Strengthening China-U.S. Cooperation on Nuclear Security

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Chinese assessment on the risk of nuclear terrorism threat

Generally, many Chinese nuclear experts believe :

- **Theft, seizure, and the explosion of nuclear weapons within China--implausible**

---Because China's arsenal is very limited, tightly monitored and guarded by heavy armed forces,

- **Theft of nuclear material and making a bomb--extremely low**

---They argue: the technologies necessary for manufacturing, delivering and detonating a weapon are very difficult for Chinese terrorists to obtain.

---China has established a strict regime of security and accountability of its nuclear materials.

---However, cannot rule out the possibility of terrorists smuggling in a nuclear weapon or nuclear materials from outside China.

- **Sabotage of nuclear facilities -- plausible**

---As the number of nuclear power plants is rapidly increasing--poses a challenge to China's nuclear security.

---the Fukushima accident may increase the interest of terrorists in targeting the NPP

- **Dirty bomb—the most realistic threat**

Rethinking the nuclear terrorism threat in China

- **Insider threat**

---the possibility of insider theft of nuclear materials in China cannot be ruled out, especially as China increasingly grows into a market-oriented society and contends increasingly with corruption.

- **Outsider threat**

---in particular, the terrorist forces of "East Turkestan," which the Chinese government believes have long been recipients of training, financial assistance, and support from international terrorist groups including Al Qaeda.

---recently, Xinjiang terror activities within and outside the region are increasing .

---US and China should have a common understanding of terrorist activities.

- **Smuggling concerns**

---China has borders with Central Asia and Pakistan---a high level of international terrorist activity and cause for higher levels of concern since the risk of nuclear smuggling and proliferation is believed higher.

---these regions are also the locations where the Eastern Turkestan Islamic Movement has a solid presence.

- **A security incident elsewhere would affect China**

---a security incident on the scale of Chernobyl, wherever it could potentially occur, would be a global catastrophe and would result in severe consequences that doom prospects for large-scale nuclear growth everywhere, foremost within China, which is the most rapidly growing nuclear power sector in the world.

China and Nuclear Security Summit (NSS)

- **Have raised the nuclear security issues to a higher political level and enhanced international consensus on the danger of nuclear terrorism.**
- **Chinese leaders actively participated in the three summits.**
- **Since 2010 NSS,the public and the media have begun to be more concerned about the issue of nuclear terrorism and security.**
- **Beijing views:**

--As Xijinping stated at 2014 NSS: "Enhancing nuclear security is a never-ending process"—the NNS has "the great responsibility of building international consensus and deepening nuclear security efforts."

-- Obey the principle of voluntarism

--Take practical steps to aid the developing countries

--Highlight consensus and avoid contentious issues, etc

China's Nuclear Security Policy

Reflected in Xi Jinping's statement at 2014 NSS:

We must follow a sensible, coordinated and balanced approach to nuclear security and put it on the track of sound and sustainable development.

- **equal emphasis on development and security, and develop nuclear energy on the premise of security.**

- -without an adequate response to the potential security risks of nuclear materials and facilities, such a bright future [the peaceful use of nuclear energy] will be overshadowed by dark clouds or even ruined by resulting disasters.

- **equal emphasis on rights and obligations, and push forward the international nuclear security process on the basis of respecting the rights and interests of all countries.**

--more countries should join international legal instruments relating to nuclear security--all countries should fulfill their international obligations

--respect their right to adopt nuclear security policies and measures best suited to their specific conditions as well as their right to protect sensitive nuclear security information.

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China's Nuclear Security Policy (Con't)

- **Equal emphasis on independent and collaborative efforts, and seek universal nuclear security through win-win cooperation**

--Nuclear security is first and foremost a national goal, and the primary responsibility must be borne by national governments.

--Nuclear security is also a global endeavor. The loss of nuclear material in one country can be a threat to the whole world.

- **Equal emphasis on treating symptoms and addressing causes, and advance the nuclear security endeavor in all respects with the goal of removing the associated risks at the root.**

-- More importantly, we must tackle the root causes. We need to foster a peaceful and stable international environment, encourage harmonious and friendly relations between countries, and conduct exchanges among different civilizations in an amicable and open-minded manner. This is the only way to tackle the root causes of nuclear terrorism and nuclear proliferation, and to achieve lasting security and development of nuclear power.

China's progress made between 2010 NSS and 2012 NSS

--Presidents Hu Jintao and Barack Obama announced cooperation on the CoE at 2010 NSS. --January 2011, China and the US signed the Memorandum of Understanding for Cooperation in Establishing a Center of Excellence on Nuclear Security --November 2011, China established the National Nuclear Security Technology Center, which is responsible for the construction, management and operation of the CoE.

--Since April 2010, China has organized, in cooperation with the IAEA, the US and other countries, about 20 training courses and seminars for more than 500 staff involved in nuclear security.

--China ratified the International Convention for the Suppression of Acts of Nuclear Terrorism in August 2010.

--In September 2010, China and US signed an agreement to convert a miniature research reactor in China from using HEU to LEU fuel.

China's progress made between 2010 NSS and 2012 NSS (con't)

--In January 2011, China and the US signed the Memorandum of Understanding for Cooperation in Jointly Establishing the Radiation Detection Training Center of China Customs.

--China and US have jointly implemented the Yangshan Port Pilot Program in Shanghai under the "Megaport Initiative", and the Program was officially inaugurated on 7 December 2011.

--In August 2010, China and the IAEA signed the Practical Arrangement on Nuclear Security Cooperation , including nuclear security regulations and standards, nuclear security of major public events, capacity building and training.

--In 2011, China contributed US$200,000 to the IAEA Nuclear Security Fund to support China and other Asian countries' nuclear security capability building, and will positively consider making new contribution.

China's progress made between 2012 NSS and 2014 NSS

--August 2012 China issued a revision to its Nuclear Emergency Response and Preparedness document of 2006. Also the government issued its "National Nuclear Emergency Response Work Plan (2011-2015)

--Helping Ghana to convert its HEU research reactor under the framework of the IAEA.

--In September 2012 China and US setting up the China Customs Training Center for Radiation Detection. This center has hosted eight domestic training courses for over 210 customs officials, and its first radiation detection technology training workshop for Asia-Pacific countries.

--In the process of drafting National Nuclear Security Regulations

--The CoE broke ground on 29 October 2013 and to be completed in 2015

China’s progress made between 2012 NSS and 2014 NSS (con’t)

--In September 2013, China and the IAEA signed the Practical Arrangements of Cooperation on China's CoE

--China cohosted a seminar on IPPAS with the IAEA and is giving positive consideration to inviting the IAEA to conduct IPPAS service for one of China's nuclear power plants.

--China continued contribution to the IAEA Nuclear Security Fund, and giving positive consideration to further increasing its donation.

--Co-hosted with IAEA over 10 seminars/workshops on nuclear security, radioactive sources security, transportation security and nuclear forensics, 80% of which are regional and international activities.

More Chinese gifts for 2016 Washington NSS?

- **China should join the new initiative on Strengthening Nuclear Security Implementation as other 35 countries pledged at the 2014 Nuclear Security Summit**

-- to incorporate the IAEA principles and guidelines regarding nuclear security into its national laws

-- host IPPAS mission---allow teams of international experts to periodically evaluate their security procedures

- **Making more information available on its nuclear security policies and practices in order to build international confidence that it has effective nuclear security in place, including:**

--publishing annual reports on its nuclear security or details of its nuclear security regulations

--share best practices with WINS, etc

Current Practices of China's Physical Protection

- Widely applied the modern PPS; the concept of defense in depth and detection balance;
- Based on DBT including outsider and insider adversaries
- Switching from the traditional "guns, gates, guards" approach to an effective mixed approach, combining personnel with modern techniques;
- Facilities required to conduct in-depth vulnerability assessments;
- Applying the graded protection measures, according to the relative attractiveness, the nature of nuclear materials and facilities, and potential consequences;
- Emergency plan to response: unauthorized removal of NM, sabotage of nuclear facilities .

Cat. I nuclear facilities	Physical protection
---Facilities containing category I nuclear materials ---100 MW(th) reactors or larger ---Spent fuel pools with 10^{17} Bq Cs-137 radioactivity or larger --- Spent fuel reprocessing facilities --- High-level liquid nuclear waste storage and processing facilities	---24 hour armed policemen at individual and vehicle access to the three areas --Alarm and monitoring system at all access entrances ---Permits or badges held by authorized personnel and vehicles to enter three areas --Strict control of non-site personnel and vehicles to access; full time escort with site personnel after entering the protected and vital areas --A “two man and double-lock” rule for the vital area ---Radioactive material detection systems installed at access to the protected and vital areas ---Emergency power backup system ---A system control center to manage physical protection system

China's international nuclear security commitments

--In 1989, China acceded to the 1980 Convention on the Physical Protection of Nuclear Material (CPPNM). In October 2008, China ratified the 2005 Amendment to the Convention on the Physical Protection of Nuclear Material.

--China signed the Protocol Additional to the Agreement between China and IAEA for the Application of Safeguards in China in 1998, and in early 2002 formally completed the domestic legal procedures necessary for the entry into force of the Additional Protocol, thus becoming the first nuclear-weapon state to complete the relevant procedures.

--In 2007, China began contributing to the Incident and Trafficking Database (ITDB), the IAEA's information system on incidents of illicit trafficking and other unauthorized activities and events involving nuclear and other radioactive material outside of regulatory control.

--In August 2010, China ratified the International Convention for the Suppression of Acts of Nuclear Terrorism.

--Since 1999, China has implemented obligations under relevant UNSC resolutions, including Resolution 1267 of 1999, Resolution 1373 of 2001, Resolution 1540 of 2004, and Resolution 1887 of 2009.

China's nuclear security: Challenges

- No unified national-level DBT standard; could not cover 9/11-type attack.
- No realistic tests of security performance (force-on-force exercise)
- Major regulations and rules issued 20 years ago

---"Regulations for Control of Nuclear Materials of the People's Republic of China" (1987)

---"Rules for Implementation of the Regulations on Nuclear Materials Control of the People's" (1990)

- Ineffective MC&A system for bulk processing facilities (e.g. reprocessing plant)
- Nuclear security culture issues

---many nuclear experts continue to doubt that there is a credible threat to Chinese nuclear materials and facilities.

---complacency within its nuclear industry

China and US cooperation on nuclear security

- One major driver of improvements to China's nuclear security and control system has been international cooperation, in particular with the United States and the IAEA.

- China-US cooperation on nuclear security began in 1995-1998, mainly through the US-China "Lab-to-Lab Collaborative Program

--under the "lab-to-lab" program ,several workshops at Beijing IAPCM on MPC&A techniques; visiting scholars, etc.

--in 1998 a demonstration facility for modern MPC&A technology was installed at the CIAE in Beijing--demonstrated how technologies could be integrated in a comprehensive system for protecting nuclear materials.

--the program ceased in the aftermath of the 1999 Cox Committee Report a

and allegations of Chinese espionage at U.S. nuclear weapons laboratories

- However, in the wake of the 9/11 attacks, CAEA expands its cooperation with the US DOE, but focusing on civilian sector

China and US cooperation : major achievements

- **In July 2003, China and the United States signed a "Container Security Initiative" which has been implemented since 2005 in Shanghai, Shenzhen, and Hong Kong.**

- **In 2004, China and the United States renewed cooperation under the 1997 "US-China Peaceful Uses of Nuclear Technology (PUNT) Agreement"**

--provides the framework for much of the MPC&A cooperation now underway. The framework focuses on civilian nuclear cooperation, including promotion of technical cooperation on export controls for nuclear materials and MPC&A for nuclear materials and facilities.

--Since cooperation on MPC&A under PUNT was resumed in 2004, technical cooperation has been expanded significantly in the civilian nuclear area.

--In April 2013, the 8th Joint Coordinating Committee meeting of the PUNT Agreement was held in Beijing. The five PUNT working groups have discussed new issue areas for potential cooperation, and agreed on the need for strengthened technical collaboration on nuclear energy technologies, safeguards and security, environment and waste management, nuclear emergency management, and radioactive source security.

China and US cooperation : major achievements (con't)

- In 2007-2008, China and the US cooperated extensively on security preparations for the Beijing Olympics
- Announced cooperation on the CoE at 2010 NSS.
- After the 2010 Washington Nuclear Security Summit, China and the US jointly published "Technical Guidance on the Nuclear Export Control Lists" to help educate Chinese staff involved in nuclear export controls.
- In January 2011, China and the United States signed a "Memorandum of
- Understanding for Cooperation in Jointly Establishing the Radiation Detection Training Center of China Customs"; the center was established before the March 2012 Seoul Nuclear Security Summit.
- On December 7, 2011, China and the United States inaugurated a "Megaport Initiative" to enhance special nuclear and radioactive materials detection capabilities at the container cargo port in Shanghai. China and the United States have also jointly implemented the Yangshan Port Pilot Program in Shanghai.

Suggestions for enhancing China-US cooperation

- **In-depth discussions and best practice exchanges on how to construct a more systematic and rigorous approach to DBTs for each type of nuclear facility, focusing on those dealing with weapon-usable nuclear materials.**
- **In-depth discussions and best practice exchanges on how to decrease vulnerability to an insider threat, in particular at bulk processing facilities and storage facilities of weapon-usable fissile materials.**
- **Collaboration on applying updated material control and accounting systems and best practices to China's pilot reprocessing plant and also to a pilot MOX facility that is under construction.**
- **In-depth discussions and best practice exchanges on China's updating and enforcing new regulations, drafting an atomic energy law, strengthening the independence of regulatory bodies, and providing adequate legal authority, technical and managerial competence, and financial and human resources to ensure regulatory capacity.**

Suggestions for enhancing US-China cooperation (con't)

- **Assistance on adopting realistic performance tests including "force-on-force" exercises. Chinese experts should be invited to witness such exercises at US sites.**
- **Moving forward with cooperation on security culture including implementing targeted programs to assess and improve security culture at each key site.**
- **In-depth discussions and best practice exchanges on how to increase International assurance about China's nuclear security conditions, including how China can make substantial amounts of information public while protecting sensitive information.**
- **Using the new CAEA Center of Excellence to provide training and exchanges of best practices for domestic guards and security personnel and those from other countries in the Asia-Pacific region.**

It is the time to resume China-US Lab-to-Lab program on MPC&A

- **While current cooperation focuses mainly on the Chinese civilian sector--best practices associated with MPC&A learned through cooperation will be applied to fissile materials and facilities in China's military sector : because the CAEA is responsible for controlling fissile materials nationwide in both military and civilian stockpiles and can transfer lessons from one to the other.**

- **However, without knowing what real problems exist in the military sector, the indirect benefits of cooperation on the civilian sector for the military sector will continue to be limited. Most of China's weapon-usable fissile materials are in military sector.**

- **Since “ lab-to-lab” program ceased by the 1999 Cox report. direct cooperation on nuclear security and control of China’s nuclear weapons has not been touched upon.**

- **China treats its weapons-program MPC&A system as very sensitive and secret.**

- **Chinese nuclear experts believe that the nuclear security regime within the military sector is much more secure than the civilian regime, because nuclear weapons, weapons-grade materials, and related facilities are the “most valuable stuff” in China. The government has reported “accident-free” operations for the past fifty years.**

It is the time to resume China-US Lab-to-Lab program on MPC&A (con't)

- **Since 9/ 11 attacks, the cooperation between China and US on fighting against terrorism should provide an opportunity to restart the lab-to-lab program on MPC&A, which would be significantly benefit to China's nuclear materials and facilities in the military sector.**

- **Given the fact that the nuclear terrorist threat is a top priority in Washington, Beijing's cooperation with Washington would be beneficial to the Sino-US relationship.**

Cooperation on nuclear security in military sector?

- **As first steps, the program should begin with less sensitive activities that are identified as mutually beneficial.**

- **The two governments could conduct in-depth discussions and best practice exchanges on a number of areas, including:**

--applications of modern seals techniques and continuous remote monitoring approaches for the storage of nuclear warheads and sensitive nuclear materials;

--tracking and monitoring techniques for shipments of fissile materials;

--safety and security measures protecting nuclear weapons and nuclear materials.

Cooperation on nuclear security in military sector?(con't)

- As the lab-to-lab program moves forward, based on the experience from US-Russian cooperation, China and the United States may consider conducting mutual visits and joint work at some selected key sites.

- Others areas of focus could include DBT approaches for sensitive facilities, advanced MPC&A applied at some sites, updating regulations and procedures, and strengthening security culture at some sites.