

International Nuclear Security Situation And China's Approach

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Abstract: Since 2010, the three Nuclear Security Summits have made a number of achievements, but the international nuclear security situation is still not relaxed. The rapid development of China's domestic nuclear facilities and a large amount of nuclear and radioactive materials related to nuclear power, active international nuclear black market in China's surrounding regions, rather serious domestic and international terrorist threats as well as the emerging technology development bring about new challenges to nuclear security. Facing the complicated and long-term nuclear security situation, China from the perspective of monitoring mechanism, laws and regulations system, technical capability-building and nuclear emergency preparedness, takes a series of effective measures to build the national nuclear security capacity, and strictly fulfills its international obligations, actively participates in upgrading the international nuclear non-proliferation regime and relevant international rules, and actively takes part in the Nuclear Security Summit process, strengthens bilateral cooperation on nuclear security with major countries especially the United States of America, and jointly organizes various training with International Atomic Energy Agency, which has made great contributions to upgrading the global nuclear security level. At the end of the Nuclear Security Summit process, China should continue to strengthen its domestic nuclear security capacity building, and promote the international community to treat the root causes and symptoms, adopt a comprehensive strategy, and work together, effectively prevent and dissolve the nuclear terrorist threats.

Since "9/11" attacks, the international community is increasingly concerned with the nuclear terrorist threats. A global new round of nuclear power development boom has increased a possibility for a terrorist organization to obtain nuclear materials and attack nuclear facilities, and the rapid growth of global logistics and growing popularization of cyber networks make it more difficult to prevent nuclear smuggling and nuclear technology proliferation. China, as the global nation with the fastest development of nuclear power, and with the largest number of neighbors and the world's leading trade nation as well, has an arduous and complex task to prevent nuclear terrorism. The Chinese Government attaches great importance to nuclear security safeguard issues, adopts a series of comprehensive and effective measures, and make improvements and adjustments in line with the changing security situation. As a

responsible major country, China has actively promoted the international nuclear security safeguard cooperation, provided a large number of public goods for the international community, and made a great contribution to improving the global nuclear security environment.

I. The Current International Nuclear Security Situation is still complicated

With development of globalization and cyber network, China has become more and more closely connected with the world. As a result of the comprehensive role of internal and external factors, the global nuclear security situation is stern and complicated, which, in summary, mainly includes the following four aspects:

First, the international nuclear smuggling is still rampant. In recent years, international underground nuclear smuggling has become rampant, according to the "illicit

trafficking in nuclear and other radioactive materials database" statistics of International Atomic Energy Agency (IAEA), in 2014 there were 257 cases of theft and illicit trafficking in nuclear and radioactive materials, many of which are serious cases. The international nuclear smuggling-stricken areas mainly cover China's neighboring regions such as Central Asia, South Asia and others. After the disintegration of the Soviet Union, the loss of nuclear technology and nuclear materials and personnel of some former Soviet republics including Russia is rather serious, and in recent years, the cracked HEU smuggling cases in Central Asia shocked the world even more. The above-region is also the main overseas region for the "East Turkistan" forces to survive and carry out activities, the possibility of the terrorist organizations inside China to obtain nuclear material overseas cannot be completely ruled out, which poses a real threat to nuclear security safeguard in China to a certain degree.

Second, international terrorist forces such as the "al Qaeda", "Islamic State" and others are still trying hard to seek pursuit of nuclear materials and nuclear technology. Obtaining weapons of mass destruction has been a target of many terrorist organizations, and al Qaeda has made numerous efforts in this regard. Since 2015, the western media continuously report that the Islamic State seeks nuclear and radioactive materials in an attempt to create a dirty bomb for nuclear terrorist attacks. The Islamic State extorts from the hospitals and research institutions radioactive sources in the occupied area, and intends to purchase nuclear and radioactive materials from the black market. The terrorist and extremist organizations such as the "East Turkistan" have long-term collusion with international terrorist organizations such as al Qaeda, and in recent years some East Turkistan elements even go to war in Syria, once the "East Turkistan" forces obtain fissile materials

or radioactive materials by international terrorist organizations matchmaking, which will constitute a major threat to China's national security.

Third, the radioactive sources pose rather serious potential security risks, or become sources for building a dirty bomb. The IAEA has pointed out that globally over 100 countries have loopholes in their process to prevent radioactive materials from being stolen, even the United States once met with the terrorist attacks neglects the national radioactive substances control. The U.S. Nuclear Regulatory Commission in a report admits that since 1996, it has lost more than 1500 pieces of radioactive sources; the whereabouts of more than half of them are unknown. In addition, a report by the European Union shows that the EU countries lose more than 70 pieces of radioactive sources each year.¹ There are wide use of various radioactive sources in the global health, industry, agriculture and other sectors, with large amount, long cycle, and dispersed distribution, so the management is very difficult. In recent years, the management of radioactive sources has been strengthened by China's competent authorities, but there are still accidents of radioactive sources. According to incomplete statistics provided by the State Environmental Protection Administration, from 1954 to 2004 a total of more than 1500 radiation accidents occurred in China, with average of 30 accidents annually. In recent years moreover, the radiation accidents are still high, among which the lost or stolen radioactive sources are in first place.² Management vulnerabilities of radioactive sources could be exploited by terrorists and criminal gangs, causing serious harm to the state and social stability, which makes the management of radioactive sources a severe practical problem in the current nuclear security safeguard in China.

Fourth, nuclear facilities cyber network

security cannot be ignored. In October 2015, a British think-tank report pointed out that with the extensive use of commercial software and dependence on digital technology, global civilian nuclear facilities face increasingly severe security threats of cyber networks. At present, the global nuclear power plants are generally lack of security training and relevant rules and regulations, communication is in shortage between engineering and design personnel and network security experts, nuclear power plants staff have no rules to follow on the key networks security, and there is lack of cyber security management process adapted specialized to nuclear power.³ In 2010, the "Stuxnet" virus destruction of Iran's uranium enrichment plant proves that "physical isolation" is not reliable, most nuclear plants need to be connected with IAEA and domestic regulators via the Internet, and face greater risks to be attacked by hackers. The scale of nuclear power plants under construction ranks first in the world, nuclear facilities cyber security standards need further improvement, the operation of nuclear power plants calls for big staff, relevant training is difficult, cyber network security risk is more prominent.

II. China's Domestic Nuclear Security Measures are Comprehensive and Effective

In China, the Chinese Government takes a series of effective measures to strengthen nuclear facility protection and radioactive materials supervision, establish and improve the export control mechanisms and the related laws and regulations system, strengthen the domestic control, knowledge training and law enforcement, and has gradually established a crisis management and an emergency preparedness mechanism.

From the perspective of radiation sources monitoring, in order to improve the universality and effectiveness of the management of radiation sources, the Chinese Government has

been making unremitting efforts. As early as 1989 it promulgated "Ordinance on Radiological Protection of Radioisotope and Ray Devices". In 2003, it promulgated the "Law of China on Prevention and Control of Radioactive Pollution", and subsequently, the Radioactive Source Coding Rules, as well as the Import and Export License Requirements for Radioactive Source adopted by departments concerned. These rules and regulations have laid the foundation for strengthening management of radioactive sources. The Ministry of Environmental Protection, on the basis of the existing radioactive waste storages in 25 Cities, carries out comprehensive planning for the national urban radioactive waste storages, and actively promotes the unified collection and storage of radioactive sources. The Chinese Customs has also accelerated establishment of relevant technical and management methods, and increase control of the radioactive source of import and export.⁴

From the perspective of the physical protection of nuclear materials and facilities, the Chinese Government has promulgated a series of laws and regulations, and exercised strict control over material, equipment and technology that can be used for development and production of nuclear weapons. Any person or entity without authorization is not allowed to manufacture, acquire, possess, develop, transport, transfer or use such items.⁵ In 1987 it formulated and released the Regulations of the People's Republic of China on Nuclear Material Control, in 1990 the Practice Guidelines of the Regulations of the PRC on Nuclear Material Control, in 1994 China National Atomic Energy Agency released the Regulations On Physical Protection of the Nuclear Materials International Transportation, in 1997 the Regulation On Nuclear Power Plants Security Protection, in 2013 The Permit Application on Contents and Requirements For Nuclear Material and the Nuclear Facilities

Import and Export Control, etc. and seven guidelines in total. In addition, China is working on "nuclear security regulations". The adoption of these regulations and technical guidelines has continuously improved China's nuclear security regulations and regulatory system.⁶

Export control is an important link to prevent nuclear proliferation by non-state actors. China always believes that effective export control is an important means to achieve the goal of non-proliferation, and takes a very responsible policy and measures to strengthen export control. After many years of efforts, China's non-proliferation export control completed the transformation from administrative management to legalized management, the relevant export control practices are basically compatible with the international common practices, with some even more stringent. In recent years, targeted at the growing threats of nuclear proliferation situation by the non-state actors, China has made special revision and supplement on many related laws. After joining the Nuclear Suppliers Group (NSG) in 2004, according to obligations undertaken as a NSG member, China respectively in 2006 and 2007 revised The Regulations of the PRC on the Control of Nuclear Export and The Regulations of the PRC on the Control of Nuclear Dual-use Items and Related Technologies Export. These amendments take the NSG export control criterion and China's non-proliferation export control policy as important standards, and added to the two Regulations the content of guarding against the nuclear terrorist acts, and clarified it as one of the legislative purposes for the Regulations. In 2012, in order to strengthen the administration of the nuclear import and export, China formulated The Government Commitment On Nuclear Import Management, China Atomic Energy Authority and the U.S. NNSA published the Technical Guidance On

Nuclear Export Control List. In 2013, China Atomic Energy Authority published The Handbook for the Government's Commitment On Nuclear Import Management. These measures have played a positive role in raising the level of nuclear expertise for nuclear export/import staff and strengthening nuclear export control compliance.⁷ In addition to efforts made directly by the Government, China's arms control think-tanks and research institutions have also made positive efforts in strengthening China's internal control on export, especially enhancing the control awareness of export enterprises and raising the level of enterprise management expertise of sensitive items, many Chinese enterprises are also actively involved.

In terms of nuclear emergency preparedness, China has always strengthened the nuclear emergency management with highly responsible attitude for the people's security and social security. As early as making the decisions for development of nuclear power, China spontaneously plans nuclear emergency work. In the process of development of nuclear energy, China, in the forms of adopting laws, administrative regulations and decrees, has determined the basic principles of nuclear emergency preparedness: keeping on the alert all the time, making active inclusiveness, unified command, strong coordination, protection of people, and protection of environment. China also through the legal system safeguard, institutional mechanisms safeguard and making plans of preparedness, establishes and improves national nuclear emergency preparedness management system. What is particularly worth mentioning is that in order to respond to a bad nuclear accident, on the basis of existing capacity, China will also set up a national nuclear emergency rescue team of more than 300 personnel, which mainly undertakes shock rescue and emergency task under complex conditions of heavy nuclear

accident, and participates in the international nuclear emergency rescue operations.⁸ In terms of anti-nuclear terrorism emergency drills, in recent years, China has successively held a series of national nuclear emergency preparedness joint exercises coded as "Jindun", "Changcheng", testing the combined coordinate work among the national and local-level anti-terrorism intelligence, prevention, emergency preparedness and emergency operation by the on-site command, and effectively enhancing the capacity and level of handling nuclear radiation terrorist attacks.⁹

III. Actively Participating in International Nuclear Security Cooperation

Internationally, China strictly fulfills its international obligations, actively participates in the international non-proliferation regime and relevant international rules-making, takes an active part in the Nuclear Security Summit process, strengthens bilateral cooperation on nuclear security with major countries especially the United States of America, and jointly organizes various nuclear security training courses with international organizations such as IAEA.

From the perspective of international compliance, China in the five permanent members takes the lead in ratifying Convention on the Physical Protection Of Nuclear Material (1989) and its amendments (2008), the International Convention on the Suppression of Acts of Nuclear Terrorism (2010) and other international instruments, and is a founding member of some international mechanisms such as the Global Initiative to Combat Nuclear Terrorism (2006). China supports the IAEA Code of Conduct On the Security and Safety of Radioactive Sources, and actively participated in Conference on Security of Radioactive Sources held in March 2003 in Vienna. China has strictly complied with the obligations of the UN Security Council Resolutions 1373, 1540

and 1887, and effectively prevented non-state actors from acquisition of sensitive nuclear materials.¹⁰ Since October 2004, China, according to the requirements of the UN Security Council Resolution 1540, has submitted to the United Nations the state reports on resolution compliance, and from the perspective of legislation, law enforcement and international cooperation, and made detail briefing on the measures taken by the Chinese Government to prevent and combat proliferation activities of non-state actors.

China actively participates in the Nuclear Security Summit process. Hu Jintao, Xi Jinping successively in the presidency of China attends the Summits. Hu Jintao in his speeches at the two previous summits made a comprehensive introduction to China's efforts to strengthen nuclear security. Xi Jinping at the Hague summit systematically expounded China "nuclear security concept" featuring rational, coordinated, and parallel characteristics, interpreting the four principles with stress on both development and security, both the rights and obligations, both independence and collaboration, treatment of both symptoms and root causes, and has far-reaching significance to further promote the international nuclear security cooperation.

The Sino-U.S. cooperation is a highlight of the international nuclear security cooperation. Since 2006, China and the United States have carried out a number of exercises on physical protection of nuclear items.¹¹ In early 2011, China and the United States decided to establish a radiation detection training center for illicit trafficking of nuclear materials in Qinhuangdao.¹² By the end of 2011, a pilot cooperative project of Sino-U.S. large port program was officially launched in Yangshan Deepwater Port, Shanghai, aiming at preventing nuclear and other radioactive substances illicit trafficking through installing the nuclear radiation detection system in the port.¹³ In

addition, China and the United States jointly published the "Technical Guidance on Nuclear Export Control List" to help nuclear export control staff to improve their level of professional knowledge. China cooperates with the United States to upgrade the security facilities of radioactive sources storage center, and collect several dozen extremely hazardous radioactive sources.¹⁴ In January 2011, China and the United States signed a Memorandum of Understanding on the Establishment of Center of Excellence on Nuclear Security. At present, the designing of the Center is completed, and the relevant construction work has already started. In November 2011, China established the national nuclear security technology center, undertaking the construction, operation and management of the Center of Excellence. The Center will be equipped with world-class equipments and technical forces such as nuclear materials analysis and testing of nuclear security equipment, response strength training, etc.; will become the largest nuclear security exchange and training center in Asia-Pacific region and the world as a whole with the most complete equipments, and the most advanced technology; is expected to formally put into operation in March 2016.¹⁵ During September 2015, President Xi Jinping paid a state visit to the United States, reached broad consensus, and obtained a series of important achievements, China and the United States signed the "Statement of Intent between China National Atomic Energy Authority and the U.S. Department of Energy on Further Strengthening Nuclear Security Cooperation", and planned to hold annual bilateral talks on nuclear security issues.¹⁶ On February 20, 2016, China and the United States held first nuclear security vice ministerial dialogue, with participation of the Ministry of Foreign Affairs, Ministry of Industry and Information Technology, National Defense Science and Industry Bureau, Ministry of Environmental Protection, and the General Administration of Customs on the Chinese side and the White House National Security Council, Department of State, Department of Energy, and Department of Homeland Security at the U.S. side. The two sides had in-depth

exchange of views on preparations for the summit, Sino-U.S. nuclear security pragmatic cooperation, international nuclear security issues and the two countries nuclear security policy and practice.¹⁷

China actively carries out international cooperation under the IAEA framework. In 2006, China participated in the IAEA Database on illicit trafficking in nuclear materials and other radioactive substances, and exchanged information and shared resources with other countries. In 2007, China and the IAEA signed "Practical Cooperation Arrangements for Nuclear Security Safeguard", and carried out cooperation in the field of security related to the Beijing Olympics. In 2010, China and the IAEA signed the second Practical Arrangements, extending cooperation to areas of nuclear security standards, nuclear materials and nuclear facilities physical protection, capacity building and personnel training, and nuclear security culture. In 2013, China and the IAEA signed the Practical Arrangements for China Center of Excellence On Nuclear Security Cooperation, making specific planning for using the forthcoming completed Center to strengthen cooperation in the field of nuclear security training.¹⁸

China has also made efforts to provide nuclear security assistance to developing countries. In recent years, China and the IAEA annually hold in China nuclear security training courses and seminars with a variety of themes, and provide assistance to countries in the region through technical explanations and personnel training. China has for many years donated to the IAEA Nuclear Security Fund used for nuclear security capacity building by countries in the Asia-Pacific region, and donated the independent R & D nuclear security equipments. In 2014 during the 58th session of the IAEA general assembly, China, the IAEA and Ghana signed Agreement to Supply Low Enriched Uranium to a Research Reactor, and officially launched the Ghana Micro-Research Reactor Low Enrichment Project.¹⁹

IV. Conclusion

China faces very complex nuclear security threat, the rapid development of China's domestic nuclear

facilities and a large amount of nuclear and radioactive materials related to nuclear power, active international nuclear black market in China's surrounding regions, rather serious domestic and international terrorist threats as well as the emerging technology development bring about new challenges to nuclear security. Facing the complicated and long-term nuclear security situation, China still has a long way to go.

In terms of domestic nuclear security governance, China, based on guidance of the overall national security concept and nuclear security concept, should make unremitting efforts for various mechanism development, pool various forces together to form a powerful force on nuclear security; should strive to block loopholes existing in the management of radioactive sources from the fountainhead, reduce possibility for terrorists to get proximity to and access to radioactive sources, and prepare an emergency management plan and a crisis handling drill; targeted at the new threats from cyber nuclear security and problems generated by other technologies development, should carry out effective research, and timely improve and implement the relevant security standards. Besides, it should carry out risk assessments on a regular basis at the national and local levels, timely grasp the changing threat dynamics, and do well preventive work purposely.

From the international perspective, to strengthen nuclear security, and overwhelm nuclear terrorism, we must trust each other, treat both symptoms and root causes, and engage in comprehensive governance. To this end, China should focus on the following work:

First, promoting the international community to work together to eradicate the root causes of terrorism. Whether it is terrorism or nuclear security, Western often applies palliative remedies, but to eradicate potential nuclear terrorist risks, the symptoms and root causes must be tackled together. The Chinese Government has always held that conflicts and turbulence are a hotbed of terrorism, poverty and backwardness are the soil for terrorism, that to completely eradicate terrorism, work should be carried out in three aspects of easing regional and

international tensions, eliminating poverty and strengthening anti-terrorism cooperation; that to take comprehensive governance measures from the political, economic, cultural and social aspects, to attach importance to solve the development problems, to eliminate the rich - poor disparity and social injustice, and narrow down the gap between the North and the South and properly resolve regional conflicts cannot simply rely on military strike operation. If protection of dangerous nuclear materials and nuclear facilities is partially emphasized to the neglect of eradicating the source of terrorism, then combination of terrorism and nuclear weapons will always be a nightmare of human society. So the anti- nuclear terrorism should follow the basic principles of eliminating terrorism—treating both the symptoms and root causes. President Xi Jinping pointed out that only to create a peaceful and stable international environment, develop harmonious and friendly state-to-state relations, and carry out harmonious and open cultural exchanges, can the root causes of nuclear terrorism and nuclear proliferation be rooted out, can lasting security and development of nuclear energy be achieved, which can be viewed that the President struck home on the matter.

Second, led by the Center of Excellence on Nuclear Security, providing quality public products for the international community, especially the surrounding areas. In addition to conducting extensive cooperation at the global level, it is necessary for China to advocate complementary cooperation focusing on common regional issues, especially in East Asia. East Asia occupies world's top priority place in the development of nuclear power, potential security risks are very high. In addition to China, Japan and South Korea, ASEAN countries are actively developing nuclear power. With rapid development of nuclear power, potential nuclear security and security risks in East Asia cannot be ignored. Many countries are new hands in the field of nuclear power, and rely on imports of nuclear power technology. These countries have diverse reactors models, and sign cooperation agreements with a number of major nuclear powers. Their nuclear

regulatory systems need to be improved, but are lack of capability and experience, and urgently need international community to help. Not only that, Southeast Asian and South Asian countries have a poor geographical environment, frequent tsunamis, earthquakes, and terrorist activities are rather frequent, which pose certain challenges to the safe operation of nuclear power. In addition, Fukushima nuclear accident aftermath repeatedly exposes the serious and long-term effect of Fukushima sewage leaks and also shows that many problems still exist in Japan's nuclear safety supervision. In view of a huge impact of the Fukushima nuclear accident on development of nuclear power in the region, it is also necessary for the regional countries to draw lessons, and resolutely prevent similar incidents from occurring again. China should, on the basis of "nuclear safety regulatory high officials meeting mechanism of China, Japan and South Korea and ASEAN nuclear safety regulatory cooperation cyber framework, promote the regional countries to further strengthen docking and improve the regional nuclear security.

Third, opposing a simple quantitative evaluation of the level of a country's nuclear security and promoting the international community to systematically and comprehensively look at various countries nuclear security efforts. President Xi pointed out that one cannot have a correct drawing without a ruler. Various Countries should earnestly fulfill their obligations under international legal instruments on nuclear security, comprehensively implement the relevant resolutions of the UN Security Council, consolidate and develop the existing legal framework on nuclear security, and provide institutional guarantee and generally applied guiding principles for the international nuclear security efforts. However, to fulfill the international nuclear security obligations is not equal to the identical nuclear security measures taken by all countries in the world. At present, in the international nuclear security field is blowing a blind quantitative comparison wind. For example, the Nuclear Threat Initiative-- a U.S. NGO—since 2012 before convocation of the Summit releases quantitative assessment report on Nuclear Security

Index, and intends to put all countries nuclear security level in the world in order. But in fact, the assessment index setting is simple and rough, and the ranking is not scientific. Firstly, wearing western sun-glasses, and setting up a large category of social factors of very high weight (is called "risks environment" in the second and third version), not considering "crimes" as more meaningful indicators, but establishing a series of "democratization" levels index full of western style democracy, thus, seriously distorting the total progress score of many countries including China. Secondly, in some sub-items of very high weight, the score and the actual situation are in serious differences. For instance, "physical protection of radiation material in transport process" accounts for 7.7% of the total high weight, China as early as in 2009 specifically issued the revised "Security Regulations On Transport of Radioactive Materials", but the report 2012 edition incorrectly gave China 0 mark, then the following two reports changed 0 to full mark without any explanation, an indicator modified leads to such great changes, we cannot but conclude the index methodology represents a big problem. Thirdly, the index does not take into account the huge differences of national conditions, and simplifies the index system, for example, considering whether emphasis is laid on detecting drug use, etc. as in review of the incoming staff background. Various countries have different national conditions and focuses on prevention are also different. If simply applying rough criteria, obviously the result will be distorted and absurd. Only in-depth analysis of the sources of the nuclear security threats of various countries, and taking targeted measures, can the level of global nuclear security be effectively improved. As President Xi said that one key is for one lock alone. Various countries have the particularities of their nuclear security situations, different national conditions, have different development stages of nuclear power industry, and face different nuclear security challenges. While stressing the fulfillment of international obligations by various countries, their rights to the nuclear security policies and measures best suited to their own national conditions should be

respected. Meanwhile, it is necessary for China to systematically and comprehensively promote China's achievements in the field of nuclear security and nuclear safety, and to avoid misunderstanding of other countries for lack of understanding.

In a word, to reduce the nuclear terrorist threats requires both domestic governance of all countries, and more inseparable international community collaboration. As the long-term and world-wide major

problem, nuclear security cannot be solved once and for all by a few summits concerns, nor be shelved because of the end of the nuclear security summit process. China and other countries should continue to maintain the attention and vigilance on nuclear security issues, and continuously strengthen all-dimensional measures to leave the terrorists with no opportunity.

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