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YADERNY KONTROL

(NUCLEAR CONTROL)

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Analysis

NUCLEAR ARMS REDUCTION AND TRANSPARENCY PROBLEMS

by Anatoly Dyakov,
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[This article was originally published in Russian in *Yaderny Kontrol*, No. 5, Vol. 47, September-October, 1999]

Progress in nuclear arms reductions in the USA and Russia is impossible without strengthening and developing confidence between the two states.

One of the directions, working at confidence building, is transparency in nuclear arsenals available to the parties. It is known that the START I and II verification systems provide for control over the number of deployed carriers and warheads attributed to them. The treaties envisage control over the elimination of dismantled carriers. However, nuclear munitions arsenal and elimination of reduced nuclear warheads are not covered by verification measures. Hence, expansion of transparency measures to cover nuclear munitions and weapons-use fissile materials, excessive for national security needs, is a required and natural step to achieve deeper reductions in nuclear arms. Introduction of the aforesaid measures is accounted for in the necessity to demonstrate to the legislature and citizens of both states and to the international community on the whole impressive evidence that the process of strategic arms reductions is irreversible and does not upset the strategic balance. Thus, the main goal of transparency is mutual control over elimination of nuclear warheads, ensuring that the warheads are dismantled in conformity with the treaties, and fissile materials (plutonium and HEU components) will be no longer used for military purposes.

We presume that the lack of such measures may seriously impede the involvement of other nuclear-weapon states in the process of nuclear arms reduction and hamper implementation of efficient nonproliferation policy.

Despite the lack of legal-binding commitments, the parties, nonetheless, eliminate nuclear warheads. In the last six years Russia, according to some estimates, dismantled more than 10,000 warheads, including approximately 2,000 strategic warheads. At the same time, the USA eliminated more than 8,000 warheads, including 3,000 strategic. In this connection we have to point out that the sooner the parties agree on transparency measures towards eliminated warheads, the more efficient will be their cooperation in further and deeper reductions.

Before we give a detailed analysis of transparency issues, it would be reasonable to indicate two determining factors, which could be regarded as some marginal conditions.

The first factor is that the nuclear weapons will remain on active duty and will continue to play the key part in maintaining national security. It requires carrying out a number of activities to provide for arms safety, security, and reliability. Due to special sensitivity of these activities, each party will conduct them in secrecy, and it would be unrealistic to expect the introduction of comprehensive transparency measures in the near future. As long as the nuclear weapons exist, there will exist limitations on the level of transparency. For this reason, the introduction and development of transparency measures with respect to nuclear warheads' arsenals will probably be of step-by-step character; each step of nuclear arms reduction will require each party to seek reasonable compromise between transparency and secrecy.

The other factor relates to the symmetry of introduced transparency measures with regard to each party, i.e. the reciprocal transparency. The transparency agreements should be equitable and ensure access to an

equal amount of information. Obviously, the situation, when one nuclear weapons' complex is covered with wider transparency than another, contradicts the spirit of the process and is completely unacceptable. Some problems here may arise due to the US-Russian CTR program, although it may seem strange at first sight. The *Nunn-Lugar* framework provides for US financial assistance to Russia in implementing its commitments in the area of nuclear arms reduction. Nevertheless, the US Congress makes the allocation of means on specific projects conditional to access by US inspectors to the Russian facilities, where these projects are being carried out. The US explains it by the necessity to control the spending of appropriated financial means. This procedure implies that the USA is not obliged to follow the principle of reciprocity, to open similar US facilities for the Russian inspectors. An example is the fissile material storage facility, being built at *Mayak* plant with US help. Russia has declared its readiness to provide for bilateral or international control over the facility upon completing its construction. However, the USA strives for an agreement that would give it the right to verify the facility without providing reciprocal access to Russian inspectors to a similar facility on the Savanna River (South Carolina).

Table 1. Strategic and tactical nuclear warheads

	Early 90s		Late 1997	
	USA	USSR	USA	Russia
Strategic				
Deployed	12400	10210	7064	5800
Reserve	600	1300	1836	2170
Pending dismantlement			500	1600
Dismantled			3500	2000
Tactical				
Deployed+reserve	9500	17100	730	5650
Pending dismantlement			3450	3000
Dismantled			5320	8450

Let's define the area of transparency, i.e. those categories of nuclear munitions and the stages of their life cycle that could be covered within the transparency regime. That's where the main difference of US and Russian attitudes should be expected.

On the one hand, we presume that currently the Russian interest to establish a better transparency regime stems from a desire to eliminate the large *reverse potential*, obtained by the USA as a result of the START I and START II conclusion. First of all, it relates to the controlled elimination of strategic warheads, *taken off* of Minuteman-3 (W62, W78) and Trident (W76, W88) missiles and eliminated MX missiles (W87). Nonetheless, the US present-day national nuclear policy is based on the requirement to preserve the number of warheads at the level provided for in START I, which enables it to increase twice and rapidly the number of deployed warheads (hedge strategy). Nowadays, the USA demonstrates no intention to review this requirement, and hence, so far it hasn't decided what type and what amount of warheads should be kept in reserve. Besides, the USA is interested in preserving its most advanced W87 and W88 warheads and intends to mount W87 warheads (of the MX missiles, being eliminated under START II) on the Minuteman-3 ICBMs.

On the other hand, the USA has several times expressed the opinion that it would be reasonable to expand the transparency regime to cover stockpiles of tactical and strategic warheads. The reason for that, in the US opinion, is the large Russian tactical arms arsenal and concerns about its safety and security. Russia has never agreed with such proposals.

Another difficult problem is the long-range sea-based cruise missiles with nuclear warheads. Russia considers them to be strategic arms, whose importance grows in the conditions of deep strategic arms reductions. The USA, proceeding from its interests, regards these arms as tactical.

Table 2. US arsenal of nuclear warheads by late 1997 (estimates)

Warhead type	Delivery system	Quantity
W-62	***Minuteman-3***	610
W-84	Land-based cruise missiles	400
B61-3, 4, 7, 10, 11	Tactical and strategic bombs	660
W-76	***Trident-1***	3350
W-78	***Minuteman-3***	915
W-80	Sea- and air-based cruise missiles	2090
B83	Strategic bombs	600
W-87	***MX***	525
W-88	***Trident-2***	480
Total		9630

Bearing in mind the aforesaid reasons, we assume that the optimal solution for the first stage would be the expansion of transparency measures on deployed, reserve and pending dismantlement strategic warheads, provided for in the effective arms reduction treaties, and on fissile materials, released in the process of implementing international commitments.

The matter of tactical nuclear weapons, due to its complicated matter and the necessity to achieve real progress in warheads transparency measures, should be postponed till the further stages. At the same time, it would be reasonable to reaffirm the 1991 unilateral commitments on tactical nuclear arms and to take measures for their development. For instance, the parties may exchange the information on the number of eliminated warheads attributed to various tactical systems since 1991.

It would be reasonable to link the decision on long-range sea-based cruise missiles with the general level of reductions under the future START III treaty. If the parties agree to the level of 2,000-2,500 warheads, the long-range sea-based cruise missiles should be included in this number. If the level is about 1,500 warheads it will be necessary to demand for controlled elimination of all warheads attributed to these cruise missiles.

Obviously, the main objective of the transparency regime with agreed methods and procedures should be to assure the parties that neither of them breaches its commitments. Evidently, as in the case of carriers, the major components of the warheads transparency regime should be the exchange of information on quantitative parameters of nuclear arms and weapons-usable fissile materials, regular update of the data, and coordinated procedures of technical control over principal stages of the reduced nuclear warheads life cycle.

1991 served as a starting point for the exchange of information. The parties may exchange the data on the aggregate number of actually deployed and in-reserve strategic warheads, the number of manufactured and dismantled warheads and the number of released fissile materials, starting from 1991 and up to the moment of signing the agreement. Later on, the exchange of information on the eliminated warheads and general amount of released fissile materials could be made regularly.

At present, in accordance with START I, the parties perform inspections to verify the number of deployed warheads. The agreement on using radiation non-intrusive control could significantly increase the reliability of control over this type of warheads. By the way, we should emphasize US inconsistency in this matter. The USA itself proposed to use radiation control devices to determine the number of nuclear warheads attributed to the Russian RS-20M

(SS-18) and RS-12M (Topol) missiles. However, the counter-proposal of the Russian side to use the aforesaid means for inspection of both the Russian and US warheads attributed to the ICBMs and SLBMs, receives no response.

Table 3. Russian arsenal of nuclear warheads by late 1997 (estimates)

Delivery system	Quantity
SS-18	3170
SS-19	1100
SS-24	485
Topol	380
SS-N-18	660
SS-N-20	1260
SS-N-23	470
SS-N-8	200
SS-N-6	20
Tu-95, Tu-160 (air-based cruise missiles)	550
Bombs and air-based cruise missiles of the tactical aviation	2060
Navy	2400
Ballistic missile defense and air defense systems	1250
Total	13995

Reserve warheads will require an agreement on additional verification measures. They may include the exchange of data on the situation of storage sites and the amount of warheads in each storage facility as well as spot checks of the storage facilities with the use of non-intrusive measures.

The major problems of implementing the transparency regime are connected with the production of new warheads, which will continue in order to maintain the agreed levels. It is one of the most sensitive areas. Additional difficulties may occur due to the supposed difference in service lives of Russian and US warheads. According to the experts estimates, the service life of Russian warheads are nearly twice as short as that of US warheads. It means that to maintain the agreed level, Russia will have to manufacture more warheads than the USA. The complete solution of the problem can be found only if the production of nuclear warheads is put under control. But at the first stage such step is hardly possible. The compromise would be at first to exchange the data on the general number of warheads, manufactured during a certain period.

Let's touch upon the matter of control over reduced nuclear munitions. Their life cycle includes the following stages:

- removal from the carrier and transportation to the technical base;
- preparation for transportation to the dismantlement enterprise;
- transportation;
- dismantlement of warheads and nuclear charges, extracting of components containing weapons-use fissile materials, and placing them in containers;
- transportation of the containers with weapons assemblies to the storage facility for temporary storage;
- storage;
- transportation of the containers with weapons assemblies to the enterprise for reprocessing nuclear components into non-secret forms and reprocessing itself;
- transportation of the containers with reprocessed materials to the place of permanent storage;
- storage of the containers with reprocessed materials;
- final disposal of weapons-use fissile materials.

The technical methods, worked out by Russian and US specialists in the framework of inter-laboratory cooperation program, make it possible to control the whole cycle. However, in the real process some stages may be lacking. A particular place in the cycle belongs to the verification of nuclear warheads' dismantlement. It implies the fulfillment of two conflicting requirements. On the one hand, the verification procedure should confirm with a

high degree of certainty that the real nuclear charge has been eliminated. On the other hand, it should be non-intrusive, i.e. should exclude the transfer of information on the construction of the charge. Although the second condition rules out the possibility of direct control over the dismantlement process, the first condition can be met. Identification of warheads at the moment of their removal from the carrier (made through registration of its non-intrusive radiation certificate and control over this certificate at the entrance of the dismantlement plant), and marking and sealing the shipment casks may all provide for a high degree of certainty that the specific warhead removed from the carrier or from the arsenal has reached the dismantlement facility.

Later the verification procedure will be limited to confirming two facts. First, the containers, leaving the dismantlement plant and transported to the storage facility, really possess the weapons-use fissile materials. Second, the materials have been actually extracted from the dismantled nuclear warhead. Gamma spectroscopes, allowing to determine the quality of weapons-use fissile materials, have been tested by the specialist of both states in joint experiments and their use will most likely not face any technical difficulties. As for the second fact, it can be proved with the help of specific organization of warhead dismantlement and appropriate verification procedures. The easiest way is to do it at the enterprise, which only aim is to dismantle the warheads for elimination. Control over perimeter and entrance gates of such enterprises, control over movement of closed containers inside the enterprises before and after dismantlement can assure inspectors that the shipment casks, which leave the enterprise, contain fissile materials from the dismantled warheads. As an additional measure, we can suggest controlled elimination of the warheads' bodies and other non-nuclear components.

In our opinion, implementation of such measures won't meet any difficulties. In Russia there are four plant, intended for production and dismantlement of nuclear warheads. Their production capacity is practically close to none due to strategic offensive arms reductions, and Russia decided to concentrate the works on maintaining existing nuclear arsenal at only two plants by 2000. That's why one of the production plants, left without work, could be converted to dismantle eliminated warheads. In the USA there also exists a possibility of concentrating dismantlement at one enterprise. It can be the assembly complex at the Nevada test range.

The practice of previous negotiations demonstrates that the USA was more active in striving for transparency than Russia. It is usually accounted for by traditional Russian secretiveness and suspicion, and that is true to a certain extent. However, as it shows in START I implementation, Russia has more serious grounds for being restrained in this matter. The restraining factor for Russia, among others, is the huge financial burden of verification procedures. Their introduction will require considerable restructuring of serial production enterprises, storage and service bases, and transportation of nuclear warheads. In the situation of limited financial capabilities, when Russia spends twice less than the USA to maintain its nuclear weapons complex, secrecy is a natural measure, increasing security guarantees in case of unfavorable developments.

In the situation of START II still pending ratification, Russia could take a more active position with regard to the transparency of nuclear arms reduction and, hence, to *throw the ball* into the US court. First, transparency issues could be formally discussed without direct reference to START III talks, which the US refuses to hold before START II ratification by the Russian parliament. Second, all these matters have a sound basis, developed by previous negotiations. From 1994–1995, the parties conducted negotiations at various levels and practically reached consensus, clearing a path towards transparency of warhead arsenals. Although the talks on this problem were later suspended, many important details had already been worked out and approved. Third, in the framework of the transparency talks, the parties could discuss Russian concerns, including the problem of *reverse potential*. Finally, intensified discussion on transparency issues would promote considerably lower levels of warheads in the START III framework (about 1,000-1,500 warheads), which would evidently meet Russian interests. On the whole, the real progress in this area will contribute to a more favorable situation for START II ratification in Russia and will pave the way for achieving the agreement on the next stage of reductions.

PIR Center News

Fall 1999

1999, July 1. PIR Center held a broadened Research Council meeting on "*Cooperative Threat Reduction Program: Prospects of Development*". Representatives from Russian ministries and agencies, participating in the program implementation, US representatives, and members of the Russian academic circles attended the meeting.

The meeting attempted to answer the following questions: how well the CTR program corresponds with Russian national interests; what the relationship between US and Russian CTR participants is; what the major difficulties are; if the program helps to prevent the proliferation of nuclear weapons and their components from Russia; what the program's advantages and disadvantages are under the current framework; what changes should be made in the process of CTR implementation to enhance its efficiency; whether Russia will be able to maintain in future equipment and to use technologies, acquired in the CTR framework, independently, without US financial assistance; what role should be played by other developed states, besides the United States, in assisting Russia in nuclear threat reduction (the so called *Nunn-Lugar Plus* idea).

Keynote speakers of the meeting were Director of Cooperative Threat Reduction, Brigadier General (ret.) Thomas E. Kuenning, Jr., Senior Advisor to the MFA Department of Security and Disarmament Issues, Valery Semin, and PIR Senior Advisor, former head of the 12th Main Directorate of the Russian MOD, Gen. (ret.) Evgeni Maslin.

Brigadier General (ret.) Thomas E. Kuenning stated that as of July 1, 1999, in the framework of the CTR program, Russia had dismantled 4,838 nuclear warheads, eliminated 365 ICBMs, dismantled 346 silos, destroyed 50 bombers, eliminated 148 SLBM launchers and 30 SLBMs, and sealed 191 nuclear testing facilities. Gen. Kuenning discussed strategic offensive arms elimination, reprocessing and packing of fissile materials, conversion of active zone of Russian working plutonium production reactors, security of nuclear munitions storage facilities, nuclear weapons transportation security, and problems of chemical disarmament.

In the course of informal discussion, the parties touched upon the current situation and interim results of the CTR program; program development after the protocol signature on June 16, 1999, thereby extending then *umbrella* agreement; the CTR program and Russian foreign policy; CTR interim results compliance with initial expectations of the US and Russian sides; Russia's ability to maintain equipment and to use technologies, acquired in the CTR framework, independently, without US financial assistance, etc.

Russian participants also brought up the issue of the CTR program ineffectiveness in the area of financial spending. It is known what amount of financial means is appropriated, but it is still not clear how much money reaches Russia in the form of financial assistance and how much is left in the USA to cover administrative and other costs.

At the same time, the parties confirmed the necessity to promote better coordination between the Russian ministries and agencies that receive aid, for, according to one of the speakers, '*more money is allocated not to those, who badly need it, but to most experienced lobbyists*'.

Director of the PIR Center Vladimir Orlov, summing up the results of the meeting, emphasized that the CTR program had managed to overcome the first crisis, relating to launching and growth, and the second crisis, caused by purely political reasons, i.e. the Kosovo developments. The CTR program dynamic development should be welcomed. At the same time, the program success does not mean that all the problems have been solved. It is necessary to concentrate on drafting a list of problems and to move further to promote mutually beneficial CTR implementation.

In addition to Gen. Kuenning and Dr. Vladimir Orlov, other speakers were Alexander Zarubin (Security Council), Alexander Gromov (State Customs Committee), Yury Goncharenko (Ministry of Defense), Natalya Kalinina (Government Office), and Nikolai Shumkov (Russian Space Agency).

Andrei Zobov (Russian Nuclear Society), Vladimir Misiuchenko (State Duma), Vladimir Novikov (Russian Institute for Strategic Studies, RISI), Anatoly Negreyev (*Promexport*), Roland Timerbaev (PIR Center), Elina Kirichenko (Institute of World Economy and International Relations, IMEMO), Vasily Krivokhizha (RISI), and others also took part in the discussion.

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1999, July 28-August 5. The 11th international symposium on science and world affairs was held in Shanghai (China). The symposium was organized by the Union of Concerned Scientists (USA) and the Center for US Studies of the Fundan University (China). The conference discussed a wide range of issues concerning the current state and prospects of control over WMD and nuclear arms in particular. PIR Research Associate Ivan Safranchuk made the report "*Development Prospects of the Russian Strategic Nuclear Forces*".

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1999, September 2-8. The annual Halki international seminar "*Shaping Europe's Future*" was held in Greece. The seminar participants were representatives of governmental and non-governmental structures of most European states and international organizations (NATO, OSCE) officials. The participants focused on the problem of overcoming the Kosovo crisis consequences. PIR Research Associate Ivan Safranchuk represented the PIR Center at the seminar.

Summary

Yaderny Kontrol (Nuclear Control) Journal of the PIR Center for Policy Studies Volume 46, No. 4, July-August, 1999

The *Editorial*, entitled "*Nonproliferation: Game without Rules?*", maintains 'In May the international community witnessed the first war in history between *new nuclear weapon states*. Islamic separatists invaded the territory of the Indian State of Jammu and Kashmir. There is little doubt that the separatists received full Pakistani support and that soldiers of Pakistan's Armed Forces participated in the conflict. It is fair to assume that the conflict is between India and Pakistan, *de facto* nuclear weapon states (although under the NPT they do not possess such a status).

It's not the first time when nuclear weapon states have been engaged in conflict with each other, albeit in an indirect manner. During the Cold War period Soviet and American soldiers were on either side of the battlefield on the Korean peninsula and in Vietnam; military advisers and instructors on special operations had a chance to meet even more frequently.

However, at that time both parties followed the rules of the game, which had been taking shape for years and were generally observed. These rules prevented the escalation of local conflicts and regional wars into global thermonuclear war. Why? Primarily due to the fact that hostilities took place in Third World countries (practically without exception), far from the borders of the Soviet Union or the United States. These were wars for influence and power in the world. Two empires preferred to test each other's strength far from home, at the global periphery. In such circumstances the possibility of escalation was minimal.

The Indian-Pakistani conflict is another case. The two states are doomed to fight on their own territory; hence, the stakes in conflict grow tremendously and justify the use of any and all offensive means available to the

parties. That is why the May hostilities are so dangerous. India and Pakistan's refraining from employing nuclear weapons should not be regarded as a reassuring factor. So far the states have not completely brought up their arsenals to full-fledged combat readiness. They continue to develop missile programs and their main objective is to create intermediate-range missile delivery systems. Thus, both countries have no capabilities to start and conduct real nuclear warfare. But this is the way the situation is developing now. Who knows what will happen in two or three years when new missiles will be ready for serial production and will have nuclear warheads produced for them?

The Kosovo crisis gave *carte blanche* to those states that have been striving to solve their problems by force and enabled several states to abandon some previous commitments. For instance, India, hiding behind the pretext of NATO aggression in Yugoslavia and attempts to violate the territorial integrity of the latter, refuses to discuss the CTBT treaty. All previous Indian pledges to sign the treaty in the near future (significant from the point of nuclear nonproliferation and disarmament) are no longer valid. Obviously, the Indian position is not flawless and it is doubtful that it will get away with not signing the CTBT by using the Kosovo conflict as a pretext. However, the state has a sovereign right to link its policy on certain issues to the world developments in other regions. This is a common right of all states.

The India-Pakistan conflict is not just another clash between the Indian military and separatists, which happens more or less regularly in this region. It's the conflict of a new generation, the first conflict between *new nuclear weapon states* and the first post-Kosovo conflict. And it has demonstrated, at least at the declaratory level, that countries like India feel more at ease in conducting their foreign policy.

What's the conclusion? Is the USA the most righteous state since it is vigorously participating in enforcement actions against Yugoslavia but has made minimal international commitments regarding wartime law? The same can be said of India and Pakistan: they are not NPT signatories and by the acquisition of nuclear weapons they are not guilty of breaking the international law.'

'The nonproliferation arena is much broader than the provisions of its founding treaty, and it vests the international community with the power (moral imperative at least) to use enforcement actions against violating states. However, the USA agrees with the logic of nonproliferation regime violators, giving others the *go-ahead*. India and Pakistan are merely demonstrating their ability and willingness to be the first to make the most of this situation,' concludes the *Editorial*.

Yury Fyodorov in "*Caspian Region: Periphery or New Center of World Politics?*" argues that 'on the edge of the XXI Century, the world economy, especially financial markets, has reached a period of vagueness, a sort of twilight zone, which is likely to last for several years. This uncertainty is typical to certain regions in Asia and Latin America as well as to the centers of economic might and influence. For instance, the consequences of massive capital inflow to the USA, resulting from crisis at the so called *emerging* markets in Asia, Russia, Brazil, etc., are still not clear. In current circumstances, unexpected turns of events are quite possible and they are normally not taken into account in the forecasts of economic and political development. Presumably, this conclusion is true with respect to the oil market. For example, today it is difficult to predict certain leaps in oil prices but they may appear in the next decade.'

Guzel Taipova in the article "*Legal Status of the Caspian Sea*" states, 'Bearing in mind the consolidated position of Central Asian states, the process of Caspian sea division may be sped up by Iran, which has already started to seek for solution of a mutually acceptable legal wording. The best impetus for Tehran would be a shift in the uncompromising position of the United States. For the economic interests determine the policy of Caspian states it should take the form of a clear Western signal, demonstrating the willingness to review course of the latter aimed at blocking economic projects with Iran's participation. The most powerful *catalysts* of US-Iranian rapprochement are economic interests. More and more representatives of Western oil companies express their interest in resuming cooperation with Iran. For instance, *British Petroleum* has re-opened its office in Tehran while American *Mobil* has declared its willingness to exchange

extracted Turkmen oil for exported Iranian oil. French *Elf* and *Total* and Russian *Gazprom* actively participate in exploitation of the largest Iranian oil and gas fields.'

Yaderny Kontrol (Nuclear Control) Journal of the PIR Center for Policy Studies Volume 47, No. 5, September – October, 1999

The *Editorial*, entitled "*Joint Statement in Cologne: Breakthrough or Lack of Agenda?*", maintains, 'At first sight, the *G-8* summit in Cologne has brought practically no fruition for Russia. Only President Clinton marked the value of Russia's participation in the summit. Other world leaders kept courteously silent on the matter.

Russian participation in the Cologne summit was minimal: Prime Minister Sergei Stepashin attended the meeting for two days and, in fact, did not go beyond bilateral contacts while President Yeltsin visited Cologne for about only six hours. All major issues of the agenda were discussed without Russian participation. Presumably, Moscow was ready for such a state of affairs and planned beforehand the tactical moves for such circumstances.

The *G-8* summit was important for Russia above all for domestic reasons. World leader status is one of the few trump cards Boris Yeltsin has as no other politician in Russia can match this trump. In this connection, participation of the Russian president in the work of the summit should have been something outstanding and historic, resulting in *breakthroughs* in some areas.

Despite intensive negotiations in Cologne held by Prime Minister Stepashin on June 18-19 (at that time Boris Yeltsin was preparing for the summit in his Gorki-9 official residence), the talks did not yield any results. It was not clear what Yeltsin would propose at the summit, for a solution to financial matters could not be reached while the Kosovo crisis settlement dragged on (by June 19 the Helsinki negotiators had not achieved any breakthrough).

However, for the majority of the *G-8* leaders, Yeltsin's participation in the summit was absolutely indispensable even if it was mostly symbolic in nature. One of their main arguments was that the developments in Yugoslavia had complicated or even brought naught to Western relations with Russia. Hence, Yeltsin's refusal to visit Germany would have played against them.

And President Yeltsin came to Cologne. Moreover, he put forward some *historic* initiatives and held negotiations with Bill Clinton, resulting in signature of the *Joint Statement Between the United States and the Russian Federation Concerning Strategic Offensive and Defensive Arms and Further Strengthening of Stability*. The latter should clear the way for talks on nuclear arms.

So, what is the real outcome of the summit? One of the vice-prime ministers of the Russian Government admitted that if it had not been for the Cologne political breakthrough, «it would have affected the position of state creditors and attitude of international financial organizations towards Russia». It seems that the deal was struck. Boris Yeltsin visited his *friends* and convinced them that relations with Russia would remain stable while Russian behavior was under control and quite predictable. In exchange for that he got credits. Global initiatives such as this mask Russia's willingness to rationalize its foreign policy course by selling up the remaining greatness it still possesses.

Clearly, *G-8* does not exist except in vague diplomatic rhetoric and nor does Russia enjoy full-fledged relations with the *G-7*. Russia can only conduct substantial dialogue with the United States, contradicting its foreign policy objectives, i.e. the concept of facilitating the emergence of a multi-polar world.

At the same time, many in the West connive at the globalistic whims of the Russian ruling elite.

As a result, we witness a situation where the Russian-Western relationship cannot generate new directions of cooperation and lacks a full-fledged *agenda*, an agenda that might prevent destabilization in their relations, caused by short-term crises.'

Dmitry Litovkin in his article "*Indian Program of Nuclear Fleet Development: Cooperation with Russia*" states, 'In summer 1998 top-ranking Indian delegation visited the North Fleet. Officially, the Indians were interested in the condition of Admiral Gorshkov aircraft carrier, intended for export and situated at *Murmansk*

shipbuilding yard. The Indian delegation also had a chance to visit a few garrisons of submarine crewmen, where Russian admirals with a high degree of transparency demonstrated to their Indian colleagues some samples of modern multipurpose and attack submarines. According to witnesses of this unofficial military show, the Indians were particularly impressed with Akula nuclear powered submarine. In November 1998 at the meeting of bilateral commission on military technical cooperation the parties discussed the issue of acquiring two such submarines. Moreover, in Severodvinsk Russia turned out to have the same amount of unfinished ships of this type. According to preliminary agreement, the Indians committed to pay for completing the building and testing of nuclear powered submarines, simultaneously starting training of two crews.'

Oleg Bukharin in "*Post-Cold War Consolidation of Nuclear Weapons Complexes in the United States and in Russia*" maintains, 'The end of the Cold War and nuclear arsenal reductions require fundamental review of the organization and structure of US and Russian nuclear weapons complexes. As a result of purposeful and well-financed endeavors of the US Department of Energy, the United States has generally completed the first stage of reductions and consolidation of its nuclear military complexes. Russia has not taken yet any similar, practical, or purposeful measures to consolidate its own nuclear complexes.

Adoption of the program on structural reorganization within the Russian nuclear weapons complex is the first significant step in the right direction. Implementation of the program will require considerable efforts by Minatom enterprises and central staff as well as endeavors by the Russian Government and the legislature. At the same time, it is necessary now to think about the different ways to deeper reconstruct the nuclear weapons complex, relating to the process of further nuclear arms reductions.'

The issue also contains *Library* section with book review on "*SIPRI 1998. Arms, Disarmament and International Security*", *Documents* section, including *Joint Statement Between the United States of America and the Russian Federation Concerning Strategic Offensive and Defensive Arms and Further Strengthening of Stability* and communique of the *G-8* leaders.

Commentary

CONSEQUENCES OF THE KOSOVO CRISIS WON'T AFFECT US-RUSSIAN CTR COOPERATION

by Inna Melnikova,
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1999 has become an important stage in implementing the *US-Russian Cooperative Threat Reduction* program (CTR), also known as the *Nunn-Lugar* Plan.

The framework of this program provides for technical assistance to Russia, Ukraine, Byelorussia, and Kazakhstan in elimination of strategic offensive arms, transportation and storage of fissile materials, and destruction of chemical and biological weapons. Since 1991, when the program was launched, the USA has appropriated $1.7 billion to Russia, while $450 million have been actually spent. For the FY2000, the Clinton administration requested $475.5 million ($35 million more than in 1999) and has already gained consent of the US Senate.

On June 16, 1999, the parties signed a protocol at the Russian embassy in Washington, extending the *Nunn-Lugar* program *umbrella* agreement till June 16, 2006. By signing this protocol, Russia provided for legal basis for the CTR program for the next seven years and, hence, contributed to maintaining it. At the same time, all previous agreements were left unchanged.

According to the *New York Times*[1], a month before the expiration of the agreement, neither the Pentagon nor the US Congress knew if Russia would extend the agreement

by the specified deadline. That's why the US administration notified concerned committees of the Senate and House of Representatives about a possible freezing of the funding. Meanwhile, the US DOD on June 9, 1999, was ready to inform program contractors that the projects might be suspended. More likely, the actions of the US executive were formal and overcautious, for, according to our sources in Moscow, the decision to sign the extension protocol had been taken no later than late May. US uncertainty was probably caused by insufficient coordination with its Russian counterparts.

Russia Is *Doomed* to Cooperate with the *Nunn-Lugar* Plan

Despite sharp reaction to the US bombing in Yugoslavia, the Russian ministries and agencies didn't stop cooperation in the CTR framework. The only exception was the actions of Russian MOD, which temporarily suspended contacts with representatives of the US Department of Defense. Such actions by the MFA, the MOD and Minatom should be justified for it is based on the Russian vital interest in receiving international aid.

From the point of finance, Russia is presently unable to fulfil its commitments, provided for in the international agreements on WMD dismantlement. In recent years the budget financing has been steadily reduced. In 1997, the budget provided for 3.2 billion rubles on disposition of arms and materiel. In 1998, this figure decreased by nearly two times to 1.9 billion rubles, while real funding allocated in 1998 didn't exceed 786.6 million rubles[2]. Even this amount of financial means is ten times lower than is required. Programs on CW dismantlement and nuclear powered submarines disposal are vivid examples of decreasing funding.

In 1997, Russia signed the Chemical Weapons Convention (CWC), under which it is obliged to eliminate 40,000 tons of chemical agents by 2007. In March 1996, there was adopted the Federal Program on "*Elimination of Chemical Weapons Stockpiles in the Russian Federation*" for 1996-2009. In April 1996, the program got status of the presidential program.

Table 1. Russian budgetary capabilities and CWC implementation

	1998	1999
Required (mln. rubles)	4,000	5,000
Allocated (mln. rubles)	500	370
Received (mln. rubles)	84	N.A.

***Sources*:** *Federal Budget for FY1999. Materials of the State Duma; Alexander Kalyadin, Russia at the Edge of Default in Fulfilling CWC Commitments. Yaderny Kontrol, No. 3, 1999, pp. 54-60.*

As you can see from Table 1, the amount of allocated financial means was more than eight times lower than required for smooth destruction of chemical weapons. Experts on CW dismantlement speak about prospects of default in fulfilling CWC commitments. Under these circumstances, international assistance is an essential source of financial means. And in the framework of the *Nunn-Lugar* program, the US Congress appropriated $138.7 million, $46.8 million (or 1.1 billion rubles) of which have already been expended[3].

Another example shows Russian problems in the area of nuclear powered submarines disposal. Taking into account that Russia annually dismantles only three submarines, while about 130 submarines are due to be disposed, the process may take 40 years and more. Hence, 31 SLBM submarines won't be eliminated in time as provided in START I. Thus, Russia won't be able to fulfil its commitments. According to Deputy Minister of Atomic Energy Nikolai Yegorov, nuclear powered submarines dismantlement annually takes $50 million, while elimination of all 130 submarines requires $2.27 billion[4].

The above-mentioned examples show that Russia can't turn down international assistance and the *Nunn-Lugar* program in particular (for it's the largest program in this area).

Financing Continues and Be Increased

Because the USA clearly wants Russia to carry out its START I obligations and to ratify START II, the USA will likely continue to financially support the CTR program. Funding should, therefore, continue to

increase as it has since the program's inception eight years ago. In early 1999 the USA laid down the extensive CTR program, envisaging that in 2000-2004 the spending would amount to $4.5 billion[5]. As before, the USA focuses on strategic arms elimination, nuclear warheads dismantlement, nuclear weapons transportation and storage security, storage of fissile materials and a number of other programs, concerning nuclear safety issues. The USA is planning to appropriate on these matters $2.8 billion for five years. Another important direction deals with non-nuclear WMD ($1 billion), which includes programs on CW destruction, BW proliferation prevention activities, job retraining for BW scientists to provide them with opportunities to pursue peaceful, commercial activities, and export control issues. Expenditures on the program of retraining nuclear scientists and their employment in nonproliferation and nonmilitary-related endeavors and enterprises will grow five times: during eight years of CTR existence this sector got $162.5 million, and in 2000-2005 it will receive $535.5 million. The extensive program provides for a completely new initiative: assistance in building houses for retired servicemen of the Russian Armed Forces. Up to 1999, the USA refused to finance social sphere. The Clinton administration proposal to allocate $83 million to provide housing demonstrates a shift on the US position. Presumably, it's the result of persistent Russian moves in this area. Another question is whether Congress will support Clinton's proposal. It will depend on the ability of the US administration to prove the necessity of such expenditures. The US spending on housing will significantly contribute to increasing CTR prestige in Russia. The existing negative attitude of rank and file of the Russian army, which regards the US financial assistance as an attempt to weaken Russian strategic might, may become less critical.

It is necessary to point out that the USA and Russia disagree on the amount of assistance. The USA argues that assistance in the CTR framework amounts to $1.2 billion. Unofficial Russian sources claim that received assistance doesn't exceed 20-25% of aforesaid $1.2 billion. In fact, in eight years of the program's existence the US Congress appropriated $1.2 billion. The US budgetary process, concerning defense expenditures (including the CTR program), is a very complicated procedure. Analysis of the open data shows that in 1992-1997 $978 million were obligated, while the US DOD expended (i.e. concluded the contracts) only $871 million which was nearly $100 million less. As one can see, this amount differs from Russian estimates (20-25%). We presume that such Russian assessment is based on evaluating the prime costs of actually received equipment and services at Russian prices. Hence, if the contractors were Russian enterprises, the same amount of work would be cheaper while real assistance would be larger.

From the very start of the CTR program, Russia and the USA have disagreed about who should receive the contract work. Under decision of the US Congress, the US DOD must place orders with US enterprises. And it seems rightful - donor state, rendering assistance to a foreign state, should create new jobs at home. Russia argues that US expensive labor force reduces the efficiency of financial spending. We presume that arguments of both parties are quite logical. Nowadays, the USA is seeking for a compromise to the problem. According to Director of the CTR program Brigadier General Thomas Kuenning, who visited Moscow in June 1999, some projects in the area of strategic offensive arms elimination will take the following scheme. The US DOD gives the contract to a US contractor, which works out the project details, carries out some work and can make deals with Russian subcontractors on conducting a part of the project jobs on the spot, i.e. in Russia. First, such a scheme meets more Russian interests. Second, it lowers the possibility of equipment shipments that do not meet Russian conditions and technical requirements.

Legal and Tax Problems: Russia's First Step to Solve Them

Political components of the program have been studied in detail - from the point of problems and chronology. The least explored is the problem of legal status of the program,

above all its tax aspects. Although this problem at first seems to be of secondary importance, its unresolved character has constantly impeded efficient supplies since 1992. The 1992 framework agreement and 15 inter-agency agreements between the United States and Russia give the tax and dues exempt status to all imported equipment, materials and services. At the same time, it's just a general provision since the aforesaid agreements do not provide for any really working mechanism of tax and dues exemption. Evidently, all supplies since 1992 have been, in fact, tax-free, but permanent administrative and bureaucratic obstacles have constantly emerged in the lack of real legal mechanism of that kind. The necessity to extend the 1992 *umbrella* agreement made it possible to establish such an efficient mechanism.

Russia used this chance to further streamline the process. On May 4, 1999 President Yeltsin signed the Federal Law "*On Grants to the Russian Federation*". The law provides for a new scheme of granting tax and customs privileges. The program of technical assistance shall be registered by the Russian Government (an appropriate authority for registration, its form and procedure shall be worked out no later than three months after the law enters into force). On the basis of this registration, the embassy of the state rendering aid shall issue a certificate, proving the belonging of means, goods, works, and services to technical assistance. The certificate shall be the principal document for giving tax and customs privileges. Earlier technical assistance was exempted from customs duties and VAT following the complex scheme, which included consideration of a specific application by the Ministry of Economics and further approval of the State Customs Committee (GTK). Obviously, in practice all equipment supplies, conducted works and services in the framework of the *Nunn-Lugar* program didn't undergo this complex scheme. They were brought to Russia without paying VAT, customs duties and other taxes, but this practice had no legal backing in domestic legislation and, hence, its opponents had grounds for criticism. The Law "*On Grants to the Russian Federation*" reduced the legal discrepancy with domestic legislation and facilitated taxation procedures but didn't manage to eliminate all problems in this area. For instance, there is still a problem of double-income tax collection from the representatives of US corporations, working in the CTR framework. It's not clear when there will be set up a new procedure of granting tax and dues benefits.

On June 16, 1999 a new protocol was signed in Washington, extending the 1992 framework agreement. This event has great importance since preserving legal basis of the *Nunn-Lugar* program Russia preserves the program itself. The agreement will require ratification in the State Duma. Taking into account background noise in the form of anti-NATO and anti-American sentiments, the ratification should not be expected to go smoothly. Thus, we presume that its fate will depend on the ability of the Russian Ministry of Foreign Affairs to convince the deputies in the necessity of the program as such and the whole number of privileges, provided for in the agreement.

Analysis of Russian capabilities of arms elimination, US intentions, and everyday work to remove barriers to assistance proves that the *Nunn-Lugar* program is functioning normally and that US-Russian tensions, related to the war in Yugoslavia, had little impact on CTR implementation.

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[1] Judith Miller, US and Russia Extend Deal Reducing Threat from Arms. *New York Times,* June 17, 1999.

[2] The 1999 Federal Budget Calculations. Materials of the State Duma.

[3] Extensive CTR Program. Materials of the CTR Moscow office, US Embassy.

[4] Report of Deputy Minister of Atomic Energy Nikolai Yegorov at the Conference "*Problems of Nuclear Powered Submarines Dismantlement*", December 1998.

[5] Extensive CTR Program. Materials of the CTR Moscow office, US Embassy.

Polemics

CTBT AND MAINTENANCE OF NUCLEAR WARHEADS SAFETY

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CTBT was negotiated within the framework of the Conference on Disarmament in Geneva since January 1994. Later it was adopted by the 50th session of the UN General Assembly and open for signature on September 24, 1996. The emergence of such a treaty was inevitable for since the first test of nuclear explosive device the public began to call for prohibition of nuclear tests. Suffice it to mention the famous Russell-Einstein manifesto, and such demands can be heard hitherto.

CTBT has become a logical sequel to a number of treaties, including the NPT. In my opinion, CTBT requires further development: it is necessary to clarify sanctions for its infringement, the procedure of withdrawal from the treaty, etc.

What do countries test nuclear devices? First, they prove theoretical calculations in the course of developing new models of nuclear charges, of determining resistance of various types of military materiel to nuclear explosion effects. Second, nuclear tests verify the state of available nuclear munitions, above all their safety and reliability. This is very important since a complicated technological system such as a nuclear munition undergoes changes relating to the aging of materials, which may somehow ruin this complicated system, primarily affecting its safety. Third, about 30% of all explosions in the USSR were carried out to the benefit of further scientific development and improvement of peaceful nuclear devices for industrial explosions.

A comprehensive ban on nuclear tests has naturally impeded work on the development of third generation nuclear munitions, hence, hampering so called *vertical* proliferation of nuclear weapons. To a certain extent, prohibition of nuclear tests also prevents *horizontal* nuclear proliferation, which is absolutely welcomed. However, you can't rely on a test ban as the only source of preventing nuclear proliferation. It is known that a US bomb - Little Boy - didn't pass preliminary testing. There is no data about South African nuclear tests, although this state managed to create its own nuclear weapons. That's why there is no need to overestimate the test ban as a means to prevent nuclear weapons proliferation, especially if we speak about development of elementary nuclear devices.

As to the conduct of peaceful nuclear explosions, it is not reasonable to refrain from them. They should have been conducted under strict international control with all possible experts and examinations. Scientifically beneficial, these explosions enable a deeper understanding of fundamental scientific principles and encourage better understanding of nuclear explosion processes. The latter made it possible to steadily increase efficiency of nuclear energy use, to produce more and more nuclear energy, and on the whole to obtain new knowledge necessary for scientific development.

Conclusion of the CTBT was a political decision. It was taken, in fact, with *brute force*. This *force* managed to *break* nuclear experts since they understood that they would have to face a serious problem of maintaining nuclear arsenals' safety and security.
In 1994, at the outset of CTBT negotiation, the USA appropriated funds for the program of munitions' maintenance, which was expected to last for about 15 years. The program includes:

- increased development of advanced computer systems to enhance the capabilities of computer modeling in the area of nuclear munitions' explosion;
- increased development of ground experimental programs such as hydrodynamic testing, powerful lasers,

inertial nuclear fusion, plasma physics, and research in the area of materials;
- support for constructing other plants for ground experiments, aimed at assessing of nuclear weapons' processes.

This program also demonstrates the willingness to preserve current capabilities of Los Alamos and Livermore in the area of nuclear weapons development through enhancing computer modeling capabilities and research in the field of weapons physics, using a number of large experimental plants. Most of them are planned for construction and may require billion-dollar investments.

As any other nuclear weapon state, Russia has a certain system of maintaining its nuclear arsenal, i.e. its security, safety, and its resistance to various effects. This system is based on the Russian experience, conditions and current capabilities of the state. Two major components of the system are security demands (they differ from country to country) and scientific-technological basis, including theoretical calculations and modeling, physical modeling, gas-dynamic research, effects modeling, and technology of munitions' manufacture. Most activities on munitions' maintenance relate to the strict compliance with established procedures of nuclear munitions' development and appropriate rules and requirements. The latter are based on results of specific research as well as on aggregated data in the area of nuclear weapons. We provide for strictly regulated works with munitions in stationary storage facilities and complexes, for different types of control procedures relating to munitions and their assemblies, and for hydrodynamic testing (in CTBT framework).

At the moment, Russia endures not only financial difficulties. While the Soviet Union put forward various peace initiatives and declared an unilateral moratoria, other nuclear powers conducted tests for data that was used not only to create new munitions, but also to provide for maintenance and development of existing nuclear arsenals in compliance with future CTBT commitments.

It would be reasonable to hold within the CTBT framework, multilateral consultations on security of nuclear munitions between all officially recognized (and perhaps even non-official) nuclear weapon states, for India and Pakistan, testing their nuclear devices, intended after all to join the treaty.

Naturally, such international cooperation should be carried out with regard to national interests and confidentiality. As a result, all concerned parties will be sure about security of their nuclear weapons stockpiles. Some changes in this direction are under way. For instance, US-French consultations, which managed to convince France to take the most prompt decision on CTBT. At the same time, there is some negative experience, too: for example, US refusal to sell Russia powerful modern computers, despite a preliminary agreement on this issue.

Thanks to Russian scientists, Russian nuclear complex can function for quite a long time. However, everything will depend on the successful implementation of various scientific and technological programs, including the program on maintaining security and safety of existing nuclear arms.

It is very important for present-day Russia to have a safe, ready-for-combat, and reliable nuclear arsenal, taking into account current economic crisis and weakening Armed Forces. Nowadays only the possession of nuclear arms enables a country to have a voice in the international community, to assert its political and economic interests and to provide for its national security.

Interview

NIKOLAI VOLOSHIN: 'SUBCRITICAL TESTS ARE AN IMPORTANT COMPONENT OF VERIFYING ARSENAL EFFICIENCY'

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***YADERNY KONTROL*: Nuclear weapons improvement is a top-secret issue. As head of the Minatom department, directly engaged in nuclear weapons development, could you tell us what Russian modern nuclear arms are?**

NIKOLAI VOLOSHIN: To clear up the topic of conversation we should remember most general definitions of two terms: nuclear weapons and nuclear munitions. Nuclear weapons are the means and methods of preparing offensive and defensive operations for nuclear warfare. This term includes nuclear munitions, means or systems of their delivery to the targets and all infrastructure, providing for appropriate functioning of guidance and target designation systems in the course of weapons employment as well as of storage and maintenance systems.

Naturally, I know better the problems of nuclear munitions. A nuclear munition consists of a nuclear charge and the system ensuring its work in accordance with a preset program. Technically, nuclear munitions can take the form of a warhead for ICBM, submarine missile or torpedo, cruise missile, or become an artillery-fired atomic projectile, air bomb, atomic demolition munition (mine).

Anyway, the main element of any nuclear munition is a nuclear charge, providing for maximum release of energy with minimal weight, yielding power unmatched by any other existing explosive device. Besides mechanical energy pulse, nuclear explosion generates powerful electromagnetic pulse, gamma rays, heat and thermal radiation. It also produces neutrons and fragments of uranium-235 and plutonium-239 fission as well as fragments of heavy construction materials. The explosion ensures dispersion of some fissile materials, which haven't undergone the process of fission. If we speak about thermonuclear or hydrogen bombs, then the explosion provides for the spread of tritium, not used in fusion.

There are a lot of books and articles on this topic both scientific and popular scientific. Hence, it may seem needless to return to this matter, taking into account that in September 1996 most nations signed the CTBT treaty and the international community is discussing ways to prohibit nuclear weapons as a type of WMD.

Q.: The situation in Russia is paradoxical. On the one hand, Russia strives for nuclear disarmament, has signed or is preparing to sign international treaties on this matter. On the other hand, we proudly announce that we continue research in the area of nuclear weapons improvement. What is the logic then?

A.: This is a rhetorical question. The current situation, implying existence of nuclear weapons, will always draw attention of the military and the science to the issue of testing its efficiency and operational safety. There is only one way to do that, i.e. to detonate a tested device. That's the only reliable source of information about its condition and combat capabilities. However, such large-scale tests are banned. In these circumstances, nuclear weapon states - the USA, Russia, Great Britain, France, and China - have to find and use other methods to maintain security and safety of their nuclear arsenals.

It's understood that part of the munition, which provides for the setting off of its nuclear component, can be verified in laboratory or on the factory. In this case it has nothing to do with the destruction force of this nuclear munition element. In previous years, efficiency, readiness, and safety of nuclear charges were tested with the help of

atmospheric, underwater, and underground nuclear tests. It was possible to test newly made devices as well as earlier developed and commissioned models of nuclear charges, including those that had been stored for a long time and undergone the impact of various factors, which interested both the military and the civilian producers.

Nowadays, there are at least three scientific technical ways to verify the readiness of existing arsenals. The first one is computer modeling with supercomputers. The second is physical modeling with unique laboratory plants and devices. The third is non-nuclear explosion (subcritical) tests. All these methods are of not equal value, as they are mutually complementary, and it is difficult to say that they will be able to replace nuclear tests completely and forever.

Q.: Would you elaborate on these methods of testing nuclear munitions?

A.: We won't go into details about the first two aforesaid ways but let's speak about the third one. Non-nuclear explosion experiments or hydrodynamic tests (which are normally called "subcritical") are not new. They returned in discussion after the ban on nuclear tests. Such experiments took place at the outset of developing first samples of nuclear and thermonuclear charges. Generally speaking, only due to this technology, the USA and Great Britain agreed to change their position on signing international nuclear test ban treaties. The technology of subcritical or hydrodynamic test secures the state control over its nuclear arsenal without any violation of international agreements.

The essence of such experiments is to monitor the effect of pressure from high explosives on fissile materials' substitutes at inner test sites, i.e. special sites in nuclear laboratories of different countries. The only energy released is energy, generated by corresponding high explosives. Contemporary hydrodynamic experiments, conducted at former nuclear test sites, differ from the above-mentioned ones since instead of fissile material's imitators, they involve some quantity of uranium-235 or plutonium-239 with ensured level of environmental safety. The United States conduct such tests at the Nevada nuclear test site in the underground plant LYNER. Russia possesses the only nuclear test range facility in the Matochkin Shar strait of Novaya Zemlya archipelago.

At present, at least two modifications of non-nuclear explosion experiments are known. These are experiments, involving fissile materials' samples of different age (storage period), which undergo the impact of blast waves, produced by high explosives. And we use fragments of nuclear charges, which undergo many-sided pressure from detonation of a regular high explosive.

In the first case we study the characteristics of aging fissile materials, which affect the reliability of a long-stored nuclear charge. The results of this research are used to determine the service life of corresponding nuclear munitions. In second type of experiments, so called weapon-like tests, we check integral characteristics of the initial stage of nuclear charge explosion, although it doesn't reach a critical state on purpose. Sometimes this regime is called subcritical. Hence, we can study the effect on reliability, produced by the storage duration of fissile, constructional and explosive materials as well to solve the problems of replacing one material with another.

Q.: We speak about the environmental safety of subcritical tests and that they do comply with international nuclear test ban agreements. How could it be?

A.: One of the most important characteristics of nuclear munitions and, therefore, nuclear charges is their operational safety. It's common knowledge that the whole history of nuclear weapons knows only two examples of nuclear arms combat employment. It happened on August 6 and 9, 1945 during US air bombing of two Japanese cities: Hiroshima and Nagasaki. After that, nuclear arms served as a deterrence factor against any aggression. In these circumstances, the utmost significant characteristic of nuclear munitions, i.e. the main components of nuclear weapons, are their safety in the

process of assembling, storage, transportation, use, dismantlement, and disposal. That's why from the very beginning of nuclear charges and nuclear munitions development safety requirement is the most important in the process of designing and optimization of their initiating schemes and algorithms. It is necessary to provide for proper functioning of nuclear munitions, which, at the same time, should be resistant to any external effects, thus, preventing incidents and emergency situations. Unfortunately, nuclear munitions should be indifferent to many external effects, including technological and natural disasters, transportation accidents, possibility of nuclear terrorism, and so called human factor, in general. As for non-nuclear explosion experiments, I should say that one of the most challenging tasks in conducting these tests is maintenance of safety and security, especially in situations when computing methods are not enough to ensure safety.

Experiments with the models of nuclear devices are carried out in the same mines and use the same technology as in the case of real nuclear devices. The only difference from full-scale explosions is that the model of nuclear device uses subcritical dose of nuclear material, which is equal to no more than 0.1 mkg of TNT. The model is put in a special container, covered with bentonite clay, the drift entrance is immured with concrete and after that the device is ready for testing. Thanks to four levels of protection, these experiments with the models of nuclear devices are completely environmentally safe. For instance, the special container allows to conduct subcritical tests without serious harm for environment or human beings even in the open air at Minatom inner test ranges.

Under the influence of released heat from high explosives bentonite clay normally vitrifies and even if the container is destroyed it will envelop parts of nuclear device in a *glass cocoon*. Moreover, it fills all geological cracks in tectonic strata, preventing dispersion of radioactive materials beyond the limits of the rock. The third and the fourth levels of protection are the concrete *tap* and the rock itself. The safety of such experiments is proved by the fact that the researchers themselves stay at 30-meter distance from the *ground zero*.

Q.: The Minatom Ministerial Board meeting, which discussed the results of 1998 activities, stated that in 1999 the amount of research in the area of nuclear energy military use would be significantly reduced. Does it mean that the pacifist sentiments prevailed in the Defense Ministry and Minatom?

A.: Of course, not. We have to handle the problem of strategic offensive arms reduction, which results today in intensified dismantling of decommissioned nuclear munitions. Regular dismantlement is connected with the expiration of nuclear munition service life and the necessity of replacing it with a newly made device. The intensified dismantlement results from essential nuclear arms reduction under START I and START II. It is carried out in the USA and Russia without mutual verification. However, in the Helsinki statement of 1997 the two presidents maintained that when START III entered into force such dismantlement of decommissioned nuclear munitions would require control. Forms and methods of this control are subject to elaboration and coordination and are being worked out by experts.

The costs of Russia's program on maintenance and verifying nuclear munitions' efficiency and operational safety amount to 2 billion rubles and are provided for in the state budget expenditures as *Minatom military programs*. Out of this sum only 30-40 million rubles are spent on the tests themselves, while the rest is used to prepare laboratories for experiments and to support enterprises of the industry. In current circumstances, when there is no direct threat for Russian national security on the part of other world powers, these expenditures are a serious financial burden. Especially if we take into account that in the past we produced a mighty arsenal of nuclear arms, which is sufficient to provide for long-lasting national security. That's the reason for cutting down defense contracts.

Our Armed Forces need less and less nuclear munitions.

Minatom has a clear vision of this problem. In 1999-2000 the ministry is planning to lay off 25,000 out 40,000 employees, working in nuclear weapons production. 2003 would leave only two out of four enterprises, directly engaged in assembling and dismantling of nuclear devices. All plants will stop assembling new nuclear munitions by 2000, while dismantling of the latter will terminate by 2003.

In the long run it means that state political leadership understands the redundancy of current activities but does realize their importance. And the series of five subcritical tests at *Novaya Zemlya* nuclear test site in late 1998 proves this. In 1999, we are planning to conduct a number of tests with operational nuclear munitions, used in the army. That's why it is too early to speak about pacifist sentiments in Minatom and the Defense Ministry. The work is under way, although its amount in comparison with the Soviet times is more modest, due to the political will of the Russian leadership and to economic expediency.

Q.: In accordance with international treaties, Russia should reduce the number of its nuclear munitions. Minatom was charged with the task to carry out disposal activities. What's the future of weapon plutonium released in the process of disposing nuclear munitions?

A.: As for disposal of nuclear munitions and the future of fissile materials, I can say the following. The problem with uranium-235 is easy to solve - it is degraded and is widely used in fuel production for nuclear power stations. The situation with plutonium-239 is different. Direct ways of peaceful use of its large amounts haven't been invented yet. There is a technology of producing so called mixed uranium-plutonium oxide fuel (MOX fuel) for nuclear power plants. Such a fuel contains plutonium-239 in a certain state and proportion to other components of heat-releasing elements. In the process of MOX fuel burn-up in NPP reactors it doesn't produce new amounts of this artificial radionuclides. Hence, MOX fuel relieves main concerns of proponents of military nuclear technologies' nonproliferation. Unfortunately, in present-day reactors such a fuel is practically not used and construction of fast-breeder reactors, where it could be used more efficiently, has not developed yet. Nevertheless, in recent times, experts from Russia, France, USA and Germany have started serious research to find solution of the problem of MOX fuel use in nuclear power plants of a new generation.

Another way to dispose plutonium once used for military purposes is its immobilization through vitrifying and burying in long-term storage facilities. However, this method doesn't rule out the possibility of returning this plutonium in military sphere. Plutonium half-life is more than 24 thousand years. If the ideology of political leadership changes, vitrified plutonium may be extracted from the storage facilities and be used to reconstruct nuclear weapons. Unfortunately, it's not the only danger. Plutonium is a chemically hazardous element and its intrusion into atmosphere or soil of our planet in large quantity may lead to serious environmental damage. On the other hand, no one can guarantee the absolute safety of vitrified plutonium storage facilities in the next hundred thousand years.

There is another exotic way of weapon plutonium handling - its transmutation. It requires high-energy accelerators, capable of altering the atomic composition and converting one radionuclide into another. However, this technology is still in the process of development and is far from being introduced into practice. Thus, we can't assume that the problem of dissolution has been already solved for plutonium, which is released in the process of dismantling reduced nuclear munitions. Moreover, storage and reprocessing of weapon-grade fissile materials is very expensive, that's why the choice of disposing procedures also depends on economic reasons. It's not the first time when we can reaffirm that disarmament, nuclear disarmament in particular, is not less costly and easier than nuclear arming. Especially when as time goes by we obtain more knowledge about the dangers of dismantling and disposal of such weapons and the increased requirements to maintaining of long-term environmental safety for mankind.

Analysis

MISSILE DEFENSE TESTING IN THE PACIFIC

by Michael Jones,
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Despite the end of the Cold War, the United States is planning for increased missile defense testing and for deployment of national and theater missile defense systems. Much of the testing of these systems will be done in the Pacific. These tests could have serious environmental impacts and raise questions about compliance with the ABM Treaty. This report discusses US plans for missile defense testing and summarizes recent plans for deployment of a National Missile Defense (NMD).

The United States has done missile defense testing in the Pacific since the late 1950's; some of the test sites were also involved in nuclear tests. For example, the US conducted 12 atmospheric and high altitude tests near Johnston Atoll (about 1,200 kilometers southwest of Hawaii) in 1958 and 1962. In fact, the *Operation Dominic* test series[1] ended just after the *Cuban Missile Crisis*. Several tests were done to determine the effects of high altitude nuclear explosions on simulated reentry vehicles and to study electromagnetic pulse effects. These studies were part of the effort to develop an Anti-Ballistic Missile (ABM) defense using nuclear-armed interceptors. The tests produced little localized fallout but an explosion of a Thor rocket on the Johnston (Kalama) Island launch pad on July 25, 1962 contaminated the area with plutonium from the warhead[2]. The cleanup effort is still in progress[3].

The Pacific has also been used for numerous tests of offensive missiles. The US launches ICBM's from *Vandenberg Air Force Base* in California to the *Kwajalein Missile Range*. (Hawaii is halfway between Kwajalein and Vandenberg so sensors in Hawaii are used to track target missiles.) The Soviet Union also conducted missile tests in the Pacific. A test of an SS-18 on September 30, 1987 particularly alarmed people in Hawaii. One reason for alarm was that the reentry vehicle hit the ocean about 1,000 km northwest of the island of Kauai. Press reports claimed that this was closer to US territory than any previous Soviet ICBM test. The other reason was that Hawaii state government officials were not informed until after the test even though the Soviet Union had informed the US State Dept. on September 27.

There are several connections between nuclear testing and missile defense testing in the Pacific. Nuclear tests at Johnston in 1962 had defensive as well as offensive motivations. The "*Safeguard C*" program mandated by the US Congress as a condition for consent to the 1963 Limited Test Ban Treaty set up the *Kauai Test Facility*[4] to launch sensors in case the US decided to resume atmospheric tests in the Pacific. The *Kauai Test Facility* was never used for this purpose and is now involved in missile defense testing. A common feature of both testing efforts is a disregard for the long-term impacts on the environment and on Pacific island residents, especially residents of the Republic of the Marshall Islands. Since the 1970's environmental impact analyses are required for major projects in the US; the public has an opportunity to review and submit comments on these analyses. In particular, the Environmental Impact Statements (EIS) analyzing missile tests contain useful information about the proposed tests. However, detailed technical information can still be difficult to obtain and responses to public comments are often superficial and self-serving.

The US is currently doing research and development on several systems intended to intercept ballistic missiles both for National Missile Defense (NMD) and Theater Missile Defense (TMD). Testing of NMD systems is restricted by the ABM Treaty to the *White Sands* and *Kwajalein* missile ranges. The *Kwajalein Missile Range* in the Marshall

Islands has been the primary US ABM test range since the late 1950's. Since the 1991 Gulf War, increased emphasis and funding have been given to TMD systems. Some of these systems have very limited capabilities and thus are not restricted by the ABM Treaty, which limits only ballistic missile defenses that can intercept strategic missiles. Other systems may have some capability against strategic missiles and thus raise questions about ABM Treaty compliance. There is increasing uncertainty whether the US will continue to abide by ABM Treaty restrictions on NMD testing and deployment. In addition to ABM Treaty compliance questions, some proposed TMD tests raise questions about compliance with INF Treaty restrictions. Finally, there are potentially serious environmental impacts at the possible launch sites.

National Missile Defense Systems

For the past few years, research and development on NMD systems to intercept strategic missiles has been oriented toward developing a system that could be deployed in 2003 if a decision to deploy were made in 2000. However, on January 20, 1999, Sec. of Defense William Cohen announced that the Clinton administration was proposing to increase the NMD budget to $10.5 billion from 1999 until 2005 to allow for deployment[5]. Actual deployment would likely be delayed until 2005 but a decision is expected after the deployment readiness review in June 2000. A June 1998 GAO report[6] notes that both technical and schedule risks of the NMD program are high. The 1993 USAKA EIS[7] examined the impacts of expanded missile defense testing at Kwajalein. The intermediate level of increased testing activity (140 launches annually in the late 1990's compared to 84 for the "*No Action*" alternative) was the proposed action in the final EIS, but a 6 March 1995 reply to my comments on this EIS indicated that the Record of Decision proposed action would likely be a '*modified Low Level of Activity which gives full consideration to the recent emphasis to the Theater Missile Defense program*.' So far only one NMD integrated flight test has been done[8].

One of the main impacts of expanded testing is the continuing occupation of the extremely limited land area by the *US Army Kwajalein Atoll* (USAKA). For example, the non-indigenous USAKA population of about 3,000 occupies the 748 acres on the largest island, Kwajalein, while about 8,000 Marshallese are confined to 90 acres on the island of Ebeye[9]. The contrast is vividly illustrated in an article in the Oct. 1986 issue of National Geographic magazine and in the documentary "*Home on the Range*". A related document of *USAKA Environmental Standards and Procedures* offended the Marshallese by proposing regulatory mechanisms that only require consultation with Marshallese environmental authorities rather than formal approval, as would be required in the US. The USAKA EIS also identifies a bizarre potential impact - that Cold War era cultural resources (Sprint and Spartan missile silos) have not been evaluated for possible listing in the *National Historic Register*.

Environmental analyses needed to support NMD deployment are underway. The *Ballistic Missile Defense Organization* (*BMDO*) announced in the 17 Nov. 1998 *Federal Register* its intention to do an Environmental Impact Statement for deployment of an NMD system. Locations in North Dakota and Alaska will be evaluated as possible sites for 20 ground-based interceptors[10]. Only the site at Grand Forks, North Dakota is allowed by the ABM Treaty. Even if an NMD interceptor is successfully tested by 2000, it seems likely that interceptors at any of these sites would have little capability against missiles targeted on Hawaii or Florida. Thus there would seem to be inevitable pressure to expand the system.

ABM-TMD Demarcation

The ABM-TMD demarcation agreements[11] signed on September 26, 1997 attempt to distinguish between allowed TMD systems and NMD systems subject to ABM Treaty restrictions. However, some criteria in these demarcation agreements are vague, and interpretations are subject to further consultation between the United States and the USSR Successor States (Russia, Ukraine, Belarus, and Kazakhstan), assuming that these agreements are ratified by all the

parties. At the session of the Standing Consultative Commission that ended on October 14, 1998, the parties completed work on procedures to implement the 1997 Agreement on Confidence-Building Measures. Their joint statement[12] reaffirmed their commitment to the ABM Treaty.

TMD Systems Being Developed

Recent reports[13] to Congress by *BMDO* Director Lester Lyles summarize the status of various TMD systems. The two TMD systems being developed to defend relatively small areas - the Army PAC-3 and Navy Area defense[14] - are generally agreed to have little capability against strategic missiles. These systems appear to be covered by the First Agreed Statement of the ABM-TMD demarcation agreements. This statement declares that interceptor missiles with maximum velocity less than 3 km/sec will not be considered as ABM interceptors as long as they are tested against target missiles with maximum range of 3,500 km and maximum velocity of 5 km/sec.

Two other TMD systems - the Army THAAD and Navy Theater-Wide – are intended to defend much larger areas and could have some capability against strategic missiles. Tests so far have demonstrated no capability. The THAAD interceptor has failed in all six intercept attempts and the LEAP hit-to-kill vehicle intended for use in the Navy Theater-Wide system has failed in all four intercept attempts. A report[15] analyzing these tests characterized the intense schedule pressures and inadequate preparation as '*rush to failure*'. These systems are explicitly identified in the ABM-TMD demarcation Agreement on Confidence-Building Measures. THAAD seems to be covered by the First Agreed Statement and Navy Theater-Wide by the Second Agreed Statement, which applies to interceptor missiles with maximum velocity exceeding 3 km/sec. This Second Agreed Statement contains the less stringent provision that '*each Party undertakes that, in the course of testing*' such interceptors which are not ABM interceptors, the maximum range and velocity of the ballistic missile target must be less than 3,500 km and 5 km/sec respectively.

In addition to the TMD systems which use missile interceptors, the US Air Force is developing an Airborne Laser (ABL) intended to have the capability to destroy missiles during the boost phase[16]. A prototype would be tested in 2002. The ABL would be in a Boeing 747 aircraft and would need to be within a few hundred kilometers of the missile it intends to destroy. The ABL could have a significant capability against strategic missiles, but it is dubious that a country planning to launch strategic missiles would allow the aircraft carrying the ABL to get close enough to use that capability. Therefore, the ABL seems to be a system '*intended to counter ballistic missiles other than strategic ballistic missiles*' but it is not explicitly mentioned in the ABM-TMD demarcation agreements and the testing restrictions on the maximum target range and velocity are not very relevant to it.

Testing Sites and Restrictions

The Agreement on Confidence-Building Measures requires notification of the '*test ranges and other test areas*' where launches of interceptor missiles for the THAAD and Navy Theater-Wide systems will occur. There are also potential restrictions on the locations from which target missiles may be launched. The Intermediate-Range Nuclear Forces (INF) Treaty requires that launches of missiles with ranges between 500 and 5,500 km occur only from sites listed in the associated Memorandum of Understanding. The 1994 TMD Extended Test Range EIS[17] selected the *White Sands Missile Range* and the *Kwajalein Missile Range* as sites for launches of targets and interceptors. TMD tests are being done at these sites. Environmental Impact Statements evaluating TMD testing in the Gulf of Mexico, associated with the *Eglin Gulf Test Range* , and in the Pacific, associated with the *Pacific Missile Range Facility on Kauai* [18] , were released in June 1998 and December 1998 respectively. These analyses consider TMD tests involving targets with ranges less than 1,200 km.

Target missiles

The main target missile developed for TMD tests is Hera[19], which has a single-stage configuration (Hera A) and a two-stage configuration (Hera B). Hera B is composed

of a Minuteman II 2nd stage plus a Minuteman II 3rd stage and has a maximum range of 1,140 km. Hera B launches are, therefore, subject to INF Treaty restrictions. Article VII, paragraph 12d of the INF Treaty requires that the launchers be 'fixed, emplaced above ground and located only at research and development launch sites which are specified in the Memorandum of Understanding.' The list of launch sites in the Memorandum of Understanding can be updated every six months. The December 1998 list has three sites in the Pacific (Kwajalein, Kauai, and Wake Island) plus two sites in Alaska and one in California.

The INF restriction to fixed, land-based launchers is explicitly recognized in the 1994 TMD EIS[20]. This restriction seems to prohibit launches from aircraft and launches from platforms at sea if the range of the target exceeds 500 km. However, both of these options are being considered for some tests. The proposed Air Drop Target System would involve a single-stage missile dropped over water from a C-130 aircraft. The maximum range of this system is given as 600 km in the 1998 TMD EGTR EIS[21]. Sea-launches of several possible target missiles are also being considered. The 1998 TMD EGTR EIS does not specify the ranges of these missiles but does note that the START Treaty requires that sea-launched targets have ranges less than 600 km. This apparently refers to Article V, paragraph 18a, which prohibits tests and deployment of 'ballistic missiles with a range in excess of 600 kilometers, or launchers of such missiles, for installation on waterborne vehicles, including free-floating launchers, other than submarines.'

Another missile that has been considered as a TMD target[22], is the Strategic Target System (STARS), a refurbished Polaris missile with a new 3rd stage added. The 29th Agreed Statement of the START I Treaty declares that STARS is subject to the INF Treaty. STARS was designed to be able to simulate multiple-warhead ICBM's and has a maximum range of 5,500 km. There have been four STARS launches between 1993-1996 from Kauai to Kwajalein primarily for testing sensors and reentry vehicles[23]. Therefore, tests using STARS could potentially exceed the 3,500 km maximum range in the ABM-TMD demarcation First and Second Agreed Statements.

Proposed TMD tests near Kwajalein and the *Pacific Missile Range Facility*

TMD tests associated with Kwajalein could involve targets launched from floating platforms or nearby islands. A 1995 USAKA Environmental Assessment[24], examining tests of Patriot interceptors rejected launching target missiles from specialized barges because of cost and schedule impacts. The preferred alternative was to launch the targets from an island in Aur Atoll, about 400 km east of USAKA. There is no INF restriction on such launches because the range is less than 500 km. Longer-range targets for TMD tests[25] would be launched from Wake Island[26], 1,100 km north of Kwajalein.

The *Pacific Missile Range Facility* (PMRF) on Kauai is also being promoted as a site for TMD tests[27]. Targets for tests near PMRF could be launched from aircraft, ships, or land. The land-based sites considered in the PMRF Enhanced Capability EIS were required to be within 1,200 km; they included Tern Island in French Frigate Shoals (700 km from PMRF) and Johnston Atoll (1,200 km from PMRF). However, sites at greater distances were identified in the 3 March 1997 Siting Report[28] and would presumably be used to launch targets for tests of the Navy Theater-Wide Defense. These sites include Midway and Kure Atolls, Wake Island, Kwajalein, *Vandenberg* AFB, and three sites in Alaska (Adak, Cold Bay, and Kodiak). These last six sites are all near or beyond the 3,500 km maximum range for TMD tests. The first launch from the *Kodiak Launch Complex* occurred on November 5, 1998[29].

Air-drop and sea-launch target options are presented in the 1998 PMRF EIS. Some sea-launch scenarios appear to require target ranges exceeding 500 km, but the EIS has no discussion of INF Treaty compliance. The response to my comments asking for a detailed discussion states only, 'We will not implement any actions that are not in

accordance with current US policy on treaty compliance.'[30].

Interceptors for TMD tests could be launched from Navy ships or on land. Launch facilities are already available at Kwajalein for TMD and NMD interceptors. For tests near PMRF, land-based interceptors would be launched from PMRF or from the nearby island of Niihau, which is privately owned and has never been used for missile launches. Scenarios illustrated in the PMRF EIS and in the 1997 Siting Report indicate that land-based theater interceptors (presumably THAAD) are being considered for launch from Niihau.

The proposed tests could have serious environmental impacts. Tern Island and Johnston Atoll are national wildlife refuges (NWRs). The US Fish and Wildlife Service commented during the scoping process for the PMRF EIS that 'it appears unlikely that launching missiles and establishing tracking instrumentation sites within NWRs would be found compatible with the objectives of refuge maintenance.' The radius of the launch hazard area proposed for launches at Johnston Atoll is about half that specified for Hera launches at Wake Island; the proposed hazard area just excludes the *JACADS* facility which incinerates chemical weapons. (The Dec. 1998 final PMRF EIS states that the Navy has determined that Tern Island and Johnston Atoll '*are not reasonable alternatives and therefore have been eliminated as proposed sites*'.) Launches from Niihau would risk large brush fires from a catastrophic launch failure; even successful launch operations seem likely to have substantial impacts on the culture and rural lifestyle of the native Hawaiians who live there. (The family that owns Niihau had initially supported plans for missile launches but withdrew its support in March of 1999.)

Issues Related to Testing and Deployment

The recent THAAD failures and reports examining the technical and schedule risks have focused attention on the test schedule and the need for thorough preparation. Where the tests are to be done has received less attention. One might have thought that the testing sites were settled by the 1994 TMD Extended Test Range EIS [31] but now sites near Kauai and Florida are being considered. These sites were rejected in the 1994 EIS and it is unclear to what extent the new analyses reflect a need for more or different sites. (Senate Report 103-321 on the 1995 Defense Appropriations Bill 'directs that the *Pacific missile range facility* [PMRF] shall be designated the primary test range for completion of Navy lower tier and upper tier missile flight tests.' However, the 1994 EIS had eliminated PMRF from consideration 'because of the lack of the full range of land-based instrumentation sites to observe intercepts and inadequate land area for interceptor deployment or for placement of instrumentation that would have to be brought in from another range.') It is also unclear how or if the sites will be compared and what criteria will be used to decide what tests are done where.

Probably the most fundamental issue is whether the basic principles embodied in the ABM Treaty will be maintained. If the treaty is abandoned, most restrictions on TMD tests and TMD and NMD deployment are eliminated. There have been efforts to require NMD deployment since the Republicans gained a majority in the US Congress in 1994. In 1998 and 1999, bills introduced in the US Senate would have declared US policy 'to deploy as soon as technologically possible an effective National Missile Defense system capable of defending the territory of the United States against limited ballistic missile attack (whether accidental, unauthorized, or deliberate).' The bill itself was not voted on in 1998 only because the attempt to end debate failed by one vote. On March 17, 1999, the Senate approved this bill by a vote of 97-3. Despite a vague amendment that states that the US will continue to seek negotiated reductions in Russian nuclear forces, this bill appears to commit the US to a deployment forbidden by the ABM Treaty. It does not specify criteria for determining whether an NMD system is '*effective*' or for judging if such a system is '*technologically possible*'. On March 18, 1999 the US House of Representatives passed a similar proposal by a vote of 317-105. The House resolution states simply, '*To declare it to be the policy of the*

United States to deploy a national missile defense.'

The Clinton administration's "3+3" program to develop an NMD system by 2000 that could be deployed in 2003 nominally complied with the ABM Treaty, but this program recently changed to emphasize deployment. On January 20, 1999, Sec. of Defense William Cohen announced that an additional $6.6 billion was being requested to allow for NMD deployment in 2005[32]. His announcement indicated that this deployment might require modifications to the ABM Treaty and mentioned the option of withdrawing from the treaty. Indeed, a treaty-compliant NMD deployment in North Dakota would seem to have little capability to defend all US territory. Even the initial NMD deployment could violate the treaty - especially if the main emphasis is defending Alaska from missiles launched from North Korea. At public hearings in December on the NMD EIS, Air Force Lt. Col. Rick Lehner commented, '*North Dakota is the treaty-compliant area and Alaska is the threat-compliant area.*'[33].

If the prohibition of a large-scale national missile defense system is to be maintained, several questions arise about TMD systems. One of the principles specified in the ABM-TMD demarcation Second Agreed Statement is that TMD systems may be deployed 'which will not pose a realistic threat to the strategic nuclear force of another Party and which will not be tested to give such systems that capability.' The only explicit restrictions on testing are on the maximum range and velocity of the targets. Is it possible to develop a TMD system that poses a '*realistic threat*' to strategic missiles with these restrictions? What testing conditions would be required to determine that a TMD system posed a '*realistic threat*'? Would multiple targets launched from multiple sites be necessary? Would multiple interceptor launches be necessary? Is use of information from space-based sensors to cue interceptors allowed? In addition to these specific questions about testing conditions, one should ask whether there is a common understanding what would constitute a '*realistic threat*' and how that could be evaluated as strategic nuclear forces are reduced.

Another possibility is that restrictions on missile defenses would be eliminated in conjunction with a treaty banning nuclear weapons and/or nuclear-armed missiles. The Nuclear Non-Proliferation Treaty (NPT) obligates the nuclear-weapon states 'to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament.' This obligation was reaffirmed in the 8 July 1996 opinion of the International Court of Justice, which added the phrase '*and bring to a conclusion*' apparently to emphasize the importance of completing negotiations and implementing nuclear disarmament. If strategic nuclear forces were reduced to levels below a few hundred weapons, NMD and TMD systems could pose a '*realistic threat*' to these forces - especially if either party's forces were capable of destroying a large fraction of another party's forces in a first strike. To reduce instability and uncertainty, it may be necessary to negotiate a transition from deterrence based on large strategic nuclear forces and limited missile defenses to collective security based on verifiably few nuclear weapons at low alert levels. If ballistic missile defenses were demonstrated to have high effectiveness against attacks involving a few missiles, it might be desirable to amend or terminate the ABM Treaty in conjunction with the elimination of nuclear weapons on ballistic missiles or adoption of a Nuclear Weapons Convention that abolishes all nuclear weapons.

Outlook

The future of the ABM Treaty looks bleak. It is doubtful that required 2/3 of the US Senate would ratify the ABM-TMD Demarcation Agreements; there have been no hearings in the Senate since the agreements were signed. The recent emphasis on NMD deployment by the Clinton administration and the approval by Congress for declaration of policy to deploy a national missile defense may doom the ABM Treaty itself. The reasons often cited for this sudden change are the July 1998 report of the *Rumsfeld* Commission[34] on ballistic missile threats and the 31 August 1998 launch of a 3-stage missile by North Korea. There are also

domestic political considerations[35] that make it likely that missile defense funding will increase. Pressure to deploy and expand national and theater missile defense systems seems likely to increase regardless of the technical capabilities of these systems or consequences for arms control.

Prospects for an affordable, effective NMD system look equally bleak. Failures in tests of hit-to-kill interceptors emphasize the technical difficulties. Schedule pressures are so severe that it seems unlikely that adequate testing would be done before a deployment decision is made; thus there will be serious doubts about the effectiveness of the system even under test conditions[36]. If interceptors successfully hit simple targets under test conditions, there will still be uncertainty about their effectiveness against countermeasures and from the deployment site. In fact, there are no plans for any test launches of interceptor missiles from whatever initial deployment site is chosen according to a Nov. 1998 *BMDO* Fact Sheet "*National Missile Defense (NMD) Deployment Concept*"[37]. Finally, it is also unclear whether the system is affordable given the other expensive weapons systems under development.

Unfortunately, little thought and even less public discussion is directed to the long-term consequences of this '*rush to deploy*'. Missile defense enthusiasts do not seem to consider the impacts on nuclear arms reduction process if the ABM Treaty is abandoned while thousands of nuclear weapons are still deployed. ABM Treaty supporters have not produced a detailed plan for maintaining treaty restrictions on NMD systems while allowing TMD systems. There is no plan for a transition from deterrence to a nuclear-weapon-free world although a beginning has been made in a 1997 report[38] from the US National Academy of Sciences. United Nations Resolution 53/77 Y "*Nuclear Disarmament: The Need for a New Agenda*"[39] provides an outline of actions that would promote nuclear disarmament. Unless more attention is focused on the relation between arms reductions and missile defense testing and deployment, there seems likely to be a waste of valuable resources, nearly irresistible pressure for deployment of systems of dubious capability, and decreased US as well as international security.

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Viewpoint

RUSSIAN NUCLEAR-POWERED SUBMARINES SERVE TILL DEATH

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"*Russian nuclear-powered submarines serve till deterioration*" - this is the conclusion of military-industrial complex specialists with respect to the prospects of Russian Navy development. In 2003, when all Russian strategic nuclear-powered submarines reach the middle of their service life, the Navy will possess only 12 nuclear-powered submarines of *667BDRM Delphin* (*Delta IV*) and *667BDR Kalmar* type armed with 16 nuclear missiles, and five *941 Akula* (*Typhoon*) type submarines with 20 ballistic missiles. The class vessel of the 941 *Typhoon* series should be commissioned by that time. The same refers to a new nuclear-powered submarine, Yury Dolgoruky, whose construction began in 1996 at the *Severodvinsk machine-building plant* (*Sevmash*).

If the situation develops in this mode, Russia would possess 1100 nuclear warheads attributed to nuclear-powered submarine launchers. However, at present, it is clear that this won't occur. The explosion of a new SLBM RSM-52B Variant-3 or Bark (a modification of SS-N-20 developed at the *Miass Makeyev Design Bureau*) on November 25, 1997, in the sky of Severodvinsk affected the fate of Typhoon and Yuri Dolgoruky submarines. Bark missile was designated for the modernization of the Typhoon armament and for the fourth generation submarine Yury Dolgoruky.

The Russian Security Council ordered further development of Bark to be stopped and to

called for a new missile system to be developped. The defense contract was awarded to the Moscow Institute of Heating Engineering, known for its Topol and Topol-M ballistic missiles. The institute is charged with the development of a new sea-based ballistic missile system and supplying it to the Navy as soon as possible. The specialists from Miass will assist in speeding up the works.

The new missile system should combine the characteristics of sea-based and land-based missiles. As a result and in accordance with Security Council aspirations, the missile system may become a unified weapon for the Strategic Missile Forces (SMF) and the Navy in the XXI century. However, despite the seeming easiness of such a technological *crossing*, the multibillion project success depends on the availability of budgetary means and the project will require at least ten years of intensive design works.

The class vessel of the *Typhoon* series has spent ten years in dock, waiting for the Bark missile. The uncertainty with future armament saved it from decommissioning. Russia doesn't have the money to maintain and repair such huge submarines; that's why since 1995 they haven't been on active duty. Now the fate of Typhoon has been decided. The wonder of engineering, the prototype of the Hollywood Red October, will be dismantled as will five other ships of this type. On August 12, 1999, on the eve of the US DOD delegation visit on *Sevmash*, the plant press service informed that, in the framework of strategic offensive arms reduction program, the final decision on the disposal of 941 Typhoon submarine had been taken.

At the same time, the *Associated Press* reported that the Chinese Government conducted unofficial negotiations with Russia on the purchase of two Typhoon type nuclear-powered submarines for $1 billion. This deal might have been very profitable for the Russian Navy. However, the deal is unlikely to occur, for China possessing such nuclear-powered submarines would pose a threat to the Russian national security. And, besides, Russia will get $1 billion from the USA for disposal of six submarines of *941*series. In any case, the money will be given to *Sevmash*.

In these circumstances, the fate of the Yury Dolgoruky submarine is vague, for there is not much sense in constructing this submarine without a new missile system. At one of the press conferences, Navy Commander-in-Chief Admiral Vladimir Kuroyedov said that in March 1999, new design drawings for the Yury Dolgoruky submarine would be ready. The design changes of the vessel, which still remains on paper, concern the missile bay. According to Admiral Kuroyedov, "the Navy doesn't need 100-ton missiles. The task of nuclear deterrence can be accomplished with less heavy and no less efficient missiles. So, the Navy is ready to wait." The only thing to regret is the money invested in the development of Bark missile since 1982 and the new multibillion expenditures.

The Delphin and Kalmar type submarines, which have become the main attack force of the submarine fleet and are carrying the Russian *nuclear shield*, need repairing and new missiles. However, the solution to these problems requires new expenditures. The work of the *Krasnoyarsk machine-building plant* to produce missiles for these submarines was suspended for a long time. Under a Government decision, the plant was initially closed, and only the failure of the new missile and lobbying by the former Governor of Krasnoyarsky krai Valery Zubov saved the plant. Now the enterprise will have to quickly start the manufacture of a slightly modernized SS-N-23 missile.

Meanwhile, Russia planned to solve the problem of a weakening nuclear defense with the help of the Topol missiles. According to MOD plans, Topol-M missiles will replace 270 MIRV missile systems with silo launchers, i.e. SS-18, SS-19, SS-17 liquid-fuel ballistic missiles and SS-24 solid-fuel ballistic missiles. In time, the MOD will decommission 350 mobile Topol missile systems, which will be replaced with the mobile Topol-M missile system on the basis of eight-axle prime mover undergoing tests in Plesetsk. To fulfil this plan, Russia will have to commission annually from 60 to 90 Topol-M systems. However, nowadays, it has neither money nor productive capacity for that purpose. As Defense Minister Igor Sergeyev admitted, the defense industry can manufacture only one Topol-M regiment a year, i.e. ten missile systems. Under START I, Russia is allowed to have only 4,900 deployed warheads attributed to ICBMs and SLBMs and is free to determine the ratio between sea-based and land-based missiles.

If START II is ratified, Russia will have to increase the might of its Navy. At present, the Navy possesses 27.3% of warheads attributed to ballistic missiles. By the time of START II implementation, the Russian Navy may possess 58% of all warheads. It means that out of 3,000 warheads, the SMF will have 800-900 warheads and the Navy will have 1,700-1,750, leaving the rest for heavy bombers. However, even without START II ratification, Russia will have less nuclear-powered SLBM submarines by 2003 than is provided for in the treaties.

The first regiment of Topol-M missiles was commissioned in December 1998 and is on active duty in Tatishchevo (Saratov region). The lack of funding made the Russian MOD suspend the works on modernization of ten more silos. Under these circumstances, financing of a new sea-based missile is unrealistic. Both the Government and the defense industry designers admit this but the Government resolution has already been passed and is being implemented. The full technological cycle (from design to deployment) of a new ballistic missile system will take no less than ten years and will depend on the steady budgetary financing for Topol-M production. The leadership of the Moscow Institute of Heating Engineering fears that the decision on development of a new sea-based missile will mean the redistribution of scarce budgetary resources between two missile systems. As a result, the Armed Forces will be left without the required number of missile systems.

Military experts agree that in the situation of normal funding, the Typhoon type submarines could remain in service for about 30 years. This would help to bridge the gap between decommissioned nuclear-powered submarines and commissioned Yury Dolgoruky type vessels; and, besides, this approach would provide for Russian national security. Nowadays, Russia finds itself in a rather precarious situation as its naval component of strategic nuclear forces will comprise two dozen *667BDR* and *667BDRM* type nuclear-powered submarines. These will have to serve till deterioration. As a result, their service lives will decrease, and they will be prematurely decommissioned, while Russia loses its naval component of the nuclear triad.

Analysis

SCANDAL WITH MIG-21 SALE TO NORTH KOREA MAY AFFECT KAZAKHSTANI ARMS MARKET

by Iskander Maut

[This article was originally published in Russian in *Voprosy Bezopasnosti*, Vol. 60, No. 16, 1999]

On September 13, 1999, Kazakhstan officially admitted the fact of illegal MiG-21 sale to North Korea. Deputy Prime Minister and Minister of Foreign Affairs K. Tokayev stated that a group of sellers supplied the aircraft in circumvention of the Kazakhstani export control system. According to Tokayev, they got "*a large amount of cash in US dollars*". At present, a joint US-Kazakhstani investigation is under way.

The first mentioning of DPRK intentions to purchase 133 MiG-21 aircraft from the Kazakhstani Air Force dates back to early 1996. *Kazvoyentekhimpex* (a company under the auspices of Kazakhstani MOD) drafted a contract amounting to $28 million. However, in August 1996, the US State Department showed displeasure with the Kazakhstan attempts to sell to North Korea the MiG-21 spare parts, and the deal failed.

Undeterred, the DPRK continued its attempts to acquire 133 MiG-21 from Kazakhstan. In early 1997, Kazakhstani Defense Minister M. Altynbayev delivered to the MFA a letter from the Sierra Leone ambassador to Moscow, informing that the aircraft were destined for that African state. The MFA officials doubted the document's authenticity. They noticed that the former Sierra Leone ambassador to Moscow signed the letter, and the seal was a little bit larger than the original seal of the embassy. The MFA rejected the document. Later, the same

story happened with an analogous letter from Peru.

The deal was organized by Oleg Senkin, a former GRU (Main Intelligence Directorate of the Russian General Staff) officer. To be demobilized from the Armed Forces, Oleg Senkin faked insanity, jumped from a balcony, underwent medical treatment and was transferred to the reserves. He has since became an active arms trader, acting as a representative of the Czech company *Agroplast*. This firm is known for purchasing arms in Kyrgyzstan, Uzbekistan, and Kazakhstan. In Kazakhstan, Senkin used his former army ties and obtained the support of former Military Intelligence Chief Z. Ryspayev and former Defense Minister Altynbayev.

In 1995, Oleg Senkin found himself for the first time in the center of an arms scandal in Kazakhstan (the scandal didn't leak out in the press). He convinced the MOD to sell at a low price two new MiG-29 aircraft. The contract also included many outdated MiG-21; that's why Kazakhstan agreed to sell two new MiG-29 at a low price, taking into account the general amount of the deal. The parties agreed to ship new aircraft first. Upon receiving the aircraft, the buyer disappeared and didn't even pay the remaining $2 million.

In 1997, Senkin was mentioned in a *Washington Times* article. The newspaper referred to a top-secret CIA report, arguing that Kazakhstan, Ukraine, China, Russia, and Iran were in the list of leading arms suppliers to terrorist states. A "*Kazakhstani Colonel Oleg Sinkin*" was called the major missile supplier. The article maintained that Colonel Sinkin had tried to purchase SS-21 Scarab short-range missiles in Russia to export them to a third country, most likely, to Iran. The newspaper mentioned a 1997 US embassy note to Kazakhstani Government that denounced the selling of more than two dozens of SS-21 missiles and six mobile launchers, designated for Iran.

Although Senkin was blamed for arms supplies to many conflict zones, including Yugoslavia and, according to some sources, even Chechnya, he had a large office in Moscow and maintained contacts with many Russian government officials, responsible for the sensitive area of military-technical cooperation.

All his attempts to sell old MiG aircraft to North Korea failed until he met Alexander Petrenko in Almaty. Petrenko introduced himself as a close aid of the Kazakhstani shadow ruler, National Security Committee Chief Nurtai Abykayev. Petrenko was not a civil servant, and his job was to carry out personal delicate orders by Abykayev. For instance, he bought real estate in Florida for Abykayev and former Prime Minister A. Kazhegeldin. Petrenko didn't understand the US legislation, failed to pay on time and the whole project failed with substantial financial losses.

Making use of the Abykayev name, Alexander Petrenko wormed himself into the confidence of Oleg Orlov, a well-known Russian arms dealer, and headed the Kazakhstani branch of the Orlov company *Omarus*. Petrenko got the seal and blank forms with Orlov's signature and registered the Almaty branch, office, three houses, and other real estate belonging to Orlov, under his own name. At the same time, Abykayev made it impossible for Orlov to stay in Kazakhstan. As one of Orlov's assets, Petrenko acquired the promissory notes of the *Metallist* plant manufacturing small arms and became director of the *Metallist* representative office in Almaty. According to Kazakhstani legislation, the defense industry enterprises enjoy the right of unlimited arms export. Thus, Petrenko became the active arms dealer enjoying the support of the most influential person in Kazakhstan, Abykayev, who in his turn, got control of a *pocket* company, which, besides, helped him to collect confidential and compromising information about top-ranking officials and foreign guests.

Oleg Senkin and Alexander Petrenko, who had experience in dealing arms to North Korea, decided to circumvent the US State Department recommendation, which urged the Kazakhstani MFA to refrain from any arms deals with DPRK as a country

supporting international terrorism. In this connection, the parties prepared a fake contract with the Czech *Agroplast*, which allegedly agreed to transport old scrap metal for melting. MiGs were to be loaded in *Ruslan* aircraft and were to leave Kazakhstan for North Korea. "*Nurtai and money decide everything in Kazakhstan*," - said Petrenko, and he was not far from the truth. The partners paid for the accommodation and all other costs for the representatives of North Korean foreign trade firm, who were interested in old aircraft and new defense technologies. Abykayev patronage helped them to open the doors of any enterprise.

However, they had to come to an agreement with the military. First, the military had to ship not scrap metal but battle fighters. Second, the aircraft were to be examined by North Korean and not Czech citizens. That's why the partners had to confide in Defense Minister Altynbayev, Deputy Commander-in-Chief of the Kazakhstani Air Force S. Nurgazhin, and some other military officials. The senior officials knew that the contract was under the control of *omnipotent* Abykayev, who was allegedly acting in conformity with the informal decision of President Nursultan Nazarbayev.

At first, everything was all right: the *Ruslan* aircraft freighted in Russia, arrived in Kazakhstan and took dismantled MiGs for transportation - six MiGs and spare parts per flight. The Russian pilots were not curious and got used to such flights. The Kazakhstani MOD expected to earn $8 million and it is still unclear how much Abykayev and his team got from this deal.

However, the sixth flight was fatal for the deal, due to the vigilance of Azerbaijani customs authorities, who were warned by US authorities about suspicious cargo. When *Ruslan* landed in Baku for refueling, it was detained and examined. The customs authorities were suspicious of the documentation, for there were two sets of documents for the same cargo: the Czech Republic (whose Government immediately denied the deal) and Slovakia were mentioned as points of destination. At the same time, the pilots maintained that the plane was going to North Korea.

All further developments were described in detail in the Kazakhstani and Russian press. South Korean intelligence found 30 new MiGs in DPRK. Kazakhstan found itself under severe international diplomatic pressure; Kazakhstani ambassadors to the USA, South Korea, and Japan were asked to explain. The USA threatened to suspend the annual financial assistance to Kazakhstan, which amounted to $70 million. The Kazakhstani authorities had to start a criminal investigation and arrested Alexander Petrenko. Oleg Senkin disappeared from Kazakhstan. Besides Petrenko, 12 people were arrested, including the Abykayev employees. Abykayev, Defense Minister Altynbayev, Major-General Nurgazhin, Major-General Bozhko, Colonel Subbotin, and Director of the *Metallist* plant Askar Gabdulin were dismissed.

It is still not clear, why the aircraft destined for North Korea, landed for refueling in Baku, thereby flying in the opposite direction. The version with the railway aircraft transportation is dubious. In this case, the aircraft should have transited Russia or China. And, besides, Kazakhstan doesn't have railcars for aircraft shipment.

According to some information, Kazakhstan hasn't received the money for the sold aircraft. The payment for the aircraft was most likely to arrive on the MOD account from the letter of credit. In this case, Kazakhstan may lose all money, for there are no experienced specialists in the MOD, who are familiar with this form of payment.

After Abykayev resigned, the arms trade went under the control of Kazakhstani Prime Minister Nurlan Balgimbayev (it was he, who earlier signed the decision on exporting MiG-21). Balgimbayev issued a vague Government Resolution "*On Selling and Disposal of Arms and Military Equipment*" and charged with this mission the head of his office. Moreover, Balgimbayev tried to withdraw the arms export licenses of all companies, except the *Karu-Zharak* state company. Meanwhile, he fired the company leadership and appointed his protege this post. However, the rumors predict that the PM will soon resign and, hence, the principal arms dealers are waiting for *their happy hour*; the partition of the arms market has only started.

There are several candidates for supervising the arms export. However, some of them may find this area too risky because in recent years,

Kazakhstan has found itself in the center of arms scandals four times (some of the participants to these scandals are still in jail). Besides Balgimbayev, the most influential contender for controlling the military-technical cooperation is so-called *Aliyev group*, which comprises the president's daughter Dariga Nazarbayeva, his son-in-law Rakhat Aliyev (newly appointed Deputy Chief of the National Security Committee), and Alnur Musayev (Chief of the National Security Committee after Abykayev resignation). This group has close ties with the Kazakhstani secret services and will inevitably come to a decision to control the arms business.

However, these moves of the Kazakhstani politicians may be spoiled by the US State Department. According to various estimates, the average annual arms export from Kazakhstan amounts to $15 million. The US aid exceeds this amount several times, and besides, Kazakhstan regards the USA as a guarantor of the state independence from Russian influence. President Nazarbayev will have to recover in US opinion, and as a result, he may reorganize the system of military-technical cooperation in compliance with US recommendations. In this case, Kazakhstan will lose half of its potential markets, and the arms business won't be attractive for Kazakhstani oligarchs, who gain stable profits from raw material export.

Kazakhstan lacks a coherent approach towards arms export. The export system, if any, was formed spontaneously, and the arms trade licenses were given under pressure from political groups and influential politicians.

Abykayev lost his post but preserved the image of *backstage conductor* of the Kazakhstani political scene. He is familiar with presidential disgrace. Last time he was *sent in exile* to London as Kazakhstani ambassador to Great Britain. After a short period of disgrace, he returned to Almaty as First Presidential Aid and, then, National Security Committee Chief. Nowadays, he is most likely to be appointed Kazakhstani ambassador to Vienna. Some experts doubt this scenario, for Abykayev managed to spoil diplomatic relations with all key partners of Kazakhstan and put into humiliating position not only the MFA, but President Nazarbayev himself. Anyway, he is unlikely to be a subject of criminal investigation, for even overthrown Abykayev arouses fear in his political rivals.

Commentary

RE-EXPORT OF RUSSIAN CONVENTIONAL ARMS MAY INTENSIFY

by Vadim Kozyulin,
PIR Research Associate

Translation into English. Abridged version

In the last few years there have emerged new trends in the area of arms export from Russia and, in particular, re-export of some Russian-made arms and military equipment through other states (mostly FSU) to the Middle East, South Asia and East Asia.

To start with, the Pakistani authorities continue their persistent efforts to establish military-technical cooperation with the CIS states, above all, with Russia and Ukraine. The relationship inside this *triangle* is far from being ideal but there are all conditions for their harmonization.

When official sources announced in 1996 the signature of a contract between Ukraine and Pakistan on the shipment of 320 tanks, the Russian mass media primarily condemned this deal as a Ukrainian attempt to take a Russian piece of pie. In Russia, this deal was called treacherous. Moscow resented that although 80% of the T-80UD tanks assemblies were made in Russia, Kiev allegedly refused to share the profits. Russia even tried to hamper the deal; the Government denied the *Malyshev* plant (Ukraine) supplies for artillery systems and electronics. However, these attempts failed.

Thus, the Ukrainian-Pakistani deal has become an *apple of discord* for Russia and Ukraine, although in different circumstances it might have been an example of subtle export policy of the two states.

Russia still adheres to a political decision that it won't sell weapons to Pakistan in order not to damage its relations with India – Russia's strategic partner in the region. If it hadn't been Kiev, Pakistan would have acquired the

tanks in France. Kiev actually played into Russia's hands since $150 million out of the $650 million deal went to Russian enterprises under inter-firm cooperation agreements.

Moreover, besides hard currency benefits in payments for Russian spare parts and assemblies for the Ukrainian tanks, Russia got another big bonus - to maintain balance in tanks india had to urgently purchase more advanced models. Upon arrival in Pakistan, most of the Ukrainian tanks were deployed in regions near the Indian border. That's why the Indian military leadership intends to arm five tank regiments with Russian T-90s, making them the core of the army corps situated in the plain regions of the India-Pakistan border, which passes through the Tar dessert. And now Moscow is ready to celebrate a new deal with India by shipping a large lot of T-90s tanks.

That's how the declared Russian-Ukrainian tank war turned out to be mutually beneficial for both parties. And Russian benefits are not limited to financial means, for Russia has a greater opportunity to influence the situation in the region.

Another problem for Pakistan is the necessity to acquire new fourth generation aircraft. It could be the Russian MiG-29 or Su-27, or some French or Chinese aircraft. However, the French aircraft are too expensive, and Chinese planes are of low quality.

Hypothetically, we may presume that Pakistan will suddenly purchase the aircraft from Ukraine or Byelorussia. It is known that although aircraft production is situated in Russia, both states possess the Su-27 (Ukraine - 66; Byelorussia - 26) and the MiG-29 (144 and 82 respectively). Former Soviet republics enjoy the right to sell some outdated military equipment and to purchase modern models (naturally, in Russia at a good price on the basis of good-neighbor relations and mutual respect). These conditions may encourage even Kazakhstan to arm Pakistan. It is likely that some of the aircraft will not be second-hand but brand new. It will be difficult, nonetheless, to verify the truth.

During the Cold War, the USSR was not always able to provide for direct arms supplies. It had to use the help of some of it satellites, which eagerly re-exported Soviet arms for some extremist revolutionary regimes. Poland and Bulgaria were notorious for these supplies, and old ties help them to survive nowadays. The USA also practiced re-export, for instance, arming Afghan Mojaheds through Pakistan.

The end of the Cold War resulted in new trends in the arms trade - world public opinion condemned clandestine arms supplies, especially in states engulfed in armed conflicts. The US department of state began to openly threat on those participants of the arms markets, who tried to partner with the US foes.

As it is known, Russia twice had a chance to scorn the US criticism for its ties with Iran and Syria. Nevertheless, the Russian response to these accusations was firm; Russia won't curtail its links that comply with international law requirements, and it will continue to assert its position on the world arms market, despite counteraction by the west. Appropriate officials in Moscow reiterated it many times. Russia does not fear the possibility of sanctions for arms supplies to Syria. Yury Maslyukov, the then First Vice-Prime Minister, once said that the language of threats would fail with Russia, despite its current economic weakness. According to Maslyukov, there are two ways for Russia to counter the possible aforesaid measures. The first is diplomatic: to insist on the lifting of sanctions against those states, to which it has links in the area of military-technical cooperation. The second is active penetration in the world arms market, including the states on the US *black list*. Let's pay particular attention to these words of a top-ranking official.

The then Prime Minister Sergei Stepashin stated that arms export should ensure due financing of the defense industry. He pointed out that the Russian defense complex endured difficult problems, and there were no additional resources for its funding. In this connection, Stepashin said, military-technical cooperation with foreign states is an essential element of strengthening our defense potential and should be efficiently exploited.

As for new Prime Minister Vladimir Putin, he has not yet put forward any program ideas in the area of military-technical cooperation. Nevertheless, experts presume that on the eve of elections the Kremlin expects an increase in

incomes from arms export. It is clearly demonstrated in the recently signed Presidential Decree "*On the Measures to Increase the Efficiency of Military-Technical Cooperation of the Russian Federation with the Foreign States*". The decree defines as priority "consolidation of efforts of the federal organs of power and organizations of the Russian Federation in order to provide state support for promoting military production on the foreign market, state regulation and control in the area of military-technical cooperation", "strengthening of the Russian positions in the states traditionally importing Russian military production" as well as "active opening up of new markets for selling military production".

Nevertheless, there are some political interests and bilateral commitments that impede Russian military cooperation with Taiwan, Pakistan and Iran. Political taboos have more than once contradicted political and economic advisability of military cooperation. And as the Russian defense industry slowly dies without contracts and the competition on the arms market increases these contradictions will grow. As one of the ways out, Russia may take the path of re-export, especially considering that export controls are not always efficient. There are known cases when, in accordance with the certificates of the end-user (a document required for arms export in Russia), it turned out that some small African states acquired as much weapons as large and much richer states. The answer is simple: arms are purchased for resale or in the interests of the neighbor, who doesn't want to be mentioned in the deal.

In July 1999, Syrian President Hafez Assad made his first visit to Moscow in nine years. In the course of negotiations, the parties gave much attention to the possibility to resume military cooperation. Damask is interested not only in modernization of its MiG-21 and MiG-23 fighters but in acquiring new aircraft, armored vehicles, and air defense means. Russia is most likely to offer Syria MiG-29 fighters, T-80 tanks, and S-200 Angara air-defense missile systems (or even its newly modified Volga and Vega). Syria seems to be ready to spend $2 billion on Russian arms over the next five years.

Where will the country with economic difficulties find $2 billion? Some experts hint that the assistance will come from Saudi Arabia. However, a different answer may be found if we analyze the visit of another top-ranking guest - Iraqi Deputy Prime Minister Tariq Aziz. Let us imagine that the Russian Ministry of Foreign Affairs gained a new diplomatic victory and managed to reconcile the irreconcilable Arab states - Syria and Iraq - in Moscow.

The conflict between the two states is nearly over, and it is obvious that now the neighbors have nothing to fight about. On the contrary, there are reasons for cooperation: oil pipeline from Iraq, programs of developing ballistic missiles, etc. Syria badly needs financial means for its military purchases. And it would be only natural if the two states decided to solve their problems in the easiest possible way; Iraq can finance its own military purchases and those of Syria. This is proved by information from some intelligence reports. Syria allegedly assists Iraq in selling more oil than it is permitted by the UN quota and has made a $100-million deal to supply Iraqi armored vehicles of Russian origin with the spare parts. If it so, we can expect that Syria may help Iran to reinforce its antiaircraft defense and aviation, re-exporting arms and equipment from Russia. In this case Iraq may render financial aid to carry out Syrian military purchases.

What would be the Russian reaction if it discloses the end-user of the military equipment? Perhaps, Russian exporters will know the destination of their military supplies. According to some sources, Russia continues to negotiate various military contracts with Iraq, hoping to implement them after the international embargo is lifted. Presumably, these negotiations were blessed by the then Prime Minister Yevgeny Primakov. Other sources say that Iraq continues to buy weapons from Russia, using mediators in Turkey, Jordan and Bulgaria (notorious Bulgarian *Kintex* in particular). The Russians will feel at ease if the Syrian leadership takes responsibility for illicit military trafficking.

Another sponsor of the Syrian army modernization may become Iran. Iran takes the second place after Saudi Arabia in oil exports and its oil incomes amount to $20 billion a year. Besides, Iran has mighty armed forces and implements a large-scale program for their re-armament.

According to our information, in the 1995 framework of the Gore-Chernomyrdin

Commission, the parties signed a protocol (which was not published), under which Russia committed to stop all contacts with Iran in the area of military-technical cooperation by December 31, 1999. The Russians presumably made this concession in exchange for the US promise to eliminate existing restrictions on selling to Russia certain high-tech Western goods.

Some sources insist that the agreement covered only a prohibition to transfer nuclear technologies to Iran. Nevertheless, the existence of clandestine US-Russian agreements on reducing military-technical cooperation with Iran is indirectly proved by the fact that in October 1998 the State Duma voted for the Declaration "*On Expansion of Cooperation between the Russian Federation and the Islamic Republic of Iran*", omitting in the text of the document any mentioning of military-technical cooperation.

Even if the Iranian leadership is not planning to purchase new arms, Iran has to find channels for acquiring spare parts for its soviet military equipment. We can't rule out the possibility that Syria may serve as such a channel, bearing in mind the intensification of Syria-Iran strategic cooperation, which is also stimulated by expansion of Israel-Turkey military ties.

The possibility of Syrian secret military-technical assistance to Iran is also high because both states seem to have successful experience in illegal operations with even more sensitive weapons. In 1996, the press, referring to CIA sources, claimed that the Syrian Scientific-Research Institute acquired missile assemblies in China. The Institute was reportedly involved in the area of missile building in the interests of some states of the Middle East, Iran in particular. Thus, Syria allegedly served as both contractor and executor of Iranian missile contracts.

So, a critical situation in the defense industry, the willingness to restore lost positions in the Middle East, toughening competition on the traditional arms markets, and the necessity to draw greater financial resources in view of coming election campaign – may all encourage Russia to participate in non-traditional ways of military cooperation through re-export of Russian weapons to the markets closed for official arms shipments due to political reasons or international law requirements.

YADERNY KONTROL JOURNAL IN 1998 IN THE COMMENTS OF OUR READERS

Sergei Kapitsa:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal contains a lot of useful and unbiased information. Such a journal is needed, especially in our not very stable time.
What do you think about the professional level of materials, published in the journal? - The journal contains competent and high-quality information on nuclear control agenda and issues, relating to it.
How would you assess independence and objective character of the editorial board? - To my mind, judging from analytical reviews, published in the journal, and their conclusions, the editorial board and the authors provide the readers with independent and objective information.
Which problems, covered in the journal, do you consider to be the most important? - Problems of transportation, control and storage of fissile materials, problems of external nuclear fuel cycle, problems of nuclear powered submarines and radioactive wastes of the Russian Navy.
How do you use the articles of Yaderny Kontrol Journal in your activities? - It helps to maintain the sufficient level of competence. The information is used in the process of working at scientific publications.
About the author: President of the Eurasian Physical Society, Moscow

Igor Sergeyev:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal is needed.
What do you think about the professional level of materials, published in the journal? - It is necessary to raise the professional level.
How would you assess independence and objective character of the editorial board? - Rather high.
Which problems, covered in the journal, do you consider to be the most important? - The current state of affairs with the ABM Treaty and the prospects of preserving its viability. Limited armed conflicts and problems of Russian security.

Which matters did we touch upon insufficiently? - The problem of strategic arms limitation in new geopolitical situation.
What were the articles of special interest to you (author, title)? - Leonid Ivlev, "*Problems of Interaction between Legislature and the Russian Defense Ministry*".
How do you use the articles of Yaderny Kontrol Journal in your activities? - We analyze them and make conclusions.
What would you suggest to improve the journal in 1999? - There is a necessity for a closer cooperation with military scientific research centers in the area of nuclear security and safety.
About the author: Defense Minister of the Russian Federation, Moscow

Sergei Pavlenko:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal is needed.
What do you think about the professional level of materials, published in the journal? - High.
How would you assess independence and objective character of the editorial board? - High.
Which problems, covered in the journal, do you consider to be the most important? - Export controls in the area of non-nuclear weapons.
Which matters did we touch upon insufficiently? - Software export.
How do you use the articles of Yaderny Kontrol Journal in your activities? - Daily use.
What would you suggest to improve the journal in 1999? - To go on.
About the author: Deputy Head of the Main Supervisory Board, Moscow

Yevgeny Reshetnikov:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal is needed.
What do you think about the professional level of materials, published in the journal? - Satisfactory.
How would you assess independence and objective character of the editorial board? - Rather independent.
Which problems, covered in the journal, do you consider to be the most important? - Analysis of nuclear power stations' functioning and their environmental impact. Disarmament issues.
How do you use the articles of Yaderny Kontrol Journal in your activities? - As a reference source.
What would you suggest to improve the journal in 1999? - To be more objective.
About the author: Deputy Minister of Atomic Energy of the Russian Federation, Moscow

Alexander Vengerovsky:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal is badly needed.
What do you think about the professional level of materials, published in the journal? - The highest possible level.
How would you assess independence and objective character of the editorial board? - Objective and independent.
Which problems, covered in the journal, do you consider to be the most important? - Russian-Iranian relationship, the Y2K problem.
Which matters did we touch upon insufficiently? - Geopolitical prognosis.
What were the articles of special interest to you (author, title)? - Alexander Yakovenko, "*Y2K Problem*".
How do you use the articles of Yaderny Kontrol Journal in your activities? - Deputy inquiries.
What would you suggest to improve the journal in 1999? - To include illustrations on the topics you cover.
About the author: State Duma Deputy, Chairman of the Intelligence Subcommittee, Moscow

Vladimir Smirnov:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal is useful, objective, professional and badly needed.
What do you think about the professional level of materials, published in the journal? - High.
How would you assess independence and objective character of the editorial board? - High.
Which problems, covered in the journal, do you consider to be the most important? - Security and safety of nuclear weapons and nuclear military plants.
Which matters did we touch upon insufficiently? - Problems of moral and technical *aging* of nuclear weapons.
What were the articles of special interest to you (author, title)? - Igor Valynkin, "*We Won't Let Accidents Like That of Novaya Zemlya Repeat*".
How do you use the articles of Yaderny Kontrol Journal in your activities? - As a source of information.
What would you suggest to improve the journal in 1999? - To publish the documents as a

separate appendix. To publish the list of laws and regulations relating to nuclear security and safety issues.
About the author: Deputy Military Prosecutor General, Office of the Military Prosecutor General, Moscow

Vladimir Rostunov:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal is needed.
What do you think about the professional level of materials, published in the journal? - Rather high.
How would you assess independence and objective character of the editorial board? - The readers are unfamiliar with decision-making mechanism of the editorial board, hence, the question is not correct.
Which problems, covered in the journal, do you consider to be the most important? - Export control system efficiency.
What were the articles of special interest to you (author, title)? - Series of articles on the problems of cooperation with Iran. Oleg Dyachenko, "*Legal Regulation of Export of Conventional Arms and Materiel in the Russian Federation*".
About the author: Deputy Director of the Department of Military Technical Cooperation, Ministry of Commerce of the Russian Federation, Moscow

Mahmut Gareyev:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal is very informative and useful. Undoubtedly, it is needed.
What do you think about the professional level of materials, published in the journal? - Quite sufficient.
How would you assess independence and objective character of the editorial board? - It is more objective than other journals but you can't be absolutely unbiased nowadays. Otherwise we'll have to do without journal.
Which problems, covered in the journal, do you consider to be the most important? - The problem of measures to prevent further WMD proliferation.
Which matters did we touch upon insufficiently? - The lack of analysis of military strategic issues, which influence nuclear security (for instance, an attempt to establish Unified Supreme Command of Strategic Deterrence Forces).
What were the articles of special interest to you (author, title)? - An article on nuclear weapons of India and Pakistan; Vladimir Medvedev, "*Russia's Nuclear Deterrence: A Look into the Next Decade*"; Victor Mikhailov, "*Towards Strategic Stability through a Balance of Force and Transparency*"; Ivan Safranchuk's materials.
Were there any articles that you didn't like (author, title)? - Neither article was completely bad.
How do you use the articles of Yaderny Kontrol Journal in your activities? - I study them thoroughly, share with other members of the Academy and try to use it to form a correct understanding of nuclear control issues.
What would you suggest to improve the journal in 1999? - Give more new facts, you don't have to recur. At present there is a problem with subscription to foreign journals, that's why it is necessary to follow materials on nuclear issues, published in the foreign periodical press, UN official data and convey them to the readers. You may continue to focus on technical matters but you should not forget about military political and operational-tactical aspects. You should engage new authors. Thanks for your attention to the readers.
About the author: Doctor of Military and Historical Sciences, President of the Academy of Military Sciences, Moscow

Pyotr Ivanovsky:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal is needed.
What do you think about the professional level of materials, published in the journal? - High.
How would you assess independence and objective character of the editorial board? - Independence and objectiveness can be seen in many publications.
Which problems, covered in the journal, do you consider to be the most important? - Problems of control over fissile materials, disposal of radioactive and chemical wastes (chemical weapons, etc.).
Which matters did we touch upon insufficiently? - We presume that you gave insufficient coverage of control over export and import of fissile materials (latent control with a new method of gamma-spectroscope).

What were the articles of special interest to you (author, title)? - *Yaderny Kontrol* No. 3, pp. 11-25; all *Editorials*; Nikolai Sokov, "*Evolution of Russian Strategic Offensive Weapons*"; Alexei Rei, Konstantin Makiyenko, "*Russian Contracts with China in Aerospace and Military Technical Sphere*"; Alexander Bolsunovsky, "*On the Interview by Yevgeny Mishin and the Problem of Nuclear Materials Security*".
Were there any articles that you didn't like (author, title)? - There were some polemical articles but in general all articles are rather good, especially made to order on a certain problem.
How do you use the articles of Yaderny Kontrol Journal in your activities? - In the course of developing checkout equipment (gamma-spectrometers, alpha-, beta- and gamma-detectors, neutron meters) we take into account the problems, touched upon in the journal.
What would you suggest to improve the journal in 1999? - In our opinion, you should expand *Newsboard* section to include more information on development of control devices, for instance, to monitor materials of trans-uranium group, which are hidden in potassium and graphite.
About the author: Deputy Director on Scientific Work of the Vekshinsky State Scientific Research Institute of Vacuum Engineering (GNIIVT), Moscow

Anatoly Shevtsov:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal is one of the sources of information on disarmament and problems of missile technologies' nonproliferation. It is needed.
What do you think about the professional level of materials, published in the journal? - Rather high.
How would you assess independence and objective character of the editorial board? - Rather high for the journal reflects different points of view.
Which problems, covered in the journal, do you consider to be the most important? - Problems of MTCR implementation, nuclear disarmament and nuclear security.
Which matters did we touch upon insufficiently? - Negotiations on CFE adaptation to new circumstances.
What were the articles of special interest to you (author, title)? - Gennady Khromov, "*Current Problems of Missile Proliferation*".
How do you use the articles of Yaderny Kontrol Journal in your activities? - As an additional source of information in the course of preparing analytical publications.
What would you suggest to improve the journal in 1999? - Try to systemize information on implementation of various international treaties relating to arms limitation, reduction and elimination.
About the author: Doctor of Technical Sciences, Professor, Head of DPhNISI, Dnepropetrovsk, Ukraine

Alexander Goltz:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal is extremely important and needed.
What do you think about the professional level of materials, published in the journal? - High.
How would you assess independence and objective character of the editorial board? - The journal strives for objectiveness.
Which problems, covered in the journal, do you consider to be the most important? - Problems of strategic nuclear arms, START II, and nonproliferation.
How do you use the articles of Yaderny Kontrol Journal in your activities? - As a reference source.
About the author: Correspondent, Itogi journal, Moscow

Andrei Fyodorov:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - Yes, sure, I do need it.
What do you think about the professional level of materials, published in the journal? - Rather high.
How would you assess independence and objective character of the editorial board? - High.
Which problems, covered in the journal, do you consider to be the most important? - Dissolution of surplus military plutonium.
Which matters did we touch upon insufficiently? - The way Minatom specialists solve the problems of nuclear energy safety, *nuclear legacy*, and environment.
What were the articles of special interest to you (author, title)? - Materials by Y.G. Kudryavtsev (Minatom) on the problems of MOX fuel.

How do you use the articles of Yaderny Kontrol Journal in your activities? - To find in the journal a regular direct discussion (question-answer) between opponents and proponents of nuclear energy, Minatom ecologists and independent experts; comparative studies of nuclear and traditional (thermoelectric, hydroelectric) power; analysis of Minatom attempts to solve the problem of radioactive wastes and alternative concepts on this matter.
About the author: President of the Information Association of Nuclear Energy and Industry Enterprises (Inform-Atom).

Nikolai Kravchenko:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal is useful for the specialists, engaged in struggle with illicit trafficking of nuclear and radioactive materials.
What do you think about the professional level of materials, published in the journal? - Sufficient.
How would you assess independence and objective character of the editorial board? - Sufficient.
Which problems, covered in the journal, do you consider to be the most important? - Problems of preventing illicit trafficking of nuclear and radioactive materials.
How do you use the articles of Yaderny Kontrol Journal in your activities? - As additional information.
About the author: Deputy Head of the Regional Information Technical Customs Directorate, State Customs Committee of the Russian Federation

Vladimir Tumbakov:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal is needed for the specialist, working in nuclear science and technology area.
What do you think about the professional level of materials, published in the journal? - High. The authors are competent specialists.
How would you assess independence and objective character of the editorial board? - The journal has its own independent and objective approach to covered topics.
Which problems, covered in the journal, do you consider to be the most important? - Problems of plutonium dissolution, nuclear materials' safety.
Which matters did we touch upon insufficiently? - You should give annotation on respectable foreign books on corresponding subjects (for instance, Judith Perera, *The Nuclear Industry in the Former Soviet Union*, 2 volumes, 1996).
What were the articles of special interest to you (author, title)? - Victor Mourogov, "*On the Prospects of Nuclear Energy Development*".
How do you use the articles of Yaderny Kontrol Journal in your activities? - We analyze the publications, summarize them and report to the leadership, we keep a dossier.
What would you suggest to improve the journal in 1999? - To publish materials relating to activities of the Federal Agency on Legal Protection of the Results of Intellectual Activities of Military, Special and Dual-Purpose Character.
About the author: Ph.D. (Chemistry), Head of the Main Department of NTI, the Bochvar GNTs-VNIINM, Moscow

Vladimir Danileiko:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal is certainly needed.
What do you think about the professional level of materials, published in the journal? - High.
How would you assess independence and objective character of the editorial board? - Sufficient.
Which problems, covered in the journal, do you consider to be the most important? - Nuclear safety, terrorism, physical protection, nuclear weapons proliferation.
How do you use the articles of Yaderny Kontrol Journal in your activities? - A good analytical material.
What would you suggest to improve the journal in 1999? - Thanks for your work. Best wishes, success and luck in 1999!
About the author: Doctor of Technical Sciences, Deputy Director of the Central Physics Technical Institute, Ministry of Defense of the Russian Federation, Sergiev Posad

Igor Goloskokov:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - It seems to be the most interesting edition for me.
What do you think about the professional level of materials, published in the journal? - To my mind, the majority of authors are professionals in their areas of research.
How would you assess independence and objective character of the editorial board? - I have no doubt about them.

Which problems, covered in the journal, do you consider to be the most important? - Accounting and control over weapon-grade nuclear materials, program of military plutonium use.
Which matters did we touch upon insufficiently? - Physical protection of nuclear materials and nuclear facilities, counter-terrorist and counter-diversion activities.
What were the articles of special interest to you (author, title)? - Vladimir Orlov, "*CATU Employees Should Get Due Respect*"; Vladimir Belous, "*Concept of Nuclear Deterrence and START III*"; Igor Terekhov, Andrei Titarenko, Vitaly Tsymbal, "*Managing Problems of the Development of Dual-Use Technologies in Russia*"; *Stories of the Past* section, etc.
Were there any articles that you didn't like (author, title)? - I have no professional interest in conventional arms issues.
How do you use the articles of Yaderny Kontrol Journal in your activities? - To enlarge my scope, to get to know the problems which previously escaped my attention for some reasons.
What would you suggest to improve the journal in 1999? - To keep an eye on the problems of CATU and Minatom enterprises. It would be nice to see comments of the lawyer on published legal acts (which can be published as an appendix).
About the author: Deputy Director General on Security of the Sibirsky Chemical Combine, Ministry of Atomic Energy of the Russian Federation, Seversk

Boris Litvinov:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - Of course, it is needed. Along with *Yadernoye Nerasprostraneniye* it is the rostrum for open and professional discussion on nuclear weapons.
What do you think about the professional level of materials, published in the journal? - Professional level is rather high.
How would you assess independence and objective character of the editorial board? - Sufficient since all mass media depend on environment and have to maneuver. C'est la vie!
Which problems, covered in the journal, do you consider to be the most important? - As a person, engaged in work with the core of nuclear weapons - nuclear charges, I'm interested in the prospects of nuclear arms in the XXI century.
Which matters did we touch upon insufficiently? - In my opinion, these problems are the possibility of solving any conflict with nuclear weapons employment, problems of nuclear arms elimination or their replacement with other weapons, peaceful use of nuclear explosions.
What were the articles of special interest to you (author, title)? - Nikolai Sokov, "*Evolution of Russian Strategic Offensive Weapons*"; Vladimir Orlov, "*Some Aspects of Israeli Policy on Nonproliferation: Notes from a Conference*".
Were there any articles that you didn't like (author, title)? - Mikhail Kokeev, "*The UN Role in the System of Arms Control*"; the UN role was vaguely expressed in the article. To my mind, the UN becomes more and more dependent on the USA.
How do you use the articles of Yaderny Kontrol Journal in your activities? - They serve as a valuable reference materials and sometimes give hints on a new vision of the problems.
What would you suggest to improve the journal in 1999? - Try to hold a round-table discussion on true situation with nonproliferation. It is not that simple. To pay more attention to peaceful use of nuclear explosions. To compare nuclear arms reduction to missile defense development, etc. Try to summarize and list the harm to humanity from various weapons of mass destruction.
About the author: Doctor of Technical Sciences, Academician of the Russian Academy of Sciences, Professor, Deputy Scientific Director, RFYaTs-VNIITF, Snezhinsk

Nikolai Filonov:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - Yes, it is necessary to have such a journal at your disposal. The journal has educational purposes and serve to shape the public opinion on the matters under discussion. Its value is a wide range of issues: starting from publications in periodical press, which are meant for a common reader, up to official documents (laws, regulations, etc.).
How would you assess independence and objective character of the editorial board? - Sufficient and it proves the lack of comments from the editorial board.

Which problems, covered in the journal, do you consider to be the most important? - Nuclear safety, elimination and dismantlement, physical protection of nuclear facilities and nuclear materials.
Which matters did we touch upon insufficiently? - India and Pakistan declared their nuclear weapon status. However, you didn't reflect their opinion on nuclear disarmament, which is rather original and logical.
What were the articles of special interest to you (author, title)? - Each article contains something useful, you only have to find it for yourself.
Were there any articles that you didn't like (author, title)? - Any viewpoint, any information, even misinformation, has the right to live.
How do you use the articles of Yaderny Kontrol Journal in your activities? - They help to form my own view that later reflects itself in my work.
What would you suggest to improve the journal in 1999? - You cover international security agenda from the point of WMD, i.e. its military aspects. Is it possible to include some other aspects as well, like maintenance of environmental security? You should focus then on various technologies and their consequences.
About the author: Department Head, Federal Nuclear and Radiation Safety Supervision Agency of the Russian Federation

Yevgeny Avrorin:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal is needed.
What do you think about the professional level of materials, published in the journal? - High (as a rule).
How would you assess independence and objective character of the editorial board? - Sufficient.
Which problems, covered in the journal, do you consider to be the most important? - Nuclear weapons nonproliferation.
What were the articles of special interest to you (author, title)? - Boris Litvinov, Vladimir Loborev, "*On Determining the Purpose of Nuclear Explosion*".
What would you suggest to improve the journal in 1999? - To collect the documents and to store them in an electronic database with free access.
About the author: Academician of the Russian Academy of Sciences, Scientific Director, the Zababakhin RFYaTS-VNIITF, Snezhinsk

Tatyana Brovkina:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - This is a necessary journal. Our organization *CATU Women* is elaborating the concept of municipal development of CATU in the situation of conversion of the city's major industrial facility (RFYaTs-VNIITF).
What do you think about the professional level of materials, published in the journal? - Very high.
How would you assess independence and objective character of the editorial board? - Very high. It's good that the journal publishes Government programs, independent expert estimates, and digests of the foreign press.
Which problems, covered in the journal, do you consider to be the most important? - Prospective development of weapon systems, disarmament problems, problems and prospective development of nuclear energy and new types of weapons.
Which matters did we touch upon insufficiently? - Budgetary issues, official matters, elite pensions, problems of attracting youth in the industry, matters of training, work with young specialists, personnel-relating matters.
What were the articles of special interest to you (author, title)? - Roland Timerbaev, "*Attitude of Academician Kapitsa…*"; press review after dismissal of the Minister of Atomic Energy Victor Mikhailov; Nikolai Geraskin, Alexander Tolstoi, Vladimir Orlov, "*MEPhI Course on Nuclear Nonproliferation*".
How do you use the articles of Yaderny Kontrol Journal in your activities? - It helps to reach a good level of understanding the problems, provides with information to use in the dialogue with the RFYaTS-VNIITF leadership, city authorities and other non-governmental organizations.
What would you suggest to improve the journal in 1999? - Good luck!
About the author: Chairman of the Board of Directors, Snezhinsk City Public Organization "CATU Women", Snezhinsk

Alexander Izmailov:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - Yes, it is needed.

What do you think about the professional level of materials, published in the journal? - High and in recent years it has considerably grown.
How would you assess independence and objective character of the editorial board? - Naturally, you can't completely avoid subjective estimates of the authors but, in general, the publications are rather objective.
Which problems, covered in the journal, do you consider to be the most important? - Problems of physical protection of nuclear materials and plants.
Which matters did we touch upon insufficiently? - Problems of physical protection of various nuclear facilities (nuclear power plants, nuclear materials storage units, nuclear science and industry enterprises, etc.). There are different concepts.
What were the articles of special interest to you (author, title)? - It is difficult to make a preference, I read with interest Roland Timerbaev's articles.
How do you use the articles of Yaderny Kontrol Journal in your activities? - As reference material for scientific and research work, for comparative analysis of the ways to provide physical protection of nuclear materials and plants in different states.
What would you suggest to improve the journal in 1999? - The journal is called *Yaderny Kontrol* but it devotes more and more space to the articles on general disarmament issues, chemical and biological weapons elimination, etc. You should either change the name or to limit this information in order to preserve the domination of nuclear topics.
About the author: Doctor of Technical Sciences, Professor, Department Head, GUP SNPO Eleron (Minatom of the Russian Federation), Moscow; Chairman of the Russian section, INMM, USA

Nikolai Voloshin:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - I highly appreciate the journal, it is needed.
What do you think about the professional level of materials, published in the journal? - I didn't find any drawbacks, the professional level is high.
How would you assess independence and objective character of the editorial board? - There were no biased or made-to-order articles. I find the journal independent and objective.
Which problems, covered in the journal, do you consider to be the most important? - Nuclear nonproliferation, nuclear deterrence, nuclear weapons, control and accounting of nuclear materials.
Which matters did we touch upon insufficiently? - There were not so many comparative publications (for instance, nuclear tests in Russia and the USA; nuclear weapons complex funding in the USA, Russia, France, Britain, etc.).
What were the articles of special interest to you (author, title)? - The whole journal is interesting.
Were there any articles that you didn't like (author, title)? - I didn't come across any of such articles.
How do you use the articles of Yaderny Kontrol Journal in your activities? - In preparing reference materials and in planning of activities.
What would you suggest to improve the journal in 1999? - Go on!
About the author: Doctor of Technical Sciences, Head of the Department of Development and Testing of Nuclear Munitions, Minatom of the Russian Federation, Moscow

Vladimir Baranovsky:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The most useful source of information on nuclear weapons problems. It is certainly needed.
What do you think about the professional level of materials, published in the journal? - High.
How would you assess independence and objective character of the editorial board? - High.
Which problems, covered in the journal, do you consider to be the most important? - Nuclear nonproliferation problems.
Which matters did we touch upon insufficiently? - I would like to see more analysis and information *threshold* and *new* nuclear states.
How do you use the articles of Yaderny Kontrol Journal in your activities? - As a source of information.
What would you suggest to improve the journal in 1999? - To pay more attention to China.
About the author: Doctor of Historical Sciences, Deputy Director of the Institute of World Economy and International Relations, Russian Academy of Sciences (IMEMO)

Yury Tychkov:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - Obviously, it is needed.

What do you think about the professional level of materials, published in the journal? - Rather high.
How would you assess independence and objective character of the editorial board? - Rather objective.
Which problems, covered in the journal, do you consider to be the most important? - Problems of nuclear parity.
Which matters did we touch upon insufficiently? - Psychological aspects of work in the Russian nuclear industry in current circumstances.
What were the articles of special interest to you (author, title)? - Victor Mourogov, "*On the Prospects of Nuclear Energy Development*"; Vladimir Belous, "*Concept of Nuclear Deterrence and START III*"; Igor Terekhov and others, "*Managing Problems of the Development of Dual-Use Technologies in Russia*".
How do you use the articles of Yaderny Kontrol Journal in your activities? - Discuss them with my colleagues, some theses of Igor Terekhov's article were used in amending the statute of *Fond Mikroeletronika*.
What would you suggest to improve the journal in 1999? - To announce discussions on most topical problems of nuclear industry and psychological aspects of these problems, involving leading political scientists and Minatom specialists, especially from federal nuclear centers.
About the author: Doctor of Economics, Professor, Advisor to the Minister of Atomic Energy of the Russian Federation, Moscow

Andrei Gagarinsky:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - Evidently, it is needed.
What do you think about the professional level of materials, published in the journal? - High.
How would you assess independence and objective character of the editorial board? - Corresponding with the objectives.
Which problems, covered in the journal, do you consider to be the most important? - All problems relating to nuclear sphere and dual-use technologies.
Which matters did we touch upon insufficiently? - Problems of military plutonium dissolution require more detailed coverage.
What were the articles of special interest to you (author, title)? - Roland Timerbaev's articles, Ivan Safranchuk, "*PIR Study Paper No. 8*".
How do you use the articles of Yaderny Kontrol Journal in your activities? - Regularly, as information and reference material.
What would you suggest to improve the journal in 1999? - Military plutonium dissolution, information on nuclear programs of Libya, North Korea, Iran (Study Paper No. 8 is a wonderful example).
About the author: Doctor of Physical Mathematical Sciences, Director on External Activities of the Kurchatov Institute - Russian National Center, Moscow

Alexei Yablokov:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal has become the most known and interesting periodical in the area of nuclear arms. The journal is needed.
What do you think about the professional level of materials, published in the journal? - High.
How would you assess independence and objective character of the editorial board? - High.
Which problems, covered in the journal, do you consider to be the most important? - Nonproliferation.
Which matters did we touch upon insufficiently? - Space and nuclear weapons, MOX fuel.
What were the articles of special interest to you (author, title)? - Victor Mourogov, "*On the Prospects of Nuclear Energy Development*".
How do you use the articles of Yaderny Kontrol Journal in your activities? - Selectively, from time to time.
What would you suggest to improve the journal in 1999? - You should compare different viewpoints on a certain problem. To give critical analysis of official documents and not just publish them.
About the author: Doctor of Biological Sciences, President of the Center for Ecological Policy of Russia, Moscow

Valery Sveshnikov:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - Yes, it is needed. It is necessary for the specialists in the area of nuclear and radiation safety.
What do you think about the professional level of materials, published in the journal? - Rather high.
How would you assess independence and objective character of the editorial board? - Rather high.

Which problems, covered in the journal, do you consider to be the most important? - Problems of disposal, environmental and radiological aspects of activities, maintenance of radiation safety.
Which matters did we touch upon insufficiently? - Problems of radiation control over nuclear materials and nuclear substances.
How do you use the articles of Yaderny Kontrol Journal in your activities? - As a source of reliable information.
What would you suggest to improve the journal in 1999? - To give a broader coverage of problems and possible solutions in the area of maintaining nuclear and radiation safety in Russia and abroad.
About the author: Head of Inspections of the Nuclear and Radiation Safety Department of the Russian Defense Ministry, Moscow

Leonid Malyshev:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal is needed.
What do you think about the professional level of materials, published in the journal? - Rather high, except reprinting publications from newspapers, they are too late.
How would you assess independence and objective character of the editorial board? - Sufficient.
Which problems, covered in the journal, do you consider to be the most important? - Problems of nuclear deterrence, strategic nuclear forces and START II ratification.
Which matters did we touch upon insufficiently? - Problem of *political bargaining* about every treaty on nuclear arms reduction.
Were there any articles that you didn't like (author, title)? - Ivan Safranchuk, "*Nuclear Weapons in the Foreign Policy: What Are the Adequate Criteria*". Presumably, the author didn't elaborate well the meaning of the terms in his article.
How do you use the articles of Yaderny Kontrol Journal in your activities? - Directly, in teaching and my scientific research.
What would you suggest to improve the journal in 1999? - Good luck in your future endeavors! There is no need to publish complete texts of the laws, regulations and statutes for they are officially disseminated or can be copied in the State Duma. Focus your attention on the materials where *Yaderny Kontrol* priority is undoubted.
About the author: Ph.D. (Military Sciences), Corresponding Member of the International Informatization Academy, Senior Research Associate, Professor, Department of Operational Skills of the Navy, Military Academy of the General Staff of the Russian Federation, Moscow

Alexei Meshkov:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - Yes.
What do you think about the professional level of materials, published in the journal? - High.
Which problems, covered in the journal, do you consider to be the most important? - Nonproliferation regime, limitation of missile defense, nuclear-weapon-free zones.
Which matters did we touch upon insufficiently? - Problems of nuclear weapons use, defense from nuclear weapons.
Were there any articles that you didn't like (author, title)? - The articles overloaded with publicism and preoccupied with technical aspects.
About the author: Head of the Department of Foreign Policy Planning, Ministry of Foreign Affairs of the Russian Federation, Moscow

Vyacheslav Danilkin:
What do you think about Yaderny Kontrol Journal? Do you need such a journal? - The journal is needed.
What do you think about the professional level of materials, published in the journal? - High.
Which problems, covered in the journal, do you consider to be the most important? - Nuclear and missile dossiers.
Which matters did we touch upon insufficiently? - Disposal of nuclear wastes and missile fuel.
What were the articles of special interest to you (author, title)? - Nuclear and missile dossiers section.
How do you use the articles of Yaderny Kontrol Journal in your activities? - To prepare the documents.
What would you suggest to improve the journal in 1999? - Go on!
About the author: First Deputy Designer General, State Missile Center, the Makeyev Design Bureau, NTB, Miass

PIR – CENTER FOR POLICY STUDIES IN RUSSIA

PIR is the acronym for the Russian words *Policy Studies in Russia*. The PIR Center is a non-profit, independent, Moscow-based research and public education organization, which was founded in July 1994. Although its name and flexible structure permit it to conduct research on a wide range of issues related to Russian foreign and domestic policy, the Center is currently focused on **international security arms control, and nonproliferation issues** that are directly related to Russia's internal situation. It is considered to be the leading Russian non-governmental organization working in this area.

That the PIR Center, registered and based in Russia, is a Russian non-governmental organization is important for two reasons. **First**, being a Russian organization, it avoids the current tension between Russian officials and foreign non-governmental organizations, which are conducting research and working on international security issues related to Russia. **Secondly**, in the present situation when Russia is trying hard not to copy the political experience of the West and is seeking its own roots and path, a Russian non-governmental organization is more likely to bring about needed changes in Russian policies and political practices than a foreign one.

The PIR Center has the following **objectives**:

- to promote the principles of democracy and the rule of law in Russia;
- to make information on security issues available to the public and to distribute this information to the general public and experts via newsletters, journals, and study papers;
- to independently analyze the most urgent international security issues from a Russian perspective; and
- to educate Russian decision makers, legislators, young researchers, and students in the areas of international security and arms control.

Leading Russian and international experts in the area of arms control and nonproliferation contribute articles to the Center's publications or have contracts with the Center to work on one or more research projects. The target audience of the Center's academic and technical journals and reports includes Russian policy makers, legislators in the Federal Assembly, and experts, as well as the decision-making communities of other countries in the CIS. Therefore most of the study papers and reports are in Russian.

Located in southwest Moscow, the city's academic center, the PIR Center is a small and flexible non-profit institute working on the most challenging issues on the international security and arms control agenda.

PIR CENTER MAJOR PROGRAMS AND PROJECTS IN 1999 - 2000

1. Research & Publishing

1.1. *Program "Nonproliferation & Russia"*
1.1.1. Yaderny Kontrol Journal
1.1.2. Digest of the Russian Nonproliferation Journal Yaderny Kontrol
1.1.3. Arms Control Letters Newsletter
1.1.4. PIR Study Papers Journal
1.1.5. Nuclear Weapons and Their Future
1.1.6. Sensitive Exports & Export Control in Russia
1.1.7. Cooperative Threat Reduction Program: How Efficient?
1.1.8. Sociological Poll: "Examining Attitudes of Russians towards Nuclear Weapons"
1.1.9. "Russia in Nuclear Nonproliferation: 1995 – 1999" (A Monograph)
1.1.10. Russian Nuclear Regionalism
1.1.11. Arms Control and Nonproliferation: Platforms for Russia's Major Political Parties, Blocs, and Presidential Candidates
1.1.12. Russia and the 2000 NPT Review Conference
1.2. Program "Domestic Politics & Russian Security"
1.2.1. Security Issues, Executive Intelligence Newsletter
1.2.2. Polikon Analytical Reports Series

2. Information-oriented Projects & Consulting

2.1. YADRO – Nuclear Russia Database
2.2. PIR Arms Control Library Development
2.3. PIR Center Internet Web-Site Development
2.4. Non-governmental Register of Conventional Arms Exports from the CIS

3. Educational

3.1. Lectures on Nuclear Nonproliferation at the Moscow Engineering Physics Institute (MEPhI)
3.2. Nuclear Nonproliferation Handbook
3.3. Educational Program for Russian Legislators on Arms Control & Nonproliferation (including a Duma Seminar Series)
3.4. Training Program for Young Researchers

PIR CENTER RESEARCH COUNCIL

Individual, corporate, and associate members

As of October 1, 1999

Abdullaev Pulat, Amb., Ministry of Foreign Affairs, Moscow, Russia
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