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NUCLEAR SECURITY: NEW CHALLENGES, NEW ANSWERS

The ways of ensuring the security of nuclear materials and countering nuclear terrorism were the key issues of the two most significant nonproliferation events in 2010 – the Nuclear Security Summit in Washington and the NPT Review Conference in New York. What is the link between nuclear nonproliferation and security of nuclear materials? How different are the Russian and U.S. approaches to these problems? And how could contemporary Russia adopt the international experience?

*These and many other questions were addressed by the participants of the round table discussion: Professor, Head of the 12th Central Research Institute of the Russian Ministry of Defense Rear Admiral Sergey **Pertsev**; Deputy Head of the Department of Security and Disarmament of the Russian Foreign Ministry Oleg **Rozhkov**; Deputy Director of the Moscow Office of the U.S. Department of Energy Jon **Shearer**; Deputy Head of the International Cooperation Department of the State Atomic Energy Corporation Rosatom Alexey **Ubeev**; Director of ANO Aspekt-Conversion (Center for Cooperation in Conversion for Decommissioning of Weapons and Military Hardware) Evgeny **Maslin**; Consultant of Booz Allen Hamilton Inc. (Moscow Office) Dmitry **Kovchegin**; Head of the Laboratory in the Nuclear Safety Institute (IBRAE) of the Russian Academy of Sciences Sergey **Antipov**; Senior Vice President of PIR Center Lt. Gen. (rtd) Gennady **Evstafiev**; PIR Center President Vladimir **Orlov**.*

SERGEY PERTSEV (RUSSIAN MINISTRY OF DEFENSE): For the foreseeable future nuclear weapons will remain a key element of the Russian armed strength and an important instrument of safeguarding our country's national interests and security. However, the very nature of those weapons poses a real threat to our country, our people and the entire mankind in the event of a nuclear accident, man-made disaster or an act of sabotage. Ensuring nuclear and radiation safety and security of nuclear weapons at every stage of their life cycle (from development to manufacture, operation, dismantlement and disposal) has always been and will always remain a matter of national importance.

Nuclear safety and security of the nuclear weapons complex depends on the following factors:

- proper and carefully monitored implementation of all the nuclear safety and security requirements stipulated in relevant regulation documents;
- good working order of all the nuclear-related instruments, devices and equipment, monitoring systems, packaging, buildings and premises, transport and communications;
- high qualification of personnel, discipline and safety culture; and
- well-trained and equipped forces that can localize and eliminate the consequences of any accidents which may occur during nuclear-related operations.

Safety and security of all nuclear warheads and ammunition is gradually improving as governments introduce new computerized accounting and control systems for nuclear materials and better security systems. The current level of organizational and technical measures makes it possible to rule out an accidental or unauthorized nuclear detonation during every stage of normal



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operation as well as in emergency situations. In essence, nuclear munitions have become as safe as conventional ones.

Russia is well aware of the tremendous responsibilities of being a nuclear power. Safety and security of nuclear weapons is a matter of national priority. In the new social and political situation maintaining that safety and security requires timely and effective everyday solutions. In 1996 the Russian government adopted a resolution entitled "On priority measures to ensure safety and security of nuclear weapons". In accordance with that resolution, Russia has introduced a state system of ensuring safety and security of nuclear weapons. Organizationally this structure is based in the existing Russian ministries, agencies, services and organizations that are involved in designing, testing, manufacturing and operating nuclear weapons, as well as in their transportation, security, elimination and disposal, in protecting those weapons from nuclear terrorism and maintaining a system of nuclear supervision.

The system encompasses all levels of government and is designed to implement government policy on ensuring the security and safety of nuclear weapons. The functioning of the state system of ensuring the security and safety of nuclear weapons is based on the principles of personal responsibility of officials for the security of nuclear weapons in their remit.

Ever since nuclear weapons were created, any accident involving a nuclear weapon is treated as an emergency. It must also be taken into account that any such accident would have major geopolitical repercussions, and the cost of dealing with the aftermath would be enormous.

The Russian Federation has a state system of prevention and liquidation of emergency situations. Given the special nature of the measures required to deal with incidents related to nuclear weapons, this state system has a functional subsystem designed specifically to deal with such incidents.

This functional subsystem of response to nuclear weapons related incidents is based on special emergency services and formations of the *Rosatom* state nuclear energy corporation and the Ministry of Defense, as well some other agencies as per their special areas of expertise. The Ministry of Defense and *Rosatom* hold regular joint exercises to test the system's efficiency and viability.

In 2004 the Russian Armed Forces and the Federal Agency for Nuclear Energy held the *Avariya-2004* exercise. Some 48 observers from 17 NATO member states were present. The aim was to demonstrate to the international community the entire range of measures and systems Russia has in place to deal with incidents related to the safety and security of nuclear weapons. Our country has shown that the safety and security of the Russian nuclear arsenal is up to the most demanding world standards, and in some areas (such as resilience of nuclear weapons to unauthorized use) Russia is the world leader.

The reliability of our nuclear safety measures depends to a large extent on the legislation and regulation introduced by the federal legislative and executive authorities. Russia is working hard to improve its nuclear security and safety legislation and regulation, which is based on the Constitution of the Russian Federation, international agreements, treaties and conventions, as well as the whole body of Russia's nuclear, environmental, social and other legislation. The Russian Ministry of Defense is working to improve nuclear safety and security measures at its nuclear facilities as part of the plan to implement the first stage of the "Basics of State Policy on Nuclear and Radiation Safety in the Russian Federation until 2010 and in the Longer Time Frame".

The Russian Federation continues to improve and update its legislation and regulation at all levels, from the federal (laws, strategies and concepts) to agency level. This system of legislation and regulation encompasses all the issues of nuclear weapons security and safety at every stage of their life cycle, from creation to storage in the nuclear arsenals to decommissioning and disposal.

As the threat of international nuclear terrorism continues to grow, the Ministry of Defense takes all the required measures to ensure **physical security** of nuclear weapons storage facilities and their **resilience to terrorism**. The system of ensuring the security of the Russian nuclear arsenal is based on protecting and guarding the Russian nuclear facilities using the best available technology. The weapons are guarded and protected not only at the storage sites but also during their transportation to other facilities for dismantlement and disposal.

The Ministry of Defense is implementing a program of phased improvement of security technology at its nuclear facilities, from the actual nuclear weapons storage rooms to the perimeter of nuclear facilities, i.e. the so called integrated complexes.

The projects to improve physical security and protection of the Ministry of Defense nuclear weapons storage sites are being implemented as part of the State Military Procurement Program (MPP) and international cooperation programs.

As part of the MPP the Ministry of Defense is improving physical security and protection systems and its nuclear facilities under the "Unified Plan of Works to Improve the Physical Security and Protection of the Sensitive Facilities of the Russian Armed Forces for the Period of 2004–2015".

Integrated engineering and technological security systems play a special role in ensuring the resilience of nuclear facilities to terrorism. The main objectives of these systems include early detection of terrorists and saboteur groups, prevention or delay of unauthorized actions, assessment of the situation and correction of the actions of security details as they conduct combat actions to interdict and destroy the attackers.

Ensuring the security and safety of nuclear weapons is increasingly becoming an international problem. Russia is actively integrating itself into the international legal system in the area of nuclear security and safety. International cooperation in this area pursues the following main objectives: reducing the threat of a nuclear conflict; improving the mechanisms of preventing the proliferation of nuclear weapons; nuclear weapons reductions and elimination on a multilateral basis; providing mutual assistance in the event of a nuclear accident.

One of the key outcomes of the G8 summits in recent years has been the Global Partnership against the proliferation of weapons and materials of mass destruction and the adoption of the G8 action plan to prevent the proliferation of weapons of mass destruction. The existing positive experience and the tangible results of such partnership that have already been achieved have enabled Russia to introduce a lot of advanced technology, including emergency and rescue equipment, supercontainers, radiation metering systems, polygraphs, instruments to detect drugs and alcohol in the human body, computer equipment.

The most valuable practical assistance in improving the safety and security of nuclear weapons storage and transportation has been provided by the United States and Germany. Cooperation with these countries began in 1995 and 2003 respectively, based on intergovernmental and interdepartmental agreements.

Thanks to cooperation with the United States, Russia has upgraded the security and safety technology at dozens of MoD nuclear weapons storage sites (including the sites operated by the Navy, the Strategic Missile Troops and the 12th Main Directorate of the MoD). Projects to introduce advanced technology are currently under way at several more facilities. Funds have been allocated to pay for the transportation by hundreds of special trains of nuclear ammunition to *Rosatom* facilities for disposal.

As part of cooperation programs with Germany, Russia is currently upgrading the security technology at three nuclear ammunition storage facilities operated by the 12th Main Directorate.

All the storage facilities are now equipped with obstacle belts and trespasser detection instruments, as well as modern security complexes that meet all the Russian and international requirements. I would like to stress that our ability to ensure the required level of security at our nuclear arsenals has been the main and the most important outcome of implementing international cooperation programs in this area.

Over the next several years we are planning to complete the modernization of security complexes at the nuclear weapons storage facilities.

At the G8 summit in St Petersburg in July 2006 the presidents of Russia and the United States proposed an initiative that was later formulated as the Global Initiative to Combat Nuclear Terrorism (GICNT). The Russian MoD is actively involved in the implementation of the GICNT initiative. Our experts are working to improve the "Guidelines for the Architecture of Nuclear Detection". The draft guidelines were released in April 2010. This is the first important practical achievement after three years of work on the initiative.

It would make sense for representatives of Russia and the United States, the two founding members of the GICNT, to review and improve the "Guidelines for the Architecture of Nuclear



Detection'' once again in a bilateral format and then submit the joint version of the document for the approval of all the members of the initiative.

The position of the Russian Ministry of Defense on the nuclear security problem is clear: Russia is taking all necessary measures to ensure reliable security and protection of its nuclear arsenals. We have been implementing those measures since the late 1980s and early 1990s, taking into account new trends in the rapidly changing political, social and economic situation in Russia itself and internationally. In the early 1990s all Soviet nuclear weapons were removed from the territory of the former Soviet republics. We have also optimized the number of nuclear weapons storage sites and their location, including the facilities where weapons designated for disposal are stored.

Security and safety of nuclear weapons has always been and will always remain a major factor of our national security. This is a difficult organizational and technical challenge. It is being addressed using a whole range of measures. At present, I can say with confidence that the Russian nuclear arsenals are safe and secure.

Taking into account all the international trends, areas for further improvement of safety and security of nuclear arsenals include measures to improve the resilience of these arsenals and of the nuclear weapons themselves to various emergency situations and attempts at unauthorized use. We also need to continue to improve the system of preventing terrorist attack against nuclear facilities, augment the existing security and protection systems, and introduce new modern physical security measures.

OLEG ROZHKOV (RUSSIAN FOREIGN MINISTRY): General Pertsev has already described in great detail the work that has been done and that is now being done in Russia. Looking forward, the following question comes to mind. Suppose we have resolved the problem of ensuring the security and safety of nuclear materials, weapons and facilities on Russian territory. Suppose that problem has also been completely resolved in the United States and three of four other states that have nuclear weapons. Will that be enough to ensure global security, i.e. security on a global level?

We all know that apart from the nuclear-weapon states, there are also half a hundred or more of countries which pursue nuclear energy programs and have large stocks of nuclear and radioactive materials. There are also countries that are only just beginning their nuclear energy programs. That means that ever greater efforts will be required to ensure the safety and security of nuclear materials and facilities, as well as proper accounting and controls.

When we were discussing with our American counterparts the question of where to go next in our cooperation with the United States, when we were drafting the joint presidential statement on nuclear cooperation, we discussed these issues as well. From that discussion came the idea of holding a nuclear security summit.

Russia, the United States and other countries with advanced nuclear programs have always discussed one way or another, the question of security of nuclear and radioactive materials. But there is also a large number of countries that have only a very vague idea of what needs to be done to make sure that all the required standards are met. We need to focus on implementing the nuclear security and safety standards developed and recommended by the IAEA, on introducing reliable accounting and control systems for nuclear materials, etc. These are the main objectives of the summit at this stage.

The issues of ensuring the security and safety of nuclear weapons and military facilities are very sensitive. As affirmed during the launch of the GICNT initiative, the security of nuclear materials is receiving a lot of attention, and at present the level of that security is sufficient. All the countries that have nuclear weapons are responsible for the security of those weapons. But I would like to say that this is primarily their *own* responsibility as sovereign nations. Only to a lesser degree is it a subject of broad international cooperation.

JON SHEARER (U.S. DEPARTMENT OF ENERGY): According to a recent Harvard University report, if a nuclear bomb with the explosive power of 10,000 tons of TNT were set off in a major city on a typical workday, it would kill up to 500,000 people and would cause roughly \$1 trillion in direct economic damage. This is obviously a scenario that must be avoided at all costs. Terrorists' continued pursuit of these weapons and materials, along with related technologies, equipment, and expertise, makes our joint efforts no less critical than they were 15 years ago when we began cooperating in the post-Soviet era.

The Material Protection Control and Accounting (MPC&A) Program has a long history of working with counterparts in Russia and in other former Soviet States to strengthen the physical protection and control and accounting of nuclear weapons and materials. During this time the U.S. has made vast improvements in our nuclear security and we have begun to down-size our nuclear weapons complex. By working together as colleagues and friends consistently and steadfastly over the past 15 years, we have made the world a safer place.

The MPC&A Program has completed security upgrades at 73 Russian nuclear warhead sites containing hundreds of warheads, including 39 Russian Navy nuclear sites, 25 Russian Strategic Rocket Forces sites, and nine 12th Main Directorate sites. Together we have completed security upgrades 50 nuclear material sites in Russia and other former Soviet Union (FSU) states, including a total of over 200 buildings.

Together we have downblended almost 12 metric tons of HEU not from weapons and are working together to consolidate nuclear material into fewer buildings at fewer sites to reduce long-term security costs. Together we have enhanced national-level MPC&A infrastructure by developing regulations and procedures, strengthened inspection and oversight capabilities, developed training and education programs, improved conditions for protective forces and enhanced SNM transportation assets.

Related efforts have led to the installation of radiation detection equipment at 231 Second Line of Defense Core sites (land border crossings, airports, and sea ports) in Russia and 13 other countries, and installation of radiation detection equipment at 23 major shipping ports around the world under the Second Line of Defense Program's Megaports Initiative. Installation is in progress at more than 20 additional ports around the world.

We have done all of this because we recognize that threats that terrorists post are continuously evolving, and that by working together we are stronger than working in isolation. Our physical protection philosophy rests on the concepts of detection and delay of adversaries and response to them. Being prepared is a deterrence. In line with this philosophy, we have cooperated on several types of upgrades at multiple sites to enhance the abilities of protective forces to respond to emergencies. For example, we upgrade site radio systems to improve communications, and renovate buildings to allow protective force personnel to reside much closer to the nuclear materials that they protect. These upgrades significantly decrease the response time of the protective forces, thereby enhancing the effectiveness of physical protection measures.

A significant challenge in nuclear material accounting is keeping track of the numerous items. To address this challenge, we have cooperated on the implementation of modern computer accounting and laser-readable identification systems. Together, these two types of system significantly enhance the process of inventorying nuclear material items by increasing the pace of the process, decreasing the occurrence of errors, and facilitating reporting to site and to national authorities.

We are very encouraged by the progress of the MPC&A Culture project, which promotes attitudes that are an important adjunct to the technical and procedural MPC&A upgrades. This work started at Russian nuclear sites. As a result of our cooperative success there, this work has expanded to sites in Belarus, Kazakhstan, and Ukraine.

In addition to our site work, our cooperative MPC&A Program also involves national infrastructure work. For example, our ongoing cooperation under the MC&A Equipment and Methodologies Working Group (MEM Working Group) brings together technical specialists from many *Rosatom* sites to work on a wide variety of material control and accounting measurement issues.

Encompassing all of our cooperative efforts, we have jointly agreed on the principles to sustain security upgrades in the interest of continued effective operation of MPC&A systems. The Joint Sustainability Working Group, along with site and infrastructure project teams, have worked intensively for several years to identify seven critical elements of sustainability, and specify the tasks necessary to fulfill these seven elements of sustainability in site-specific joint plans. These seven elements, which we believe apply to nuclear enterprises everywhere, are: site MPC&A organization/system operational planning; regulatory documents for MPC&A system operation; human resource management and site training; operational cost analysis; preventative maintenance, repair and calibration; performance quality verification and technical control; MPC&A system configuration management.



To facilitate our joint work on performance testing, key representatives from nuclear sites have visited the Y-12 National Security Complex for performance assessment workshops with presentations, demonstrations and exercises. We plan more such visits, on this topic and others of mutual interest.

ALEXEY UBEEV (ROSATOM): Starting from the mid 1990s we have tried to build a kind of bridge from aid and assistance to equal partnership, not only bilateral but also multilateral, aimed at sharing our experience with other countries. The Nuclear Security Summit in Washington (April 12–13, 2010) was initially proposed as a kind of seminar, but for various reasons many participants of the meeting in Washington did not accept such a model, because it would have looked as though people were being lectured. Imagine what would happen if a representative of every participant, including 44 nations and four international organizations, is given 10 minutes each to make a statement. That would translate into eight hours of non-stop statements. Were any of the heads of state prepared to take that?

Also, people will probably make use of the summit to hold bilateral meetings on the sidelines. But the very fact that the summit focuses on such a topical subject, which is, nevertheless, very narrow from the global point of view – that already tells you a lot. That is why the organizers are facing a very complex task.

There are several very serious issues. First, would it be right to just keep scaring people? Second, aren't we overdramatizing the need to counter nuclear terrorism and improve security? And finally, are we going to promote nuclear energy? The idea is not to announce some kind of clampdown in the final communique by the heads of state. The idea is to demonstrate the benefits of nuclear energy, given the ongoing world energy crisis. I believe that such an opinion is shared by many people other than *Rosatom* representatives.

Representatives of many industrialized nations agree that we need to clearly demonstrate the role of nuclear energy - though naturally we also need to abide by all the safety and security standards and regulations. In the current situation, and especially if we take into account the Kyoto protocol, there is simply no alternative to nuclear energy if we want to resolve the energy situation. That is the task I would like to draw your attention to, and that is how we should look at the future of nuclear energy.

In January 2006 the president launched the initiative on multilateral approaches to the nuclear fuel cycle. The initiative has its upsides and downsides.

In 2009 the IAEA Board of Governors passed a resolution instructing the Director-General to sign an agreement with Russia on creating a guaranteed reserve of low-enriched uranium. Creating the regional centers is a real contribution to nonproliferation – provided, of course, that there is a very limited number of such centers and that they are all placed under the IAEA safeguards system.

In general, speaking about the current climate, the working plan is now much better than it used to be in the beginning. But there are also a few *irreconcilable* countries, which first questioned the need for the nuclear security summit as such and then tried to fill the purely technical text of the working plan (I am not talking about the communique) with political statements. That was the main difficulty during the preparations.

EVGENY MASLIN (ASPEKT-KONVERSION): I have been involved in various issues related to nuclear weapons for many decades. In the early 1960s I worked with colleagues from the Ministry of Medium Machine-Building. At that time facilities of the Defense Ministry's 12th Directorate were working hard to catch up with the United States and achieve nuclear parity. In 1962 I did not go to Cuba, but the nuclear warheads I helped to assemble did. Then came the time of Eastern Europe in the 1960s. All our Warsaw Pact allies hosted Soviet nuclear weapons on their territory. Back then, I did not even think about nuclear safety and security. But just imagine for a second: war planners at the time expected that up to 700 nuclear devices would be used in frontline aviation in the event of a large conflict. Just imagine Europe where war is raging and frontline aviation alone has 700 nuclear devices to use against the adversary. There were also plans to launch up to 1,000 warheads, with another 1,000 for retaliatory strike. There was this concept of a retaliatory strike. The idea was to take them all out in one fell swoop. Thank God, those times are over, and most importantly, the confrontation of ideologies is over.

When we had all those ideological problems, when we thought about Socialism and then Communism as the next stage of human evolution, when we thought that if World War III ever comes, it will be a nuclear war and then Socialism will certainly prevail all over the globe – back then it was difficult to think of security as we think of it today.

A lot has already been said today about joint efforts on nuclear security. But the very idea of nuclear security is not as simple as the idea of conventional security. It includes aspects such as security of storage, security of transportation, security against terrorism, etc. Previously it was believed that the biggest threat was the risk of unauthorized use. Now these problems are gone. Now, in my view, we are talking about fairly mundane problems compared to the ones we had a few decades ago. And as the number of the remaining nuclear warheads falls, security continues to improve.

As for the idea of a world free of nuclear weapons, I was once asked about my opinion about the Global Zero initiative. That initiative proposes a specific plan to free the planet of nuclear weapons by 2030. So when they asked me what I think of the idea, I said that for the current generation this idea is something of a pipe dream. But at some point we will have to start thinking seriously about it, because we are all well aware what kind of dangers those weapons pose.

Nuclear weapons have long become a political weapon. But realizing the dangers of proliferation, we must follow the path towards nuclear arms reductions, in line with the requirements of Article VI of the Nuclear Non-Proliferation Treaty. I believe that once the two countries that possess the largest nuclear arsenals on the planet reduce them to a certain number of warheads, other nuclear powers will have to become involved. They must all join the negotiations and start thinking about what we should do about nuclear weapons.

One of the issues that have a direct effect on nuclear security is the so called Personnel Reliability Program. So long as nuclear weapons exist, the people who operate them must be properly selected to minimize the *human factor* and improve reliability.

Starting from the 1990s, in Soviet times, the security technology at nuclear facilities was limited to barbed wire and one detector instrument called Kristall. If the wire was cut, two guards with assault rifles would come running to investigate. There were also signs at the perimeter saying "No trespassing". In Soviet Union no-one had any idea what terrorism was-so the security systems were the way they were. But very soon measures were taken in all haste to step up nuclear security, especially when Ukraine wanted to become a nuclear-weapon state and was therefore very reluctant to give up the Soviet weapons on its territory. At present, as General Pertsev has just said, all the military arsenals are equipped with excellent new security systems.

I would like to hope that practical steps will be worked out on nuclear security. The IAEA must do its job. But this cannot go on forever – all these resolutions do not solve the actual problem. The technology of producing nuclear weapons is well understood. The terrorists understand it as well. I doubt that any terrorist organization will ever be able to assemble a nuclear device and pull off a proper nuclear detonation. This is very unlikely. But they can scavenge some radioactive waste, put it into a package, blow it up and cause a huge panic. That is a realistic scenario, and it must not be ignored.

Politicians must work towards the eventual goal of reaching the nuclear zero, because mankind has plenty of other problems to worry about besides nuclear weapons, such as climate change and the planet's resources running out. People are already thinking about sending a mission to Mars, yet we continue to threaten each other. The possibility of nuclear weapons being used in anger is still present, and it is unlikely to disappear completely any time soon. We should think seriously about that.

DMITRY KOVCHEGIN (BOOZ ALLEN HAMILTON): At present one of the key issues in Russian-American cooperation is ensuring long-term efficiency of the improvements already implemented. Work on that subject gives plenty of food for thought. And many lessons can be drawn from that work for the future of Russian-American cooperation in this area, as well as for cooperation with other countries all around the globe.

Nuclear security is not a final state we can arrive at. It is a continuous cyclical process. In other words, we cannot just implement some project, install detectors, build fences and then rest on our laurels. The threats we are facing are constantly changing, and the situation with nuclear materials



keeps changing as well. Which is why we need to continuously analyze those threats and develop effective mechanisms to counter them.

We need to work on developing processes to ensure nuclear security. The result of these processes should be the reliable functioning of the nuclear security system. We need to develop ways of ensuring nuclear security locally rather than always rely on assistance from the outside. Otherwise we will eventually face a situation whereby the donors will have to continue giving more and more money for new improvements. Russian–American cooperation in this area began in the mid 1990s. Some 15 years have passed since then. The equipment installed back in the mid-1990s is already worn out and obsolete. And we cannot just continue replacing the same old systems. This is a road to nowhere, both for the donor countries and for the recipients.

As part of the cyclical process we must focus our attention on assessing the threats we are facing and assessing whether the solutions we have are adequate to those threats. We need to take into account that there are no universal approaches. In other words, the United States is facing one set of threats, Russia is facing another, Pakistan yet another, and so forth. We need to develop systems designed to counter those specific local threats. So there is no universal solution which the United States could offer to Russia, or which the U.S. and Russia together could offer to a third country.

This is why one of the key elements of cooperation is reaching an agreement on the methods that should be used to assess the threats and estimate the efficiency of the systems we use to counter them. Both of these processes are critically important and represent the information we should work from. I believe that if we correctly formulate the problem as part of that process, finding a solution will be much easier. Any reasonable manager or official at a nuclear facility or some military structure will do everything in his power to remove the threat if he has sufficient and accurate information about its nature.

Therefore we need to work on these two processes. We also need to support the efforts to implement these processes in the countries where this has not been done yet, for various reasons. The United States and Russia have already made a lot of progress, and these processes have already become a matter of routine at U.S. and Russian nuclear facilities. In other countries things are different. So we need to spread this practice to other countries.

As for exchanging information about specific threats, this has always caused some difficulties, from both the American and the Russian side. But we need to develop such exchange, as far as possible. Naturally, that exchange should not be limited to the donor-recipient format, whereby the donor country must have some information about the problems of the recipient country in order to have some guarantees that the money will not be misspent.

The next issue is that we cannot view nuclear security separately from the larger situation. Take Russian–American cooperation, for example. The reason it began was not some specific event related to nuclear security. The main reason was the collapse of the former Soviet Union and the whole range of the economic, political and social problems that ensued.

Nuclear security is not an isolated issue, and neither is it the single top priority for the sake of which everything else can be sacrificed. The top manager of a nuclear facility has plenty of other things to think about. He must divide his attention between nuclear security, nuclear safety, paying wages to his staff, increasing the profits of his company, and many other things.

On the one hand, this situation creates problems and risks, in a sense that different priorities compete for our attention. But it also presents some opportunities for resolving the existing problems more efficiently. The fact that the problems of nuclear security are interlinked with other problems can help us use the available resources from the adjacent areas. This thinking, this view of the problem already exists locally, as a rule. But people higher up, the politicians in charge of our cooperation do not pay sufficient attention to this.

Therefore the organizations tasked with ensuring nuclear security have a very important role to play here. The situation may be a bit different in the armed forces, where there is a certain hierarchy. But in the civilian sector the people directly responsible for nuclear security at a nuclear facility are the top managers of that facility. These people, these organizations at the grassroots level know their own problems better than anyone else. It is they who should formulate the requirements for areas or cooperation that are best suited to address their needs. Meanwhile, the people at the top, the politicians who take part in the summits, they must properly analyze the

information they are receiving from the grassroots level and create the necessary conditions for effective work of these organizations.

Right from the start of our cooperation there was a good example of how it should be done. I am talking about the so-called lab-to-lap cooperation, whereby specialists from Russian and U.S. nuclear facilities could work directly with each other. These days, when I look at direct contacts between specialists at the grassroots level, the impression I get is also very positive. At that level it becomes obvious that our cooperation is making progress and bringing tangible benefits.

Now I would like to make several conclusions. First, we need to take into account the problems and interests locally in the countries which are facing tangible nuclear security threats. Therefore we need to explain the existing problems and threats instead of trying to impose our vision on other countries. Sometimes we have situations whereby the donor country imposes its vision on the recipient country in order to implement its own approaches to ensuring nuclear security.

Second, the issue of nuclear security should be considered in a wider context. We had examples here in Russia in the 1990s when most of the problems were coming from the outside, from the general situation. We also have Pakistan at present, where nuclear security problems are linked to the wider context. All this needs to be taken into account and analyzed.

Unfortunately, we cannot resolve all nuclear security problems just by working with nuclear facilities. We cannot resolve them just by installing detectors and building fences. We also need feedback from the people who are directly involved in nuclear security issues at the grassroots level.

GENNADY EVSTAFIEV (PIR CENTER): It is important to note the contribution made by the 1996 nuclear security summit in the Kremlin. I was a member of the Russian delegation. That summit drew the conclusions from the huge work that had been done by Russia to normalize the situation with the nuclear facilities, and this has been recognized. It is starting from the 1996 summit that Russia began talking as an equal with the other participants in the process. That is when other parties really started to listen to Russia.

As for nonproliferation, I have to say that when we accuse A.Q. Khan of nuclear weapons proliferation, the charge is not entirely accurate. Khan was dealing only with official government structures of other foreign countries. He never dealt with Al Qaeda or similar organizations. That fact is now being ignored.

PERTSEV: Mr. Kovchegin has raised some important issues, some of them theoretical. If I understand him correctly, we need some specifics in the exchange of information on threat assessment. No-one is against such an approach. Let me give you a brief example. Back in the early 1990s we had a program to assess the efficiency of the analysis of the vulnerability of nuclear facilities. It was developed by Americans. Well, they gave us the complex program, but they kept the database to themselves. That tells us about openness. So we adapt the program to our own circumstances, to the specific facilities and territories. We cannot use exactly the same program for the whole of Russia. We have to take into account the local crime situation, and many other factors that are important to make that program work well.

Mr. Kovchegin has also said that the donor country usually tries to impose its vision of the nuclear security problem on the recipient country. But as our own experience of cooperation with our U.S. partners shows, especially in recent years, we do not feel any such pressure. They say to us, "look for your own ways, look for your own solutions". The only situation in which differences sometimes arise is when we find some kind of equipment, and they say to us that it is a bit too expensive and that we need to find something a bit cheaper. Nevertheless, we manage to find a compromise. We do not feel any pressure to impose their way of doing things on us.

SERGEY ANTIPOV (RUSSIAN ACADEMY OF SCIENCES): Starting from 1995 I have been actively involved in Russian-U.S. programs to create physical security, accounting and controls systems at Russian nuclear facilities, including those operated by the 12th Directorate and the Institute of the 12th Directorate. So I am very closely familiar with these things we are now talking about. But I would like to start from a subject that is not directly related to nuclear security issues.

Military medics have this principle: on the battlefield after the battle they give assistance first to those who are lightly injured, then to those with more serious injuries, and only then to the severely injured. At first glance, that does not seem very humane: it means that there are severely injured people lying there and suffering on the battlefield while people with much less serious



injuries are the first to receive assistance. But actually such a system makes a lot of sense. Because while you are busy treating someone who is severely injured, for a long time you will not be able to assist anyone else. And while you are busy with that one man, someone who had a light wound will turn into a medium-gravity patient, and someone who was medium-gravity only a short time ago will turn critical. As a result, overall losses will only increase.

Now let us look at the approach of our foreign partners to choosing the priorities of our cooperation at any given period. We have discussed the issue of nonproliferation. In my view, it consists of two parts. The first part is the threat of new countries becoming nuclear-weapon states, i.e. acquiring nuclear materials, nuclear weapons and weapons technologies. The second part is the threat of those materials falling into the hands of terrorists, be they individuals, small groups or larger organizations.

The thing we have to take into account is that the first group, i.e. state actors, want nuclear weapons to defend themselves or maybe even to attack. But the second group has different purposes, and for those purposes they can use not only nuclear weapons but also radioactive materials and even radioactive waste to create a dirty bomb. Meanwhile, a dirty bomb does not have to be an actual device one can assemble with a screwdriver. It can be just a pack of explosives or a fuel-laden plane that crashes into a radioactive waste storage facility, contaminating the entire area. For a long time during the early stages of our cooperation our partners ignored such risks.

Let me give you one example of cooperation with our U.S. partners. In 1995, when we started implementing programs to improve the physical security of Navy facilities, they had a very strict directive: they were interested only in those facilities that stored nuclear ammunition or fresh highly enriched nuclear fuel. They weren't interested in anything else. They said, those other facilities are your own problem, we are not spending any money on them. Then after a while – and September 11 probably played a role here – they became interested in the problem of protecting spent nuclear fuel. The United States began to allocate funds for the transportation of spent nuclear fuel from the Mayak combine storage facilities, for its reprocessing, for creating a fleet of containers, special trains, etc.

Then we said to them, we have radio-isotope thermoelectric generators (RITEGs). This is an autonomous energy source designed to last for decades. They are usually used to power light beacons or some other facilities in very inaccessible places. They do not produce a lot of energy, but they contain highly radioactive materials. The places where these generators are installed are remote and entirely deserted, so in that sense they are unprotected. If the terrorists steal them, they can be used to do a lot of damage to the planet's population. Our foreign colleagues, apart from the Norwegians, were not interested. But now, following a seminar of the IAEA contact expert group, which was held at our initiative in Oslo in 2005, five countries (Norway, the United States, Canada, France and Finland) have allocated funds to resolve this problem. Starting from 2005 some 250 RITEGs have been removed from inaccessible facilities, brought to Rosatom plants, dismantled and disposed of. This work is still ongoing. In other words, we are now coming to the realization that in addition to the severely injured, we also need to treat those with medium and light injuries.

By the way, have the facilities operated by the Russian Academy of Sciences ever been considered as nuclear facilities or radioactively dangerous facilities? We have always focused on the Nuclear Industry Ministry and MoD facilities. But it turns out that more than 70 institutes at present, and more than 150 institutes in earlier days worked with radioactive substances. They also produce radioactive waste. And because discipline there was never as strict as at the Nuclear Industry Ministry facilities, many things still remain unchanged. Many of these Academy facilities are located in large cities. The vice president of the Academy, N.P. Laverov, has proposed the initiative of improving physical security at those facilities. The priority list includes 12 of the most vulnerable facilities. Projects to improve security at two of these institutes are already nearing completion. I hope that the remaining 10 will follow.

Of course, we cannot just blindly copy the strategy of military medics: leave the severely injured for later, deal with the lightly injured first. But neither should we ignore it entirely. In other words, while we work on the big and serious threats, we should not be forgetting about the less serious ones. Such incidents may be less serious in terms of their possible consequences - but they may actually be more likely to happen.

PERTSEV: It is important to note that the security of the nuclear arsenals was guaranteed, both in the 1990s and now. It is just that nuclear security and nuclear safety depend on three components: organizational measures, organizational-technical measures and design and technology solutions. There are the three pillars on which security rests. In earlier days, we just paid more attention to organizational measures. In other words, instead of a security platoon we had an entire security regiment. So the proportion of each of the three components has changed.

Now our national concept of nuclear security prioritizes design and technology solutions; organizational-technical measures come second, and organizational measures come third. Organizational-technical measures include laws and regulations, standard procedures, guidelines and other documents, all the way up to the federal laws I have already talked about. This component must be up to scratch. In my opinion, right now it is quite rational. It was rational in the 1990s, 1980s and 1970s as well, it is just that the proportion of each component was different. Back then, barbed wire and a “No trespassing” sign were enough to make sure that people stay away. Right now, that same barbed wire and sign will actually attract people just out of curiosity or to make a point that they are in a free country and can go anywhere they please. That makes things different.

The actual nature of nuclear security is such that development never stops. We always need to aim for the better, because technologies become obsolete, they constantly have to be upgraded and modernized, so we need to introduce new ones. In general, we need to reduce our reliance on the human factor. Even if we use people only as operators for sophisticated technology, or as guards, even if we introduce new rules for groups of three people, groups of six people, we still need to make use of new approaches in terms of social and psychological selection and adaptation. We have some very good techniques, and we need to improve them, taking into account the democratic nature of our country. The polygraphs we began to introduce in 1995 – they need to be upgraded as well.

VLADIMIR ORLOV (PIR CENTER): To conclude this round table, let me say this. *First*, we should be careful not to overdramatize the threat of nuclear terrorism and its consequences. Theoretically, we can go a bit too far. But we need to have effective preventive measures, because the threat of nuclear terrorism really is serious. The actual likelihood of an incident is not that high, but so what? Just one such incident will be enough for people to realize that they should have listened. So the objective remains, we need effective preventive measures. The money that will have to be spent on preventing terrorism, including nuclear terrorism, will be recouped if we manage to prevent an actual attack, or prevent an incident from turning into a geopolitical situation.

Second, I believe that Evgeny Maslin has raised a fundamental issue. He has reminded us that not so very long ago we were discussing the possibility of an actual nuclear war in Europe. We were talking about attack and retaliation. There were even scenarios that have now come to light under which our country was to continue delivering strikes even after all the Soviet political leadership has been destroyed. Such information that is now coming to light is an important reminder of those times. So it is very important that we have moved on from nuclear confrontation to nuclear cooperation. It is important to draw lessons from the past. I believe this round table has helped us to do just that. 

