

A RAY OF HOPE AMID NUCLEAR CLOUDS

Over the past few months, the world witnessed continued transformation of the global landscape. The trend is controversial; old partnerships are stress tested; new formats of cooperation emerge. Nuclear-related events have been high on the global agenda: failure of the 2015 NPT Review Conference and long-awaited nuclear deal with Iran. The current issue of the *Security Index* Journal focuses on the recent developments and emerging trends in the nuclear sector as well as on the international relations in the field.

The 2015 NPT Review Conference demonstrated that nuclear nonproliferation and disarmament, which have so far been immune to political turbulences, are no longer safe. Tensions between Russia and the United States over Ukraine cast a shadow on the discussions and Washington's desire to protect Israeli interests sunk the Final Document. Experts are wondering which global or bilateral disarmament arrangement will be next to fall victim to politics. An article by Andrey Baklitskiy offers an eyewitness account of the bumpy NPT review process, while interviews with high-ranking officials and experts from the U.S., France, Brazil, China, Austria and Russia demonstrate widening rift between nuclear and non-nuclear states.

This year has also seen a move of a completely different nature. An approach based on negotiations and compromise that the international community was unable to pursue in NY succeeded in Vienna, where after over a decade of futile talks a historic deal between Iran and P5+1 was concluded in July. Though it has yet to stand to the United States Congress and the Iranian Majlis, chances are that the worst is behind us. If all goes as planned, in just a few months from now the gradual process of sanctions-lifting will begin and very soon a former rogue state might become a respectable member of the responsible nuclear energy states family and its markets will be opened up to the world. The power balance in the region—if not globally—will inevitably shift. Just a few days after the Grand Finale of the talks one of the key Russian negotiators Deputy Minister of Foreign Affairs Sergey Ryabkov answered the questions of the *Security Index* Journal.

More and more countries come knocking on the door of the nuclear energy club. Among the many urgent issues they will have to deal with is nuclear security. A comprehensive overview of best international practices and IAEA standards in the field is contained in



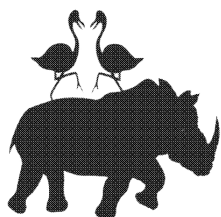
E
D
I
T
O
R
I
A
L

Dmitry Kovchegin's article *Nuclear security in nuclear energy newcomer countries* and offers a useful toolkit to the first-timers.

While nuclear disarmament is in decay, nuclear energy is booming. Countries that fail to reach an agreement on conceptual matters show true partnership when it gets down to business. A *TENEX*-moderated roundtable on the role of the nuclear fuel cycle held at the 2015 ATOMEXPO served as a vivid illustration. Although European sanctions against Russia are still in place and confrontation with Kiev continues, Russian companies remain reliable suppliers of nuclear fuel and material to Ukraine and France. This offers a ray of hope.

Problems remain, but recent success stories are encouraging. Aside from drawing inspiration from them, now is probably the moment to ponder over how the success was achieved, what helped bridge the gaps and find compromise. Then, with a little bit of luck, more will follow.

Olga Mostinskaya



Sergey Ryabkov:

«WE WILL FOCUS ON BUILDING CONFIDENCE AND TRUST
BETWEEN IRAN AND THE INTERNATIONAL COMMUNITY»

On July 14, 2015, a comprehensive agreement on the Iranian nuclear program was reached in Vienna. It took two weeks past the deadline for Iran and the P5+1 to agree on a 159-page outcome document. If properly implemented the Joint Comprehensive Plan of Action (JCPOA) should eliminate the threat of weaponization of Iranian nuclear program and bring the country out of international isolation.

In his interview to the *Security Index* journal¹, Deputy Foreign Minister of the Russian Federation and one of the key Russian negotiators Sergey Ryabkov outlined future steps towards the implementation of the deal, drew attention to the outstanding issues to be negotiated by the parties and rejected the rumors about a side-deal with the USA.

— What in your view will be the most difficult obstacles for the implementation of the Joint Comprehensive Plan of Action, and what regional implications for the very unstable Middle East should we expect? Did recent developments in the region facilitate the deal?

— As to the obstacles to implementation, there are many, and they are not to be underestimated. First, the United States Congress will now have to review the deal. As you know, the *Corker Bill* provides for a very rigorous procedure under which the U.S. Administration has to report to the Congress, and theoretically, the Congress can block any agreement. In this case, the U.S. President can veto this decision but even then, the Congress could obtain a two-third majority to override the President's veto.

According to our estimates, in order to sustain his veto the President will need 34 votes, and these votes are now going to be fought for by very influential players, lobbyist structures, media, think-tanks. We're going to closely follow that struggle. A situation where the Security Council takes a decision but de facto the future of the deal depends on how the Congress votes is nothing short of a conflict of laws and a political dilemma. It was very difficult to find proper wording in the agreement but the solution that was eventually reached is acceptable to all. Under the current arrangement, the Security Council is not dependent on the vote of the United States Congress, which would be unacceptable, at the same time the U.S. legislators are free to make their own decision.



W
E
I
V
R
E
T
N
I

The second issue we will have to deal with is the removal of nuclear materials from Fordow facility and reconfiguration of Arak reactor. We have agreed upon general framework of work, allocated responsibilities and decided on the sequence of actions, but there hasn't been a feasibility study of the reactor's reconfiguration, nor a contract for the removal of nuclear material from Fordow facility. Everything that could be done without violating the existing sanctions regime has been done. We are in constant contact with Iranians, everyone understands that in order to move forward we need the resolutions imposing sanctions to be withdrawn. After it happens, we can start working on the substance of the matter. It isn't going to be an easy ride. We don't think of it as of a commercial venture, but we are not going to do charity either. The project will be self-sustaining; no budget funding will be allocated. This is a difficult task, but I'm confident that Russian Foreign Ministry and *Rosatom* will find a good solution.

As to the reconfiguration of Arak, this is not our job. The reactor was designed by China. Similar reactor is operated in Algeria, and there is a number of countries that have a deeper knowledge of this technology and are, hence, better positioned to deal with the matter. However, initially it was *Rosatom*, who came up with a technical solution for the heavy-water reactor in Arak. The principle of operation will remain unchanged but Iran will not be able to produce significant amounts of weapons-grade plutonium. You know that any reactor produces plutonium, they only difference is its quality and quantity.

As for the regional implications, the answer depends on whether you are an optimist or a pessimist by nature. There are revisionists who criticize every provision in the document and believe that it is detrimental to their interests; others see the same document as a ray of hope. So, all depends on one's past experiences, habits and propensity to self-promotion.

If we look at the matter using the Cartesian reasoning, we shall see there are no reasons to expect any drastic changes of the situation in the region, on the oil market or as regards Iran's role in the Middle East. We have charted the course of gradual evolution. I believe all actors and stakeholders are going to look at the situation from two angles: first, look for new opportunities, and second, follow issues that require attention and make sure their own interests are met.

The evolutionary path will not lead to sensations, but this is the only possible way forward given the history of the issue, endless delays, the composition of the negotiating group as well as the positions of our colleagues, sometimes conflicting. The holistic approach of all parties and their efforts to bridge the differences between Russia and China on the one hand, and our Western partners on the other definitely contributed to reaching the deal. It will certainly be interesting to follow the developments in the relations between Iran and Saudi Arabia that was following the process with anxiety and suspicion, just like other countries of the Gulf. Besides, Israel criticizes the deal harshly. We understand the underlying motives, but are still waiting to hear what specific parts of the deal are problematic or unacceptable. It looks like it is difficult for the opponents of the JCPOA including Iran's detractors in the Middle East to find specific arguments against the deal. This in itself proves that the advocates of the new deal are in the right. As time goes by, Iran will play a more constructive, open and clear role in regional affairs. At the last week's BRICS outreach meeting in Ufa with SCO members and observers as well as members of the Eurasian Economic Union President Rouhani made a statement that was quite

remarkable in terms of both tonality and substance. It was a statement by a country determined to act as a responsible international actor.

The regional situation had no significant bearing on the negotiations. Everyone focused on specific issues. Certainly, when arms embargo or sanctions relief were discussed, we inevitably remembered Iran's support to different Shia groups in the Middle East, but this was just one of many arguments, not a factor that could accelerate or, to the contrary, delay the process. I would not say that regional aspects had any bearing on the negotiations.

— The rumor has it that the United States offered to Russia some kind of a swap, a compromise on certain issues in exchange for Russia relenting its position on the Iranian nuclear program. How would you comment on that?

— Looking at our position I would not say any element of it was softened or that we diverged from our fundamental principles. On the contrary, I would say that it is thanks to the full implementation of Russia's position that we managed to arrive at the deal.

As to any swaps with regards to Iran's nuclear program, my answer is negative — there haven't been any. Nor did we receive any proposals from the United, either behind closed doors or publicly, not even a slightest hint. I don't believe that the United States ever considered this as an option, or we could have considered any deal like that. Numerous participants to the process each have their own agenda, which makes such swaps impossible. Moreover, any such deal would eventually surface and bring parties to it under harsh domestic criticism. Besides, swaps are never fair.

— Russia agreed to remove excessive enriched nuclear material from Iran, what are the conditions?

— We have agreed on a nuclear fuel-swap deal, under which Russia will remove excessive enriched nuclear stockpile (currently around 8 metric tons above the limit for the material enriched up to 5%) in exchange for the equivalent quantity of natural uranium. We are yet to look at all costs involved but the initial analysis shows that it can be done in a sustainable manner.

First of all we need to take samples of the Iranian material and do quality tests, which is impossible under the existing sanctions regime. We will do it as soon as the new UNSC resolution is adopted. Most probably the Iranian material will become part of the low enriched uranium reserve in Angarsk.

— Many countries, Israel in particular, do not trust Iran. What are the mechanisms for monitoring and verification?

— We have developed one of the most elaborate and multilayered systems of monitoring and control ever. First of all, Iran agreed to immediately start provisional application of the Additional Protocol, which is considered by the vast majority of the international community to be a gold standard in the field of monitoring and identification of undeclared nuclear material or undeclared nuclear activities in any country.

The Additional Protocol, inter alia, enables IAEA to request a visit to any site, location or facility after giving specific reasons for seeking such a visit. This is called managed access, but in fact it provides IAEA unlimited access to any facility.



Besides, the Iranian side agreed to begin immediate application of the so-called modified Code 3.1 to its Subsidiary Arrangements with IAEA, which requires a country to share well in advance the design information on any nuclear-related facilities including NPPs the country in question plans to build or rebuild. Everything a country intends to do needs to be shared with and previewed by the International Atomic Energy Agency.

Moreover, according to the Joint Comprehensive Plan of Action, apart from the standard application of Additional Protocol and modified Code 3.1, Iran has agreed to a regime, which may be described as AP+. It involves installing sensors and cameras in sensitive areas and granting access to some facilities on which the information previously provided by the Agency to Tehran has been considered insufficient. Furthermore, the Iran-IAEA framework document on past military dimensions provides for visits, samples taking, further information sharing, etc. This goes well beyond what is required from any other country, and I believe Iran will implement its commitments under the JCPOA fully. For this reason, Russia made special emphasis during these negotiations on including a provision in the agreement and in the prospective UN Security Council resolution stating, that this case should not set precedent. It is unique and *sui generis* and should not be considered as a point of reference for any other situations or places. This extraordinary arrangement was needed because of mistrust between Iran and many regional players, between Iran and European Union, between Iran and the U.S. In our view, it should be regarded as an extraordinary case, and it should not be applied anywhere else, so we are glad that such formulas of no precedent-setting have been approved and included in the texts of both the core agreement and the draft resolution despite Iran's objections.

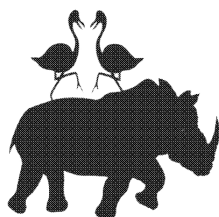
— Are additional political or technical measures outside the current agreement needed to promote transparency and verification, or is the JCPOA sufficient?

— Access and transparency were among the most difficult issues during the talks, both emotionally and politically. We managed to strike a good balance. Under the current agreement, the IAEA or individual countries will be able to get full information and perform all the necessary checks and inspection, while Iran will not have to disclose its entire military program. That is with the exception of the nuclear program, which will be subject to full and comprehensive control.

Looking ahead, we will focus on building confidence and trust between Iran and the international community and could go beyond the scope of the JCPOA or the UN Security Council resolution that will be adopted soon. For instance, we need to resolve the outstanding CTBT issue; Iran might allow reconnecting the existing monitoring station to the International Data Center in Vienna. I am confident that Iran will never produce a device that would need testing, but the very fact that they may eventually connect the station located on their territory to the IDC would send the right message and create yet another verification tool. The monitoring system will be comprehensive, and there are no gaps, no stone has been left unturned, everything has been considered over and over again. Skeptics will have a hard time finding grounds for criticism apart from emotions and the very fact that the contracting party is the Islamic Republic of Iran. 🐘

References

- 1 The interview is based on the Q&A session of the meeting of the *Dialogue Club International* held on July 16, 2015.



Vladimir Orlov:

«THERE IS NOW A RISK THAT THE ENTIRE INTERNATIONAL
NUCLEAR NONPROLIFERATION REGIME WILL ERODE»

The 2015 NPT Review Conference, which took place in New York from April 27 to May 22 ended without consensus on a final document. The U.S., the UK and Canada blocked the document over objections to the paragraphs on the creation of the WMD-Free Zone in the Middle East. The Review Conference was also marked by violent disagreements between the P5 and the non-nuclear weapon states over the implementation of Article 6 of the NPT.

In his interview to the *Security Index* journal, the Founder and Special Advisor to PIR Center Vladimir Orlov, who participated in the Review Conference as member of the Russian delegation, placed the outcomes of the Conference in a broader context, spoke about opportunities lost and the future of the nonproliferation regime.



W
I
E
V
R
T
E
N
I

— NPT Review Conference 2015 failed to produce the final document. Do you think that the wider international situation has contributed to the outcome?

— Even before the conference, many of the participants were deeply skeptical about the possibility of making any progress on nonproliferation and disarmament this year. There are some good reasons for such an attitude. First and foremost, the two *main* members of the P5, Russia and the United States, are in a state of bitter confrontation that shows no signs of abating. Second, there has been a severe deterioration of the security situation in Europe. Third, the Middle Eastern states — especially Egypt — are deeply disappointed with the lack of any progress on implementing the 1995 RevCon's decision calling for Israel to join the NPT, and on establishing a WMD-free zone in the Middle East. Fourth, there is a deep crisis of the multilateral disarmament process, as demonstrated by many years of stagnation at the Conference on Disarmament in Geneva. Another sign of the crisis is that the Comprehensive Nuclear Test Ban Treaty (CTBT), which was signed back in 1996, has yet to enter into force because a handful of states — including the United States — have yet to ratify. Fifth, there are growing tensions in East Asia, including North Korea's determination to accelerate its nuclear weapons and missile programs.

— In your view, was the failure inevitable?

— Two opposite trends were in progress at the 2015 RevCon. *The first trend* was towards a complete bust-up. It was obvious among some members of the P5, some of the *non-*

nuclear activists, and several Middle Eastern states, especially Egypt. Each country had its own motive not to try very hard for a compromise. For example, what France saw as unacceptable concessions on disarmament issues was regarded by Austria and Mexico as watered-down steps not even worth considering.

The second trend was towards finding a difficult compromise despite all the differences. At some point, it seemed that most of the delegations were in just such a frame of mind. There were no illusions or unrealistic expectations. No one was trying for a massive breakthrough that would go beyond the 2010 Plan of Action. Realizing that the current international situation was not conducive to ambitious steps or major breakthroughs, the adherents of the compromise approach were determined to make small but tangible steps forward, and to return to their respective capitals with a Final Document approved by a consensus. Proponents of such a flexible approach included Spain, Brazil, Iran, Australia, Sweden, and, at some point, Switzerland. Russia was also determined to achieve a positive result rather than to accept a fiasco. That was the general sentiment of the Russian draft of the Middle Eastern section in the Final Document, which included the proposal for the UN Secretary-General to convene a conference on establishing a WMD-free zone in the region no later than March 1, 2016.

— Do you think the draft final document prepared by Amb. Taous Feroukhi was balanced enough to forge consensus?

— When I first read all 24 pages of the document, I was forced to admit that Amb. Feroukhi and her small team had achieved something that was almost impossible. Of course, the document was by no means revolutionary. It was merely a final document of yet another Review Conference. But the draft was very ambitious in at least two key elements.

To begin with, I believe that the 19 points of the paragraph on further steps on nuclear disarmament should have satisfied the non-nuclear-weapon states, which all demanded “further progress”. That paragraph began with a recognition of the “deep concern at the catastrophic humanitarian consequences of any use of nuclear weapons”. It went on to urge Russia and the United States to begin talks on deeper nuclear arms reductions “as soon as possible”. All nuclear-weapon states were called on to improve their nuclear weapons accounting and reporting, albeit “without prejudice to national security”. The document also urged the eight states that have not yet ratified the CTBT, preventing it from entering into force, to do so “without further delay and without waiting for any other State to do so”. Also worth mentioning is the final, 19th point, which recommended that the UN General Assembly set up a working group to identify effective measures on full implementation of Article 6.

My first reaction was that the proposed draft represented a victory for the *non-nuclear activists* and a capitulation by the P5 group, torn as it was by internal squabbling. Upon more careful study, however, I began to see the outlines of a reasonable and balanced compromise. It is now clear to me why the head of the Russian delegation later described the draft as a “very useful effort on the part of Amb. Feroukhi, a draft that could and should have been approved”.

The core of the Middle East section in the proposed draft consisted of Russian proposals. Those proposals did not emerge out of nothing, of course; they were the result of marathon consultations with Middle Eastern states, especially Egypt, but also several others. Israel was present at the RevCon both invisibly (for it sometimes seemed that

the Americans and the Canadians were voicing Israel's position rather than their own) and visibly, in the form of Israeli observers. Signs of Israeli presence were everywhere in the lobbies. Sticking to what has already become a tradition, Russian diplomats held numerous meetings with their Israeli counterparts to discuss possible solutions and the degree of their acceptability. Naturally, they also maintained dialogue with the United States and the UK. In fact, up until the final week of the conference that dialogue seemed entirely constructive, as suggested by complaints in the lobbies that "the Russians and the Americans are once again singing from the same hymn sheet on the Middle East".

— The draft final document was not adopted over the opposition from the US, UK and Canada. What does it mean for the future of the nonproliferation regime?

— Let me make one thing perfectly clear: the future of the NPT was not at stake at the 2015 RevCon. The NPT has an indefinite term, and the review process has been going through ups and downs ever since the treaty's entry into force in 1970. There have been good RevCons, and there have been bad ones. However, with this reservation, I have to recognize that what happened on May 22, 2015 was a *major setback* for the nuclear nonproliferation regime. Even by the least pessimistic assessments, that setback has destroyed at least a decade of progress.

The consequences of this fiasco will be felt on all fronts. There is now a risk that the entire international nuclear nonproliferation regime will erode. Of course, only a small minority will benefit from such erosion. But that minority has already demonstrated its ability to seize the initiative by unfurling attractive and seemingly universal banners.

With growing tensions on the European continent, with the nuclear factor once again being bandied about, with fresh plans to deploy new nuclear weapons and a clear risk of the INF Treaty being lost — in these dire circumstances, the NPT should be as steady as a rock, with no reservations.

Speaking of European security, the time is coming to start thinking seriously about how we can strengthen the nonproliferation regime on the European continent. The measures might include nuclear-weapons-free zones and other steps to prevent nuclear weapons being stationed outside the borders of the nuclear-weapon states.

The most urgent priority now is to reduce the risk of incidents involving nuclear weapons, i.e. accidental risks with potentially irreversible consequences.

Another pressing issue that still remains unresolved is the interrelation between offensive and defensive strategic weapons, as well as the connection between nuclear weapons and new types of conventional strategic weapons (global prompt strike weapons). Unfortunately, despite the obvious urgency of this problem, most Europeans seem to remain indifferent to it.

At the same time, we have to recognize that the Humanitarian Initiative and the Austrian proposals will continue to gain momentum. In my view, these discussions are merely diverting us from key disarmament issues rather than focusing our attention on them. My understanding is that some people hope to turn that initiative into an alternative to the NPT, and use it as a launch pad for a convention banning nuclear weapons. Will that help the NPT? Not at all. To the contrary, that could be the very source of the NPT's erosion I have already warned of. As the saying goes, the road to hell is paved with good intentions.



W
E
I
V
R
E
T
N
I

Should nuclear-weapon states be afraid of the *non-nuclear activists*? Of course not. They need to pursue dialogue with them, both from within and from without. What will it change if they merely turn a deaf ear to them? Let us not forget that the conference in Vienna was attended by all the CIS and CSTO members (except for Russia and Tajikistan), and by all the BRICS states (Russia being the sole exception). Perhaps Russia and France could learn from China, which does not avoid this discussion, but sends low-level delegations to these events.

The most dramatic turn of events, however, could unfold in the Middle East. Israel may now feel triumphant. Tactically, the United States has protected its interests. But how will Egypt respond? Where is the boiling point after which the Middle Eastern states will decide that since the decision of the 1995 Conference has not been implemented, and since no one seems eager to implement it, they have no choice but to take the initiative? And, to avoid that boiling point, who and how will fill the current vacuum when the mission of Finnish diplomat Jaakko Laajava, as facilitator to the Middle East WMD-Free Zone conference, failed?

After the fiasco of the conference, the blame is increasingly being laid at Egypt's door in some quarters. The Egyptian delegation is facing accusations of obstinacy. It is said that the Egyptians were secretly planning to derail the RevCon right from the start. Even if we accept for the sake of argument that the Egyptian delegation did in fact adopt an extremely unyielding stance, one cannot help but think that the Egyptians had already been way too patient. They have been waiting since 1995, with no real progress being made. Indeed, it sometimes feels as though no-one really cares about the fact that the 1995 RevCon decision on the Middle East is not being implemented. 🐘



Andrey Baklitskiy

OUTCOME OF THE 2015 NPT REVIEW CONFERENCE: WHAT AWAITS THE NONPROLIFERATION REGIME

The final plenary session of the 2015 NPT Review Conference was formally concluded at 22.00 on May 22. In practice, however, the conference ended three hours earlier, when U.S. Under Secretary of State Rose Gottemoeller rejected the proposed draft of the Final Document. The stumbling block was the section on establishing a WMD-free zone in the Middle East. Even though everything had already been decided, the delegates could not just leave early — they had to watch the proceedings play out until their formal conclusion. These proceedings included statements in support of the U.S. position by the British and Canadian delegations. The clock was then stopped; the Iranian delegation convened a meeting of the Nonaligned Movement; the proceedings then resumed; the Egyptian representative delivered a speech, in which he thanked the Russian delegation for its strong leadership; and finally, the majority of delegations praised the chairman of the Review Conference, Algerian Ambassador Taous Feroukhi, for her hard work. Only then were the delegations and the experts who attended the conference finally able to start trailing from the General Assembly chamber towards the only exit that was still open at such a late hour. The 2015 NPT Review Conference was over; preparations began for the 2020 RevCon. In the dark and desolate corridors of the UN headquarters, the outlook for that event seemed especially gloomy.



A
N
A
L
Y
S
I
S

ON THE ROAD TO NEW YORK

The 2015 RevCon's failure to adopt a Final Document should not have come as any great surprise; there were grave doubts about the outcome of that conference right from the start.

The conference on establishing a WMD-free zone in the Middle East, which the 2010 RevCon scheduled for 2012, had yet to be convened. The Middle Eastern states were unable to agree on substantial and organizational issues. Two of the three co-sponsors of the conference, the United States and Britain, were consistently siding with Israel on all important issues. During the second session of the Preparatory Committee in 2013, the Egyptian delegation walked out in protest over the lack of progress on the WMD-free zone, so everyone knew that the issue was a ticking time bomb.

Another apparent reason for the RevCon's failure was disagreement on disarmament issues. Different approaches to disarmament commitments were the main reason why the third session of the Preparatory Committee had proved unable to deliver a consen-

sus report.¹ Representatives of the P5 insisted on a step-by-step approach to nuclear disarmament that would take into account the nuclear weapon states' security concerns. Many of the non-nuclear weapon states, however, insisted on recognizing the catastrophic consequences of any potential use of nuclear weapons, and called for a speedy multilateral disarmament. On October 20, 2014, New Zealand's Dell Higgie made a statement on the humanitarian consequences of nuclear weapons at the First Committee of the General Assembly;² that statement was supported by 155 countries, which is 80 per cent of the UN membership.

Another cause for pessimism was a new bout of tension between the two largest nuclear powers, Russia and the United States (with Britain and France largely taking Washington's side). Apart from the Ukrainian issue, which was the main irritant between Moscow and Washington, the sides also differed substantially on the issue of compliance with arms control and nuclear arms reduction agreements. Differences between Russia and the United States made it highly unlikely that the two countries would agree to further nuclear cuts below the ceilings agreed upon in the New START treaty, angering the proponents of a nuclear zero.

All that being said, however, the eventual failure of the 2015 Review Conference did in fact come as a surprise to many of the people involved. The negotiations were very difficult, but the outcome did not seem predetermined. There was a good chance of the RevCon adopting a Final Document after all — and the reason for its eventual failure to do so was fairly unexpected.

WHAT WENT WRONG

On the whole, the 2015 RevCon kicked off to a more positive start than many observers had expected. Palestine's decision to join the NPT in February 2015 had made the treaty the world's largest arms control agreement in terms of membership.³ Palestine was able to join after Russia accepted its ratification instruments (it was the only one of the NPT depository states that agreed to do so). This was met with approval among the Arab states and members of the Non-Aligned Movement. Another distinctive feature of the 2015 NPT was Israel's presence. Tel Aviv is not a member of the NPT, and it is suspected of possessing a significant nuclear arsenal. Nevertheless, for the first time in 20 years, the Israeli delegation was present as an observer. Tel Aviv's presence probably owed more to its eagerness to improve relations with several of its Arab neighbors and the United States than to any changes in Israeli nuclear policy. Nevertheless, it was taken as a good sign that opened up opportunities for dialogue. Good progress achieved at the talks between Iran and P5+1, with the Lausanne agreements signed less than a month before the start of the RevCon, also added to the positive atmosphere in New York.

The P5 states had also done their homework. At the start of the conference Russia, Britain, China, and France announced their ratifications of the protocol to the Central Asian nuclear weapons-free zone, which was signed by all five of the nuclear-weapon states in 2014.⁴ The U.S. government announced that it had submitted the protocol to Senate for ratification.

The first signs of impending trouble came on the third day of the conference, when U.S. Secretary of State John Kerry accused Russia of violating the Intermediate and Shorter Range Nuclear Forces (INF) Treaty. He also accused Moscow of being in breach of the terms of the Budapest Memorandum on security assurances given to Ukraine in connection with the country's accession to the NPT. Russian representative Mikhail Ulyanov

Ambassador Fu Cong

Deputy Permanent Representative, Permanent Mission of the People's Republic of China to the United Nations Office at Geneva

— *In your view, what are the main contradictions in the interpretation of Article VI of the NPT?*

— Article VI of the NPT clearly specifies the direction of the nuclear disarmament process, namely pursuing negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date, to nuclear disarmament, and to a treaty on general and complete disarmament under strict and effective international control. We do not see any “legal gap” in the Treaty. In the current international environment, the NPT, as well as the decisions adopted by its successive Review Conferences, including the 2010 Action Plan, constitute practical and feasible roadmaps to promote international nuclear disarmament in a step-by-step manner. Any re-interpretation of the role of the NPT in nuclear disarmament is conducive neither to maintaining the authority and effectiveness of the Treaty, nor to promoting progress in nuclear disarmament.

— *Since the signing of the NPT all nuclear reductions were pursued either bilaterally or unilaterally, but not directly in the framework of the Treaty. In your view, what is the role of the NPT in nuclear disarmament?*

— It is regrettable that the 2015 NPT Review Conference concluded without an outcome. However, the NPT still serves as the cornerstone of the international nuclear non-proliferation regime, as well as an important mechanism to promote international nuclear disarmament. Since the end of the Cold War, Russia and the US have concluded a series of bilateral treaties to reduce their respective nuclear arsenals. Such measures were not adopted directly in the framework of the NPT. However, they are consistent with the purpose of the Treaty and were endorsed by its Review Conferences as practical and feasible measures for nuclear disarmament. These treaties must be scrupulously observed, and we also hope to see further substantial reductions of nuclear arsenals by the US and Russia. It must be pointed out that China always keeps its nuclear arsenal at the minimum level required for its national security, which serves as an important contribution to the international nuclear disarmament. Once conditions are ripe, China will also

commit itself to joining the multilateral nuclear disarmament negotiation process.

— *At the 2015 NPT Review Conference Austria, on behalf of more than 150 states, gave a statement on the humanitarian consequences of nuclear weapons. How do you see the future of the Humanitarian Initiative?*

— China fully understands the concerns of some countries over the possible humanitarian consequences of the use of nuclear weapons. We likewise stand for the complete prohibition and thorough destruction of nuclear weapons and support international efforts to draw up a practical and phased long-term plan at an appropriate moment, including the conclusion of a convention on the complete prohibition of nuclear weapons, leading to complete and thorough nuclear disarmament. At the same time, however, we must also acknowledge that nuclear weapons are related to national security and global strategic stability. Failure to recognize this fact will not contribute to progress in the nuclear disarmament process, and will over time also make such humanitarian initiatives unsustainable.

THE NUCLEAR NON-PROLIFERATION TREATY IN BRIEF

Signed	1968
Entered into force	1970
Extended indefinitely	1995
Membership	191 states
Withdrawals	DPRK
Not signed	Israel, India, Pakistan, South Sudan
Review Conferences	Once every 5 years
Between Review Conferences	Preparatory Committee sessions held on years 2, 3 and 4 of the 5-year cycle
Decision-making	By consensus



rejected the American accusations and voiced Russia's own charges against the United States on the issue of the INF Treaty and on joint nuclear missions with the non-nuclear NATO members. The acting head of the Russian delegation also recalled numerous failures of U.S. expertise on the matter, citing Iraq as a case in point. The speech by M.I. Ulyanov appeared on the official UN website only the following day; it was re-written at the last moment after the statements made by the U.S. side.

The Ukrainian issue, however, failed to make it to the top of the conference agenda. Apart from the U.S. Secretary of State and Ukraine's own foreign minister, only a few Western delegations, including Canada and Poland, directly accused Russia of violating the Budapest Memorandum. After the head of the British delegation announced a joint statement by the P5 on April 30, it became clear that the great powers had decided not to allow a confrontation within their own ranks to spiral out of control.⁵ The issues of disarmament and the Middle Eastern WMD-free zone took the center stage from then on.

Against all expectation, the matter of convening a conference on the WMD-free zone in the Middle East was discussed in a fairly constructive manner. The entire subject of the Middle East was debated at Subsidiary Body 2 sessions, which were held in camera. Everyone knew, however, that Israeli representatives were taking part in informal consultations. During the first week of the conference the Israeli delegation was led by Jeremy Issaharov, first Deputy Director-General of the Israeli Foreign Ministry. The basic draft on the table was proposed by the Arab States Group, and it included some fairly tough clauses (ending the mandate of the Finnish coordinator, Amb. Jaakko Laajava, instructing the UN Secretary-General to convene the conference within 180 days after the adoption of the RevCon Final Document, and establishing two working groups).⁶ The draft was later amended by the Russian delegation. Under the Russian proposal, the conference on establishing a WMD-free zone was to be convened three months later than originally proposed, by March 1, 2016, and all decisions were to be taken by consensus.⁷ The Russian working draft was then used by the chairman of Subsidiary Body 2. On the whole, Russia had invested a lot of effort and resources into the Middle Eastern part of the RevCon debate. When the discussions at Subsidiary Body 2 started to grind to a halt, the Russian delegation essentially assumed the functions of the body's chair.

Such an approach yielded some positive results. Several days before the end of the conference there were discussions in the lobbies about how to rescue the Middle Eastern deal, which seemed all but guaranteed, if and when disarmament issues sank the Final Document. There were very serious discussions as to whether the RevCon could adopt a separate document on the issue of the Middle Eastern WMD-free zone. Experts insisted that in theory, it was possible; there have been precedents of RevCons taking separate decisions that were not part of the Final Document, but those decisions tended to be on technical rather than substantive issues.

Meanwhile, disarmament was increasingly becoming a cause for concern. There were vehement arguments between the nuclear and non-nuclear weapon states at Main Committee I, whose remit includes disarmament and negative security guarantees. Austria, backed by 159 other states, proposed that the broad humanitarian agenda be included in the Final Document. The Egyptian delegation reminded everyone that the plan of action adopted by the 2010 RevCon contained a reference to the proposed convention on the prohibition of nuclear weapons, and invited other delegations to resume discussions of that idea.

Ambassador Alexander Kmentt
Director for Disarmament, Arms Control and Non-Proliferation
Federal Ministry for Europe, Integration and Foreign Affairs of the Republic of Austria

— In your view, what are the main contradictions in the interpretation of Article VI of the NPT?

— The main contradictions stem from a fundamental divergence between NWS and most NNWS as to what constitutes credible progress of nuclear disarmament and what the obligations under Article VI entail. NWS interpret nuclear disarmament and Article VI as a gradual process conditioned upon maintaining strategic stability, and therefore, in their view, the preservation of nuclear deterrence. Until such conditions come to be, possibly in the distant future, it seems like NWS will be prepared to take only very limited steps, such as reductions, but not measures that would fundamentally change their reliance on nuclear weapons or alter the status quo. This is why concrete measures agreed to in 1995, 2000 and 2010, such as de-alerting, doctrinal changes, etc. are implemented very reluctantly if at all.

Most NNWS believe that Article VI was further developed in past Review Conferences, not just as through a series of non-binding political declarations of intent, but by clarifying what Article VI obligations actually mean. Consequently, compliance with Article VI and nuclear disarmament are not subject to any conditions, they are treaty obligations that requires a clear and discernible move away from reliance on nuclear weapons. This is nowhere in sight, and reductions of numbers of nuclear weapons, which are welcomed, cannot be seen as substitute to such credible and direct steps. To the contrary, long-term investments and modernisation programs in NWS not only demonstrate unwillingness to move away from reliance on nuclear weapons, they are also in clear opposition to the spirit and letter of the NPT. This leads, thus, to a situation where the five permanent members of the Security Council are seen by more and more states as being de facto in noncompliance with their NPT obligations of Article VI.

— Since the signing of the NPT all nuclear reductions were pursued either bilaterally or unilaterally, but not directly in the framework of the Treaty. In your view, what is the role of the NPT in nuclear disarmament?

— The NPT should serve as legal framework in which nuclear disarmament is to be achieved. All efforts that are consistent with the objective of achieving a world without nuclear weapons are complementary to Article VI of the NPT and in fact contribute to its goals, as is highlighted by Action 1 of the 2010 Action Plan. Bi- or unilateral disarmament measures by NWS can therefore be seen as partial implementation of the respective Article VI obligations, but are no substitute to treaty-based multilateral disarmament. Hence, the need to identify and pursue the effective legal measures necessary for the achievement and maintenance of a world without nuclear weapons as required by Article VI. In the view of Austria and over 100 other states, this should require measures to fill the legal gap for the prohibition and elimination of nuclear weapons.

— At the 2015 NPT Review Conference Austria, on behalf of more than 150 states, gave a statement on the humanitarian consequences of nuclear weapons. How do you see the future of the Humanitarian Initiative?

— The 2015 NPT Review Conference was always seen as by Austria an important opportunity to achieve concrete progress in nuclear disarmament based on the sense of urgency developed by the arguments of the Humanitarian Initiative: namely that the consequences of nuclear weapons explosions would be far greater than previously assumed, that the risks of such explosions, whether by accident or design, are also considerably greater than previously known, and that there is no capacity anywhere to respond to such humanitarian emergencies. However, the RevCon was not the end point of the initiative. While the unwillingness of NWS to engage on these substantive arguments during this RevCon was a disappointment, the discourse about nuclear weapons has, in our assessment, changed in the context of the humanitarian debate and can no longer be conducted only from a military security perspective. 108 States support the Humanitarian Pledgeⁱ and more States are likely to endorse this line of argument in the future. We will continue to promote these key conclusions in all available fora. We are, of course, still in the process of analysing the NPT RevCon and will discuss with likeminded states concrete steps that should be taken.



The P5 states made their own counterproposals. They rejected out of hand the documents containing assessments of the results of the previous review cycle and outlining further steps on disarmament, which were proposed by the chairman of the Main Committee I, Peruvian Amb. Enrique Roman-Morey⁸, and chairman of Subsidiary Body 1, the Swiss diplomat Benno Laggner.⁹ Representatives of the P5 described the document drafted by Subsidiary Body 1 as unacceptable. They said the proposed text should be discarded in its entirety, and that all further discussions should focus on the document proposed by Main Committee I. Speaking at the meeting of that committee, the head of the French delegation, Amb. Jean-Hugues Simon-Michel, said that the Final Document should not welcome UN General Assembly resolutions that were adopted without a consensus. He added that Paris would not accept decisions by informal conferences in which France did not take part. In his reply, an Iranian representative said that by the same token, other countries were free to ignore decisions by the UN Security Council as well as outcomes of the meetings of the P5 or the Government Experts Group under the Fissile Material Cut-off Treaty.

The discussion eventually yielded an updated document of Main Committee I, and then a combined document that included the texts produced by Main Committee I and Subsidiary Body 1. Both documents contained fewer references to the Humanitarian Initiative; they also reduced the commitments to be undertaken by the nuclear-weapon states. As a result, the text came under criticism from both the non-nuclear weapon states (who branded it as too weak) and from the P5.

Nevertheless, the situation gradually began to improve as far as disarmament was concerned. Talks on Article VI continued, and uncompromising official statements were followed by informal talks. All the parties were gradually moving towards a compromise that would be acceptable to nuclear and well as non-nuclear weapon states. The P5 did not oppose the inclusion of references to humanitarian consequences of nuclear weapons and to the Humanitarian Initiative; for their part, the non-nuclear weapon states were ready to acquiesce in the absence of any rigid deadlines for disarmament.

By the end of the month-long marathon, all the parties had a distinct feeling that a compromise was within reach. The delegations were to receive the chair's draft of the Final Document late in the afternoon on May 21. But because of lengthy consultations, the diplomats who gathered at the UN headquarters had to wait until midnight — only to be told that the draft would not be ready until the following morning. On the morning of May 22, when the final draft was released¹⁰, the general feeling at the conference was that the document would be approved.

None of the participants were especially happy about the document itself. The paragraphs on Article VI mentioned catastrophic humanitarian consequences of any potential use of nuclear weapons. The nuclear-weapon states were to report about the state of their arsenals and their disarmament activities in 2017 and 2019. The reports were to be made available to all NPT members. Finally, the NPT Review Conference gave the UN General Assembly a recommendation to establish an open-ended working group on the implementation of Article VI of the NPT; the group was to make decisions by consensus.

As expected, members of the Humanitarian Initiative were unhappy with the lack of any new commitments on nuclear disarmament. The nuclear-weapon states, for their part, would have to accept the humanitarian discourse, agree to greater transparency on their nuclear arsenals, and report to the conference about their progress. Nevertheless, it

Ambassador Jean-Hugues Simon-Michel Permanent Representative, Permanent Mission of France to the United Nations Office at Geneva

— In your view, what are the main contradictions in the interpretation of Article VI of the NPT?

— Article VI of the NPT is crystal clear. It calls for the cessation of an arms race, which has been achieved long time ago. It also refers to a nuclear disarmament process, which is a long-term one, and which is clearly framed in the context of general and complete disarmament. This perspective, as well as the preamble of the NPT, clearly shows that the Treaty takes into account the strategic context and the reality of the world as it is. This is precisely what the most radical countries on nuclear disarmament refuse to take into account, and this is where the interpretations of Article VI of the NPT might differ. These countries have an ideological approach of nuclear disarmament, whereas others have a more pragmatic and effective approach, based on concrete incremental steps. The supporters of a radical approach call for a nuclear weapons convention, which is not consistent with the spirit and the letter of the Treaty. The NPT refers only to a treaty on general and complete disarmament under strict and effective control.

— Since the signing of the NPT all nuclear reductions were pursued either bilaterally or unilaterally, but not directly in the framework of the Treaty. In your view, what is the role of the NPT in nuclear disarmament?

— The NPT is the cornerstone of the global nuclear non-proliferation regime, the essential foundation for the pursuit of nuclear disarmament in accordance with Article VI of the NPT and an important element in the further development of nuclear energy applications for peaceful purposes. The NPT review process provides an irreplaceable framework for discussion, and allows for powerful political incentives to move forward on all three pillars of the NPT. It can only work if all stakeholders make concrete efforts to build a consensus on a basis which is acceptable to all, nuclear-weapon States and non-nuclear-weapon States. The review process is a political mechanism, not merely an institutional framework. Obviously, all the useful and concrete measures on nuclear disarmament, be they unilateral, bilateral or multilateral, have to be taken into account by the NPT review process.

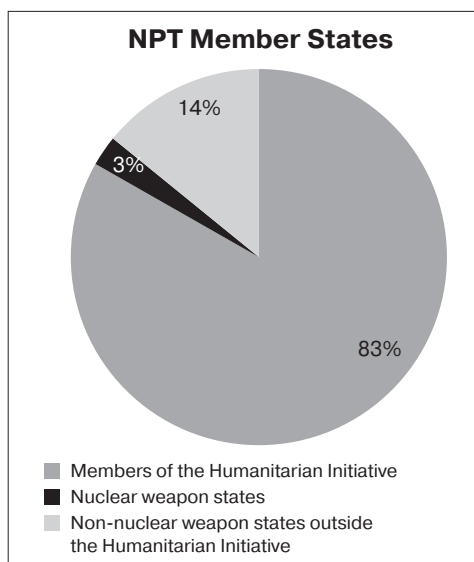
— At the 2015 NPT Review Conference Austria, on behalf of more than 150 states, gave a statement on the humanitarian conse-

quences of nuclear weapons. How do you see the future of the Humanitarian Initiative?

— France is fully aware of the severe consequences of nuclear weapons. In his statement on the French nuclear deterrent on 19 February this year, the French President, Mr. François Hollande, referred to the “devastating effects” of nuclear weapons. In the French doctrine, nuclear weapons are not battlefield weapons, but a means of deterring a potential adversary from attacking vital national interests. They may only conceivably be used in extreme circumstances of self-defense. When it comes to nuclear disarmament, France has always been of the view that concrete actions are more effective than wishful thinking or principled positions. We have not simply spoken of disarmament; we have done it as necessary. This realistic approach differs from the one which is supported by the humanitarian initiative, which aims at stigmatizing nuclear weapons and banning nuclear deterrence. Past experience and history have proved that disarmament initiatives which do not take into account the security context do not bear concrete fruits. This is not the NPT approach. The NPT is the only possible process for moving forward when it comes to nuclear disarmament, non-proliferation and peaceful uses of nuclear energy. It is the most useful instrument to fight against proliferation and it continues to play an irreplaceable role in our collective security.



S
I
S
Y
A
L
A
N



appeared that none of the countries or groups was prepared to be the one responsible for the RevCon's failure over Article VI.

As for the WMD-free zone in the Middle East, the draft of the Final Document asked the UN Secretary-General (acting via a special representative) to convene a conference no later than March 1, 2016, with all decisions on preparations and on the agenda of the conference to be taken by a consensus. Russia, the UK, and the United States were to lose their privileged right to convene (or, conversely, not to convene) the conference. Russia, which orchestrated the entire Middle East effort, supported the document. At the same time, the tight deadline and the proposal to strip the United States of its veto right on convening the conference obviously ran counter to the Israeli position. That proved fatal for the 2015 Final Document.

WHAT IT MEANS FOR THE NPT REVIEW PROCESS

The lack of consensus on the Final Document does not mean that the basic principles on which the NPT is founded are being questioned by its members. The vast majority of the NPT state parties have a clear interest in nuclear nonproliferation, and the price of violating the treaty's provisions is high enough to deter potential proliferators. To understand what the failure of the 2015 RevCon means for the nuclear nonproliferation regime, let us look at the broader context of that failure.

First, there is nothing unprecedented or even unusual about an NPT Review Conference ending without a Final Document. Since the treaty entered into force in 1970, its members have failed to reach a consensus on a Final Document at four RevCons out of nine (in 1980, 1990, 2005 and 2015). Statistically, there is roughly a 50/50 chance of any given RevCon adopting a Final Document. The outcome of the 2015 conference, disappointing as it may be, does not really help us to understand the key trends taking place in the nuclear nonproliferation regime.

Second, the key differences that are being discussed in the framework of the NPT review process have not really changed ever since the treaty was signed. Over the past 40 years the bi-centric world order has collapsed, and India, Pakistan, and North Korea have tested nuclear weapons. Nevertheless, disarmament under Article VI of the NPT remains the most contentious issue. As Joseph Nye wrote in 1985 in his article headlined "The Logic of Inequality", the non-nuclear weapon states accuse the nuclear-weapon states of "discrimination, hypocrisy, and failure to live up to their commitments to disarm". According to Nye, "Excessive rhetoric is a hallmark of such conferences, and it will not necessarily signify an imminent collapse of the treaty. Yet these charges underscore more basic, long-run security problems ... that could lead to the failure of the NPT."¹¹ Several months after that article was published, the 3rd NPT Review Conference successfully adopted a Final Document, and in another 10 years' time the Treaty was extended indefinitely. Meanwhile, the history of attempts to establish a WMD-free zone in the Middle East — i.e. the straw that broke the camel's back in 2015 — can be traced back to at least 1974.¹²

Third, the world has already seen a confrontation between two nuclear superpowers — yet the nuclear nonproliferation regime was left relatively unscathed. Relations between Russia and the United States currently remain very tense, which bodes ill for bilateral disarmament. The United States is accusing Russia of violating the Budapest Memorandum, while Moscow says that NATO's joint nuclear missions are a violation of Articles I and II of the NPT. At the same time, both sides continue to comply with the existing arms control agreements, such as the New START Treaty and the INF Treaty (even though

Ambassador Pedro Motta Pinto Coelho Permanent Representative of Brazil to the Conference on Disarmament

— In your view, what are the main contradictions in the interpretation of Article VI of the NPT?

— It is a difficult question. Nuclear-weapon states are still hanging on to the traditional interpretation of Article 6. Which, first of all, does not imply an obligation for a multilateral disarmament. Second, nuclear-weapon states believe that disarmament represents a long-term process. Third, according to them, this commitment has already been met by means of a number of initiatives. This is the main contradiction because we, non-nuclear-weapon states, feel that there is a legal obligation in Article 6 to pursue negotiation in good faith, which has not been observed by nuclear-weapon states. That is not to say that Article 6 by itself is not a legal obligation.

This leads us to another contradiction, the so-called legal gap. As for Brazil, the legal gap means the necessity to observe the existing legal obligations under Article 6. The nuclear-weapon states don't seem to consider themselves to be bound by the obligations, moreover, they even can accept the idea that the legal gap exists, and this is very dangerous approach. We need to stress that Article 6 already constitutes a legal obligation. Actually, there is no legal gap. We only accept this term in the sense of the implementation of legal commitment that already exists in Article 6.

— Since the signing of the NPT all nuclear reductions were pursued either bilaterally or unilaterally, but not directly in the framework of the Treaty. In your view, what is the role of the NPT in nuclear disarmament?

— The idea that reductions of nuclear arsenals and weapons can be done unilaterally and bilaterally is welcome. However, this is not enough with respect to the commitments under the NPT. Looking at the outcome of the 2015 NPT Review Conference, I do not think that NPT will ever have the substantial value to push to disarmament; we are very disappointed about that. We are even questioning the value of the NPT as such. In this Review Conference it was very clear that there is no favorable context for the NPT to be able to push forward disarmament. Although the conference gave some positive suggestions, they were not approved.

The idea of creating of an open-ended working group under the General Assembly to move forward these negotiations was rather a good point, in spite of the fact that it re-emphasized

the role of the consensus. If under the presence circumstances we try to involve the General Assembly it may be a positive move. Especially, given the situation at the Conference on disarmament.

There were countries, including members of the New Agenda Coalition, pushing for rejection of the final document, giving the weakness of the section on disarmament. I thought that we should give it a try. We have talked to the Humanitarian Group, because we are a part of it. Maybe this was not an outcome they had expected. But in my view the final document included the main aspects of the humanitarian approach, this is why Brazil saw the document in a positive way. We were quite happy with the results in Committee 2 as well as in Committee 3. Overall, considering the draft document as a whole, we thought we should give it a try and considered a positive result for the Conference.

However, the result on the Middle East made it impossible, which is why I said that the results of the NPT review conference were not that bad. The "bad" of all these is the situation of the Treaty itself. After the Conference the NPT is in a very delicate position, as it has exhausted itself, has come to its limits. I do not know what else can the NPT conceive in terms of disarmament, it has come to its limits.

— At the 2015 NPT Review Conference Austria, on behalf of more than 150 states, gave a statement on the humanitarian consequences of nuclear weapons. How do you see the future of the Humanitarian Initiative?

— I think it is very important. It is not going to go away; on the contrary, this movement has the potential of giving disarmament a boost. Whatever is going to happen to disarmaments right now, in the short to the middle term, is going to be driven by the humanitarian approach. For instance, if we decided to go toward a nuclear weapons ban, I think, the Humanitarian Group would be more than prepared to do so. I hope that between now and the next General Assembly meeting we should articulate some kind of a specific move together with the General Assembly. I think we should not go outside, at least that's how Brazil sees it. I acknowledge that it is not very clear within the Humanitarian Group. There is no clear idea on how to deal specifically with the issue if it is going to be a ban treaty and if this issue is going to be dealt within the General Assembly or in parallel with it. This is still to be seen.



S
I
S
Y
L
A
N
A

each side accuses the other of violating the INF). Russia and the United States also continue to cooperate in the P5 framework, a consultation format within the NPT that was established in 2009.

At this time Russia is not prepared to support Washington's proposals on further nuclear arms reductions, which would see the ceilings reduced to 1,000 deployed warheads. In Moscow's view, further reductions require strategic stability, and Washington is currently undermining that stability by deploying its ABM system, developing non-nuclear strategic weapons, and rejecting Russia's proposal to sign a treaty that would ban the placement of weapons in space. If any of these trends change as a result of improvement in bilateral relations or the emergence of creative diplomatic solutions, bilateral and multilateral disarmament initiatives could well be put back on the agenda.

All that being said, however, there are several worrying trends gaining momentum in the NPT review process. The main issues being debated at the RevCons remain unchanged — but the sides appear increasingly unwilling to compromise or to search for a consensus. The state parties that are unhappy with the state of the NPT review process are looking for short and straight paths to their goals, especially in the area of disarmament. There is a growing temptation to move the discussion on the most contentious issues to the UN General Assembly or to some ad hoc body, where decisions would be taken by a majority rather than consensus. That would enable the majority of the states to ram through their own agenda, ignoring the position of the dissenting states. Such a step may appear superficially attractive, but it is very unlikely to yield the desired results. To the contrary, it would further weaken the NPT review process, and consequently, the nuclear nonproliferation regime as a whole. That risk is perfectly illustrated by the following two examples.

During the latest RevCon, the inflexible position of the United States and its allies, who lobbied Israeli interests at the negotiations on establishing a WMD-free zone in the Middle East, clashed with the Egyptian delegation's unwillingness to forget about the promises given in 1995 and 2010. In the end, Washington refused to accept the Middle East section of the Final Document, meaning that the entire Final Document was not approved. Since the special coordinator in charge of convening the Middle Eastern WMD conference, the Finnish diplomat Jaakko Laajava, has essentially stepped down, and no new decisions have been made, preparations for the conference have been frozen indefinitely. The Director of the nonproliferation and arms control department in the Russian Foreign Ministry, Mikhail Ulyanov, was very frank in his remarks on the issue. "The previous mandate for the WMD-free zone has already expired, and it appears that the new one can be approved only at the next Review Conference in 2020".¹³

Meanwhile, other participants in the review process may have their own ideas. For example, nothing can stop the Arab states from putting the Middle East WMD-free zone issue on the agenda of the UN General Assembly. Using the backing of the Non-Aligned Movement, the Arab States Group could secure enough votes at the General Assembly to instruct the UN Secretary-General to convene a conference on the proposed WMD-free zone despite U.S. and Israeli opposition.

Such a move would be met with jubilation in the Arab world, but it would not make us any closer to launching proper negotiations involving all the regional players — and without such negotiations there is no chance of establishing a WMD-free zone in the region. Initially at the 2015 NPT Review Conference, the Arab States Group came up with fairly uncompromising demands on the issue of convening the WMDFZ conference, but it then

Ambassador Adam M. Scheinman
Special Representative of the President for Nuclear Nonproliferation
Bureau of International Security and Nonproliferation, US Department of State

— In your view, what are the main contradictions in the interpretation of Article VI of the NPT?

— The United States does not regard Article VI of the Nuclear Non-Proliferation Treaty (NPT) to contain contradictions, whether in interpretation or in practice. The letter of the Treaty is clear, in that it obligates parties to pursue nuclear disarmament. The NPT sets no timelines for achieving nuclear disarmament and no single pathway or specific measures for getting there.

Some incorrectly assert that Article VI obligates NPT parties to establish a legal framework for accomplishing nuclear disarmament. There is no basis for this argument in the Treaty text, its negotiating history or subsequent practice of its parties. Nor is there a basis for the argument that an international treaty on general and complete disarmament (GCD) is a necessary predicate for nuclear disarmament. Article VI plainly provides for pursuing nuclear disarmament without any such linkages or preconditions.

Differences among NPT parties with respect to Article VI are primarily political, not legal. Some are frustrated with the pace of nuclear disarmament actions; this is a frustration the United States shares. There are practical, achievable actions that could be taken now to advance nuclear disarmament. This includes bilateral efforts such as further nuclear negotiations between the United States and Russia, as President Obama proposed in 2013, as well as multilateral efforts such as completion of a Fissile Material Cutoff Treaty, and entry into force of the Comprehensive Nuclear Test-Ban Treaty. More radical ideas, such as pursuit of a nuclear weapons ban or time-bound elimination of nuclear weapons, are neither achievable in the current environment nor a practical next step toward fulfillment of Article VI goals.

— Since the signing of the NPT all nuclear reductions were pursued either bilaterally or unilaterally, but not directly in the framework of the Treaty. In your view, what is the role of the NPT in nuclear disarmament?

— The NPT establishes a legal obligation to pursue nuclear disarmament. It is the only international treaty that does so, making it a vital instrument serving international peace and security. However, the NPT sets no timelines for nuclear disarmament and identifies no spe-

cific measures for carrying forward this goal. Measures that have been completed, whether bilateral treaty reductions, unilateral steps, or multilateral negotiations as with the CTBT, all contribute to achievement of NPT goals, but none are specifically prescribed by the Treaty.

The NPT itself does not provide a forum for nuclear arms control or disarmament negotiations. Other bodies exist for this purpose, specifically the Geneva-based Conference on Disarmament for multilateral negotiations. What the NPT provides for is a review process every five years, which the parties have used historically to reach shared understandings on actions that have been taken and those that could contribute to the implementation of Article VI, as well as all other aspects of the Treaty. Those understandings are political and not legally binding, but they serve an important function by helping to set common expectations and guide future actions.

— At the 2015 NPT Review Conference Austria, on behalf of more than 150 states, gave a statement on the humanitarian consequences of nuclear weapons. How do you see the future of the Humanitarian Initiative?

— The United States fully appreciates the destructive potential of nuclear weapons, and we and the rest of the world have long understood the catastrophic consequences that could result from their use. This concern underpins U.S. nonproliferation and disarmament efforts and has for decades. In this regard, we share the impatience of humanitarian initiative supporters who call for accelerating the pace of nuclear disarmament actions. However, we see no viable alternative to a practical step-by-step approach, which has produced major reductions in nuclear forces since the NPT entered into force. What we do not support are attempts to exploit international attention given to nuclear weapons through the humanitarian initiative in order to pursue impractical, unachievable aims, including a nuclear weapons ban on possession or use, or the time-bound elimination of nuclear weapons. It remains our hope that the drivers of the humanitarian initiative will use the process to improve understanding and facilitate engagement among NPT states and not drive them apart.



S
I
S
I
A
L
Y
A
N
A

toned those demands down in order to win broader support for its initiatives. For example, a new paragraph was included in the text of the draft Final Statement to the effect that all decisions at the negotiations on convening the conference would be taken by a consensus, which would essentially give Israel a veto on all substantive issues.¹⁴ If, however, the Arab states decide to initiate a UN General Assembly resolution, they will not have to tone anything down. A resolution would be adopted even if the clause on taking decisions unanimously were to be removed, whether Israel likes it or not. Such terms will be even less favorable for Tel Aviv than the ones that were eventually rejected at the RevCon. As a result, the conference on establishing a WMD-free zone in the Middle East will have to be held without the only state in the region that actually possesses nuclear weapons.

The situation with nuclear disarmament also looks very complex. During the latest RevCon, 160 state parties supported the so-called Humanitarian Initiative, which focuses on the consequences of nuclear weapons use for people and the environment. That group of states advocated the establishment of legally binding instruments for eliminating nuclear weapons¹⁵ — a proposal the P5 states find unacceptable — and insisted on the inclusion in the Final Document of the terms and wording formulated by the group (such as *humanitarian consequences* of nuclear weapons). For their part, the nuclear-weapon states refused to recognize the *humanitarian* approach and insisted that despite the opinion of the majority of NPT state parties, there is no need for immediate action in the area of disarmament; just like the non-nuclear weapon states, they devoted their energies to debating terminology rather than matters of substance.

Many participants and observers believed that a disarmament section of the Final Document that would include *humanitarian* terminology but lack any binding decisions on disarmament had a fair chance of being approved. Even though many non-nuclear weapon states were less than enthused by the contents of that section, nobody wanted to be the one responsible for the RevCon's failure. It is therefore safe to assume that some members of the Humanitarian Initiative felt a great deal of relief when U.S. Under Secretary of State Rose Gottemoeller declared that it would be better "to conclude this conference without a final consensus document rather than endorse a bad final document".¹⁶

To summarize, the expectations of the non-nuclear weapon states were not met, and two of the NPT depository states, the United States and Britain, prevented the adoption of a Final Document in order to further the interests of a country that is not even a member of the Treaty. The chances are now high that some of the state parties that are particularly unhappy with such an outcome could go beyond the framework of the review process. The Humanitarian Initiative and its more radical wing, i.e. the 108 states that have signed the Humanitarian Pledge to *stigmatize, prohibit and eliminate* nuclear weapons, could choose to start working on the long-discussed legal instruments of banning such weapons. That could be done at the UN General Assembly or at the next conference on the humanitarian consequences of nuclear weapons.

If the proposed convention on the prohibition of nuclear weapons is put on the agenda of either of these forums, the states that possess nuclear weapons, their allies, and some of the more moderate countries will choose not to participate in the discussion. Such a step would further exacerbate the differences between the various groups of states advocating different approaches.

There has always been a risk of the NPT review process splitting up along the ideological divides. The inherent inequality on which the treaty is predicated and the large number of

region and issue-specific groups in the review process framework make such a fragmentation a distinct possibility. Nevertheless, over the past 45 years the state parties have largely managed to hear each other. The dialogue between them enabled the review process to move forward; the Review Conferences and sessions of the Preparatory Committee have been a good venue for discussions and for attempts to find a consensus. That practice must not end.

The Arab states' unwillingness to continue negotiations on the Middle Eastern WMD-free zone on U.S. and Israeli terms is entirely understandable, especially since not a single one of the promises made since 1995 has been kept, and there are still no guarantees of success. Nevertheless, the negotiations must continue — but without Tel Aviv's participation, they will be pointless, and direct Arab-Israeli dialogue must carry on. For their part, the United States and Israel must understand that the Arab states' patience is not inexhaustible. And if the conference on a Middle Eastern WMD-free zone is convened without Tel Aviv, that will only exacerbate regional differences and increase international pressure on Israel; both countries would prefer to avoid such a turn of events.

As for nuclear disarmament, the Humanitarian Initiative states must have some clarity about their goals and realistic ways of achieving them. So far, the introduction of *humanitarian* terminology and discussions of new data concerning the consequences of nuclear weapons use remain barely above actual progress on the nuclear disarmament front in the group's list of priorities. The Humanitarian Initiative has managed to attract more attention to the importance of Article VI of the NPT, and the initiative itself has become a rallying call on nuclear disarmament issues for the majority of NPT states. But if the group wants to remain relevant, its participants will have to engage in a complex diplomatic effort so as to augment their broad support with an agenda which all NPT states would agree to discuss. For the foreseeable future, the states that possess nuclear arsenals will not agree to sign up for a convention banning those arsenals. The Humanitarian Initiative, meanwhile, lacks any serious alternative proposals on disarmament for the near and medium time frame; that has a negative impact on the entire NPT review process.

Meanwhile, the states that possess nuclear weapons must not reject the humanitarian approach out of hand. The main idea of the Humanitarian Initiative is that a nuclear war would have catastrophic consequences. The nuclear-weapon states understand that better than most. The realization that a nuclear war must not be allowed to break out is at the foundation of the nuclear deterrence strategy; it is also one of the reasons why nuclear weapons have never been used in the past 70 years. What is more, not a single nuclear power denies the need for disarmament. From the P5's point of view, disarmament is an important and complex process that must be taken forward step by step, without any harm to the security of all the countries involved. Open dialogue between the nuclear and non-nuclear weapon states on possible disarmament steps and their implementation would increase the transparency of the review process, strengthen the NPT, and augment the nuclear nonproliferation regime.

The NPT state parties must continue to pursue dialogue on the most contentious issues. The 2020 Review Conference will mark 50 years since the entry of the NPT into force. Few recall that had the state parties extended the treaty by 25 years in 1995 instead of agreeing to an indefinite extension, we would now be in for another nail-biting finale of the Review and Extension Conference in 2020.

Fortunately, there is now no need to worry that the entire Treaty will simply cease to exist because of some procedural issue or the position of a single country. Free of that threat,



the NPT state parties must now work together so as to achieve their shared goal: making the world a safer place for all its citizens. The treaty that was signed almost half a century ago is entirely adequate to that task. 🗨️

References

- 1 Baklitskiy Andrey. Towards the NPT Review Conference: Deceptive Ease of the Third PrepCom — No Harbinger of Miracle. *Security Index*, Issue 3–4, 2014. P. 27–35
- 2 Joint Statement on the Humanitarian Consequences of Nuclear Weapons delivered by Ambassador Dell Higgin. October 20, 2014 http://reachingcriticalwill.org/images/documents/Disarmament-fora/1com/1com14/statements/20Oct_NewZealand.pdf (Retrieved on July 6, 2015).
- 3 NPT overtook the Chemical Weapons Convention in term of membership. <http://www.opcw.org/about-opcw/> (Retrieved on July 6, 2015)
- 4 Joint statement by state parties of the Agreement on the Central Asian Nuclear Weapons Free Zone at the general discussion during the 2015 NPT Review Conference. New York, April 27, 2015. http://www.un.org/en/conf/npt/2015/statements/pdf/centralasia_ru.pdf (Retrieved on July 6, 2015)
- 5 Statement by the People's Republic of China, France, the Russian Federation, the United Kingdom of Great Britain and Northern Ireland, and the United States of America to the 2015 Treaty on the Nonproliferation of Nuclear Weapons Review Conference, April 30, 2015 <http://statements.unmeetings.org/media2/4658065/uk-p5.pdf> (Retrieved on July 6, 2015).
- 6 Implementation of the 1995 resolution and 2010 results on the Middle East. Working document presented by Bahrain on behalf of the Arab States Group. April 22, 2015. <http://daccessdds-dny.un.org/doc/UNDOC/GEN/N15/113/98/PDF/N1511398.pdf?OpenElement> (Retrieved on July 6, 2015).
- 7 Statement by M.I. Ulyanov, acting head of the Russian delegation to the NPT Review Conference, at Subsidiary Body 2 of the Conference, New York, May 14, 2015. http://www.mid.ru/brp_4.nsf/newslne/77C845031092DB0C43257E470044D346 (Retrieved on July 6, 2015).
- 8 Report of Main Committee I: Chairman's Draft on Substantive Elements. 8 мая, 2015. <http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/npt/revcon2015/documents/MCI-CRP3.pdf> (Retrieved on July 6, 2015).
- 9 Subsidiary Body 1: Draft substantive elements. May 8 2015. <http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/npt/revcon2015/documents/SBI-CRP1.pdf> (Retrieved on July 6, 2015).
- 10 2015 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons. Draft Final Document. P. 22. May 21, 2015, <http://www.reachingcriticalwill.org/images/documents/Disarmamentfora/npt/revcon2015/documents/DraftFinalDocument.pdf> (Retrieved on July 6, 2015).
- 11 Joseph S. Nye Jr., NPT: The Logic of Inequality, *Foreign Policy*, No. 59 (Summer, 1985), P. 123–131, <http://www.jstor.org/stable/1148604> (Retrieved on July 6, 2015).
- 12 United Nations General Assembly Resolution 3263. Establishment of Nuclear-Weapon-Free Zone in the Region of the Middle East. December 9, 1974. <http://daccess-dds-ny.un.org/doc/RESOLUTION/GEN/NR0/738/65/IMG/NR073865.pdf?OpenElement> (Retrieved on July 6, 2015).
- 13 Mikhail Ulyanov: The Review Conference has confirmed the significance of the NPT. RIA Novosti. June 1, 2015. <http://ria.ru/interview/20150601/1067514136.html> (Retrieved on July 6, 2015).
- 14 2015 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons. Draft Final Document. P. 22. May 21, 2015, <http://www.reachingcriticalwill.org/images/documents/Disarmamentfora/npt/revcon2015/documents/DraftFinalDocument.pdf> (Retrieved on July 6, 2015).
- 15 See, for example: 2015 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons. Subsidiary Body 1: Draft substantive elements. May 8, 2015. Para. 17 <http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/npt/revcon2015/documents/SBI-CRP1.pdf> (Retrieved on July 6, 2015).
- 16 Remarks at the Conclusion of the 2015 Nuclear Nonproliferation Treaty Review Conference. Rose Gottemoeller, under secretary of state for arms control and international security, May 22, 2015, <http://www.state.gov/t/us/2015/242778.htm> (Retrieved on July 6, 2015).
- i The *Humanitarian Pledge* (initially the *Austrian Pledge*) to *stigmatize, prohibit, and eliminate nuclear weapons*. See: Pledge presented at the Vienna Conference on the Humanitarian Impact of Nuclear Weapons” by Austrian Deputy Foreign Minister Michael Linhart. December 9, 2014



Dmitry Kovchegin

NUCLEAR SECURITY IN NUCLEAR ENERGY NEWCOMER COUNTRIES

Despite renewed doubts about the benefits of nuclear energy in the wake of the accident at the Fukushima NPP in Japan, a large number of countries have recently launched nuclear energy programs or announced plans to do so in the near future. The list of the *nuclear newcomers* includes such states as Bangladesh, Belarus, Kazakhstan, Turkey, the United Arab Emirates, Vietnam, and several others. These states vary greatly in terms of their technological development, financial capabilities, and existing experience in managing nuclear material and facilities. All of these factors have an impact on the nuclear newcomers' ability to provide adequate levels of nuclear safety and security.

Nuclear security is one of the key elements of a successful nuclear energy program. According to the IAEA, the definition of nuclear security includes prevention, detection, and effective response to theft, sabotage, unauthorized access, unlawful transfer, and other malicious acts involving nuclear material and other radioactive substances, as well as nuclear facilities and nuclear material storage sites.

Given the existing range and severity of threats, the provision of nuclear security must be regarded by the nuclear newcomer states as one of the key obligations that follow from the acquisition of nuclear facilities and material. Key nuclear security measures include nuclear material protection, control, and accounting (MPC&A).

Physical protection¹ of nuclear material consists of a range of technical and organizational measures implemented at nuclear facilities, as well as coordination between nuclear operators, law-enforcement agencies, security services, and other agencies involved in nuclear material management.

Nuclear material accounting is defined as determining the quantity of that material, as well as the compilation, registration, and maintenance of nuclear accounting and reporting documents. Nuclear material control is defined as controlling the presence and any movements of nuclear material, including control of access to nuclear material, equipment and information, monitoring nuclear material, and inspecting authorized placement and transfer of nuclear material.²

The key sources of MPC&A expertise required by the nuclear newcomer countries include IAEA recommendations and assistance provided by the suppliers of nuclear facilities, material, technologies and equipment. These countries can also make use of the existing international mechanisms of assessing the state of MPC&A systems and providing feedback and recommendations on how these systems can be improved.

This article focuses on the existing international requirements for MPC&A and provides a list of measures that can be implemented by the nuclear newcomer countries at the national level in order to achieve an adequate level of nuclear security.



S
I
S
Y
L
A
N
A

THE INTERNATIONAL NUCLEAR SECURITY REGIME

The international obligation to undertake adequate MPC&A measures was established by UN Security Council Resolution 1540, which was adopted in 2004. That obligation includes adequate national controls over nuclear weapons and related materials in order to prevent their proliferation. Under the terms of Article 3 of the Resolution, member states have an obligation to develop and implement adequate and effective measures to ensure physical protection, control, and accounting of nuclear material.

Fundamental nuclear security requirements are established by the Convention on the Protection of Nuclear Material. In accordance with amendments to the convention, each state party shall establish, implement and maintain an appropriate physical protection regime applicable to nuclear material and nuclear facilities, with the aims of protecting against theft of nuclear material in use, storage and transport; ensuring the implementation of rapid and comprehensive measures to locate and recover missing or stolen nuclear material; protecting nuclear material and nuclear facilities against sabotage; and mitigating or minimizing the radiological consequences of sabotage. To achieve these goals, state parties must establish and maintain a legislative and regulatory framework to govern physical protection, establish or designate a competent authority or authorities responsible for the implementation of the legislative and regulatory framework; and take other appropriate measures necessary for the physical protection of nuclear material and nuclear facilities.

It is worth mentioning that the initial text of the convention adopted in 1980 covers only nuclear material during international transportation. The amendments adopted in 2005 increase the scope of the convention to include all nuclear material and nuclear facilities used domestically by the member states. These amendments, however, have yet to enter into force because not enough member states have ratified them to date.

As far as nuclear material control and accounting is concerned, there is no international document in this area similar to the Convention on physical protection. Some requirements for material accounting and control are established in the safeguards agreements signed between the IAEA and the NPT member states in accordance with Article 3 of the Treaty. Under Article 7 of the model safeguards agreement, state parties are required to implement and maintain a system of control and accounting for all nuclear material placed under safeguards. Article 32 of a model safeguards agreement also contains fundamental requirements for a national material control and accounting system.

Detailed recommendations on physical protection of nuclear materials and facilities that ensure compliance with compulsory requirements of the Convention on Physical Protection of Nuclear Material are provided in various IAEA documents, including:

Nuclear Security Series Publications No 20: Objective and Essential Elements of a State's Nuclear Security Regime (*Fundamentals*). This document is for use by politicians, legislators, government agencies and other state institutions and officials to aid them in establishing, implementing, and maintaining long-term effectiveness and sustainability of a national nuclear security regime. The document draws on the provisions of many international agreements that define the legislative and regulatory framework in the area of nuclear security, as well as the experience of IAEA members in establishing and maintaining their own national nuclear security regimes.

NSS 13: INFCIRC/225/Revision 5, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (*Recommendations*). This document contains a list of *recommended* requirements that are necessary to

achieve the goals and implement the measures outlined in the Fundamentals. Over the years, this document has become the standard of key requirements that must be reflected in the national legislation and regulation of IAEA members. Many experts believe that the requirements outlined in the Recommendations are insufficient — but they are the only ones at the moment to which all parties can agree.

There are also several other IAEA documents that provide recommendations on specific elements of nuclear material protection systems.

Another useful publication that contains detailed requirements in this area is **Nuclear Material Accounting Handbook, IAEA Services Series #15**. It provides recommendations on implementing national control and accounting systems.

These documents establish basic criteria for assessing the state of national MPC&A systems, including protection systems at individual nuclear facilities.

NUCLEAR SECURITY REQUIREMENTS

IAEA recommendations have been used to formulate the following requirements to national MPC&A systems for the nuclear newcomer countries, including measures implemented at the national level and measures to be taken by each individual facility that works with nuclear material.³

Requirements to national MPC&A systems

Physical protection, control and accounting of nuclear material must be compulsory for any activities that involve nuclear material and the operation of nuclear facilities.⁴ National legislation must define MPC&A as a compulsory requirement for any activities that involve nuclear material and for the operation of nuclear facilities. It must list nuclear materials and special non-nuclear materials — including their type, form, and threshold quantities — that are subject to control and accounting, as well as material and facilities that require physical protection. The list of material and facilities subject to physical protection, control and accounting must comply with IAEA recommendations.

National laws and regulations **must make operators responsible for control and accounting of nuclear material and nuclear facilities**. They must set out mechanisms of ascertaining the operator's ability to provide physical protection, control and accounting for nuclear material. Activities that involve nuclear material and facilities must be suspended if the operator is unable to provide adequate protection, control and accounting (licensing, inspection, and penalties).

Laws and regulations **must establish responsibility for ensuring physical protection, control and accounting of nuclear material at the national level**, including responsibility of government agencies, their remit, and coordination.⁵ National legislation must establish responsibility of various agencies for ensuring physical protection, control and accounting of nuclear material. Laws and regulations must define agencies that are directly responsible for managing and coordinating activities in the areas of physical protection, control and accounting of nuclear material, and that act as the competent authorities in these matters at the international level. Laws and regulations must also define agencies that do not have direct responsibilities related to nuclear material management, but whose work is important to ensure nuclear security, such as law-enforcement agencies, agencies providing armed security guards, and agencies



involved in emergency response. Laws and regulations must define the remit of these agencies with regard to nuclear security issues and the procedure of their cooperation in discharging these functions.

Laws and regulations **must designate a regulatory authority** that is functionally, organizationally, and financially independent of the agencies and organizations that govern nuclear material management, manage nuclear material, or provide services related to nuclear security, such as designing physical protection systems for nuclear material and facilities. The remit of the regulatory authority must include establishing compulsory requirements and verification of compliance with these requirements at the licensing stage and during operation, as well as applying penalties for any violations.⁶

A legislative and regulatory framework for MPC&A must be put in place.⁷

The existing national legislative and regulatory framework must ensure the development of laws and regulations that establish requirements for physical protection, control and accounting of nuclear material. The existing system must make it possible to identify gaps in the legislative and regulatory framework and to develop new and/or review the existing laws and regulations. Fundamental laws and regulations must be put in place to regulate physical protection, control and accounting of nuclear material. The established requirements must be made available to any organization whose work requires physical protection, control and accounting measures, or which provides relevant services. A system of advisory documents must be put in place (guidelines, standards, recommendations, etc) to help nuclear operators comply with compulsory requirements.

There **must be penalties, including criminal penalties**, for violating MPC&A requirements and for unauthorized action with regard to nuclear material and facilities.⁸ National laws must stipulate penalties, including criminal ones, for violating MPC&A requirements and for unauthorized action involving nuclear material or facilities. These penalties must be in line with the relevant international agreements in this area (Convention on the Protection of Nuclear Material, International Convention for the Suppression of Acts of Nuclear Terrorism). The existing national law-enforcement system must ensure that perpetrators are identified and brought to justice.

Nuclear material and facilities must be categorized in order to establish graded requirements for their protection, control and accounting systems depending on their attraction as targets for unauthorized action and the gravity of the consequences of such action.⁹

States **must put in place a system of response to unauthorized action involving nuclear material and facilities**, including measures by law-enforcement agencies to find and retrieve nuclear material, as well as to mitigate and neutralize the consequences of unauthorized action involving nuclear material and nuclear weapons. A government must designate agencies responsible for emergency response, their remit, and coordination procedures.¹⁰

A country **must have a national register of nuclear material** that contains information about all nuclear material on national territory that is subject to accounting requirements, regardless of its form of ownership. A country must also have a reporting system and requirements for the data these reports must contain, and for how regularly they must be submitted to the national register by the operators. The national reporting system must be compatible with the reporting requirements contained in the safeguards agreement with the IAEA.¹¹

Non-nuclear weapon states **must place all their materials under IAEA safeguards.**¹² The application of comprehensive safeguards in accordance with INFCIRC/153 is

regarded as the minimum acceptable standard, while the application of the Additional Protocol in accordance with INFCIRC/540 is regarded as best practice.

A country **must participate in and comply with the requirements of all the international security regimes** that pertain to nuclear security, including the Convention on Physical Protection of Nuclear Material, UNSC Resolution 1540, and the International Convention for the Suppression of Acts of Nuclear Terrorism. In particular, a country must submit a national report under UNSC Resolution 1540.

Requirements to the operator

National regulations **must establish requirements for threat assessment** (vulnerability analysis). The results of vulnerability analyses must be used to specify requirements for the physical protection system of each individual nuclear facility. Regulations must specify minimum requirements for the frequency of regular vulnerability analyses; they must also specify the cases when a vulnerability analysis must be conducted immediately, regardless of when the previous analysis was conducted.¹³

National regulations **must specify requirements for assessing the effectiveness of physical protection systems**. If the assessment determines that the system is not sufficiently effective, remedial measures must be taken; their sufficiency must be confirmed by an ad hoc effectiveness assessment.¹⁴

Long-term sustainability of physical protection, control and accounting systems must be ensured.¹⁵ An operator must implement measures to ensure long-term sustainability of MPC&A systems. These measures must include the following:

- Organizing and planning MPC&A activities, including designating departments, officials, and coordination procedures necessary to perform MPC&A activities;
- Developing procedures and instructions for MPC&A measures;
- Personnel management and training;
- Repair, maintenance, and validation of MPC&A equipment;
- Evaluating the costs of operating MPC&A systems;
- Checking the performance and analyzing the state of MPC&A systems;
- Managing the configuration of MPC&A systems.

Regulations **must instruct operators to designate material balance areas at nuclear facilities for control and accounting purposes**, and establish requirements for material balance areas.¹⁶

Regulations **must require measurement-based accounting of nuclear material**. They must also specify requirements for measuring systems, including the precision of measurements made for material accounting purposes.¹⁷

Regulations **must specify requirements for assessing any discrepancies between the shipper and recipient during the transfer of nuclear material between organizations**, as well as the procedure for resolving the differences if those differences are above a certain threshold of discrepancy that may suggest a loss of nuclear material.¹⁸

Regulations **must establish requirements for taking a physical inventory of nuclear material**. There must be specific requirements for the frequency of taking an inventory depending on the category of nuclear material at the facility, and for situations that



require an ad hoc inventory to be taken without waiting for the next regular one. Regulations must contain specific requirements for organizing and conducting inventory-taking operations and for steps that must be taken when the discrepancy obtained during inventory taking is over a certain threshold that may suggest a loss of nuclear material.¹⁹

Regulations **must contain requirements for the procedure of assessing unmeasured technological losses and accumulations of nuclear material** in technological equipment.²⁰

Regulations **must require each nuclear facility to maintain a system of accounting and reporting** documents that shows the inventory quantity of nuclear material for each material balance area and any changes in the inventory quantity, including inbound and outbound material for each material balance area. Regulations must also specify requirements for the form and frequency of reports submitted by each nuclear facility to the national register of nuclear material so that the facility reports enable the state to fulfill its obligations under the safeguards agreement with the IAEA.²¹

Regulations **must specify requirements for physical protection, control and accounting of nuclear material and nuclear facilities depending on their category**. In particular, regulations must specify requirements for physical protection of Categories I, II and III nuclear material, including design solutions, physical barriers, technical means, and organizational measures. Regulations must establish requirements for the frequency of taking a physical inventory and using access control systems depending on the category of nuclear material.²²

Regulations **must contain a requirement that nuclear material and facilities must be protected by armed security guards**. Regulations must also contain requirements for the organization of armed security and its interaction with the nuclear facility and external emergency response forces in ordinary circumstances and emergency situations.²³

Regulations **must contain requirements for physical protection of nuclear material during transportation** at or above the minimum requirements recommended by the IAEA. In particular, there must be a requirement to conduct vulnerability analysis and effectiveness evaluation, and to provide armed security guards during the transportation of top-category nuclear material. Regulations must contain requirements for coordination between the shipper, recipient, and the authorized national agencies involved in providing physical protection during transportation.²⁴

Regulations **must contain a requirement for operators to conduct self-assessment of the state of their MPC&A systems** to assess their performance and compliance with regulatory requirements. When shortcomings are identified, remedial measures must be taken and their implementation must be monitored. This self-assessment must be performed in addition to inspections conducted by the regulatory authorities. Its purpose is not to identify violations or mete out penalties, but to maintain a constant and ongoing process of improvement.²⁵

PROVIDING ASSISTANCE TO IMPROVE NUCLEAR SECURITY IN THE NUCLEAR EXPORTS FRAMEWORK

The main, and in most cases the only source of nuclear material and technologies, which the nuclear newcomer countries require to develop their nuclear programs, is technologically advanced nuclear exporters who already have a wealth of nuclear expertise.

This opens up valuable opportunities to improve the state of nuclear security in the nuclear newcomer states.

In accordance with Nuclear Export Guidelines (INFCIRC/254/Rev.12), nuclear material and technology can be exported only on the condition that nuclear security measures are taken to prevent unauthorized use and application of nuclear material. These nuclear security measures must comply with IAEA recommendations stipulated in INFCIRC/225. Another necessary precondition for exports is that the importer country must have enacted a safeguards agreement with the IAEA that requires all source and special fissile material used in the current and future peaceful programs of the importer state to be placed under safeguards. This creates the framework for establishing a national system of nuclear material control and accounting.

The requirements contained in the Nuclear Export Guidelines are reflected in the national legislation of the exporter states. Russia, for example, has a government-approved regulation *Provisions on exports and imports of nuclear material, equipment, special non-nuclear material, and related technology*. These provisions stipulate that exports can be authorized only if the importer state has provided assurances of application of IAEA safeguards and if nuclear security measures in the importer state meet the minimum recommended requirements of the IAEA.

In addition to the obligations required of the recipient states by the exporter states in accordance with the Nuclear Export Guidelines, some exporter states also include measures to facilitate compliance with MPC&A requirements by the importer state in the extended package of services supplied along with the core set of technologies, equipment, and nuclear material. The provision of such support is part of the terms of all the agreements on peaceful nuclear energy cooperation Russia has signed with other countries.

A case in point is Russian cooperation with Turkey. In addition to building the nuclear power plant in Akkuyu, Russia is also providing support to Turkey in creating its national MPC&A infrastructure. Many of the regulatory documents and licensing requirements for the Akkuyu NPP were transplanted from the Russian regulatory framework. In particular, the following Russian documents have been used:

- *Standards of physical protection of nuclear material, nuclear facilities, and nuclear material storage sites*, approved by Cabinet Resolution No 456 of July 19, 2007;
- Federal norms and standards NP-030-05 *Basic standards of nuclear material control and accounting*;
- Federal norms and standards NP-083-07 *Requirements for physical protection systems for nuclear material, nuclear facilities, and nuclear material storage sites*.

These documents were used during the licensing stage, and the requirements they contain are part of the terms of the license. The nuclear facility must comply with these requirements during its operation.

MECHANISMS OF ASCERTAINING COMPLIANCE WITH MPC&A STANDARDS

The mechanisms of ascertaining compliance with MPC&A standards remain fairly limited. No compulsory checks or inspections are required as far as physical protection is concerned. As for control and accounting, indirect assessments can be made on the



basis of inspections held in the framework of the safeguards agreements between the IAEA and its member states.

The Convention on Physical Protection of Nuclear Material does not include any verification mechanisms. Under the terms of the convention, implementation of physical protection measures is the remit of national legislations and competent authorities of the member states.

The most comprehensive and well-regarded mechanism of assessing the state of physical protection of nuclear material and facilities is the International Physical protection Advisory Service (IPPAS) of the IAEA. IPPAS conducts its assessments at the request of any state that wants such an assessment to be made. The assessments are made by a group of experts convened by the IAEA on the basis of source information provided by the state being assessed. The following elements are assessed:

- Physical protection measures at the national level;
- Legislative and regulatory framework;
- Licensing and inspections;
- Coordination with other organizations and departments;
- Implementation of physical protection measures at individual facilities.

The criteria used for the assessments are defined by the Convention on Physical Protection of Nuclear Material, including amendments, and by IAEA guidelines, such as the aforementioned INFCIRC/225/Revision 5 Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities.

A report containing the results of the assessment is a confidential document, but it can be released into the public domain on the initiative of the state being assessed. The results are not used to compile any national rankings. The expert group that conducts the assessment also draws up recommendations and proposals; their implementation may be the subject of another assessment held at a later time.

In terms of the scope and of the results of the assessment, IPPAS is the most effective instrument available that can be used to improve the state of nuclear security. Nevertheless, IPPAS currently also has several drawbacks, some of which significantly reduce its effectiveness. First, its assessments are held on a voluntary basis at the request of the state being assessed, and the state is not mandated to follow its recommendations. Second, IPPAS missions do not cover nuclear material control and accounting issues, which are an important element of nuclear security.

The purpose of the application of safeguards, including inspections held in the Safeguards Agreement framework, is to ascertain that there has been no diversion of nuclear material from peaceful use to nuclear weapons programs. This means that formally, the inspections do not assess the state of the control and accounting systems in the country or at its individual nuclear facilities. Nevertheless, under the terms of Article 7 of a model agreement on safeguards, during inspections the IAEA takes into account the technical effectiveness of the national system. In other words, the effectiveness of nuclear material control and accounting systems is assessed during these inspections after all, albeit indirectly, and a positive report by inspectors demonstrates that the national nuclear material control and accounting system is adequate.

CONCLUSIONS AND RECOMMENDATIONS

Based on all of the above, the following conclusions can be made:

- Given the range and gravity of the existing threats, nuclear security must be regarded by the nuclear newcomer countries as one of the key responsibilities that follow from the acquisition of nuclear material and facilities.
- The main sources of expertise the nuclear newcomer countries require to put in place adequate MPC&A arrangements include IAEA recommendations, assistance from the nuclear exporters, and international mechanisms of assessing the state of MPC&A systems that can be used to receive feedback and recommendations.
- The system of international requirements and recommendations in the area of MPC&A covers the entire range of nuclear security measures. The existing documents stipulate fundamental criteria that can be used to assess the state of national MPC&A systems, as well as systems at individual nuclear facilities.
- The mechanisms of implementing these requirements and recommendations as well as controlling compliance thereof remain insufficient to ensure their uniform implementation in all the potential nuclear newcomer states.
- The mechanisms of nuclear export control provide a valuable opportunity to improve the state of nuclear security in the nuclear newcomer countries. The nuclear export guidelines contain a requirement to make sure that the state of nuclear security in an importer country is at or above the IAEA-recommended level. They also require the application of safeguards, which creates a framework for the development of a national MPC&A system.

The following recommendations can be made to achieve an adequate level of nuclear security in the countries that have recently launched or are about to launch nuclear energy programs:

- The scope of the assessments conducted by the IAEA in the IPPAS framework can be increased to cover nuclear material control and accounting. That would make it possible to produce detailed assessments of the state of national control and accounting systems — something that is not yet happening as part of the implementation of the safeguards agreements — and to provide recommendations to the states being assessed on how to improve these systems.
- Nuclear exporter countries should be encouraged to make the provision of assistance to improve the state of nuclear security in the importer countries part of the agreements and contracts they sign with these countries.
- Nuclear newcomer countries should be encouraged to invite IPPAS missions to conduct extended assessments that would include physical protection as well as material control and accounting issues. The adoption of a national plan of implementing any recommendations made by the IPPAS missions should be one of the elements of the programs to build the national infrastructure required to pursue nuclear energy development in line with IAEA guidelines.

References

1 Physical protection. Nuclear Nonproliferation: a Brief Encyclopedia. Ed. A.V. Khlopkov. Moscow: Russian Political Encyclopedia, 2009



- 2 Nuclear material accounting and control. Nuclear Nonproliferation: a Brief Encyclopedia. Ed. A.V. Khlopkov. Moscow: Russian Political Encyclopedia, 2009
- 3 The list of requirements cited in this article is not formally stipulated in any official documents. These requirements were formulated by the author on the basis of the existing compulsory requirements and recommendations.
- 4 Fundamental Principle E: Responsibility of the License Holders, Articles 1.12, 3.12, 3.13, 3.23–3.26, Table 1 in Section 4, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5). Articles 7, 112, The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/153).
- 5 Article 3.8, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5)
- 6 Fundamental Principle D: Competent Authority, Articles 3.18–3.20, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5)
- 7 Fundamental Principle D: Competent Authority, Articles 3.18–3.20, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5)
- 8 Articles 3.15–3.16, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5) Article 3.5, IAEA Nuclear Security Series #20, Objectives and Essential Elements of a State's Nuclear Security Regime
- 9 Article 3.43–3.44, 4.5–4.8, 5.4–5.8, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5)
- 10 Fundamental Principle K: Contingency Plans, Articles 3.58–3.60, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5)
- 11 Section 4.4, Nuclear Material Accounting Handbook, IAEA Services Series #15
- 12 Article 3, Nuclear Non-Proliferation Treaty
- 13 Article 3.34–3.40, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5)
- 14 Article 3.39, 4.35, 5.15, 5.16, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5)
- 15 Article 3.27, 3.29, 3.57, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5)
- 16 Articles 32, 110, The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/153) Articles 2.3.3, 4.5.7, Nuclear Material Accounting Handbook, IAEA Services Series #15
- 17 Article 32 a-b), The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/153) Article 4.5.9 and Section 5.2, Nuclear Material Accounting Handbook, IAEA Services Series #15
- 18 Article 32 c), The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/153) Article 2.4.3, 4.5.12, Nuclear Material Accounting Handbook, IAEA Services Series #15
- 19 Article 32 d), The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/153) Article 2.3.10, 4.5.11 and Section 5.4, Nuclear Material Accounting Handbook, IAEA Services Series #15
- 20 Article 32 e), The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/153)
- 21 Article 32 e), The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/153) Section 5.3, Nuclear Material Accounting Handbook, IAEA Services Series #15
- 22 Article 3.14, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5)
- 23 IAEA documents do not contain a recommendation on providing armed security guards at nuclear facilities as a compulsory requirement. Nevertheless, we believe that this is an important requirement and crucial for achieving nuclear security goals.
- 24 Section 6, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5)
- 25 Section 6, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5)



UNDERSTANDING THE NUCLEAR FUEL CYCLE INDUSTRY

The nuclear fuel cycle is the backbone of the global nuclear power industry. Companies that are working in the field create a complex network covering a wide variety of processes from uranium extraction and enrichment to fuel fabrication and reprocessing. The *Fukushima Daiichi* accident, changes in the global demand for nuclear fuel and technological advancements have profoundly influenced the industry.

On June 2, 2015, the VII ATOMEXPO International Forum hosted a round table on *The Role of the Nuclear Fuel Cycle at the Current Stage of Nuclear Power Industry Development*. The event was moderated by *TENEX*. The round table benefited from participation of the leading experts from the industry and consulting firms: Ms. Anna **Bryndza**, Vice President of *The Ux Consulting Company*; Mr. Sergey **Yashin**, First Deputy Chairman of the Management Board at *NAC Kazatomprom JSC*; Mr. Philippe **Hatron**, Senior Vice President, Mining & Front-End Sales at *AREVA*; Mr. Gene **Clark**, President of *Trade Tech Energy*; Mr. Aleksey **Dolgov**, Head of Department at *TVEL*; Ms. Dominique **Dapei**, *EDF Group's* Director of International Affairs; Mr. Dmitry **Anufriyev**, Head of Division at *Rosenergoatom* Concern; Mr. Fletcher **Newton**, President of *TENAM Corp*; Mr. Ladislav **Havlíček**, Head of the Fuel Cycle Strategy and Services Department at *CEZ Group*; Mr. Aleksey **Lebedev**, Director-General of the *International Uranium Enrichment Center*; and Mr. Andrey **Tovstenko**, *TENEX* Deputy Director-General for strategy and marketing.

BRYNDZA: Nuclear energy remains very important, but there is a whole range of new factors that have an impact on its development. I am not just talking about the post-Fukushima syndrome; I am also talking about shale gas, renewables, and deregulation of the electricity markets. The latter trend makes it more difficult to predict electricity prices and that planning is part of any decision on whether to build or not to build an NPP. All that being said, however, the *Ux Consulting Company* projects a growth of the global nuclear energy market. Most of that growth is expected in the so-called CRIS group, which consists of China, Russia, India, and South Korea. It will also be important to maintain the current level in three other key markets: the United States, France, and Japan.

The markets are slowly trying to adapt to the new environment. For example, on the uranium market, supply will outstrip demand in 2015. Meanwhile, market players took time to react even to the Fukushima accident; companies initially cancelled plans to build more generating capacity, but they did not reduce their output at that time. Also, there is the secondary uranium market, which emerged thanks to supplies under the HEU-LEU deal.



E
J
B
A
T
D
N
U
O
R

That market is now being supplied by enrichment companies, from the United States Department of Energy stockpiles, and from stockpiles accumulated by some individual companies. As a result, in the short and medium time frame, the excessive supply in the uranium market will persist.

Uranium conversion is often regarded as the weak link in the nuclear fuel cycle. Unlike many other markets, the conversion market is fairly balanced, on a global scale. The supply on that market is limited, so if some of the existing capacity is taken offline, there is an immediate threat of disruption of supply. There are also regional imbalances; there is an excessive supply in North America, for example, but a shortage of supply in the UK.

As for the enrichment services, the balance there has yet to be found. A reduction in demand after Fukushima coincided with long-term trends in the industry, including the changing geography of demand and the transition from gas diffusion enrichment technology to gas centrifuge technology. At this time, the market is oversupplied, but because it is difficult to stop the centrifuges once they have been launched, companies use their spare capacity to enrich the tails — which turns them into players on the uranium market.

The launch of new reactors in Japan will have a positive psychological effect on the markets, but in the medium term, the price will return to the levels dictated by supply and demand.

YASHIN: The speed of the nuclear energy industry's growth will directly depend on the safety of nuclear power plants, and one of the key factors in their reliable work is uninterrupted nuclear fuel supply. On the one hand, many new states have plans to build a nuclear energy industry, but most of them do not have the required nuclear expertise. On the other hand, only a limited number of companies offer nuclear fuel supply services.

The most widespread practice at this time is direct supply of nuclear fuel from the producer to the consumer. The alternative is for each individual country that plans to build a nuclear energy industry to make fuel for its NPPs at its own facilities. The necessary ingredients can be produced locally or imported. It is also possible — although this has yet to be implemented — to create regional centers that will make fuel for specific types of reactors. At this time, the key suppliers of uranium do not have the enrichment capacity or fuel manufacturing technology, but they would be glad for an opportunity to participate more actively in such cooperation. Of course, all the relevant factors must be taken into account when technology transfer is involved, including nuclear nonproliferation.

Kazakhstan has large reserves of natural uranium, and it believes that its mission is to offer guaranteed supplies of uranium to every country that pursues peaceful nuclear energy development. In addition, Kazakhstan has preserved and improved technologies for making individual nuclear fuel components, and it hopes to become involved in every stage of the nuclear fuel cycle at some point in the future. That gives the nuclear newcomer states a choice of fuel suppliers. In addition to natural uranium supplies, Kazakhstan currently offers the service of returning uranium back to the nuclear fuel cycle by processing materials that contain uranium and making nuclear fuel components out of them. In partnership with AREVA, *Kazatomprom* supplies nuclear fuel components to the Chinese market. An agreement has been reached to produce fuel in Kazakhstan for French-designed reactors operated by *China General Nuclear Power Corporation (CGNPC)*. This represents an emerging new trend whereby it becomes standard practice for operators to have more than one nuclear fuel supplier; this is a guarantee of reliable fuel supplies. Finally, *Kazatomprom* also plans to enter the uranium conversion market.

HATRON: A sustainable and reliable nuclear energy industry must be based on social responsibility, environmental friendliness, and economic viability. To achieve these goals, the nuclear industry must fulfill the following conditions: ensure safety, security, and local development; minimize the environmental impact; and be economically viable and competitive. France’s nuclear industry is the country’s third-largest industry. Every possible effort is being made to ensure the safety of the industry’s employees. The French nuclear companies are subject to inspections not only by the national authorities but also Euratom, which makes their work even more transparent.

To build a sustainable nuclear energy industry, it is important to minimize the amount of nuclear waste. In this context, the best solution is a complete nuclear fuel cycle, which creates a secondary fuel market and saves natural resources, and thereby creating a stockpile of material for the nuclear power plants of the future. Besides, this is a question of a country’s independence from external suppliers. France reprocesses spent nuclear fuel; the plutonium extracted by means of reprocessing is used to make MOX fuel, while uranium is enriched to the required level and also used to make fresh fuel. Making fresh nuclear fuel material by means of reprocessing spent fuel is more costly than simply using natural uranium — but by pursuing that path, France makes a contribution to long-term and sustainable development.

CLARK: The same quantity of enriched uranium can be obtained from various quantities of natural uranium by means of increasing or decreasing the amount of separative work units (SWU) spent on enrichment. Depleted uranium (the so-called “tails”) will have different residual amounts of U²³⁵. That gives the enrichment process a lot of flexibility. As the price of natural uranium or SWU fluctuates, the balance of the resources used in the enrichment process will also change to ensure the lowest possible price of the resulting product. Another thing to remember is that the financial interests of enrichment companies may differ from the interests of the buyers of enriched uranium.

Russia has the world’s largest enrichment capacity; it is followed by *URENCO*, *AREVA*, and Chinese companies (which are growing fast and planning to win large shares of the US and EU markets). These are the main players on the market. Because of flagging demand, the companies that pursued the laser enrichment technology — which is the main competitor of the centrifuge technology — have put their research on hold. According to estimates by Trade Tech Energy, the excessive supply of enrichment capacity on the market will persist until 2025. Nevertheless, it can be assumed that thanks to the aforementioned flexibility, a balance will be found.

DOLGOV: Nuclear fuel must meet the customer’s requirements, especially in terms of safety, reliability, performance, and competitive pricing. Performance can be improved through longer fuel life, higher power output, or higher burn-up fraction. Costs can be reduced by upgrading fuel technology and standardizing fuel design.

Three generations of fuel have been developed for VVER-440 reactors, which are in operation at the *Paks* NPP in Hungary and the *Dukovany* NPP in the Czech Republic, among other places. Third-generation fuel has also been developed for VVER-1000 reactors; in fact, it is already in use. The fuel for VVER-1000 reactors can work in the daily maneuvering mode. This was confirmed during trials in 2006 and 2015. The operator can therefore increase or decrease the reactor’s output depending on the grid’s demand. The objectives now being pursued by nuclear fuel developers include increasing the reactor output to 107 per cent.



DAPEI: Most of the electricity in France is generated by the nuclear power plants; this is why the security of the fuel supply is a key issue for us. It is critically important to manage each step of the fuel cycle and to define a front-end procurement strategy—that is, uranium supply, enrichment, and commercial services.

Since the beginning of the French nuclear program, leading actors of the national nuclear industry, *CEA*, *EDF*, and *Cogema*, have forged a strong partnership with *Tenex* to ensure the security of fuel supply. We clearly have strong ties with *AREVA*, which is today our main partner. However, since the beginning of the French nuclear program in the early 1970s, *Tenex* has provided the French nuclear fleet with enriched uranium. This is a very important point for us. It is a long partnership, which proved to be decisive at the beginning of the French nuclear program. While *Georges Besse I*, the first French enrichment plant, was under construction in the 1970s, *Tenex* was able to supply, along with the US enrichers, our first fleet of plants. At the beginning, the contracts were signed between *CEA* and *Tenex*. When *Cogema*, *AREVA*'s ancestor, was created, a new contract was concluded between *Cogema* and *Tenex*. Since mid-2005, *EDF* has established a direct relationship with *Tenex* through long-time contracts.

During all these years, *EDF* was particularly appreciative of *Tenex* as a partner. I would like to underline that there was not a single case of the low quality or delay in *Tenex* deliveries during all these years, which is of utmost importance in regards to the high level of expectation from our nuclear plants. I would also like to mention the high level of technology of *Tenex*, which meets the highest French environmental standards, and its high level of reliability. We are lucky to have *Tenex* to support our activities and competitiveness. This is a success story, and we wish this strong partnership to continue.

ANUFRIYEV: I would like to tell you about our experience of using nuclear fuel as part of implementing a program of increasing electricity generation. All the previous speakers focused on the initial and final stages of the nuclear fuel cycle. In my report, I will speak about the intermediate stage, i.e. burning nuclear fuel in a reactor.

The main task that has been set before us by the *Rosatom* corporation is to increase electricity generation in the existing VVER-type nuclear power reactors without any detriment to safety. *Rosenergoatom* currently operates 18 VVER-type reactors. We have three separate projects in this area. One is to increase the power output of the VVER-1000 model first to 104 per cent, and then at some point to 107 per cent, while at the same time implementing an 18-month fuel cycle. The second project is to increase the output of the VVER-440 model to 107 per cent and to implement a 6-year fuel cycle. The third and final project is to implement an 18-month fuel cycle for the VVER-1200 (AES-2006) reactors. The design of the latter model was finalized in 2007, and back at the time, we were not aiming for an 18-month fuel cycle. There was little ongoing R&D in that area, so the design was based on a 4-year fuel cycle.

In order to ensure the required length of the fuel campaign, we approached the *TVEL* company. A new design of fuel assemblies was developed, and the uranium load was increased by means of enlarging the fuel stack and introducing fuel elements with a higher uranium content. All the necessary procedures were also performed to demonstrate the safety of the modified fuel cycle and of operating the equipment on a fuel cycle longer than 12-months. That included demonstrating the safety of the proposed length of the fuel cycle between scheduled maintenance periods, upgrading the hardware, and conducting a probability analysis for safety. Even though we have already transitioned to using two main fuel types, we are also continuing trial operation of several new fuel types.

Working in cooperation with *TVEL*, we have developed a program of fuel improvement. Twelve TVSA-12 fuel assemblies are now in operation on a trial basis until 2016; these will be supplied to nuclear power plants in Ukraine and Bulgaria.

As for the results, according to 2013 data from the *Balakovo* NPP, we had a very respectable output of almost 33.7 billion kWh by all four reactors. The installed capacity utilization ratio was 96.2 per cent, and the availability ratio was almost 96.7 per cent. These figures demonstrate that increasing the power output and transitioning to the 18-month cycle has not had any negative impact on operational figures, reliability, or sustainability. We have also performed a technical and economic feasibility study compared to a 12-month cycle. According to that comparison, using the 18-month cycle generates an additional profit of about 5.2 billion roubles.

Let me also say a few words about another promising project. Our company has approved a program of increasing the thermal output of the No 4 reactor at the *Balakovo* NPP to 107 per cent. This builds on the previous project of increasing the reactor's output to 104 per cent using a similar process with several stages. It includes a feasibility study, the actual upgrade, operation in a trial mode, and finally commercial operation. Before taking this decision, the company performed R&D that demonstrated the feasibility of achieving 107 per cent.

Finally, let me say that the objectives set before *Rosenergoatom* have been met. We have completed a transition to 104 per cent power output at all our VVER-1000 reactors, except for the No 1 reactor at the Kalininskaya NPP; ditto for the development and implementation of 18-month cycles using bi-fuel assemblies. Analysis of the actual technical and economic indicators has confirmed that the upgrade has yielded the desired effect. One of the problems that has yet to be resolved, however, is the removal of spent nuclear fuel.

NEWTON: I would like to add a few words about the effects of this program on demand for uranium. The transition to an 18-month fuel cycle somewhat increases the consumption of natural uranium, but the increase in the amount of waste is outweighed by the savings achieved by reducing the amount of the fuel being loaded, and by increasing the number of days in a year during which the power plant produces electricity. The purpose of the program is to increase the power output, and the greater the output, the greater the demand for fuel.

HAVLÍČEK: *ČEZ group* is an international utility with a strong position in Central and Eastern Europe. The biggest share of our power generation is in Northern Bohemia, and the most important *working horses* in our fleet are the nuclear power plants. Nuclear power plants *Dukovany* and *Temelin* were substantially upgraded and now they are generating almost 50% of our output. What is even more important, this output is very profitable. Currently the electricity prices are very low in the Czech Republic and Central Europe, so for us it is important that thanks to the low fuel costs, those power plants are still very efficient. This could not have been achieved without excellent fuel performance, so we are eager to maintain this vital cooperation with the supplier in the long term.

Dukovany NPP was put in operation in 1955; this year we completed 70 years of operation, and for us it is a very important moment. In the Czech Republic, we have to renew our license every ten years; in 2015, we have to apply for license for the next ten years. Historically all fuel for this power plant has been delivered by the Russian propagator. The current fuel contract covers all of the expected operational lifespan of the plant. However, we hope that we will be able to prolong the operation time even further.



R
O
U
N
D
T
A
B
L
E

The *Temelin* NPP was launched in the year 2000. The plant is operated in 12-month cycles. We have studied the possibility of moving it to 18-month cycles, but in the Czech Republic, we have the highest electricity prices from January to March and from October to December. It would be very difficult to arrange all fuel outages to be out of this period. As a result, we decided to keep the 12-month cycles. At the beginning, *Temelin* used the Westinghouse Vantage 6 fuel. There were some modifications to the design to dissolve operational issues. In 2006 a Russian company, *TVEL* was selected as a supplier for the next decade, with the TVSA design of the fuel. This design was successfully licensed in the Czech Republic, and since 2010, we are operating TVSA fuel in our reactors.

Regarding our front-end strategy, that is, the procurement of nuclear materials, we try to maintain a portfolio of contracts for uranium procurement, conversion and enrichment services with individual primary suppliers or traders. We prefer to have some diversity and flexibility, not to be forced to buy in the market when the situation is not favorable for us. We are also a member of the EU, which means that if we sign a supply contract for nuclear materials, it must be co-signed by Euratom Supply Agency. Currently we have two fuel contracts, one for NPP *Dukovany* and one for NPP *Temelin*. Under the *Dukovany* fuel contract, either we deliver our own fuel concentrate, which is then converted, enriched, and fabricated into fuel in the Russian Federation, or we buy the fuel as a package. In case of NPP *Temelin*, a substantial part of the enriched uranium comes from the Czech Republic; it is fabricated into fuel, and only a small portion of enriched uranium product is delivered directly by the fabricator.

Very quickly about our back-end strategy: in the Czech Republic, it is based on an open fuel cycle. We store the fuel at the sites of the power plants, and the deep geological repository should be in operation from 2065. We regularly assess the strategy, but without construction of new units, I think, there is no reason to change it.

We remain committed to continue improving efficiency of our fuel and the highest level of fuel safety, and we have to be in compliance with the EU policies. *ČEZ group* remains committed to continue our support for research and development in the nuclear fuel cycle area; we finance a number of local experiments in fuel structure models. We are also active participants in international projects, like Zero Defects, the Halden Reactor Project, and so on.

LEBEDEV: The *International Uranium Enrichment Center (IUEC)* ownership structure has not changed since 2012. We still have four stakeholders, with a 50-per-cent plus one stake owned by Russia, 10 per cent by Ukraine, 10 per cent by Armenia, and 10 per cent by Kazakhstan. Nevertheless, energetic negotiations have been under way all these years, and I have good reasons to expect another two stakeholders to join us by the end of 2016. I would like to recall that the conditions for any country becoming a stakeholder in the IUEC are as follows. First, the country must comply with its obligations under the international nuclear nonproliferation regime. Second, it must be developing a nuclear energy industry (i.e. it must require, either at this time or in the future, a certain amount of nuclear fuel that will be supplied by the *IUEC*). Third, it must be a member of the IAEA. And fourth, the enriched uranium made by the *IUEC* and exported from Russia must be used for the importer country's own nuclear energy needs. One final thing: we prioritize countries that do not have any national enrichment capacity, and have no plans for building such capacity; this is our contribution to the nonproliferation program.

We started off with a small contract with Ukraine in 2012, and we believe that this is a very important contract; it is being successfully fulfilled. The arrangement under the contract

is as follows: we receive natural uranium from Ukraine and pay for it. We then enrich the uranium. Usually we do it at Angarsk, at our Angarsk enrichment facility. We then ship the enriched uranium to *TVEL*, where it is used to make fuel assemblies. These assemblies are supplied to Ukrainian nuclear power plants. The overall value of the contract is over 25 million dollars over four years. For our small center, which employs only 14 people, this is a lot of money. The amount of enrichment services we export is 240,000 separative work units (SWU), which is equivalent to two fuel loads for a 1,000 MW reactor. Despite the complicated relations between our two countries, we successfully fulfilled our contractual obligations last year, and I am sure that we will do the same this year. The framework agreement with Ukraine covers a period until 2017; I hope that it will be extended.

Let me now say a few words about our assured stockpile. This, after all, is our main reason for being. That stockpile consists of over 132 metric tons of LEU in the form of uranium hexafluoride enriched to 2 — 4.95 percent. Russia pays for its accumulation and maintenance. A total of about 300 million dollars in today's currency has already been spent. The assured stockpile is kept at an *IUEC* facility that has been placed under IAEA safeguards. Incidentally, we place non-commercial material for Ukraine under IAEA safeguards as well, so when IAEA personnel visits to inspect our material from the assured stockpile, they also inspect the commercial material that is destined for Ukraine. Essentially, we kill two birds with one stone. I would also like to recall that this is the only facility in Russia to have been placed under comprehensive IAEA safeguards.

Russia wholeheartedly supported the IAEA initiative to set up a nuclear fuel bank in Kazakhstan. In 2011, our Permanent Mission to International Organizations in Vienna submitted a *note verbale* in which we offered *IUEC* cooperation in establishing the fuel bank in Kazakhstan. We were invited to participate in the Russia-IAEA expert group, and we will be directly involved in the transit of material because the material for the fuel bank will almost certainly be shipped via Russian territory. The IAEA will soon hold a tender for supplying the material, and we will take part in that tender, together with other Russian organizations. Regardless of who wins the contract, if the site in Kazakhstan is not yet ready to store the material, we are ready to provide our services and place it under safeguards, i.e. to store the IAEA-owned material at our Angarsk site.

One final thing: experts of the Angarsk complex, in cooperation with our own specialists, have developed a unique material control and accounting system. That system stores and automatically processes a very large amount of data. It can automatically compile reports for the standard national control and accounting systems as well as IAEA-standard reports for the facilities that have been placed under comprehensive safeguards. The system has layers of data protection and a built-in error diagnostics program. Our Belarusian colleagues expressed their interest after Russia and Belarus signed an agreement in March 2011 on building the first nuclear power plant in Belarus. Earlier this year Belarus asked the *IUEC* for information and consultation assistance concerning nuclear material accounting and control at the Belarusian NPP.

TOVSTENKO: First, let me say a few words about the state of the market. There are two key trends here. First, over the past year, market players have become more confident about the outlook on the global nuclear energy industry. Of course, it is important for the suppliers of nuclear fuel cycle products and services to have not only a good long-term outlook, but a medium and short-term outlook as well. In that regard, everyone is now watching Japan, where the first several reactors are being re-launched. I hope that when we meet again in a year's time, this trend will have gained momentum. Second, in the



E
J
B
A
T
D
N
U
O
R

most important segment of the nuclear fuel cycle, i.e. enrichment, the industry has completed a renewal of technology and transition to gas-centrifuge enrichment technology. The technological level of all the market players is now more or less the same. Another important development is the expiration of the HEU-LEU contract, which had been a key market factor for over two decades.

In these new market conditions the suppliers that want to be successful must find new ways of boosting their competitiveness. *TENEX*, which relies on the vast expertise and capability of Russian industry, seeks to gain an advantage in the form of integrated solutions. We believe that package contracts for nuclear fuel cycle products and services offer several substantial benefits, especially for companies from the nuclear newcomer countries. When an energy company buys enriched uranium (which is the product of three technological phases of the nuclear fuel cycle), it thereby secures several benefits, such as optimization of the logistics, no need to allocate money for the acquisition of material, and a better supply system. The ultimate form of the integrated solutions concept in the nuclear fuel cycle is one that brings together the output of the early and final phases of the fuel cycle. In that case, the energy company is able to resolve various important problems related to reliability of supply, enrichment of spent fuel, and the fuel's inclusion in the reprocessed uranium cycle.

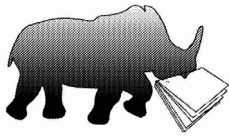
TENEX works to reflect of all the aforementioned market trends in its strategy. That strategy is based on further development of our traditional core business as well as new projects and programs structured in the framework of two key areas: integrated solutions and development of our marketing and distribution infrastructure.

As part of the effort to improve our sales infrastructure, we are working to reduce the terms of delivery and to further improve logistics and transport, which is one of the elements of our integrated solutions for the early phases of the nuclear fuel cycle. Let me give you one example. As recently as 10 years ago most of our exports were shipped via St. Petersburg on FOB (*free on board*) terms. Now almost 100 per cent of the shipments are made on DDU (*delivered, duty unpaid*) / DDP (*delivered duty paid*) terms.

I would also like to mention the project to set up a transport corridor for uranium products via the Russian Far East. We have already made several shipments on a trial basis to Japan and South Korea via that corridor. In fact, we have started to use that route on a regular basis. It reduces shipment times from 2–3 months to 2–3 weeks, which is very important for our customers in Asia.

Speaking of integrated solutions that we offer to our customers, *TENEX* has gradually transformed itself from a supplier of SWU for uranium enrichment into a company that offers the enrichment process, enriched uranium, and related services. It is important to note that *TENEX* has a good record in offering foreign customers enrichment services for reprocessed uranium; this is one of the areas we currently pursue.

We are also using the capability and expertise of the Russian industry to explore new technological solutions, including REMIX technology. It enables us to use all of the unseparated mixture of uranium and plutonium extracted from spent nuclear fuel in order to make fresh fuel for our customers with only a small addition of uranium. This is our attempt to fulfill the dream of every NPP operator: to buy fuel, burn it, return spent fuel for reprocessing to the supplier, and then once again receive fresh fuel for their reactors. 🌱



IRAN: WHAT'S NEXT?

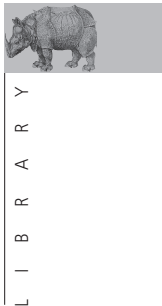
**Report “Iran in the Regional and Global Perspective”,
ed. by Andrey Baklitskiy, PIR PRESS, Moscow, 2015**

Reviewed by Sharon Squassoni

For at least eighteen months, experts and pundits have focused on the forthcoming Iran nuclear deal in endless detail. Since Iran's nuclear activities have been the subject of debate for more than a decade, there is certainly no shortage of views on how to resolve the nuclear issue. These have often focused on specific technical or legal details rather than broader security considerations. But it is becoming increasingly obvious that the views of Iran's neighbors, and regional security considerations, could influence the long-term success of the deal.

The PIR Center's recently published report, “Iran in the Regional and Global Perspective” offers a fresh twist on advice for negotiators as they continue their work on an agreement. As a compilation of articles by experts who met in Bangkok, Moscow and Washington, D.C. in 2014 to explore prerequisites for longer term solutions for strengthening nonproliferation in the Middle East, this new report provides insights from an often overlooked regional perspective. In addition to individual analyses (from, for example, Turkish, UAE, Azerbaijani, and Egyptian experts), the report contains findings from a U.S.-Russian working group on Iran. Particularly highlights include a very useful analysis of EU sanctions that will help even experienced sanctions watchers understand how European sanctions might be lifted and Pakistani and Indian views on the role of confidence-building measures. The conclusions highlight the need for long-term measures on Iran's nuclear program: adherence by states in the Middle East to the comprehensive test ban treaty (CTBT), a regional nuclear fuel cycle use for Iran's enrichment capability, and a regional agreement banning the use or threat of force (including cyberattacks) on nuclear facilities. In addition, military and non-military confidence-building measures (CBMs) should be developed.

The authors of the report stress that it would be counterproductive to have regional powers at the negotiating table now but that a long-term solution will certainly have to take regional security considerations into account. While the diversity of views in this report will surprise some, the opportunity to reflect on these differences moving forward is a vital contribution to a debate that doubtlessly will continue for some time. 🐘



Y
R
A
R
B
L