

CHAPTER 5. PROSPECTS FOR INTERNATIONAL COOPERATION IN WMD NONPROLIFERATION AND NUCLEAR SECURITY IN CENTRAL ASIA

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The need for continued international (especially Russian-U.S.) cooperation on WMD nonproliferation and nuclear security in Central Asia is obvious, based on a whole number of factors. The main problem that has yet to be resolved is the Soviet heritage related to WMD development programs.¹ There are also new challenges and threats, the most dangerous ones being illegal circulation of WMD materials, technologies, equipment, and delivery systems, as well as the threat of WMD terrorism.² There are also plans by several countries in the region to develop a nuclear industry and a nuclear energy sector. Yet another argument in favor of continued cooperation in the framework of the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction is the recent decision to expand the geographic scope of the program by accepting Kazakhstan as the 24th member and a recipient country.³ It is important to take into account that Kazakhstan is the world's largest producer of uranium, and plans to host an international bank of low-enriched nuclear fuel on its territory.⁴

The main areas of future cooperation on WMD nonproliferation and nuclear security in Central Asia include: improving nuclear security systems and nuclear infrastructure facilities; continued cooperation on the former Semipalatinsk nuclear test site; countering radiological security threats; bolstering export controls and border security; establishing cooperation in the framework of the Central Asian nuclear weapons-free zone; strengthening cybersecurity measures in the nuclear industry; facilitating joint research projects; and promoting education programs in the area of disarmament and nonproliferation.

International cooperation in improving nuclear security systems at nuclear infrastructure facilities

The partly natural, partly manmade disaster at the Fukushima nuclear power plant in Japan has triggered a renewed international debate about new approaches to various

¹ Butler, Kenley. Weapons of Mass Destruction in Central Asia. October 1, 2002. Nuclear Threat Initiative: <http://www.nti.org/analysis/articles/weapons-mass-destruction-central-asia/> (Retrieved on June 27, 2013).

² Aben Dauren. Central Asia and WMD proliferation threats / Security and cooperation in Central Asia in the 21st century: objectives, priorities, and challenges. A collection of materials of an international workshop. - Astana: Modern Research Institute at the L.N. Gumilev Eurasian National University, 2010. P. 81-88

³ Kazakhstan joins the G8 Global Partnership Against the Spread of WMD. *Novosti-Kazakhstan* news agency. February 23, 2012. <http://www.newskaz.ru/politics/20120223/2744918.html> (Retrieved on June 20, 2013)

⁴ Uranium and Nuclear Power in Kazakhstan (updated March 2013). World Nuclear Association: <http://www.world-nuclear.org/info/Country-Profiles/Countries-G-N/Kazakhstan/#.UcwdVjvwlyw> (Retrieved on June 20, 2013).

aspects of nuclear safety and security.⁵ That debate concerns not only the outlook for the development of the global nuclear energy industry and the use of safer and more secure technologies, but also the improvement of nuclear safety and security standards; nuclear materials security; modernization of protection and rapid response systems to deal with potential emergencies or acts of terrorism; and the role of the IAEA and national regulatory agencies.

The nuclear security problem in Central Asia is becoming especially urgent because of the growing threat of WMD proliferation and WMD terrorism. In addition, Kazakhstan is pressing ahead with its plans of developing a nuclear industry; the government has already made a political decision to build a nuclear power plant.⁶ As part of the Nunn-Lugar Program, a whole range of projects have been implemented in the Central Asian states in such areas as technological upgrade and improvement of nuclear and radioactive materials protection, control and accounting systems, as well as bolstering security measures at nuclear industry installations and nuclear facilities.⁷

Some might say that all these improvements, along with increased protection of nuclear facilities by law-enforcement agencies, have minimized all external threats, including the threat of a direct attack by terrorists. But one must take into account that these days, terrorists tend to be well armed and well trained, and that physical protection systems must be continuously improved to stay up to date. Let us not forget that most of the aforementioned projects were implemented in the late 1990s and early 2000s. They could not have taken into account the weaknesses and risks identified in the area of nuclear security and safety in recent years.

Technical weaknesses in the security systems of nuclear facilities, as well as shortcomings in personnel training and emergency response procedures, make these facilities vulnerable not only to natural disasters and emergencies, but also to deliberate malicious acts. That includes not only terrorist attacks, but also more covert actions, such as attempts to gain unauthorized access; illegal transfer or theft of nuclear and radioactive materials; and acts of sabotage.⁸ Even if the facility is reliably guarded and equipped with advanced physical protection systems, one cannot discount the human factor. Protection and security systems cannot be relied upon if terrorists have an accomplice among the facility's personnel.

That is why such issues as the interrelationship between the various aspects of nuclear security and safety, and the need to improve the security culture, are now coming to the fore. There is also an obvious need for further modernization of the security and physical protection systems at nuclear facilities, as well as nuclear-related research centers and industrial facilities in the Central Asian states. That modernization must include not only the installation of more advanced equipment, but also increasing the resilience of nuclear facilities to emergencies and attacks by terrorists, as well as

⁵ See, for example: Duyeon Kim, Jungmin Kang. Where nuclear safety and security meet. *Bulletin of the Atomic Scientists*. January/February 2012. Vol. 68, no. 1, pp. 86-93.

⁶ Gayfutdinova Venera. NPP to appear in Kazakhstan in 12 years' time. *Kapital*. February 1, 2013

⁷ Kazakhstan: Reducing Nuclear Dangers, Increasing Global Security. Washington, DC: Embassy of the Republic of Kazakhstan and the Nuclear Threat Initiative, 2004.

⁸ Bunn, Matthew. The Threat of Nuclear Terrorism: What's New? What's True? Nuclear Security Dossier: http://www.nuclearsummit.org/files/nuclear_terror_threat_dossier_2012.pdf (Retrieved on June 20, 2013).

augmenting the capability of the security forces. In order to achieve a real and tangible improvement in the level of security at their nuclear facilities, the Central Asian states require comprehensive assistance (i.e. money, technology, and expertise) from international partners.

With the relevant governments' consent, representatives of international partners, in cooperation with the national nuclear security and safety agencies, could conduct a so-called security audit at the existing nuclear facilities in order to estimate the scale and the cost of the required modernization projects. These inspections must include a comprehensive analysis of the existing procedures, technology, facilities and equipment in order to identify potential problems and vulnerabilities, and develop preventive measures to increase the level of nuclear security and safety. These programs could also include an independent international certification of the project to build a nuclear power plant in Kazakhstan, to make sure that the project meets all the nuclear safety and security standards and requirements.

International partners could also provide assistance to the Central Asian states in conducting regular training exercises to improve coordination between the personnel during various incidents at nuclear facilities. International partners might also take part in such exercises, if this is deemed necessary. Recommendations by experienced international specialists could help to improve emergency response procedures in the event of natural disasters, man-made emergencies, and terrorist attacks. They could also help to modernize safety and security control systems at nuclear facilities.

International assistance is also required in improving nuclear security culture, which is an important element of nuclear security. This problem requires a comprehensive approach. Projects in this area must target the personnel responsible for protecting nuclear facilities and materials, as well as specialists responsible for safe and secure operation of nuclear facilities and radiation safety. This applies both to the nuclear industry facilities and to national regulatory agencies. The higher the level of security culture among the personnel, from senior managers to rank and file, the higher the level of security at nuclear facilities, and the lower the risks caused by the human factor, including the insider threat.

To facilitate an improvement in the level of security culture in the nuclear industry, and to promote the sharing of best practice, international partners could provide the Central Asian states with assistance in rolling out multilateral education programs covering all aspects of nuclear security. It would be very helpful to set up regional centers of nuclear security excellence, which would offer continuous training program for nuclear security personnel and specialists working at the nuclear industry facilities and the national regulatory agencies. As a first step, international partners could assist in establishing an international nuclear security training center in Kazakhstan; the proposal was announced by Kazakh President Nursultan Nazarbayev in April 2010 during the first Nuclear Security Summit in Washington.⁹

Continued international cooperation on the former nuclear test site in Semipalatinsk

⁹ Statement by Kazakh President Nursultan Nazarbayev at a summit in Washington. *Chelovek, energiya, atom*. 2010. No 2 (8). P. 5-6.

At the Nuclear Security Summit in Seoul in April 2012 the presidents of Kazakhstan, Russia, and the United States made a joint statement to the effect that efforts to eliminate the consequences of nuclear tests at the Semipalatinsk site had been almost completed.¹⁰ It is certainly true that as part of multilateral cooperation programs, an unprecedented amount of work has been completed at Semipalatinsk to dismantle nuclear weapons testing infrastructure and to increase the level of safety and security of the facilities controlled by the National Nuclear Center of the Republic of Kazakhstan.

At the same time, there is a clear and pressing need for continued international cooperation at the former test site in Semipalatinsk. First and foremost, a number of sensitive facilities still remain there; bolstering their safety and security is in the interests of not just Kazakhstan but its international partners as well. One of these facilities is the Baikal-1, which is currently being used as long-term storage for a significant amount of nuclear materials and waste generated by the now decommissioned BN-350 fast-neutron reactor in Aktau.¹¹ Furthermore, Kazakhstan plans to use the facility as the core of the proposed new national center for radioactive waste processing and storage.¹² It is also important to maintain a proper level of security at the mothballed tunnels and galleries previously used for nuclear weapons testing.

The Kazakh National Nuclear Center is also currently working on a land rehabilitation initiative at the former Semipalatinsk test site. Based on the findings of a comprehensive radiological study, the Center believes that up to 95 per cent of the land occupied by the former test site can be returned to economic use in several phases by 2020, with the exception of severely polluted areas and the territories occupied by nuclear facilities still in use.¹³ It would therefore make sense to consider the possibility of international experts taking part in implementing this initiative. In particular, they could provide their assistance in assessing the long-term public health and environmental consequences of the proposed return of lands at Semipalatinsk to economic use.

According to the existing estimates, Soviet nuclear weapons tests at Semipalatinsk inflicted serious damage on public health in the area around the test site, and left large swathes of agricultural lands in Kazakhstan radioactively contaminated. The UN General Assembly has recognized that the consequences of nuclear tests have been grave. In the period between 1997 and 2009 it passed six separate resolutions concerning the provision of international assistance to Kazakhstan in addressing the

¹⁰ Joint statement by the presidents of Kazakhstan, Russia, and the United States on trilateral cooperation on the former nuclear test site in Semipalatinsk. Seoul, March 27, 2012. Kazakh President's website. http://www.akorda.kz/ru/page/sovместное-заявление-президентов-республики-казахстан-российской-федерации-и-соединенных-штатов-америки-о_1341834725 (Retrieved on June 20, 2013)

¹¹ NNSA Secures 775 Nuclear Weapons Worth of Weapons-Grade Nuclear Material from BN-350 Fast Reactor in Kazakhstan. Press Release. November 18, 2010. National Nuclear Security Administration: <http://nnsa.energy.gov/mediaroom/pressreleases/bn35011.18.10> (Retrieved on June 20, 2013).

¹² On the approval of the Program of the Development of the Nuclear Industry in the Republic of Kazakhstan in 2011-2014 and in the 2020 Time Frame. Kazakh legislation database. <http://adilet.zan.kz/rus/docs/P1100000728> (Retrieved on June 20, 2013).

¹³ Dairova Oksana. Semipalatinsk to be rehabilitated. *Kursiv*. August 5, 2010.

Semipalatinsk problem as part of the program titled *International Cooperation and Coordination of Efforts to Rehabilitate the Population, Environment, and Economic Development of the Semipalatinsk Region of Kazakhstan*.¹⁴

As part of the implementation of these resolutions, Kazakhstan's international partners could consider the possibility of their continued involvement in rehabilitation programs to help overcome the region's serious social, economic, and environmental challenges. Such involvement could include the provision of financial and technical assistance, as well as expertise, in conducting systemic and comprehensive studies of the public health and environmental situation, analyzing soil and water samples taken at Semipalatinsk, and implementing a system of regular monitoring of radiation levels at the former nuclear weapons test site.

International cooperation in combating threats to radiological security and safety

In recent years radiological security and safety issues have come to be regarded as part of the general nuclear security problem. Giving the growing risks and threats stemming from the possibility of radiation emergencies, the security of radiation sources, and the danger of these sources being used by terrorists, radiological security is becoming a subject of growing international concern.

Radiological security threats in Central Asia stem from the fact that after the break-up of the Soviet Union, countries in the region lost control of some of the radiation sources used for industrial, medical, and research purposes. These sources contain highly radioactive materials, including cesium-137, strontium-90, cobalt-60, and iridium-192. According to some reports, a certain amount of radioactive sources and materials were buried in Central Asia's numerous uranium tailings dumps and other radioactive waste storage sites. Unlike the Central Asian nuclear facilities, these tailings dumps and waste storage sites are not properly guarded and protected.¹⁵ If highly radioactive materials from these sites fall into the wrong hands, they can be used to build the so-called dirty bomb. That is one of the region's most serious security risks related to WMD terrorism.¹⁶

Dirty bombs do not have the capability to cause mass casualties or a serious amount of destruction. But they can cause radioactive contamination of large territories, leading to public health risks and lost economic opportunities. A dirty-bomb attack would also have a tremendous psychological impact on the population in and around the affected areas.

One of the risk factors in Central Asia is the spread of radical ideas in some sections of society, especially among the young people. In 2010-2012 Kazakhstan saw

¹⁴ Sharipov Maksut. Kazakhstan at the UN: active and responsible participant. *Kazakhstanskaya pravda*. March 3, 2012.

¹⁵ Kazakhstan hosts a workshop on locating and securing radiation sources; inventory of radiation sources to be taken. *Obozreniye eksportnogo kontrolya*. June 2005. O. 3-4; Kazakhstan and Kyrgyzstan taking inventory of radiation sources and stepping up control over radioactive materials. *Mezhdunarodnoye obozreniye eksportnogo kontrolya*. December 2005 / January 2006. P. 12-13

¹⁶ Sharipov Maksut. Kazakhstan at the UN: active and responsible participant. *Kazakhstanskaya pravda*. March 3, 2012.

growing activity of religious extremists and terrorists, which makes the threat of radiological terrorism and other forms of WMD terrorism an increasingly serious problem. Only a few years ago the risk of terrorist acts was believed to be fairly low in the country. Now, however, there is a real possibility of terrorist attacks using radioactive materials being perpetrated by radical opponents of nuclear energy development to win public support for their cause. Given the existing concerns among the Kazakh public over radiation, and the generally negative attitude to nuclear programs, radical groups might also attempt acts of sabotage. All these risks must be taken into account during the implementation of the government's plans to set up an LEU bank in the country and to build a nuclear power plant.

The risk of a dirty bomb attack is fairly high due to the relatively easy availability of radioactive materials, and the simplicity of the dirty bomb design. Furthermore, sources of radiation can be very small and compact, making them easy to transport and smuggle across the borders. That necessitates close cooperation between the Central Asian states and international partners in ensuring timely detection and interdiction of radioactive contraband in the region.

On the national level, the relevant government agencies must take steps towards further improvement of the existing protection, control and accounting measures for the radiation sources that are widely used in many legitimate areas, including healthcare, research, industry, and agriculture. The governments in Central Asia must also introduce harsher penalties for theft or improper use of radiation sources, and incorporate measures outlined in the International Convention for the Suppression of Acts of Nuclear Terrorism into their national legislation.

Interested foreign states could provide assistance to the Central Asian governments in strengthening the legislative and regulatory framework for the registration and use of radioactive materials, including the introduction of modern registration systems that would keep track of all radiation sources throughout their operational lifetime. International assistance would also be useful in taking inventory and issuing registration certificates to radioactive sources and materials; organizing regular events to locate, secure and dispose of unaccounted or decommissioned sources; building special storage facilities; and upgrading physical protection systems at the existing facilities. Assistance from international partners would be hugely important in equipping border crossings and other strategic locations with radiation detectors in order to prevent the smuggling of highly radioactive sources and materials. More active exchange of information about illicit circulation of such materials should be one of the mechanisms of multilateral cooperation in this area.

International cooperation in strengthening export controls and border security

Yet another potential threat is the possibility of Central Asian countries being used as transit routes for nuclear and other WMD-related materials, technologies and equipment. This threat is very real. To the north and east, the region borders on countries that are potential sources of such contraband (just as the Central Asian states themselves are, incidentally). To the south lie potential end users of such contraband, i.e. nations or international terrorist groups aspiring to acquire nuclear weapons. The routes of such contraband can be largely the same as the ones used to smuggle drugs out of Afghanistan and into Europe. Illicit activities can also be disguised as legal

commercial operations, with sensitive equipment and technologies, dual-use products, and fissile materials being purchased by front companies or brokerages. To this date there have been no confirmed cases of highly-enriched uranium or plutonium being smuggled via Central Asia. But there have been numerous cases in the region of the authorities interdicting cargos containing radiation sources or radioactive scrap metal.¹⁷

Although much progress has been achieved in securing and guarding the national borders in the region, the Central Asian states must actively cooperate with each other and with international partners if they are to be able to respond effectively to all these threats. Effective and timely detection and prevention of attempts at illicit circulation of sensitive materials requires continued energetic efforts to strengthen the national systems of export, border and customs control in the Central Asian states. It would make a lot of sense to use the existing experience of cooperation with international partners accumulated during the implementation of such U.S. and EU-initiated assistance programs as Export Control and Border Security, Second Line of Defense, Border Management in Central Asia, etc.

More active cooperation and exchange of information should be pursued with foreign secret services. The Central Asian states should also continue the practice of joint anti-terrorism exercises not only in the CSTO and SCO framework, but also on a bilateral and regional basis. One of the possible ways of stepping up regional cooperation and improving the Central Asian states' capability in export control and border security is to give them greater assistance in the implementation of UN Security Council Resolution 1540, which aims to prevent WMD from falling into the hands of non-state actors.¹⁸ Closer cooperation is also required under the Global Initiative to Combat Nuclear Terrorism, which is spearheaded by Russia and the United States.

Cooperation in the framework of the Central Asian NWFZ

Nuclear weapons-free zones are an important element of the international nuclear nonproliferation regime. They help to achieve the long-term goal of a world free of nuclear weapons. In 2006 Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan and Turkmenistan established the Central Asian Nuclear Weapons-Free Zone (CANWFZ). The main objective of the move was to promote global nuclear disarmament, strengthen regional and international security, and step up cooperation in resolving the region's environmental issues.¹⁹ Nevertheless, the potential of the CANWFZ has yet to be fully utilized due to a number of unresolved issues with the nuclear-weapon states; the absence of practical implementation mechanisms; and insufficient cooperation between the Central Asian states in the CANWFZ framework.

¹⁷ Hanley Charles J. Central Asia is a hotbed for radioactive smuggling. *Deseret News*. June 15, 2002.

¹⁸ Central Asia and the Caucasus 1540 Reporting. August 21, 2012. Nuclear Threat Initiative: <http://www.nti.org/analysis/reports/central-asia-and-caucasus-1540-reporting/> (Retrieved on June 20, 2013).

¹⁹ Treaty on a Nuclear Weapons-Free Zone in Central Asia. PIR Center. http://www.pircenter.org/kosdata/page_doc/p1513_1.pdf (Retrieved on June 20, 2013)

Of the five nuclear-weapon states, only Russia and China have expressed their support for the Treaty of Semipalatinsk, which established the CANWFZ. The other three (i.e. the United States, Britain, and France) say they disagree with a number of provisions in the treaty, and refuse to sign the protocol to that treaty.²⁰ Clearly, proper political legitimacy of the CANWFZ requires its recognition by all official nuclear-weapon states, and the lack of legally-binding security guarantees on their part undermines the effective functioning of the zone.

The Central Asian states have repeatedly expressed their readiness to pursue constructive dialogue with the nuclear-weapon states and discuss all contentious issues. As a result, a series of consultations was held between the Central Asian states and the five nuclear-weapon states. The experience of other NWFZs demonstrates that the signing and ratification of the protocols can sometimes take decades. It is important to avoid a similar scenario in Central Asia, because unresolved differences over various clauses in the Treaty of Semipalatinsk could become part of a geopolitical struggle for influence in the region between the leading international players, and lead to a split between the CANWFZ members.

The CANWFZ, which is the only regional initiative that includes every single country in the Central Asian region, faces the task of consolidating and strengthening regional cooperation on nuclear nonproliferation and disarmament. In and of itself, the establishment of the CANWFZ or its recognition by the international community cannot achieve that objective. What is required is a certain regional mechanism that would make the full use of the CANWFZ potential to counter proliferation challenges and threats. Under the terms of the Treaty of Semipalatinsk, the member states have agreed to hold meetings and consultations to discuss various issues related to the implementation of the treaty. So far, however, these meetings have been few and far between. This complicates the development of comprehensive cooperation between the Central Asian states on fulfilling the commitments reflected in the treaty, as well as cooperation with the relevant international organizations.

This is why all interested parties – especially Russia and the United States – should consider the possibility of providing assistance to the CANWFZ member states in establishing a standing institutional body that would coordinate regional cooperation on pressing issues of nuclear nonproliferation and disarmament, even though the legal status of the CANWFZ has yet to be fully recognized. Such a body could also be tasked with monitoring the states' compliance with the terms of the treaty. The organizational and technical verification and monitoring measures would augment the IAEA safeguards system, and help to establish a climate of mutual trust between the CANWFZ members. Since the Treaty of Semipalatinsk does not contain any information exchange provisions, such exchange could be conducted in the framework of this new institutional mechanism.

Establishing an institutional mechanism in the CANWFZ framework would enable the member states to pursue a more coordinated policy on rehabilitation and environmental protection measures, including such areas as safety and security of the uranium tailings dumps and radioactive waste disposal. A new regional structure

²⁰ Kutnayeveva Nuriya, Akhtamzyan Ildar. On the signing of the Treaty on a Nuclear Weapons-Free Zone in Central Asia. *Indeks Bezopasnosti*. 2007. Vol. 13, No 1 (81). P. 131-136.

would also facilitate closer cooperation between the Central Asian states on peaceful use of nuclear energy.

International cooperation on cybersecurity in the nuclear industry

Cybersecurity issues are now coming to the fore in the context of international and national security. The growing number of cyberattacks against government ministries, diplomatic agencies, companies and research institutions all over the world emphasize the urgent need for improved protection of information infrastructure and resources from criminals, hackers, and other attackers trying to gain unauthorized access. All of this fully applies to Central Asia as well.

Cybersecurity in the nuclear industry is especially important due to that industry's obvious sensitivity and the potential dangers of the loss of integrity of IT systems at nuclear facilities. Unauthorized access to such systems can lead to catastrophic and unpredictable consequences. Targeted cyberattacks by foreign governments or non-state actors can also lead to the leakage of sensitive information, technologies and expertise required for the manufacture or use of nuclear materials for malicious purposes. Due to the rapid progress in the area of IT, existing national security standards and practices are often lagging behind the constantly evolving cyberthreats.

This is why there should be a greater focus on cybersecurity in Kazakhstan, which is pursuing ambitious nuclear industry development plans, including the construction of a nuclear power plant. It is worth noting that Kazakhstan was one of the countries with the greatest number of computers infected by the Red October cyberespionage malware, which was discovered by Kaspersky Labs, a cybersecurity firm, in January 2013.²¹ International assistance to Kazakhstan in the search for solutions to the cybersecurity risks and challenges could help the country to create an effective system of protecting sensitive information and technologies, and to ensure the reliability and resilience of nuclear industry IT systems in the face of various cyberthreats.

Reducing the vulnerability of nuclear industry facilities requires, first and foremost, an in-depth analysis of Kazakhstan's existing body of laws and regulations in the area of cybersecurity, and of the relevant procedures pertaining to the protection of nuclear facilities. Involving reputable international specialists and scientists in this process would help to develop proposals on improving the country's legislation and procedures, identify the existing and potential cybersecurity threats, and develop effective countermeasures, with an emphasis on proper protection of information. The next step would be to hold comprehensive inspections at nuclear infrastructure facilities to identify vulnerabilities to attempted unauthorized access or acts of IT sabotage. The participation of reputable international experts in such inspections would make them more effective.

One of the critically important issues that require close attention is the choice of IT equipment and software for nuclear infrastructure facilities. Since such systems and software are not produced in the region, there is a potential danger of imported products having weaknesses and vulnerabilities that could be used by unauthorized

²¹ The Red October operation – a wide network of cyberespionage against diplomatic and government agencies. The Kaspersky Labs Research Center. January 14, 2013. <http://www.securelist.com/ru/blog/207764382> (Retrieved on June 20, 2013)

users not only to gain access to confidential information, but also to manipulate industrial automation systems for their own purposes. Preventing such unauthorized access and preserving the integrity of information requires meticulous checks of the information systems used at nuclear facilities. Cooperation with international partners would help Kazakhstan to introduce the required certification and testing procedures for IT equipment and software, as to roll out a set of organizational, legal, technical and technological measures to make sure that computer networks are properly protected.

The international community could also help Kazakhstan and other Central Asian states in setting up special cyber units within the national security agencies, tasked with countering attacks in cyberspace. In addition, individual donor countries could look into the possibility of offering training courses at their universities and colleges to address the shortage of cybersecurity specialists the Central Asian states are currently facing in various industries, including the nuclear industry.

International assistance in nuclear science and technology cooperation

As part of the Nunn-Lugar Program, hundreds of Central Asian scientists formerly involved in Soviet WMD programs have been able to apply their skills and expertise in civilian areas with the help of the International Science and Technology Center (ISTC).²² Former weapons scientists have been given support in conducting fundamental and applied R&D, and provided with opportunities for integration into the global research community by participating in international research projects.

The transfer of the ISTC headquarters to Kazakhstan after the Russian decision to quit the organization has posed certain organizational and financial difficulties. It has also raised doubts about the completion of the ongoing R&D programs and projects, and about the launch of new ones.²³ Nevertheless, the research communities of the Central Asian states want to continue their long-standing and productive cooperation with their Russian colleagues. They hope that a new mechanism will be established to enable renewed cooperation between Russia and the other participating countries in the ISTC framework.

Some Central Asian countries, such as Kazakhstan, make a particular emphasis on fundamental and applied research into peaceful use of nuclear energy. Their objectives include the development of a civilian nuclear industry. These countries pursue projects to design new types of nuclear reactors; develop high-precision and high-tech equipment for nuclear facilities; increase the security and safety of nuclear power plants; design auxiliary buildings and facilities for the nuclear industry; test new types of nuclear fuel; and resolve the problem of nuclear waste disposal. That is why continued and increasingly close science and technology cooperation with international partners, including research centers in Russia and the United States, would enable the Central Asian research organizations significantly to expand the area and scale of their theoretical and applied research into peaceful use of nuclear energy.

²² ISTC information bulletin. International Science and Technology Center. http://www.istc.ru/istc/istc.nsf/va_WebPages/ISTCFactSheetRus (Retrieved on June 20, 2013).

²³ Cheban Alexander. International mechanisms of countering nuclear proliferation and Russia's interests: the examples of Global Partnership and the ISTC. *Indeks Bezopasnosti*. Autumn-Winter 2012. Volume 18, No 3-4 (102-103). P. 141-168.

Interested parties could draw up a list of jointly financed priority R&D projects involving research centers in Central Asia and the partner countries, focusing on such areas as nuclear physics; radiation material studies; seismology; nuclear energy safety; and radiological environmental studies and monitoring. The existing research and experimental facilities in Central Asia and Russia could be used for joint testing of new materials, new types of nuclear fuel, fuel cells, and other nuclear components. That research could be part of various projects to increase the safety and security of nuclear industry facilities. It is worth emphasizing that partnership with Russia is singularly important for the success of the program to modernize Kazakhstan's research reactors. The program includes the replacement of the instruments and reactor components that have reached the end of their service life. Since Kazakhstan is interested in setting up new high-tech industrial facilities, it would make sense to consider the possibility of involving companies from Russia, the United States, and other countries in the work of the Nuclear Technology Park in the town of Kurchatov. This is why the transfer of the ISTC headquarters to Kazakhstan can be viewed as an important step in promoting cooperation between the international community and Central Asia, a step that will help to strengthen the science and technological capability of the region's countries.

Another priority and long-term area of cooperation would be for international partners to assist in the training of specialists for those Central Asian states that plan to develop their own uranium and nuclear energy industries. The region's countries still have a pool of qualified specialists who were trained back in Soviet times. But these specialists are now approaching retirement age. With no-one to replace them, it will be difficult to implement the existing nuclear industry development plans. That is why it is very important to improve the system of personnel training and retraining in the relevant areas. The capability of the region's own education and training institutions is clearly insufficient for these purposes. It would therefore make sense to study the possibility of additional training of Central Asian specialists abroad, especially at the research centers and universities in Russia and the United States.

Another potential area of nuclear cooperation is nuclear medicine. International partners could consider the possibility of providing assistance in the completion of an innovative project to set up the Nuclear Medicine and Biophysics Center in Kazakhstan, to be followed by similar centers in other Central Asian countries. Such centers are required because countries in the region are lagging far behind in the application of nuclear medicine for the diagnostics and treatment of socially significant diseases. The nuclear medicine centers could cooperate with the relevant research and production organizations in Russia and the United States in the development, manufacture, and distribution of radiopharmaceuticals for diagnostics and specialized treatment of cancer; in the introduction of innovative diagnostic and treatment methods; and in the training of medical and technical specialists.

International cooperation in the promotion of WMD nonproliferation and nuclear security education

Amid the growing risks of the proliferation of WMD, delivery systems, and related materials, technologies and equipment, the international community is facing an urgent need to step up education programs focusing on disarmament, nonproliferation,

export control, and nuclear security. Despite the heritage of Soviet weapons programs and the new WMD proliferation threats, the Central Asian states don't seem to treat education in this area as an important priority. Their secondary and tertiary education establishments do not offer any relevant courses. In addition, their government officials working for the relevant agencies do not have sufficient experience and expertise in these issues. The general public in Central Asia is very prone to radiophobia due to the lack of awareness about nuclear and radiation safety.

The importance of education in the area of disarmament and nonproliferation has been recognized at the highest international level. UN General Assembly Resolution 57/60, which was passed without a vote on November 22, 2002, emphasizes the need for concrete steps by the UN member states to promote this area of education.²⁴ It would therefore make sense for international partners to consider the possibility of establishing cooperation with the Central Asian governments in rolling out education programs and projects focusing on disarmament, nonproliferation, export control, and nuclear security.

Such cooperation could include efforts to organize specialized training courses and programs for officials and specialists working for the relevant government agencies, nuclear industry facilities, and research centers, as well as for journalists who cover these issues. It is also necessary to provide assistance in developing and *gradually incorporating in the curricula* of Central Asian universities relevant *disciplines focusing on the nuclear nonproliferation regime*, nuclear weapons reduction, export control, and nuclear security. These efforts could involve the leading research centers in Russia and the United States, which can assist the Central Asian states in developing academic courses, modules and programs at every level of education, as well as provide lecturers and training materials. In addition, Russian and U.S. research centers could conduct workshops for teachers, and continuous training courses for government officials dealing with WMD nonproliferation, nuclear security, and export control.

Another important aspect of education activities is working with the public opinion; this is currently very low on the list of the Central Asian governments' priorities. Experience demonstrates that it is very easy to form negative perceptions of any nuclear industry initiative among the general public in the region, owing primarily to a high level of radiophobia. Not so long ago activists of non-governmental organizations and environmental movements succeeded in mobilizing the public against the proposed imports of nuclear and radioactive waste to Kazakhstan for reprocessing and burial. Similarly negative coverage was given to Kazakh initiatives regarding the return of lands at the former Semipalatinsk nuclear test site to economic use; the proposal to host an international nuclear fuel bank; and the project to build a nuclear power plant in Kazakhstan.²⁵

German and Japanese experience shows that such anti-nuclear campaigns can play an important role in the social and political life of the country, and even affect election

²⁴ Resolution adopted by the General Assembly [on the report of the First Committee (A/57/510)] 57/60. United Nations study on disarmament and nonproliferation education. United Nations website: http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/57/60&Lang=E (Retrieved on June 20, 2013).

²⁵ Vasilyev Sergey. A Nuclear Gamble. *Ekspress-K*. April 4, 2013. No 58 (17658).

outcomes. There is a potential danger of opposition figures in Kazakhstan and elsewhere using anti-nuclear rhetoric for their own political ends. That would enable them to manipulate public opinion and stoke up tensions. In the difficult social and economic climate at the moment, such tactics could create fertile ground for a further increase in anti-government sentiment among the general public. Furthermore, campaigns to discredit the government's nuclear initiatives could make use of external forces, which would further increase their destructive effects. Another possibility is that the high level of radiophobia among the general public, and the general negative attitude to nuclear initiatives can make nuclear industry facilities a more attractive target for terrorists or saboteurs.

That is why education programs focusing on WMD nonproliferation and nuclear security are becoming an important element in the provision of information security in the Central Asian states. Taking into account existing experience in this area, international partners could give countries in the region necessary assistance in overcoming negative public perceptions of the civilian nuclear industry. They could also help to formulate a clear strategy of countering subversive activities and information attacks, include those relying on social networks as a medium. Other important elements in the provision of information security in the nuclear sphere should include regular and timely circulation of accurate and accessible information; the training of qualified public relations specialists; interaction with the media outlets and public opinion formers; and ongoing public education and awareness efforts. This can minimize the potential for any destructive information attacks, manipulation of information, and the spread of inaccurate or knowingly false information.

Conclusions

The end of Russian-U.S. cooperation in the framework of the Nunn-Lugar Program and Russia's pullout from the ISTC must not put an end to Russia's international cooperation in the area of WMD nonproliferation and nuclear security. That would not be in the best interests of Russia, the United States, or third countries, because it would have negative consequences for peace and stability all over the world. It is therefore very important to eliminate as soon as possible any remaining uncertainty concerning the prospects for partnership between Russia, the United States, and other countries in the area of nonproliferation and nuclear security.

The Central Asian states also have a clear interest in continued cooperation with foreign partners (especially Russia and the United States) on the entire range of WMD nonproliferation and nuclear security issues. Such cooperation can help them to resolve the issues they inherited from the Soviet Union, and to develop adequate responses to the modern challenges and threats related to WMD proliferation and nuclear security. Such cooperation is also in the best interests of the leading powers, including Russia and the United States, because it helps to reduce the risks related to WMD terrorism and illegal circulation of sensitive materials, technologies, and equipment. Another important consideration is that such cooperation can help these countries to strengthen their political and economic positions in Central Asia.

Clearly, a reformed mechanism of multilateral cooperation on WMD nonproliferation and nuclear security must be based on new guiding principles, the main such principle being equality. The new format of cooperation should also reflect the situation on the

ground and take into account the national interests of all the participating states. To increase the effectiveness of such cooperation, it would be useful to engage, as equal partners, individual countries as well as interested international and regional organizations.

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