physical protection. Nuclear safety experts stress that the more scattered the nuclear weapons devices or weapons grade nuclear materials, the more vulnerabilities in their transport or storage, but their centralized management can completely remove nuclear materials from insecurity. Minimize the use of highly enriched uranium in the civil nuclear industry, and take the same standards of protection on nuclear weapons as on civil nuclear fissile material. Just as Richard Lugar forecast that only when the security of each nuclear weapon and every gram of nuclear materials in the world can be protected in accordance with the most stringent standards, the war on terror can achieve the final victory.³²

Secondly, controlling nuclear smuggling by using diplomatic, judicial and technical means. From the diplomatic perspective, all countries need to deepen cooperation in the existing non-proliferation framework. In June 2002, the G-8 summit decided to establish an anti-proliferation of WMD weapons global partnership. In July 2007, the United States and Russia jointly launched the Global Initiative to Combat Nuclear Terrorism, and the UN Security Council Resolution 1540 and Resolution 1887 call on all countries to build joint defense lines against nuclear smuggling. From the judicial perspective, Saudi Arabia and Yemen have achieved very fruitful cooperation in the fight against conventional weapons smuggling, so have Indonesia, Singapore and Malaysia in the fight against drug smuggling. Every country in the world should learn from the successful experience of these countries in jointly combating transnational crime, advance cooperation in police administration, border service and information sharing. From the

perspective of science and technology, new emerging technology is a good weapon to combat nuclear smuggling. Targeted at the present status of the border equipment difficult to detect highly enriched uranium, more sensitive detection devices should be developed and promoted globally, and meanwhile combat nuclear proliferation with other cutting-edge scientific and technological achievements.

Thirdly, strengthen the nuclear security system, and improve the existing global governance. The existing nuclear security system includes important conventions such as Convention On the Physical Protection of Nuclear Material, Convention on Nuclear Security, Convention On Early Notification of a Nuclear Accident, Convention On Assistance in the Case of Nuclear Accident Or Radiological Emergency, and Joint Convention On Safety of Spent Fuel Management and Safety of Radioactive Waste Management. To more effectively combat nuclear smuggling requires realigning forces and resources of the international community, effectively playing the roles by international intergovernmental organizations, non- governmental organizations and other nonproliferation actors, and setting up a multi-level global governance structure. At present, expertise of main international organizations in non-proliferation has not been effectively integrated, for example, IAEA focuses on combating smuggling in respect of domestic nuclear security and export control, WTO is good at management of health risks caused by WMD weapons, and other international organizations are more adept at detecting some radioactive materials.³³ If all factors in the global governance on non-proliferation can be integrated, a more solid defense frontline to combat nuclear smuggling can be built in order to respond to the severe nuclear security challenges.

Footnotes:

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