Editorial

CAN THERE BE A BALANCE BETWEEN SECURITY INTERESTS AND DEMANDS FOR TRANSPARENCY?

We say, yes.

We are researchers at the Center for Political Studies in Russia (PIR Center), a non-governmental, non-profit organization that publishes the YADERNY KONTROL journal. This is the very journal that you are reading now. This is the journal that has been appearing on a monthly basis for two years and that informs its readers on problems regarding weapons of mass destruction in Russia and the other ex-Soviet states, suggests subjects for discussion, focuses on some of them, and publishes unabridged documents of Russian and international legislation.

YADERNY KONTROL is an independent publication, although not in every way. There is one thing we are all dependent upon: our principles. Our principles consist of those materials published by the journal, even those that do not reflect our editorial viewpoint. Our goals are first to respond to Russian and international security interests and, second, to meet the public's and experts' demands for transparent, accessible, and reliable information. We are sure that, despite all of the understandable difficulties accompanying studies in such sensitive areas as those of nuclear, chemical, biological and other weapons of mass destruction, missile delivery systems, and their production technologies, these principles can be and must be compatible. But given one essential condition - one should not outweigh the other. Security interests and the demand for transparency should be well-balanced.

At the same time we realize that the very notions "security" and "transparency" require further explanation. How can we understand these terms without the context of a political situation? To what degree do national security interests and international security interests coincide and where do they conflict? How strong is this conflict of interests? What are the limits of "transparency" and "openness" of information? How can one remain within these limits without reducing transparency to the level of blindly optimistic official reports? It would be an exaggeration to flatly assert that we know the answers to these questions. That is why we believe that you will help us answer them, once you join our discussions and share your own thoughts.

YADERNY KONTROL is a publication primarily for specialists - those who make political and military decisions and those who carry out scientific analysis. You may see YADERNY KONTROL on the tables of officials of the Presidential Administration and in the Security Council of the Russian Federation, Minatom, Gosatomnadzor, the Foreign Ministry and the Ministry of Defense. It is also read by the newly elected deputies of the State Duma. It goes to the state's

largest scientific libraries. We cannot, however, call our journal a strictly specialized one. We strive to reach everyone interested in its subjects, including journalists and students who have just begun their research.

It would not be correct to think that Moscow is the only place where YADERNY KONTROL is read. Name any "closed city" from Snezhinsk to Seversk - they also constitute our audience. YADERNY KONTROL is a journal ON RUSSIA and FOR RUSSIA. It is neither an "export" nor an "import" informational product, but rather a journal primarily for the domestic reader and with domestic authors. Its readers live in Minsk, Kiev, Dnepropetrovsk, Tashkent, and Bishkek. However, we do not suffer from a disease of "informational zenophobia" and are not going to reduce the problem of weapons of mass destruction to a solely Russian one. Take, for example, the problem of diversions of nuclear material. Of course, we write much on Russian cases. But is it only a Russian problem? Of course not. This consideration relates to many other important issues, foremost of which is the area of nuclear nonproliferation.

Though the journal is entitled YADERNY KONTROL, it is not only pure problems of the nuclear-weapons complex that are addressed in the journal. We write on problems of export control, missiles and missile technologies. We do not avoid issues connected with chemical weapons. The Center PIR will soon develop this subject in a separate journal CHEMICAL WEAPONS AND PROBLEMS OF THEIR DESTRUCTION. We intend to raise issues regarding other types of weapons of mass destruction, as well as those weapons whose performance is very close to those of weapons of mass destruction. Finally, problems of international security and the maintenance of strategic stability also lie in our sphere of interest.

In 1995 many of our readers became our regular contributors. We believe that YADERNY KONTROL and its readers will reach a new level of dialogue in 1996. We invite you to join the journal's discussions of the most serious issues, to take part in workshops, roundtables, conferences, and e-mail correspondence - in short all those scientific activities that are conducted by the Center PIR.

Yours truly,

Vladimir A. Orlov.

Nikolai Filonov,
former commander of a nuclear maintenance unit

Nuclear Security: the View from the Sidelines

This article is a response to the article “Nuclear Security: The Defense Ministry’s Viewpoint,” published in Yaderny Kontrol (# 12, 1995, p. 2).

It is necessary to emphasize that the presidential order No. 137-rp of December 31, 1991, which entrusted Gosatomnadzor with the task of supervising radiation safety and security of the use of nuclear material and radioactive substances for peaceful and military purposes without exception, has not just formal, as Yevgeny Maslin states, but legal force. This was confirmed by subsequent presidential orders No. 283-rp of June 5, 1992 and No. 636-rp of September 16, 1993. It was the slackness of top officials in Russia’s Defense Ministry that turned those orders into formal ones. There is no doubt that there was a paradoxical situation when all functions entrusted to Gosatomnadzor were in fact blocked by the Defense Ministry. And this situation lasted for years, until the President issued his order No. 350-rp of July 26, 1995.

I would like to ask Colonel-General Maslin: what would he think of subordinates who have been cheating him and have disobeyed his orders for several years? Presidential order No. 137-rp became a step forward in creating a system of effective state supervision, placing such “monsters” like Russia’s Defense Ministry and Russia’s Ministry of Atomic Energy (Minatom) under it. It had to begin somehow and it eventually began.

In accordance with its new responsibilities, Gosatomnadzor set up a directorate for the supervision of nuclear and radiation security and the safety of nuclear weapons, headed by General Anatoli Tikhankin, who had served for 37 years in the Defense Ministry's 12th Chief Directorate and in the units assigned to it and is a professional in the area of specialized activities in military units and in the industry. His staff was formed from high-ranking officers from the 12th Chief Directorate, from military units of nuclear maintenance and the Armed Forces' directorates. It impossible that Mr. Maslin had not known about this. For this reason, his statements that Gosatomnadzor’s officials did not have proper experience and qualifications are not borne out and demonstrate his disrespect for his former comrades-in-arms.

I would dare remind Colonel-General Maslin that the knowledge and experience of the old regulars used to ensure a far higher level of combat readiness, security and safety of nuclear weapons than the

present level provided under his leadership. We had been brought up on the highest standards and in the best traditions of the Ministry of Medium Machine-Building, in other words, we have been and we are professionals and patriots in the widest meaning of these notions. It is us who, even during the dissolution of the Soviet Union, developed and incorporated the system that has been providing for the safety, security and high combat readiness of nuclear warheads up to the present. But there is a limit to everything and one has to be a blind careerist not to see that the system is beginning to crack up and to pretend that everything is perfect in one's area of responsibility.

It is surprising that Colonel-General Maslin has not yet realized the difference between the control and supervision. Nobody attempted to place nuclear weapons under non-agency control, only under state non-agency supervision.

You say that Russia's Gosatomnadzor "was seeking control, but was not ready to undertake the responsibility." But what responsibility? Yes, indeed, your directorate, acting on behalf of Russia's Defense Ministry, had a few times attempted to partly shift the responsibility for security and safety of nuclear weapons on to Gosatomnadzor. Development and creation of nuclear warheads has always been the domain of nuclear scientists and designers, and Gosatomnadzor has never laid claims to co-authorship in this area. In this context I would like to ask you what responsibility should you put on GAI [traffic police — tr.], which sees to it that all participants of the road traffic observe its rules and regulations, for incidents on the road? Following your logic, the GAI should be deprived of such responsibilities. Or, a cylinder with compressed air explodes because the set operational requirements have been violated, the blame should be laid on Kotlonadzor [a body responsible for supervision over operation of cylinders], but not the person who operated it at the time of explosion? This is the very logic that helps those who are really at fault avoid responsibility.

Units of nuclear maintenance are a constituent part of not only the Defense Ministry, but of the whole community as well. For this reason they cannot but be affected by the current processes. In the present situation the statement that there are no grounds to be concerned about safety and security of nuclear weapons sounds immodest and can be considered an attempt to conceal the true situation.

How can one remain unconcerned when the press writes that the leadership in district recruiting offices take bribes during the call-ups, that officials from the Defense Ministry's Chief Intelligence Directorate sell weapons and explosives, and that a whole regiment, out of 32 aircraft, was unmanned by its commander, etc.? And what about various extremist sects and trends that came

along with religion to our country (the Aum-Shinrike case is the best illustration of this)?

You refer to the U.S. experience. You say that U.S. nuclear weapons are outside non-agency supervision. But are the situations in the United States and in Russia adequate? Or are there U.S. officers who operate nuclear warheads and are for months unpaid (I do not speak about other kinds of allowance) and have to go to the woods and in the hills to pick mushrooms and then sell them in order to feed their families? Or do you know of any cases in the United States when month-long nonpayments drove people who repair nuclear ice-breakers to despair and who then were prosecuted on charges of attempting a terrorist act. Or are you not concerned with the fact that officers who refused to serve on board the ships and in other combat units have been sent to a number of nuclear maintenance units? You yourself have admitted that there are untimely payments of salaries and other kinds of allowance, that systems of physical protection at nuclear facilities have been aging, and that facilities and their supporting systems need overall repairs. At the same time you draw our attention to the unsatisfactory state of electrical safety, which is one of the main causes of fires. Thus, you have admitted that you cannot agree with the industry about production and supplies of necessary equipment for units.

And after all this you state, “there are no grounds whatsoever for concerns and fears” since “all problems pertaining to nuclear weapons in Russia are investigated by the governmental commission on nuclear weapon problems headed by Prime Minister Viktor Chernomyrdin.” What is it: an attempt to shift the responsibility, or are you just kidding?

And what makes you think that somebody from the discharged and unsatisfied could attempt a terrorist act? May I ask you whether you have ever thought that some military men on active duty could attempt a terrorist act out of despair? I am sure you know that 100% of all diversions of radioactive material (even those involving non-weapons materials) have been committed by insiders, by people who worked with the material. The same is illustrated by the theft of heat-extracting assemblies for nuclear power reactors in the Northern Fleet (see Yaderny Kontrol # 2, pp. 12-15; # 11, pp. 2-5).

Excuse me, but do you really not see the grounds for concern? As for me, I am worried about the future of this country. And your position only increases my worries.

And in this situation you applaud your victory -- the presidential order No. 350-rp of July 26, 1995, under which state supervision

over nuclear security and safety in Russia's Defense Ministry is entrusted to the Defense Ministry itself.

I cannot but agree with you that we have too many inspectors of different kinds, it would be better to spend the funds allotted to pay salaries of these "control" officials, which increased the number of officials, on a program on upgrading nuclear weapons. I do not see any reason for having inspections for nuclear security inside the Defense Ministry. I believe that the army should have more generals who could pull the trigger, not just generate red tape. It would be less expensive to the people and to the state if we have supervisors and controllers without shoulder-straps. And people with shoulder-straps should first of all be able to fight, not just produce the appearance of well-being while controlling themselves on their own.

Summarizing the above, there are all grounds to believe that presidential order No. 350-rp of July 26, 1995 is a large step backward. Considering a nuclear weapon primarily a political weapon with gigantic destructive force and given the unpredictability of the domestic political situation and growing crime and terrorism, the following measures appear to be mandatory:

1. All nuclear maintenance units, first of all those in the armed services, should be taken from the Defense Ministry and be reassigned to Minatom or to another specially set up civilian agency in the Security Council or directly in the President's Office.

2. State, truly independent, supervision should be established over nuclear safety and security at the stages of operation and use of nuclear warheads, and should be carried out not only in the units that maintain nuclear warheads, but in the combat units that operate them as well. If for bureaucratic or some other reasons such an agency cannot be set up within Gosatomnadzor's framework, it should be set up in the Federal Security Service or in the Security Council. But this agency should be a working, not just a representative one. The most recent events in Daghestan (Kizlyar and Pervomaiskoye) demonstrated that there should be effective supervision over enforcement structures and that the President, having signed the order No. 350-rp, deprived himself of reliable information on the situation regarding nuclear security in the Armed Forces.

3. At the April meeting in Moscow, devoted to nuclear security issues, the states of the "Nuclear Club" should discuss withdrawing and reassigning their nuclear maintenance units from direct subordination to their defense ministries with a view towards decreasing the threat of a military conflict involving the use of nuclear weapons.

If responsibilities for operation of nuclear weapons and of systems of their delivery, which are presently concentrated in the hands of the Defense Ministry, are separated, it will certainly decrease the threat of a non-sanctioned use of nuclear warheads by the top political leadership.

I personally do not need answers to the questions raised. I am well aware of your motives: your personal well-being directly depends on your monopoly on the right to information about the true situation regarding nuclear safety and security in the units which are directly subordinated to your ministry. And I congratulate you on this.

Alexander Rumyantsev,
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Russian Research Center of the Kurchatov Institute

ACCOUNTING AND CONTROL OF NUCLEAR MATERIAL AND RADIOACTIVE SUBSTANCES IN RUSSIA

Behind the events of 1995, the Russian public and specialists did not notice a historic fact: half a century after its founding, the Russian nuclear complex had its legal basis established. On November 21, 1995, the Russian President signed the Federal Act on the Use of Nuclear Energy No. 170-FZ. Russia was the last nuclear state to adopt an act on the use of nuclear energy, which it had been developed over a period of more than 10 years. The United States adopted its act on the use of nuclear energy in 1964.

In connection with the creation of the newly independent states, the common state system of material control and accounting (SSAC) of the USSR, which provided security over material use in peaceful and for defense activities, ceased to exist. Each newly independent state with nuclear activities faced the necessity of creating its own SSAC.

Material control and accountancy (MC&A) of nuclear material and radioactive substances (M&RSs) is one of the most important parts of national security, including nuclear and radiation security and safety at facilities where this material is used. Proper accountancy assists in the timely discovery of material loss, in identifying the causes of the loss, and detecting and preventing diversions or non-sanctioned use of M&RSs. In this respect, the MC&A of M&RSs is a necessary complement to physical protection.

All of this was reflected in Russia's new Federal Act on the Use of Nuclear Energy. According to Article 22, Russia should have two SSACs— one for nuclear material, and the other for radioactive substances and radioactive waste. Both systems have the same objectives. Both should *"evaluate the quantity of material and substances on inventory in storage areas; prevent loss, non-sanctioned use and diversions; provide state security regulatory bodies with information regarding the inventory and the movement of nuclear material, radioactive substances and radioactive waste, as well as their export and import."*

MC&A has objectives of utter importance, which are formulated in the Act, "to evaluate material in the inventory" and "to provide information on the inventory and movement" of material. A three-part plan should be set up to achieve these objectives. The first is

to create a material measurement system at enterprises and facilities in order to confirm the quantities on-hand. The second is to create a state system of reporting on material inventory and movement. The third is to create a state system of control and accountancy of inventory and of its movement. Provided these tasks are resolved, Russia will have a MC&A system that meets the requirements formulated in the IAEA document INFCIRC-153 in 1970-1972 with the participation of the USSR [1].

As a nuclear-weapon state, the USSR was exempt from obligations that were mandatory for non-nuclear-weapon states. The MC&A system which existed in the USSR was based on principles that were different from the principles of measured, counted and controlled book inventory of material balance (MB) in material balance areas (MBA) at enterprises and facilities. All non-nuclear-weapon states party to the NPT had to incorporate those principles in their SSACs. Similar principles were the basis of the existing SSACs in some of the other nuclear-weapon states: the United States, Great Britain, and France.

The MC&A system, which was used in the USSR and is now being used in Russia, is based on accountancy that relies on operational and technical C&A, based on the principle of continuous personal financial responsibility. The operational and technical C&A is carried out at facilities. Since the moment of its arrival, material is placed under the financial responsibility of a specific person on the facility's staff and is transferred to another financially responsible person upon completion of a technological transaction stipulated in the regulations. The material movement is reflected in movement charts and operational journals. This is the essence of the principle of continuous personal financial responsibility of executors for nuclear material which is processed or stored and used in the form of feed material, semi-products or ready products. For each technological transaction there is a fixed rate of technological discard or percent output of ready products from feed material.

In addition to the operational-technical C&A at facilities, there is also accountancy. This MC&A system, which is also used for ready produce and products, is based on the system of financial accounting and reporting, as well as on the industry's rules and guidelines, which were used in the USSR and is now being used in the Russian Federation. Each facility has fixed standards and deadlines for reporting, depending on the material used. Accountancy is based on making monthly, quarterly and annual book inventories of material and functions as the first stage of inspection of the operational-technical C&A. Depending on the type of nuclear material, there are procedures for monthly, quarterly and annual accountancy of inventories with accounting reports and full accounting records on all material in the inventory. The

inventory is the second stage of inspection of the operational-technical C&A.

Financial accounting is connected with technical-economic indices of an enterprise, no matter whether it is a manufacturer of products containing nuclear material or radioactive substances or whether it is a consumer, e.g. a nuclear power plant, a research reactor or an irradiated fuel reprocessing plant. The material indices -- factual material mass, enrichment level, plutonium assay — are secondary indices to this accountancy; they are controlled from the viewpoint of the given specifications of an item or product.

One of the peculiarities of nuclear material is its use in the fuel cycle, at some of its stages the cost of material may increase and exceed its initial cost, and the transfer of material from stage to stage and the changes in its properties are subject to certain physical laws. The other peculiarity is that physical properties of material (mass, enrichment on fissioning isotopes) can be derived only through measurement: direct, indirect or calculations. Any measurement practices and instruments, including calculations, are subject to measurement error. Material measurement, for example, measurement of irradiated material or material contained in technological production waste, may be very difficult and subject to serious measurement errors. The financial C&A theoretically rules out the notion of measurement error. Measurement errors are considered from the viewpoint of meeting requirements of given final specifications of feed material, semi-products and ready products. The accounting based on passport data of a plant-manufacturer can be applied to products containing sealed nuclear material, e.g. fuel rods or fuel assemblies for reactors or parts of nuclear weapons, which can be counted and controlled by a plant’s tags and seals. However, nuclear material in other forms (tablets, powder, liquid material, etc. — bulk material) cannot be counted and controlled by the piece and need measurement practices, which are incompatible with the principles of financial accounting.

For this reason only physical accounting and analysis of material, based on experimental measurement of material quantities and properties, is sound from the standpoint of logic and physics. Only physical accounting can serve as a basis for providing radiation and nuclear security, can help implement measures of physical protection and control material loss and identify its causes. Physical accounting is a universally recognized practice of MC&A used in the United States, in the states of the European Union, in Japan and many others. It is the basis of international safeguards systems that are implemented, in particular, by the IAEA and Euratom.

The USSR began to improve its MC&A systems on the principles of measured inventory of MB in 1984. These efforts were conducted under the framework of preparations for safeguards

implementation and on a voluntary initiative of the USSR, which followed the example of the United States and Great Britain. In the USSR and today in Russia, the IAEA's safeguards are limited to the VVER-1000 5th block reactor at the Novo-Voronezhsk nuclear power plant and to an IR-8 research reactor in the Russian Research Center of the Kurchatov Institute (the RNTs KI). These facilities have created and are operating MC&A systems that meet the IAEA's requirements and are based on the principles of MB.

Initially, advanced MC&A systems, based on the principle of MB, were developed for VVER-1000 and IR-8 reactors only, but, already in 1985 they were developed for all nuclear power plants in the USSR. Appropriate works were carried out by specialists from the RNTs KI, from the Central Scientific Institute of Atomic Information, from the All-Russian Scientific Institute of nuclear power plants, and from the Institute of Physics and Power Engineering (IPPE). They prepared a number of normative and technical documents concerning the problem of MC&A during the use, storage and transportation of material at nuclear power plants, worked out guidelines for C&A of fissile material during their use, storage and transportation at nuclear power plants with VVER, RBMK and BN reactors and research reactors and elaborated rules for completing IAEA-standard accounting reports concerning nuclear material at nuclear power plants.

The scientists also prepared drafts of the following documents: "Guidelines for the MC&A system at nuclear fuel cycle facilities"; "Guidelines for control of material accountancy at nuclear power plants"; "Guidelines for a centralized MC&A informational system." Finally, in the framework of the Soviet program on scientific and technical support of IAEA safeguards, automated MC&A systems that meet the IAEA's requirements were developed and incorporated at the VVER-1000 reactor in the Novo-Voronezh nuclear power plant and at the BN-600 reactor in the Beloyarsk nuclear power plant.

These works made it possible to single out the key directions for improving MC&A systems at nuclear facilities of the USSR and to formulate a number of scientific-technical problems that were to be solved with a view toward creating an advanced SSAC. They came to the conclusion that the financial MC&A should be cardinally changed and an act on the use of nuclear energy should be developed in order to create a SSAC. They also realized that the principles of measured MB and the concept of MBA could be applied only if nuclear enterprises and facilities were equipped with systems for independent material measurement and control and non-destructive practices were used. For this purpose, it was necessary to set up industrial production of measurement instruments.

Considerable efforts were made to develop MC&A systems at the most difficult nuclear facilities: the bulk handling facilities that store, process and use final products and semi-products produced from bulk M&RSs. Among such facilities there are plants for processing ore concentrates containing nuclear material, plants for chemical conversion of nuclear material, separation plants, fuel rod or fuel assembly plants, irradiated fuel chemical reprocessing plants, plants for production of ion-emitting sources containing radioactive substances, storage facilities for nuclear fuel cycle waste, research laboratories, and various experimental facilities.

R&D in the area of creating modern MC&A systems was carried out after 1991 with a view toward securing in the future implementation of the act on the use of nuclear energy under which it would become mandatory for all nuclear enterprises and facilities to create MC&A systems based on the principles of MB and meeting modern requirements. However, the R&D did not change the old MC&A system in the USSR and in Russia. It is still functioning as it did earlier. It used to be sufficiently effective for secure storage and use of nuclear material in the USSR under the socio-political conditions and closed borders of that time.

Since the dissolution of the USSR, the situation has radically changed. The permeability of Russia's borders, the problems of restructuring the economy under conditions of an on-going crisis, the loss of the old and the search for new moral values, the appearance of the cardinally new threat to security of storage and use of nuclear material - the inside threat, from personnel of nuclear enterprises and facilities, the rapid growth of organized crime and corruption, and, finally, rapidly developing political terrorism, — all these factors determine the present situation in Russia. The system of material physical protection, control and accounting (MPC&A), that now exists in Russia, should be upgraded to deal with the new realities.

In his interview, published a year ago [2], Viktor Mikhailov, the head of Russia's Ministry of Atomic Energy, stated, "The problems of accountancy, storage and physical protection of nuclear material have always existed, exist and always will exist, and not only in Russia, but in other countries as well. For example, in the United States. Why? Since nobody knows the exact quantity of the capacities for processing this material and the exact amounts of processed material due to operational loss. As far as nuclear weapons-grade material is concerned, the system of their accountancy and storage provides their absolute, I would put an emphasis on this word, absolute safety. This material cannot be diverted anywhere."

Mr. Mikhailov's assertion about the high level of effectiveness of the accountancy of nuclear weapons-grade material is well-grounded,

but it refers only to material contained in ready components and products, to which the concept of the financial accounting by unit can be applied. However, even unsophisticated readers might give a smile on hearing this assertion about their absolute safety. A professional in this delicate field should have said that the system for their accountancy and storage provides a very high level of safety and the minimal possible risk of non-sanctioned use of such material under the present (or under the previous) conditions. Nevertheless, Minatom has been attempting to upgrade even this reliable system. Otherwise, it is impossible to comprehend why additional 100,000 containers are needed, containers of a new type, out of which 50,000 will be made in the United States. The existing system is in reality reliable. There have been incidents with nuclear weapons in the United States. In the USSR and Russia, for the entire period of the existence of nuclear weapons, there has not been a single incident, except cases of the loss of nuclear weapons that were on submarines that sank.

It follows from the minister's statement that he does not use the notion of control in its entirety. This is understandable, if we recall the fact that the nuclear complex did not have the concept of an independent state control organization before Gosatomnadzor was set up. And despite the fact that Gosatomnadzor is established and it is responsible for control, Mr. Mikhailov's vocabulary still lacks this word. It is probably because he considered Minatom's inside control sufficient for effective operation of the existing system of accountancy. But then the question arises: who will compare the minister's statement that "the material may not be diverted" with the extremely frank statement that "nobody knows the exact quantity of the capacities for processing this material and the exact amounts of processed material due to operational loss?"

As long as the nuclear fuel cycle exists, there will be inevitable operational losses of nuclear material during the phases of their processing and use. Figures from a plutonium processing reactor will always exceed figures on plutonium output from a reprocessing plant. The quantity of nuclear material supplied by a fuel production plant to a nuclear power plant will always be less than the real quantity that determines power production. It is a well-known law of mankind and of the production that mankind created, it is called "the difference in the data of a sender and receiver," or just "the difference in the data of a seller and buyer." This law has only been confirmed by the world's and Russia's experience. Improvements in measurement practices result in a change of data for the actual quantities of nuclear material. It is important to discover possible mistakes in measuring and to seek ways to minimize them, as well as to find reasonable and valid explanations for the difference [in data] that has been already discovered. The current MC&A system does not make it possible to do this. Thus, the existing Russian system objectively contributes to concealing

the true causes of diversions of nuclear material that are ascribed to legitimate technological loss.

Those who are satisfied with approximate data know or estimate the degree of approximity of these data, the inevitability of measurement errors and the cost of such data and errors. They develop procedures which allow them to evaluate capacities for processing nuclear material and evaluate processed quantities. Of course, with due consideration for error, but a calculated error. They evaluate technological loss on the basis of analysis of very approximate data regarding the quantity of material diverted from production. If a reasonable explanation cannot be found for the evaluated loss, then they attempt to improve measurement practices and production up to special inventory cut-offs. They create their MC&A systems on the principles of measured BM and provide for outside control over the system's effectiveness through independent measurement of nuclear material. For this purpose they have governmental inspectors. They realize that the problems of MPC&A, together with the problems of nuclear and radiation security, at specific levels of development of the nuclear complex, become very complicated and need constant efforts to solve them. This is how the United States, Great Britain and France do it. This is what all parties to the NPT have assumed commitments to do, while Russia, judging by Mr. Mikhailov's statement, is going the other way.

It is difficult to overestimate the importance of the adoption of the federal law on the use of nuclear energy for the security of Russia's nuclear complex. The incorporated legal norms mandate standard data on the amount of capacities and on the amounts of processed material with due consideration to operational loss — those data, regarding whose absence Mr. Mikhailov informed the United States.

Many enterprises of Russia's nuclear complex have realized the urgency of the problem of improvement of MPC&A systems. The RNTs KI has dealt with this problem practically since its foundation in 1991 on the basis of the Kurchatov Institute of Atomic Energy that was included in the system of Minatom's enterprises. Obtaining independence and new responsibilities, the RNTs KI has intensified work in the area of improvements of MPC&A systems with the use of all available domestic and international experience and all possible cooperation.

The RNTs KI remains one of Russia's largest nuclear research centers that has a large number of multi-purpose nuclear facilities that have and use a considerable number of M&RSs in various chemical and physical forms, including bulk form uranium enriched to 96% and plutonium. In 1993 the RNTs KI developed a conceptual project of an advanced MC&A system for difficult nuclear facilities (of the NUMAX system), based on the principles of physical C&A for

practically all types of nuclear fuel cycle facilities [3]. The project summarized and took into consideration provisions, requirements and recommendations of the SSACs in the United States, in the countries of the European Union, in Japan and of the international safeguards systems of the IAEA and Euratom.

The RNTs KI assumed that any SSAC that will be created according to the 1993 federal act on the use of nuclear energy in the Russian Federation will be based on MC&A at facilities. Development and implementation of an upgraded MC&A system in the RNTs KI, based on the principles of MB, with practical operation of the overall system and of its constituents, were considered to be tests, whose results would provide for an increase in the safety of material handling at the RNTs KI and could be used in developing an optimal structure and principles of effective operations of a SSAC in Russia and the other newly independent states of the CIS.

The project of the NUMAX system was submitted to Gosatomnadzor at the beginning of 1994. During 1994-1995 some of the project's materials were given to some of Minatom's enterprises. In November, 1994, the RNTs KI carried out the first initial physical inventory (PI) of nuclear material at its two nuclear installations containing uranium enriched from 21 to 96 percent, using the provisions of the NUMAX project and with the cooperation of Gosatomnadzor.

The RNTs KI intensively cooperated with Euratom's Safeguards Department during the preparations for the initial PI and the development of its procedures. The results confirmed the data of the financial MC&A system used at the RNTs KI. However, the PI also revealed a number of problems. The most important one was the absence of portable systems for material measurement in Russia, which could be used in in-process PIs. In addition, it was established that the known non-destructive material measurement practices using modern measurement instruments, such as gamma-spectrometers to measure enrichment and the so-called active neutron shafts used to measure the mass of fissioning material, which are widely used abroad, do not allow one to derive MB with accountancy-acceptable accuracy. The measurement error of these instruments allows their use only for random control purposes.

Since the second half of 1994, the RNTs KI has begun to cooperate with U.S. national laboratories within the framework of the Lab-to-Lab Cooperation Program in the area of MPC&A. Extensive experience and financial support provided by the U.S. laboratories with the close cooperation of the U.S. Department of Energy (DOE) made it possible to implement several joint projects, which have already increased the overall level of the material security at the RNTs KI. The projects made it possible to develop a prototype of a computer system of near real-time material accountancy, for the

first time used in the first PI, to improve systems of physical protection at some important facilities of the RNTs KI, and to create a system of mutual distance surveillance over material storage facilities, one of which is at the RNTs KI and the other in Idaho Falls on U.S. territory. Many joint activities are being carried out at present as well. The Lab-to-Lab Cooperation Program yielded considerable results at some of Minatom's facilities, particularly at the All-Russian Research Institute of Experimental Physics (Arzamas-16), at the IPPE (Obninsk), and at the All-Russian Research Institute of Theoretical Physics (Chelyabinsk-70).

Cooperation of the Kurchatov Institute in Moscow and Gosatomnadzor made it possible in January 1996 to carry out a control physical inventory (CPI) at one of the installations at the Kurchatov Institute, which was in fact the first CPI in Russia's recent history. Gosatomnadzor's inspectors made random material measurements and statistically processed results of the inventory of bulk material containing uranium enriched to 96%. The CPI was conducted in the presence of inspectors from the U.S. NRC. The results of the CPI confirmed statements of the Kurchatov Institute's staff and were acknowledged as positive.

The activities described made it possible to accumulate specific scientific and technical capability and practical experience that will be of help in creating a SSAC. There is much work to do in order to develop a SSAC in Russia. According to some estimates, the number of MBAs at Russian nuclear facilities may reach 1,500-2,000. Procedures for PI and CPI should be worked out for each MBA. In practice, the majority of MBAs should be equipped with systems for prompt material measurement and with computerized MC&A systems. Priorities are to be established in setting up nuclear facilities with upgraded MC&A systems. In this connection, it is interesting to consider the safeguards concept recently elaborated by the U.S. DOE [4]. Under this concept, when upgrading MPC&A systems, the main attention should be paid to nuclear facilities that contain material suitable for use in nuclear weapons. So far, a similar concept has not been developed in Russia. Personnel at nuclear installations are to be trained to conduct PI and CPI. The sizes and contents used in registration and accounting documents should be worked out and standardized in order to help meet the requirement of promptly providing state agencies with data on inventories and their movement.

A long-range objective is setting up a center for processing SSAC information. It will be an equally difficult objective to implement those provisions of the federal act that concern creating an SSAC of nuclear material, radioactive substances and radioactive waste, as well as appointing agencies that will conduct this C&A. At present several Russian ministries and agencies, including Minatom, have nuclear materials. Whether the SSAC will become a non-agency

state system and will receive information directly from nuclear facilities or whether it will become just a consumer of departmental MC&A systems, if the bureaucratic approach wins, time will show. In any case, it will take considerable expenditures and time to apply the key provisions of the nuclear energy act. However, of all the possible investments into Russia's and the world's security, implementation of the federal act on the use of nuclear energy in Russia appears to be the most effective and reasonable one.

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TACTICAL NUCLEAR WEAPONS IN THE NEW GEOPOLITICAL SITUATION

In recent years, the attention of the international community has been focused on the problem of reducing strategic nuclear weapons, especially in connection with the ratification of START I and the preparation of START II. The signing of these documents became the logical culmination of the forty years of the Cold War. However, there are so many accumulated problems that it will take years for the international community to pass into a new, stable state that will open the way to a non-violent, nuclear-weapon-free world. U.S.-Russian relations have been influenced by the transitional processes that produced a number of important political and military issues. Among them the problem of nuclear weapons is one of the most important.

In contrast with the wide coverage of problems of strategic offensive arms, there have been few reports on the situation and prospects regarding tactical nuclear weapons (TNW). Strange as it may seem, even the most important military and political documents, such as *The Strategy of U.S. National Security* and *The Key Provisions of the Military Doctrine of the Russian Federation,* do not directly address TNW. Perhaps TNWs really do play a very modest role in military doctrine? What role should they play in the policy of deterrence and in preventing wars in the new geopolitical environment?

What is a TNW?

Already in the 1950s, after the first nuclear bombs were created, the United States began to develop and test battlefield nuclear weapons. As nuclear warheads became smaller in size, projectiles for 155mm and 203mm self-propelled howitzers, which have until recently been in service in the U.S. arsenal in Europe, entered into military service. Soon tactical missiles with nuclear warheads were introduced. In the middle of the 1960s the theatre ballistic missile *Pershing-1* was developed. At the same time, the United States paid great attention to creating the aircraft delivered component of TNWs. Special nuclear weapon delivery systems, including sea-based ones, were developed. Soon the accumulation of TNWs gathered momentum, and by the beginning of the 1970s the U.S. arsenal numbered about 7,000 multi-purpose warheads, almost all

of which were deployed in Europe. As the United State updated its weapons, it withdrew some nuclear warheads from Europe and, according to former U.S. Secretary of Defense Robert MacNamara, the United States had the following TNW stockpiles on the continent in the second half of the 1980s: 1,075 aircraft bombs, 1,660 artillery munitions, 180 warheads for *Pershing* missiles, 895 warheads for Lance and Honest John missiles, 130 warheads for cruise missiles, and 870 anti-aircraft rounds and mines. Thus, there were 4,680 warheads in all (1). The yields of tactical warheads ranged from one to several hundred kilotons. But the highlight of the scientific and technical progress was the creation of the weapon with selective effects — a neutron bomb for 155mm and 203mm guns, as well as the creation of warheads for *Lance* missiles with the yield ranging from one to 10 kilotons.

The Soviet military and political leadership thought that augmenting U.S. forces stationed in Europe with TNWs would fundamentally change the correlation of forces. The USSR took decisive measures to create and deploy numerous types of TNWs. As a result, already at the beginning of the 1960s tactical missiles and the first fighter-bombers capable of delivering nuclear weapons began to enter into military service. Later the nuclear arsenal was enhanced with medium-range missiles and bombers, theatre ballistic missiles, 152mm, 203mm and 240mm nuclear artillery, tactical aircraft and naval-based delivery systems (2). Gradually nuclear weapons entered into military service in all armed services and began to be regarded as the basis of their combat power. According to data published by *News Week*, at the end of the 1980s tactical nuclear warheads were located on the territory of all Soviet republics: the Russian Federation had 12,320 warheads, Ukraine — 2,345, Belarus — 1,180, Kazakhstan — 330, Lithuania — 325, Latvia — 185, Turkmenia — 125, Uzbekistan — 105, Moldavia — 90, Georgia — 320, Estonia — 270, Armenia — 200, Tajikistan — 75, Azerbaijan — 75, and Kirgizia — 75.

The military-strategic views on the possible nature of a military conflict did not drive the nuclear weapons race any more. The creation and accumulation of nuclear weapons was subordinated to internal military and technical logic and clearly demonstrated the utter absurdity of the plans for the use of nuclear weapons on a massive scale. Nevertheless, during the Cold War it was impossible to stop the weapons race and, under experts' estimates, by the end of the 1980s the U.S. Army and Navy had more than 11 thousand strategic and 7-8 thousand tactical warheads. The USSR had 11 thousand and 15-17 thousand, respectively.

At present, the core of U.S. TNWs is made up of land-based and naval aviation capable of delivering bombs and cruise missiles. Tactical aviation has F-111 fighter-bombers with a combat radius of 840 kilometers, which can deliver three nuclear bombs, type B-61,

with a yield of 1-345 kilotons. Carrier-based and marine aviation have A-6E attack aircraft with a combat radius of 1,250 kilometers, also carrying up to three B-61 bombs, and the multi-purpose aircraft F/A-18 with the combat radius of 850 kilometers with two B-61 bombs. It should be pointed out that in case of war the United States can set up 15 carrier-based formations that can quickly sail to any region of the world and deliver nuclear strikes.

Russia's tactical aviation has Fulcrum, Fitter and Fencer fighter-bombers with combat radii of 300 to 600 kilometers. They can deliver two bombs with yields of up to 350 kilotons. Naval aviation has May, Bear F and Mail aircraft with combat radii of 600 to 1,700 kilometers. These aircraft are also equipped with two nuclear bombs. Among Russian medium range aircraft are the Badger, Blinder and Backfire. Recently Russia has carried out tests of a new tactical missile which were reportedly *successful.* There is the possibility that in the coming years it will enter into military service with the army and replace the SR-8 missile system, which has been decommissioned under the Treaty on Intermediate and Short Range Missiles (ISRM).

Today the United States and Russia can arm their warships and submarines with cruise missiles, torpedoes and bombs with nuclear warheads with yields of dozens to hundreds of kilotons, which have been removed from their warships and stored on their military bases under the mutual commitments of the U.S. and Russia.

The performance data of TNW cited above demonstrate that there is no clear dividing line between strategic and tactical nuclear weapons. This division is based on the combat range of nuclear weapon delivery systems. Combat systems that made it possible for the United States and Russia to deliver strikes on each other's territories were traditionally considered strategic nuclear weapons, while missile delivery systems with combat radii of up to 500 kilometers and aircraft of theatre aviation were referred to as tactical ones. Estimating combat capabilities of TNWs, one comes to the conclusion that they are mostly strategic weapons, though deployed on tactical delivery systems. This conclusion is based on the fact that in combat TNWs can be used to achieve strategic objectives. If we compare the effects of tactical weapons and of strategic weapons, we will see that aviation bombs of the United States and Russia have more powerful yields than warheads for the ICBM Minuteman-2 (170 kilotons) and for the SLBM Poseidon (40 kilotons). One should not forget that the United States dropped only two nuclear bombs with yields of 15 kilotons (tactical weapons under the present classification) on Hiroshima and Nagasaki to prompt Japan immediately surrender (a strategic result).

On the Concept of Deterrence and On Russia's Policy regarding TNWs

In the 1990s Russia had to review its role and its place in international relations, to determine potential threats to its security, and to find methods of confronting them. Taking into consideration the economic crisis and meager capabilities to equip its army and navy with new weapons, Russia will have to rely on nuclear weapons to provide its security not only today, but tomorrow as well. To this day the Strategic Rocket Forces (SRF) have been the main means for deterrence of the potential enemy. This was also the case during the Cold War, when the strategic stability was based on the so called *central confrontation* between of the USSR and the United States. As the intensity of the U.S.-Russian nuclear confrontation declined, the role of the *central confrontation* has noticeably decreased. At the same time, there has been an increase in the threat of regional conflicts, and the proliferation of weapons of mass destruction and of missile technologies. This is particularly sensitive for Russia and its allies since unstable states, hostile states, and potential covert proliferators of weapons of mass destruction have formed a belt along Russia's southern, western and far-eastern borders. In addition, despite the declared Partnership for Peace Program, NATO does not rule out the possibility of military conflicts with Russia. The exercise *Certain Caravan-92* proves this as well. The scenario of the exercise was based on a conflict between Russia and the Baltic States because of the territorial problems and violations of the rights of ethnic Russians in these countries.

TNWs have more political-military importance to Russia than to the United States because of Russia's geopolitical location. U.S. TNWs can be described as "war for export". For this reason, it is hardly reasonable for Russia to have a TNW doctrine that is *similar* to that of the U.S. The method of "mirror imaging" cannot be applied here. The composition and structure of Russia's nuclear forces, including tactical forces, should be determined by its national security interests and its economic potential. A majority of analysts and military experts share the viewpoint that a nuclear weapon is a *political weapon* whose major function is to deter a war, though there are various slants on this opinion. Some experts consider the nuclear weapon to be a purely political means that will never be used because of its disastrous effects. However, deterrence policy may be effective only in those cases in which there is a high likelihood of the use of nuclear weapons under exactly specified conditions. Unlike strategic nuclear weapons, which are designed mainly to *deter,* the tactical nuclear weapons could not only deter, but *repel* aggression as well.

The report "On Rapprochement of Russia's and the United States' Defense Policies", made by the Council for Foreign and Defense

Policy (Moscow) and the Center for Strategic and International Studies (Washington), contains a clear-cut approach to the concept of deterrence: “Any nuclear power that has been attacked or that is facing the threat of a complete defeat may use a nuclear first strike as the last resort at a specific moment. In any case a purely declarative policy will be meaningless and even misleading. What is important here is to prepare for a first strike through deploying nuclear weapons, developing operational plans, and conducting exercises.” (3) This provision can be fully applied to TNWs, and it has been finding growing support from military theorists. The prominent military theorist General Makhmut Gareev gives a similar estimate of the role of nuclear weapons: “Determination and readiness to respond to any aggression with a first strike provides the nuclear power with the most effective deterrence in regard to warning a potential aggressor and to increasing the reliability of its nuclear weapons.” (4)

Over the last few years there have been more and more secret proliferators of different types of weapons of mass destruction — nuclear, chemical, and biological. The question arises: how can one most successfully deter such perpetrators? The use of strategic nuclear weapons is hardly the best scenario. Should one threaten an aggressor with the delivery of a countervalue strike of a half megaton yield? Or, perhaps, should one just deliver a strike with a TNW of a comparatively small yield on the aggressor’s forces? In this case (unlike the U.S.-Soviet one) the defender could make a *demonstrative explosion* of a TNW in order to show his determination to use nuclear weapons. This explains the fact that “The Main Principles of the Military Doctrine of the Russian Federation” stipulates situations in which the Russian Armed Forces can use nuclear weapons. And they should be ready to do that in practice. This is what makes the deterrence policy convincing and effective.

Unlike conventional arms, that can deter the potential enemy only in case either of their superiority or of approximate parity, nuclear arms deter a potential aggressor even in case of the aggressor’s considerable superiority. And the Caribbean crisis is the best illustration of this.

The concept of deterrence has been changing in the new geopolitical situation. It has become more vague and less predictable. During the forty years of the Cold War, the USSR-United States mutual deterrence was enviably stable, based upon the balance of strategic arms. In addition to the approximate balance of military forces, the deterrence policy was to a certain degree based on the predictability of the two sides’ actions. In fact, strategic viewpoints of the top political-military leadership of both countries were converging. The understanding of the logic of each

other's reflective behavior gave certain confidence in its effectiveness.

It may be quite different if one of the sides has secretly obtained some weapon of mass destruction. As U.S. political scientist Paine observed, *the use* of nuclear weapons cannot eliminate the human capability of irrational behavior and of making mistakes with serious repercussions. In this connection he raises a number of important issues that could determine the effectiveness of deterrence policy concerning the third countries. How well do you know the regime you are attempting to deter? Are you sufficiently knowledgeable about the process of its decision-making? Do you know the types of threats that will influence your potential enemy's decisions, and do you know its system of values? Paine warns that if you do not have precise answers, then the deterrence policy will hardly be a preventive one. In this case it will rather aim at repelling, but not at deterring, aggression.

The Problem of Reductions of Tactical Nuclear Weapons

Since both the Soviet Union and the United States had large arsenals of nuclear weapons, there was a real danger of an exchange of nuclear strikes if there was a conflict. The leaders of both countries realized this danger, as well as the necessity of considerable reductions in nuclear weapons. The U.S.-USSR (Russia) agreements on the limitation and reduction of strategic offensive arms and medium-range missiles created favorable preconditions for solving other problems concerning disarmament. The reduction of TNWs, however, faced serious obstacles. For a long time NATO had opposed the USSR's proposals to start negotiations on tactical nuclear weapons, despite the desire of Eastern European countries to decrease the nuclear danger. Their fears resulted from the fact that the continent is very densely populated and has many industrial centers, including potentially dangerous ones. For example, in 1995 NATO conducted the large exercise *Carte Blanche* involving the simulated use of TNWs in Europe. During the exercise, possible civilian casualties were estimated based upon the use of 268 tactical nuclear weapons. According to these estimates, the losses and casualties would be approximately five times higher those of World War II (5). It was not only military factors that accounted for the West's negative attitude toward negotiations on TNWs: during the Cold War, these weapons had become embedded in the political structure of Western Europe and cemented the link between the United States and the other NATO members. They thought this to be the main role of TNWs.

The United States regarded their TNWs in Europe as a means of strengthening their leading position in NATO, and of influencing political-military and economic policies on the continent. The West

viewed the Soviet proposals to start negotiations on TNWs as an effort to undermine NATO's solidarity. However, these were not the only obstacles on the way to the negotiations. There was the serious problem of verification of the dismantlement of TNWs. Unlike the strategic means of delivery, which are easily controlled, tactical means of delivery are dual-purpose. They can deliver not only nuclear, but conventional warheads as well. This makes their elimination difficult. Hence, it was necessary to dismantle nuclear warheads. However, it was impossible to carry out mutual political and technical control over the dismantlement process during the years of confrontation between the two super powers.

Even then it became obvious that the only real way to reduce TNWs is through unilateral initiatives that rule out the necessity of mutual control. However, it took years to create conditions favorable to such initiatives.

In September 1991, U.S. President George Bush made an unexpected initiative to reduce and even destroy specific types of TNWs. He declared that the United States would withdraw to its territory and destroy all artillery ammunition and warheads from tactical missiles, and dismantle all TNWs based on surface warships, on multi-purpose submarines, and on land-based naval aircraft. All *Tomahawk* nuclear cruise missiles were to be removed from warships, and nuclear bombs were to be taken off aircraft carriers. He said that a considerable percentage of naval-based warheads would be destroyed. At the same time he warned that the United States "would keep the effective nuclear air-based capability in Europe."

Responding to Bush's initiative, Gorbachev announced plans for the radical reduction of the Soviet TNWs. Those plans were subsequently developed in Yeltsin's January 1992 statement "On Russia's policy in the area of arms limitations and reductions". It stated that Russia had ceased production of artillery ammunition and of warheads for land-based missiles, and that all stockpiles of such warheads would be destroyed. Russia would remove all TNWs from warships and multi-purpose submarines, and destroy one third of TNWs and a half of its warheads for antiaircraft missiles and aviation ammunition. Western experts estimate that the planned reductions will leave Russia and the United States with 2,500-3,000 nuclear warheads.

The question arises: why did the United States suddenly make this unexpected move? There are several reasons. The tragic events that took place in the USSR in August 1991 provided the initial momentum. There was the threat of the emergence of several independent nuclear states out of the former Soviet Union The main danger was posed by Soviet nuclear tactical weapons, which were numerous, comparatively small, and scattered throughout all

of the Soviet republics. The U.S. leadership did not feel very happy about the prospects of a few additional nuclear states joining the "Nuclear Club", even more so because of the unstable domestic situations in those states. It should be pointed out that the General Headquarters of the Armed Forces promptly withdrew all TNW stockpiles to Russia, first of all from the republics with unstable political regimes. By June 1992 all TNWs had been transported to Russia, and Russia became the nuclear successor of the USSR.

Also, the Gulf War changed the views of U.S. military specialists. During the war high precision weapons (HPW) were used for the first time on a massive scale, and they successfully attained the combat objectives that had been planned for TNWs. Russian military experts estimate the present strategic capability of U.S. HPWs to be equal to 500 tactical nuclear warheads, and that this capability will continue to increase. (6)

By that time the fundamental change in the correlation of forces in Europe became a decisive factor that made the United States change its position toward TNWs. Implementation of the Treaty on Conventional Forces in Europe would provide NATO with even more superiority over Russia. The correlation would be approximately three to one. In this situation, the *deterring* role of TNWs appeared to be an obvious relic of the Cold War.

Under the unilateral initiatives of Russia and the United States, the artillery ammunition and warheads for tactical missiles were to undergo the most radical reduction, including their destruction. Assuming these commitments, both countries thought that this would raise the nuclear threshold and decrease the possibility of a conflict in Europe. Being dual-purpose systems, the artillery guns and missiles in large quantities are deployed directly in battlefield formations and may be used even in conventional military operations if the threat of their loss appears in combat. Another danger is the probability that during military operations strikes may be delivered on nuclear warheads storage places on the battlefield, on artillery and missile firing positions, and on control and communications posts of TNW subunits. All of this made the countries agree that such weapons are the most destabilizing ones and should be destroyed.

However, many Russian experts share the opinion that a number of TNWs, principly the air-based ones, should be preserved in the current geostrategic situation. This makes it difficult to agree to totally destroy TNWs, as theorists, including military ones, propose. Remaining devoted to the idea of further reductions of nuclear weapons up to their total elimination, Russia considers this process to be a long-term one.

Should Russia Hurry in Dismantling Its TNWs?

In discussing Russia's policy concerning nuclear weapons, including the tactical ones, it should be pointed out that the world community will inevitably have to reduce nuclear weapons stockpiles up to their complete elimination in the future. There are no doubts, however, it is a long journey to a nuclear-weapon-free world. The reduction and destruction of nuclear weapons should be considered in the general context of creating an effective system of international security. These two processes should be coordinated.

After the Warsaw Treaty Organization (WTO) dissolved and the CFE Treaty was concluded, NATO received considerable superiority in the correlation of forces. Moreover, the former WTO allies of the USSR began to seek entry into NATO, which would only increase the imbalance of forces on the continent. There are hardly any doubts that the correlation of forces will continue to determine strategic stability in Europe for a long time, given present geopolitical conditions. In this connection Russia is facing an acute problem — how to most effectively correct the present imbalance. Giving consideration to its geopolitical and economic situation, Russia will have to rely on its nuclear weapons, in particular, on the TNW, in order to protect its security, sovereignty and territorial integrity until an effective system of collective security is created. It is the TNW, with its comparatively high index under the *effectiveness/cost* criterion, that could serve as an equalizer of its kind, depriving NATO of its military superiority. Today Russia may borrow NATO's recent thesis that superiority in conventional arms should be countered by a nuclear arsenal.

The Plans for NATO's expansion to the East are also an important argument in favor of a more thorough consideration of the TNWs future. Many Russian political scientists believe that NATO's enlargement may destabilize the situation on the continent. The dividing line between Western and Eastern Europe is rather a political than a geographical notion. The First and the Second World Wars were started along this dividing line and any attempt to break the present geostrategic situation on the continent could have very serious repercussions. The opinion of the Foreign Intelligence Service expressed in November 1993 is very significant in this respect. In particular, it reads: "It would be incorrect to assume that the aim of NATO's geographic expansion is to create a springboard to strike Russia or its allies. However, this does not mean that NATO's expansion to the East leaves Russia's military security interests unaffected." (7)

Recently there has been wide discussion of the possibility of deploying U.S. TNWs on the territory of NATO's new members. During their summer 1995 visits, U.S. Secretary of Defense William

Perry and Chairman of the Joint Staff General John Shalikashvili suggested the state leaders seeking NATO's membership should determine their positions toward the possible deployment of nuclear weapons on their territory. General Secretary of the North-Atlantic Alliance Willy Klas vaguely discussed the same idea when he made public the findings of the "Research on NATO's enlargement" at the end of September 1995. After he stated that the "nuclear weapons will not necessarily be deployed" on the territory of the Eastern European countries, he said that the current plans stipulate the creation of a nuclear infrastructure only for the time being. However, it is evident that, provided such an infrastructure (centralized control system, nuclear weapons storage facilities, up-graded airfields, etc.) is created, the nuclear weapons could be deployed on the territory of those countries within a few days.

Despite the fact that NATO's leadership was very cautious in discussing this topic, some Eastern European governments' leaders decided to anticipate the events, and declared their readiness to deploy nuclear weapons on their territory. The Czech Republic and Poland were the first to do this, they were followed by Albania, Hungary, Bulgaria, and Rumania. Of course, what is meant here are TNWs.

There are hardly any doubts to who the target of these weapons will be. Though it will not pose an immediate threat to Russia, many political scientists see beneath NATO's activities the desire to obtain leverage in influencing Russia's domestic and foreign policies. However, these efforts could produce the opposite result, and Russia might strengthen its TNW arsenal and increase the role of TNWs in providing for its national security. Another argument in favor of preserving TNWs is the extremely unfavorable operational-strategic situation in connection with the flank limits under the CFE Treaty. The Treaty no longer corresponds to Russia's interests. NATO's recent proposals "On the Flank Package on the CFE Treaty" are half-measures, and cannot substitute for Russia's proposals to review the flank quotas. The positions of both countries became somewhat closer during Yeltsin's visit to the United States in October 1995. However, to date not all areas of disagreement have been settled.

In recent years, the world's leading countries, particularly the United States, have been paying a great deal of attention to developing and deploying HPWs. There are no bans on HPWs. However, HPWs are extremely costly, and nuclear weapons have much higher *effectiveness-cost* indices. Russia cannot afford mass production of HPWs, even R&D in this area is facing serious obstacles. This makes many military specialists think that the most effective and the least expensive way for Russia to compensate for the imbalance in HPWs is to preserve an arsenal of TNWs.

Unfortunately, nuclear weapons, including tactical ones, cannot provide for Russia's security. Nevertheless, they can be a guarantor that the tragic events of 1941 will never recur.

At present Russia does not have a theoretical conception for nuclear deterrence that would determine the new role of TNWs with due consideration for the possible proliferation of weapons of mass destruction in the world. It should be developed by teams of scientists and leading experts from governmental and non-governmental organizations, since it is hard to overestimate the importance of this task.

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Prospects and Conflicts of Russian Nuclear Deterrence

Nuclear strategy has always been derived from more general and deeper political premises. Since the Communism collapsed in Eastern Europe and the USSR, and the USSR dissolved, the ideas of Russia's leadership and of its leading political forces regarding the role of the former Soviet nuclear arsenal have become important indicators of Russian strategic intentions.

A consecutive decrease in the role of the nuclear factor in Russia's foreign and military policies, which started beginning 1992, in practice reflected deep conceptual changes in Russia's strategy on the world stage. The new policy rejected confrontation with other states, sought integration into the world system, and gave priority to the economic, social and political improvement of the country.

In contrast, the policy of nuclear deterrence explicitly or implicitly suggests Russia's perception of the world as something hostile. In this case Russia's greatness is made dependent not as much on social improvements, as on restoring its military capability and geopolitical spheres of influence. This policy represents primarily the interests of powerful groups who are connected with the military-industrial complex and who are attempting to overcome the industrial crisis through large investments. But in its turn, this requires a revival of the old confrontation and, consequently, a foreign enemy who jeopardizes Russia's interests.

Is Russian Nuclear Policy Being Reviewed?

By the end 1992 and the beginning 1993, Russian nuclear policy had more or less been reviewed and had two key objectives. The first was to secure Russia's status of the only nuclear power on the territory of the former USSR, and to establish Moscow's undivided control over all nuclear arms left over in the newly independent states after the dissolution of the Soviet Union. The second was to seek ways to cooperate with the United States with a view toward decreasing the nuclear confrontation and reducing nuclear arsenals. In particular, it proceeded from a realistic assessment of Russia's military and economic capabilities after the dissolution of the USSR and the budgetary shortfalls regarding defense.

This policy was realized through the START II Treaty, signed in January 1993, and through agreements on the cutoff of weapons-

grade plutonium production and on the utilization of uranium components from warheads subject to reductions, including the sale of 500 tons of highly-enriched uranium that is to be blended down, to the United States. There were several agreements concerning providing Russia with aid in the destruction of decommissioned strategic systems.

Russia also made a number of forthcoming moves to the United States. First, it agreed to destroy multi-warhead (MIRVed) intercontinental ballistic missiles (ICBM), including the heavy ones. In its turn, the United States agreed to reduce more than by half the overall quantity of its strategic warheads. It should be pointed out that Russia cannot afford production of the modern multi-warhead SS-24 and SS-19 rail mobile ICBMs without close cooperation with Ukraine and has very limited capabilities to replace the aging land-based missile systems while the United States can easily maintain its strategic forces at the level determined in the START II Treaty.

In addition, the United States helped Moscow resolve a very important issue regarding Ukrainian strategic arms. Without Washington's pressure, the Ukrainian leadership could have delayed solution of this key problem for years. There was financial aid as well. Thus, in 1994 Russia received $60 million from the United States, which made it possible to implement the trilateral U.S.-Russian-Ukrainian agreement on dismantling Ukrainian nuclear weapons and on nuclear power plants (NPP) fuel supplies to Ukraine. In July 1995, the United States and Russia signed a protocol for the allotment of an additional $100 million for these purposes in 1996 and 1997 (1). To the Russian nuclear complex, which has been suffering from acute budgetary shortfalls, it was also very important to conclude an agreement on deliveries of nuclear fuel worth $11.2 billion to the United States over a period of 20 years. Agreements on cooperation in the destruction of nuclear weapons, which is a difficult and costly process, also corresponded to Russia's interests. In other words, the policy was a pragmatic, rather than an ideological, one. It assumed that it was not the United States, NATO or generally the West, but rather unstable regions of the near abroad, primarily to the south of Russia, that could pose military threats to Russia in the new geopolitical situation. For this reason, creating small, but highly-effective mobile forces could have been considered, and perhaps was considered, by Russia to be a more important objective than developing its nuclear potential.

Of course, this policy faced problems as well. Already at that time supporters of Russia's nuclear deterrence policy had a strong lobby in the industrial, military, political and scientific communities. For example, the document "Strategy for Russia," which was prepared under the leadership of the Presidential Council's member Sergei

Karaganov and published in the middle of 1992, stated that “Russia’s present economic and political weakness, as well as its interests, make it necessary to preserve its reliance on nuclear weapons and on nuclear deterrence policy. In the near future (10 years) a comparatively powerful nuclear potential will nullify practically any technological breakthroughs and superiority of military capabilities. The threat might increase if the role of the nuclear factor continued to decrease...” (2).

The Concept of the Military Security of the States-Participants of the CIS, which was adopted by CIS governments in Bishkek in October 1992, expressed an even more clear-cut position. “To prevent a war through nuclear deterrence of the potential enemy” was, as the document emphasized, one of the major tasks of the United Armed Forces of the CIS. It directly stated that the military threat from the West remains in the new geopolitical situation as well. The authors of the Concept underlined that, “those powerful forces of strategic offensive arms, i.e., the army, air force and navy, which are deployed along the outer borders of the Commonwealth during times of peace and which belong to the neighboring countries of the Commonwealth, are unlikely to undergo major reductions and will continue to present the main potential danger to the security of the Commonwealth.” (3) There are hardly any doubts that the aforementioned forces could belong to only a narrow circle of Western states, the most powerful ones from the military viewpoint, and to the People’s Republic of China.

The correlation of forces between supporters of the pragmatic course regarding national security and those who advocated nuclear deterrence must have been changing in favor of the latter. Already by the end of 1993, there were some indications that the policy of reducing the nuclear confrontation was being reviewed. In November 1993, the new Russian military doctrine was officially approved. Among other key principles, it contained the nuclear deterrence policy and gave up the earlier adopted principle of the non-first use of nuclear weapons.

In the second half of 1995 more and more indications surfaced that Russian nuclear policy might be reviewed. Russia’s new possible strategy was summarized in a lot of articles, primarily on security. Many of them were either written by military experts or referred to anonymous sources in military agencies. The most widely known of these was written in an institute for defense studies. It offers strong confrontational precepts. The concept can be boiled down to the following key points. The first is that a number of states, including the leading states of the West, primarily the United States and Germany, are posing a growing threat to Russia. The United States and Germany are attempting to preserve Russia’s geopolitical and military weakness, to isolate it as a state, to penetrate into its traditional spheres of influence and zones of interests, and even to

throw it back from present positions. The supporters of this concept insist that this policy aims to deter Russia as a superpower. It is being realized through NATO's expansion to the East, Turkey's desire to firmly establish its position in Transcaucasia and Central Asia, and Japan's claims for the South Kurile Islands, etc. The second point is that only nuclear deterrence can counter the emerging political and military threat in the current situation in which Russian conventional forces are so weak. The supporters of this approach state that it is important to not only preserve the capability of deterrence at the strategic level, but to fully use all capabilities of tactical (actually substrategic) nuclear weapons to protect Russia's positions at the regional level.

"The only thing that has been restraining the ambitions of our new 'friends,'" the Commander of the Black Sea Fleet, Admiral Eduard Baltin says, "is the nuclear weapons which Russia still has. Though the West has been constantly attempting to place under its control the production, testing, deployment, and reduction of these weapons." (4) Experts from the Institute for Defense Studies were even franker. "Under these conditions (e.g. NATO's enlargement), the only possible way is nuclear deterrence of NATO not only in the Western theater of operations (TOO), including the former Soviet-Polish border and the Baltic Sea, but on the northern TOO, including the Russian-Norwegian border and the Barents Sea, and in the southern TOO, including the Black Sea and Russian military bases in the Crimea, Abkhazia, Georgia, and Armenia. Tactical nuclear weapons should become the basis of Russia's defense in all the three TOOs (5).

So far such viewpoints have been nothing but the statements of some experts, politicians, and the military. However, there have been some hints in the press that Russian security policy, including nuclear policy, is being reviewed. Thus, Nezavisimaya Gazeta wrote in 1995: "It appears that more clear-cut and reasonable objectives will soon be set out for national security strategy" (6).

So far, there have not been official statements that Russia's military doctrine may be reviewed. Nevertheless, some moves of the executive and legislative branches have indicated certain changes in this area. First of all, the delay with the ratification the START II Treaty is becoming conspicuous. The main precondition for its ratification was Ukraine's adherence to the Treaty on the Non-Proliferation of the Nuclear Weapons. On 16 November 1994, Ukraine's Verkhovnaya Rada (Supreme Council), by a vote of 301 to 8, adopted the Act on the adherence of Ukraine to the Treaty. Two weeks later, on 5 December 1994, the United States, the Russian Federation, Ukraine, and Great Britain signed the memorandum on security assurances to Ukraine, which was the key condition of Ukrainian legislators. However, the START II Treaty was forwarded to the Russian State Duma only on 20 June 1995. At that time it was

already clear that Russian legislators were more concerned with their own re-election than with national security problems and would hardly be inclined to consider ratification before the December elections. It remains unclear when the new parliament will get down to work on this treaty and what its verdict will be. Meanwhile, despite the fact that Russia's military leadership clearly supports the treaty's implementation, the military community believes that START II may be ratified only with considerable amendments. Thus, Colonel-General Yuri Plotnikov, chief of the Dzerznihsky military academy, directly states, "the majority share the viewpoint that the START II Treaty can be ratified only after certain amendments are made. One should not dictate to us what the composition our Strategic Rocket Forces (SRF) should be. The quantity of warheads have been determined, that is all that is needed. It is up to Russia to decide where they should be deployed. Also, we should not hurry with the destruction of MIRVed ICBMs, which are so unpleasant to the eventual enemy. Current developments have shown that there is still the possibility of a third world war. For this reason we should make use of all of our achievements. And these so-called "clever" missiles should be at the ready." (7) In other words, it is suggested that one of the Treaty's key provisions should be eliminated in an amendment to the Treaty. If this idea is realized, then the Treaty is likely to be undermined. At the same time, it is not altogether clear how Russia could "maintain the readiness" of heavy missiles without the cooperation of Ukraine.

The orientation of nuclear deterrence in Russian security policy might have certain negative political and military consequences. Deterrence presupposes that there is a powerful enemy that should and can be deterred from the use of force, from aggression, or the threat of aggression only with the threat of retaliation or the first use of nuclear weapons. Otherwise, there is no sense in deterrence. Consequently, the question arises — who is this enemy and from what specific moves should it be deterred?

Numerous Russian articles contain an answer to this question — such an enemy could be the West, and first of all the United States. But if this statement enters state documents, it will do nothing but increase the West's suspicions regarding Russia and, probably, prompt it to undertake some practical measures. It should be pointed out that the plans for NATO's enlargement took shape soon after the new Russian military doctrine was adopted in the fall of 1993. There are grounds to believe that the United States would carry out a whole set of military programs, including creating offensive arms, anti-aircraft systems, and new types of nuclear and non-nuclear weapons in response to Russia's nuclear aspirations. All of this would affect considerably the present correlation of forces. It would affect the present correlation even more if nuclear weapons with super powerful impulses able to destroy electronic equipment

in communication and control systems, on-board computers of ballistic and cruise missiles, etc., are developed and put into service.

In addition, nuclear deterrence could be used for various political purposes. First of all, and in the most natural scenario, nuclear deterrence could be used to prevent foreign aggression or its threat. But there is another scenario as well, in which there is a crawling geopolitical expansion behind outward nuclear deterrence. The most simple scenario of this kind could develop as follows. A state that is expanding its sphere of influence would constantly put before the opposing state a choice: either to put up with a comparatively insignificant retreat, or to risk the emergence of nuclear confrontation. Russian nuclear deterrence policy could be perceived by the West as an attempt to disguise its attempts to restore the Russian empire or to make the near abroad a sphere of influence.

Russian Nuclear Deterrence and Strategic Stability

Nuclear weapons are often considered to be a means that can compensate for weakness in conventional arms. This argument has been used by supporters of Russian nuclear deterrence policy. Indeed, the weakness of the Russian conventional forces is obvious today. This is a result of many factors:
— Russia has lost regions of strategic importance in the outlying southern and western regions of the former USSR, the arms of the follow-on strategic forces deployed there, and thus portions of its military infrastructure: first of all air defense, communications, intelligence, command and control, airfields, etc.;
— budgetary shortfalls do not make it possible to carry out a large-scale military reform to increase of the readiness of the Armed Forces;
— the army has been receiving less up-to-date equipment; the troops have been inadequately trained;
— the military-industrial and military-scientific complexes are in a critical situation.

However, the question is whether all these problems could be resolved with the help of nuclear weapons, which are comparatively inexpensive, if based on the criterion of effectiveness-cost. Despite the seeming simplicity of the problem, it is a complicated one. One should keep in mind the other side of the problem — whether reliance on nuclear weapons would facilitate strategic stability at the global level and stabilization of crises at the regional level? In other words, the questions are whether this policy would result in the escalation of a conflict, whether it would prompt the rivals to use their forces, including nuclear ones, or whether it would deter them from this. In order to find answers to these questions, one

should consider at least three scenarios. The first is when the Russian nuclear weapons serve to compensate Russia's weakness in conventional arms if there is a threat from a non-nuclear-weapon state with powerful and numerous conventional arms or from a nuclear-weapon state whose nuclear weapons are inferior to Russia's in being poorly protected and unable to withstand a counterforce first strike. China could be such a state until it upgrades its nuclear capability.

In addition, the sub-strategic nuclear forces could considerably enhance combat efforts if they have some other tasks, for example, anti-warship defense, anti-aircraft defense, or frustration of a large tank offensive, etc. In a number of cases appropriate nuclear weapons could add up to stabilization. However, such defense-purpose systems would lose their stabilizing role if they were used, for example, to support conventional offensive operations in the outlying districts between Russia and the West. On the whole, the substrategic nuclear forces, especially the air-based ones or the naval-based ones, which are able to deliver strikes on facilities several kilometers away from the front line, are a destabilizing factor. At the regional level nuclear deterrence could be effective only if the opposite side is convinced that Russia can physically and politically use tactical weapons. This means, at a minimum, that appropriate systems should be deployed in formations and should have a high degree of combat readiness, personnel should be trained to use them and that there should be an official doctrine stipulating the conditions for the use of such weapons in regional conflicts. Nevertheless, the more Russia is ready to use substrategic arms, the stronger the potential enemy's desire to stage a preemptive strike at the substrategic level. Any state that believes that tactical nuclear weapons may be used against it, inevitably faces the choice — either to deliver a pre-emptive strike or to count on nuclear deterrence. In this connection, the question concerning the role of the strategic nuclear balance arises.

The perception of the stabilizing role of nuclear weapons was created during the Cold War and was based on the experience of strategic relations between the USSR and the United States, as well as between NATO and the Warsaw Pact. There were two conditions that caused this. The first was the high probability of practically automatic escalation of armed hostilities in the following cases:
— an armed clash between the USSR and the United States, which might have been the case, for example, in the Caribbean crisis in 1962;
— a large military conflict in Europe, involving NATO and the USSR, if Soviet troops begin to win;
— an armed conflict in the Far East in case of a Soviet attack against Japan.
In the last two cases, a special role belonged to the reliability of the so-called U.S. nuclear safeguard, e.g. the readiness of the United

States to use its strategic forces at a specific stage of the conflict, if not immediately after an exchange of tactical nuclear strikes. The other key condition was the so-called strategic “deadlock,” e.g. a situation when neither the United States, nor the USSR hoped that its the first (or preventive) counterforce strike could frustrate a retaliatory strike of the state that had been attacked with nuclear weapons.

However, if for some reason one of the states began to doubt its capability of delivering a retaliatory or retaliatory-counter strike, the situation would change. To the weak state it would become more “reasonable” to deter the other state with the threat of a first, not just a counterforce, but also countervalue strike. Otherwise, it would run the risk of losing its capability to retaliate and, consequently, its nuclear forces would no longer deter the enemy. But in the same situation the “strong” state also had to carry out the policy of a first strike, because it could not run the risk of having a preemptive nuclear strike on its territory.

These provisions are basic truths to specialists. The question is, however, whether this strategic “deadlock” will be preserved in the future under the current new tendencies in the U.S.-Russian correlation of forces. The capability to retaliate against any possible counterforce first strike exists given a set of factors and conditions. They include the composition of the strategic triad; protection, or vitality of strategic forces; their command and control system, the effectiveness of intelligence gathering and communications, as well as of mechanisms of decision-making concerning a retaliatory strike, etc.

In this area Russia is at disadvantage. For economic reasons, the balance among different parts of the strategic triad has been broken. Russia will probably have to give up one of its parts, which is likely to be the sea-based, at the beginning of the next century. In any case, this viewpoint was voiced by top military leaders and specialists connected with the Strategic Rocket Forces. Thus, Colonel-General Yuri Plotnikov states, “Today it is obvious to any reasonable person that the land-based leg of the Russian Strategic Nuclear Forces (RSNF) is the most stable and reliable one in the nuclear triad. We are aware of the difficulties that the Navy and the Air Force are facing, they make us sad. But today the Strategic Rocket Forces (SRF) stand a greater chance of overcoming these difficulties and surviving in the present situation.” (8)

The command of the Navy is also concerned with the future of the Naval Strategic Nuclear Forces. Rear Adm. Aleksey Ovcharenko, deputy chief of main naval staff operations, wrote, “We speak about the priority of the naval SNF, but in practice we are solving problems of the Strategic Rocket Forces with their Topol mobile missile systems. Many top officials in the Defense Ministry and in

the General Headquarters take it for granted that this system should receive priority in financing. And they do not take it into account that if no prompt measures are undertaken, the Typhoon submarine and missile system could be in a “critical situation.” (9)

Many experts believe that at the beginning of the next century the Russian naval strategic forces might consist of not more than six Typhoon systems, seven Delta IV systems, and a few Delta IIIs that came into operation in the 1980s. However, if the present practice and current financing continue, there about 20-25 percent of the nuclear-powered ballistic missiles submarines (SSBNs) will be operating, which equates to four SSBNs. Subsequently, they will run a high risk of falling a victim to anti-submarine forces or submarines-”hunters” of the potential enemy. At the same time, construction of not a single SSBN has been started since the beginning of the 1990s. This means that Russia might be left without its SSBNs in 15-20 years.

The land-based rocket forces are also facing serious problems. It appears that road-mobile and silo-based versions of Topol and Topol-M multi-warhead systems will make up their basis in the next century. Under the START II Treaty, Russia could have a little more than 1,000 launching systems for land-based ballistic missiles, out of which 200 could be deployed in silos left from the SS-18, which are to be destroyed, or could be “unloaded” silo-based SS-19s. Construction of new underground launching systems appears to be very costly and is hardly feasible under the predicted military budget.

As the accuracy of warheads increases, the silos become more and more vulnerable. It is believed that a modern, sufficiently protected silo can be destroyed with two warheads of the U.S. W-88 type. The possible way out is to deploy road-mobile missile systems, which makes it impossible for the enemy to precisely target ballistic or cruise missiles. However, the road-mobile systems have many shortcomings. The main thing is that the possibility of sufficiently precise targeting of counterforce warheads at mobile missile systems increases as systems of intelligence and control of warheads in flight are upgraded.

Doctor (of Science) Vladislav Repin, former general designer of the System of Warning of Missile Attack and of the System of Space Control, has said that, “...power reserves in the last phases of existing ballistic missiles, and moreover the technical characteristics of aero-ballistic missiles (cruise missiles and gliding reentry vehicles for ballistic missiles) enable retargeting over the required area, for changes in control programs at these stages of flight, and for transmission of flight commands. All of these are routine technical tasks.” The second task, which is prompt detection of road-mobile missile systems, is a more complex one,

but modern information technologies and the prospects for global information systems allow one to believe that the task will be solved at comparatively low costs within the next five to 10 years." (10) In other words, in the next ten years Russian missile systems might become very vulnerable to a counterforce first strike.

However, the growing vulnerability of the SNF is not the only weak spot. The state of the Russian system of combat control of SNF has, perhaps, even more importance in this respect. First of all, neither Russian combat control of SNF, nor any other system has ever been tested under real conditions of a massive use of nuclear weapons, followed by electromagnetic fields and radiation impulses affecting personnel and equipment, with psychological pressure and with a number of other factors that cannot be modeled.

But there are several peculiarities that account for the weakness of the Russian system of command and control of SNF. Candidate of Military Science Valeri Yarynich has singled out the following:
— the unified system for warning of a missile attack has broken down, since half of the land-based radars are now located in the countries of the near abroad;
— there is very little time to make a decision regarding the use of nuclear weapons, which will be not more than two-three minutes if a strike is to be delivered from SSBNs in the Norwegian and Mediterranean Seas;
— unprotected radio centers of the superlong wave range, which are "in fact the only means" of communicating an order to a submarine at a great depth in combat, are highly vulnerable. Russian systems are much more vulnerable against conventional weapons than their U.S. counterparts (11).

In addition, there are considerable difficulties in combat control of mobile missile systems. It is absolutely unclear (at least no data is available) as to whether the system of combat control could more or less reliably function in case of the use of nuclear warheads with an increased electromagnetic impulse, or the so-called "informational weapons" that can put computer networks out of action.

Given all this, it becomes doubtful that it is comparatively inexpensive to maintain nuclear weapons as a means for compensation for inferiority in conventional arms. For nuclear weapons to be a truly stabilizing factor, they should have an effective and reliable system of intelligence, communications and control at the global and regional levels. Otherwise, large expenditures on supporting systems should be added to expenditures on maintenance and development of the nuclear capability itself.

Taking into consideration the growing vulnerability of the Russian SNF and the possible unreliability of their command and control systems, Russia's nuclear deterrence policy might result in a considerable decrease of regional crisis-management and global strategic stability and play a provocative role.

Consequently, the Russian military and political leadership is facing a choice. The first alternative is to make serious investments into nuclear weapons, into the present SNF, and into systems of intelligence, communications, and control. Even if the necessary funds are found, which is a doubtful assumption, it will result in a shortfall of resources to upgrade conventional arms, to maintain the readiness of the armed forces, and to improve the living standards of the personnel. In addition, the United States and other western countries are likely to perceive Russian nuclear deterrence as a threat. The second alternative is to consistently decrease the role of the nuclear factor in national and international security; to reduce nuclear weapons on a mutual basis, and to simultaneously develop and upgrade those armed forces that are able to neutralize real and potential threats to Russia at the regional level.

1. Segodnya, July 1995.
2. "Strategy for Russia. Some Key Points for a Report of the Council for Foreign and Defense Policies". Nezavisimaya Gazeta, August 19, 1992.
3. Conception of Military Security of the States-Parties of the CIS. Commonwealth. Informational Bulletin of the Council of the States' Leaders and of the Council of the Governments' Leaders of the CIS. Issue 7, Minsk, 1992, pp. 36-39.
4. Nezavisimaya Gazeta — Nezavisimoye obozreniye.— November 3 & November 18, 1995, respectively.
5. Institute for Defense Studies. Key Principles of Countering Major Foreign Threats to the National Security of the Russian Federation. Segodnya, October 20, 1995.
6. Nezavisimaya Gazeta, October 28, 1995.
7. Nezavisimaya Gazeta, December 8, 1995.
8. Nezavisimaya Gazeta, December 8, 1995.
9. Nezavisimaya Gazeta, September 6, 1994.
10. Nezavisimaya Gazeta, September 24, 1992.
11. Segodnya, March 30, 1994.

Nuclear Material Storage in the Northern Fleet

Mikhail Kulik, the investigator for major cases in the Military Office of the Public Prosecutor of the Northern Fleet.

In November 1994 I finished the criminal case on the theft of radioactive material in the Northern Fleet, not far from Murmansk. Radioactive parts of three new heat-extracting assemblies for nuclear submarine reactors, containing about one kilo of uranium-235, were stolen. The perpetrators were arrested and pleaded guilty. They failed to sell the radioactive material. The trial will be soon. It seems that it is high time we passed to another case. However, I am not sure that the indictment of the three perpetrators will solve the problems of radioactive material storage in the Northern Fleet.

What is our first and foremost concern? Politicians' arguments that "theft in the storage facilities of the Defense Ministry are out of the question because... they are just out of the question" have been heard for a long time.

The services in charge of accounting, control and storage of nuclear material cannot name the exact quantity of the stored material to within a kilo. Accounts are kept either in tons or in rubles; the latter is most frequent. Inflation makes such accounts just laughable. And the idea of "a kilo more or less" became a rule, at least in the Northern Fleet.

The final report of the technical investigation states that the objects stolen are the radioactive parts of three new heat-extracting assemblies of the BM-4 AM type nuclear reactor. The assemblies are for use in the reactor of a nuclear submarine. The fuel of the heat-extracting assemblies contains 1448.9 grams of uranium-234, 235, 236, and 238, out of which there are 283.3 grams of uranium-235. Thus they contain radioactive material. The cost of one assembly according to 1986 prices is 7,106 rubles, or 17,080 rubles according to 1991 prices. After being stolen they are no longer effective and cannot be used for their designated purpose.

According to the final report of the technical examination, the disassembled heat-extracting assemblies cannot be restored, only put into storage. Their fuel composite can be used for its purpose. At the time of the theft one kilo of such composite cost 310,000 rubles. The residual value of the heat-extracting assemblies is equal to the cost of the composite, or 449,159 rubles.

According to a telegram from the commanding officer of military unit 72190, to determine the exact cost of a heat-extracting assembly for the fourth quarter of 1993, the 1991 value should be multiplied by 10 (its 1992 value) and then by 35. So the value of the stolen products at the moment of the crime was 17,934,000 rubles.

How was the facility from which the material was stolen safeguarded? From Kola Peninsula there is no barrier at all: one could sail up in a boat, especially at night, and do whatever one pleases. From the Murmansk industrial zone approach there are ship-repairing plants and a group of woodworking enterprises - in other words, an unguarded industrial zone. There are many gaps in the fence. There is no control/checking zone on the perimeter of the facility. It is easy to get to the back door of the facility. In and around the storage area there are general property and non-ferrous metal dumps. The cluttered site gives the impression that the storage unit of the heat-extracting assemblies is not seriously safeguarded, which is perfectly true.

The facility is equipped with protection against nuclear attack - for example, a control system against a self-sustaining nuclear chain reaction, a system of fire prevention and a water alarm system (the indicator is two elemental contacts at a certain level from the surface; when the water reaches that level, the contacts close and the system comes into action).

But there is no alarm system as such. There is only an elemental contact switch: when the door is open and the pin is knocked out, the system comes into operation. When the door is closed and the pin is in its place, the contacts part and the alarm system is inoperative. The system is on a control panel that is 100 meters away from the facility. Besides, if one of the facility’s doors is open (either the entrance or the side one), the alarm will not sound. Moreover, the cable runs through the loaders' cloakroom. In the cloakroom even the distribution panel was not locked. In other words, it is very easy for a criminal to switch off the distribution panel in the cloakroom and then do whatever he wants.

At the panel there are two old ladies - the guards from VOXR. But not always. To get to the site they have to go through the cluttered area, and in winter through gigantic snow-drifts. The women are armed with pistols, which they are afraid to touch. Also, there is no lighting. Even potatoes must be better guarded than radioactive material.

There must be regulations on safeguarding such objects. For example, instructions on the Protection of State Secrets (sometimes just called the ZGS) have been worked out and introduced by order of the Russian Defense Minister. Nevertheless, these are not

observed in the Northern Fleet, partly because there are no funds, and partly because of the neglect of headquarters.

According to the appropriate instructions there should be an inset lock at the facility, which would be impossible to saw. In reality there is an old barn lock, if not a rusty one. It took the criminals less than ten minutes to saw it in two.

It should be mentioned that throughout 1993 there were requests for additional financing for radioactive material storage in the Northern Fleet, in particular for financing needed repairs of present storage facilities. Means were allotted for the Northern Fleet, but they were spent on another storage.

After the theft the Commander of the Northern Fleet had his incomplete compliance regarding the facility pointed out to him. But what has changed in the facility? The number of guards have been increased, portable radio-transmitters have been distributed (too heavy for the women, though). The Northern Fleet Command held a meeting on Khon-2 type alarm systems for this and another similar facility. (These are the volume/positive-replacement alarm systems: they come into operation if the free volume of the room is decreased, for example if a man enters the room.) But there were no funds for these alarms. Such expenses were planned for 1994, but again no funds were allotted.

The question of renovating the facility was raised. In particular, it was pointed out that one or more underground bunkers should be built, guards should be posted, fire-fighting points should be setup, and a signal alarm-system installed. Military specialists came to the conclusion that this would not cost much. Nevertheless, their recommendations were not taken into consideration.

Now they say that there won't be any funding for improvement of the storage conditions. However, this question seems to be of no priority to many officers of the Northern Fleet because their salary is sometimes delayed for more than two months.

Another problem is the method of verifying the presence of the heat-extracting assemblies. That is usually restricted to examination of the integrity of the seal. Approximately once every two days the person in charge of the facility visually checks the safety of the containers: he lifts the tarpaulin to see whether there are footprints or anything is scattered around. In other words, except by accident, the theft in Murmansk might have been discovered in ten, maybe more years.

Another question is whether the radioactive material stored in the Northern Fleet is of great value to smugglers; although the above discussion is necessary irrespective of the answer to this question.

According to my data, organized criminal rings have become more active in trying to obtain large consignments of radioactive material from the Northern Fleet. They contact the staff, study weak points of the system and the possibilities for large-scale thefts. Some of them seek ways to export the stolen material, either to the West through the Baltic republics, or to the south through the Caucasus and the Transcaucasus.

Organized rings carefully study which material is in greatest demand on the foreign markets.

However, the thieves we have come across so far were non-professional and did not belong to any criminal ring. They realize what and how to steal. At the same time they don't know where and at what price to sell it.

For the material stolen in Murmansk it was almost impossible to find a serious buyer. Still, we cannot rule out the possibility that one might have been found. In this case he would have taken the stolen heat-extracting assemblies for samples. Then, should the thieves come to an agreement with an organized criminal ring and sell the material to them, they might obtain a big order. It is interesting to point out that the accused did get in touch with one serious criminal ring, but an order was not made. Afterwards they acted on the principle: "First let’s steal, then find a client. If uranium is talked about so much, then there will be no problem finding a client through the businessmen we know."

According to as yet unproven data, the stolen composite could injure or even kill. There have been cases when furnace charge was poured down the upholstery of a businessman's chair and in some months he died from blood cancer. This use of the stolen radioactive material is very attractive to hired assassins since it is difficult to trace such a murder.

Last but not least, we cannot rule out the possibility that the stolen material might be split up and poured into a water supply or river for blackmail. However, specialists argue that without a neutron source there would not be any sense in "pouring it into the water" as in this case the uranium composition would be stable. That is the reason the thieves simply stored the stolen active parts under a tarpaulin without risk. Nevertheless, when a lot is at stake such a source of accelerated neutrons can be stolen.

It should be pointed out that the stolen material was unlikely to attract foreign clients who are interested in creating a complete military nuclear fuel cycle. To a far greater extent, Russia’s security was indirectly hampered. Now the West has substantial grounds to

accuse Russia of inappropriate storage of the nuclear material in the Northern Fleet.

Indictment

On the indictment of Captain 2nd Class Alexei Yurievich Tikhomirov and Oleg Mikhailovich Baranov under the offense stipulated in Articles 223-3 and 251 (b) of the Criminal Code of the Russian Federation, and also Senior Lieutenant Dmitry Yurievich Tikhomirov under the offense stipulated in Articles 17 part 6 and 223-3, 17 part 6 and 251 (b) of the Criminal Code of the Russian Federation:

[Fragments]

The following facts were established by the investigation:

At the beginning of November, 1993, in Polyarny, Murmansk Region, Oleg Baranov, Alexei Tikhomirov and Dmitry Tikhomirov made a deal to steal the radioactive material in three fresh heat-extracting assemblies containing about 1 kg of uranium-235. They planned to sell it and share the profit.

The outline of the deal was not clear before August, 1993. Being interested in the successful realization of their criminal intentions and possessing information to which neither Mr.Tikhomirov nor Mr.Baranov had access, Mr.Tikhomirov consulted them from August until mid-November, 1993. He told them that the products they were interested in were stored in storage unit #3 on the territory of military unit 31326 in Murmansk, that the territory was poorly guarded and that there were gaps in the fence which he pointed out to them. Mr.Tikhomirov also explained the composition of a heat-extracting assembly, the way it is stored and how it can be divided into the radioactive and processing parts. He also informed them that a heat-extracting assembly does not present a radioactive danger and can be stored without special means.

On November 27, 1993, at about 1 a.m., Alexei Tikhomirov and Oleg Baranov met on Ushakov Street near house #9 and went to a construction site on Nakhimovskaya Street in Murmansk in Baranov's car. There Baranov stayed in the car while Tikhomirov went to engineering site #3 of military unit 31326. Since D. Tikhomirov did not come to the meeting, Mr.Tikhomirov went into the site on his own through a gap in the fence. Then he sawed the lock handle of the emergency door in storage unit #3-30 and went inside. There he opened radiation package #23 of the reactor BM 4-AM set, plant #746. He took out three heat-extracting assemblies and broke off their active parts. Each of those contains 283.3 grams of uranium-235 (the cost of a heat-extracting assembly is 5,978,000 rubles). With his actions he damaged military property. Afterwards

Mr.Tikhomirov put the stolen parts into the bag he had brought and went back to Mr.Baranov's car. There they put the bag into the trunk and Oleg Baranov brought the radioactive parts of the heat-extracting assemblies to Polyarny, where he hid them in his garage and kept them until their withdrawal by the investigators.

Mr.Tikhomirov, Mr.Tikhomirov, and Mr. Baranov admitted their guilt and gave truthful evidence regarding the circumstances of the crime.

Alexei Tikhomirov explained that in July-August 1993 his brother, their acquaintance Oleg Baranov and he had a talk. Mr.Baranov told them about an opportunity to sell fresh nuclear fuel for submarine reactors. However, the decision to steal was not made then. Only after Mr.Tikhomirov had visited warship PM-78 moored to the pier of the 3rd engineering site of military unit 31326, where his younger brother was in charge of the workshop for recharging the reactors, and after he had seen storage #3-30, where active zones for submarine reactors were stored and made sure that it was possible to steal them, only then did he again bring up the matter with Oleg Baranov. In the fall of 1993 they talked about it several times and by the beginning of November 1993 the three men agreed to steal active parts of three fresh heat-extracting assemblies, which, according to their estimates, contained about 1 kilo of the heat composite. And the roles were divided as follows: Alexei Tikhomirov and Dmitry Tikhomirov were to enter the storage, steal radioactive parts of heat-extracting assemblies and bring them out of the site. Mr.Baranov was to wait for them in his car, hide the stolen material and then sell it. Mr.Tikhomirov described the way a heat-extracting assembly looks to Mr.Baranov and his brother. He also told them how to divide an assembly to get the part which contains fuel composition, how to handle the fuel and how to safely hide it. To prepare for the theft he bought a pocket flashlight, a hacksaw, cutters, and a padlock, which he planned to put in place of the old one.

According to the plan, on the night of November 26, 1993, Oleg Baranov and Dmitry Tikhomirov were to drive from Polyarny to Murmansk in Baranov's car and at 1 a.m. to meet Mr.Tikhomirov in Ushakov Street near house #9, where the Tikhomirovs lived. But Mr.Tikhomirov did not come to the prearranged meeting with Mr.Baranov and the latter went to Murmansk alone. After he met Mr.Tikhomirov they drove to a construction site in Nakhimov Street, where they parked the car. Mr.Tikhomirov alone went in the direction of the 3rd engineering site of military unit 31326 while Mr.Baranov stayed in his car. Mr.Tikhomirov went alongside the railway tracks that lead to the storage. Through a gap in the fence he entered the site and went to the emergency door of storage 3-30. With the hacksaw he cut the handle of the padlock and went inside. To open the door he used a fire-fighting hook from the panel

which was not far from the storage. Once inside he came to the first shelves on the left and folded back the tarpaulin. Then he first opened the lid of the cartridge-box which was in the center of the shelves and then with the help of his knife pulled out one of the heat-extracting assemblies half way. He found the juncture of the active and processing parts and tried to saw it in two with the hacksaw. After two or three cuts he bent the heat-extracting assembly and broke it in two. Then he broke off another 2 active parts from the same cartridge-box, put everything in his bag and left the storage unit. He went back to Oleg Baranov's car via the same route and together they put the stolen goods into the trunk. After that they drove on the Murmansk-Severomorsk highway. They stopped near the city, where Mr.Tikhomirov threw away the rubber gloves that he had worn in the storage, the cutters, and put the flashlight in the glove-compartment of the car. After that Mr.Baranov brought him back to #9, Ushakov Street and went alone to Polyarny. Later Dmitry Tikhomirov saw the stolen parts of the heat-extracting assemblies in Oleg Baranov's garage and the two of them disassembled one extractor.

Alexei Tikhomirov did not make any efforts to sell the stolen parts since this was Oleg Baranov's responsibility. They were expecting to get about $50,000 for the stolen parts.

Mr.Tikhomirov confirmed his story completely during the investigation.

Mr.Baranov's evidence does not differ from Mr.Tikhomirov's. He stated that he does not know the circumstances of Mr.Tikhomirov's entry into the storage unit. He also added that though he mentioned the possibility of selling the material, in reality he did not have the channels to do it and meant to find them later. After the theft he did not begin to seek buyers because he did not expect to succeed in finding any.

Dmitry Tikhomirov's evidence does not differ from the evidence given by Alexei Tikhomirov and Oleg Baranov. He also explained that he was not going to commit the theft, though he did speak about it in the open. On the night of the theft nothing prevented him from participating in the crime, but he preferred to stay on board his ship of his own free will.

Minor discrepancies in the evidence of the accused were resolved during confrontations among them.

Apart from their frank confessions, all the three were incriminated by the evidence collected during the case.

During the examination of the scene of the crime on November 29, 1993 it was established that storage unit #3-30 is situated on the

engineering site of military unit 31326 in Murmansk. Container 23 of BM 4-AM active zone was situated on the shelves near the emergency exit on the left. Inside the container there were 5 fresh heat-extracting assemblies, two of which are intact, while three lack their radioactive parts. The traces of the entry into the storage were found at 14:30 on November 27, 1993: the padlock with the sawed handle was in the snow 1-1.5 meters away from the corner of the storage, near a concrete barrier. There was a red-painted, metal, fire-fighting hook nearby. The participants in the experiment explained that the hook had been on the fire board near unit #3-30. Inside the unit there were two seals with number 55 on the cases, connected with one wire. Under close scrutiny of the remaining processing parts it was established that there was a torn edge at the juncture with the active parts, the cylindrical form was distorted and the cases were somewhat flattened. On one of the heat-extracting assemblies near the place of the break there was a slit left by a cutting tool. Under the tarpaulin, there are remains of the heat-extracting assembly package and corrugated pressboard.

From the findings of the investigators' examination #741/03 of December 6, 1993 it is known that though the padlock is technically in good repair, it cannot be used any more because the locking end of the handle is sawed. This could have been done while the padlock was on the storage door. It was done with a saw with the teeth setting up to 1 mm, which indicates it must have been a hacksaw.

From the findings of examination #741 a/03 of December 17, 1993 it follows that the submitted processing parts of the heat-extracting assemblies had been separated from their active parts in the following way: first a cut was made with a saw with the teeth set at 1.0 mm, then with one the ends of the assembly as a lever it was broken off through frequent twists.

The following people are accused:

Tikhomirov, Alexey Yurievich, born June 18, 1958 in Leningrad. Russian, married, with a college degree (graduated from Dzerzhinsky Naval Higher Engineering School in 1980), Captain 2nd Class, assistant to the head engineer of the 35th ship-repairing plant; he lives in Polyarny on Vidyayev Street, house 3, apartment 7. He is accused of the theft of the active parts of three fresh heat-extracting assemblies, which cost 17,934,000 rubles. The crime was committed around 1 a.m. on November 27, 1993 in Murmansk. The parts were stolen from storage unit #3-30 of military unit 31326. The crime is stipulated under Article 223-3 of the criminal code of Russian Federation.

About 1 a.m. on November 27, 1993 he intentionally damaged military property - the three fresh heat-extracting assemblies. The cost of the damage is 17,934,000 rubles. The crime is stipulated under Article 251 of the criminal code of Russian Federation.

Baranov, Oleg Mikhailovich, born on December 29, 1948 in Perm. Russian, married, with a college degree (graduated from Popov Naval Higher Radio-Electronics School in 1971), Captain 3rd Class, temporarily unemployed, lives in Polyarny on Lunin Street, house 5, apartment 38.
He is accused of the theft stipulated under Article 223-3 of the criminal code of Russian Federation. On November 27, 1993, around 1 a.m., in Murmansk, he stole radioactive material - the active parts of the three fresh heat-extracting assemblies from storage unit #3-30 of military unit 31326. Their cost is 17,934,000 rubles.
On November 27, 1993, about 1 a.m. he damaged military property - the three fresh heat-extracting assemblies. The cost of damage is 17,934,000 rubles. The crime is stipulated under Article 251 (b) of the criminal code of Russian Federation.

Tikhomirov, Dmitry Yurievich, born on September 25, 1967, in Leningrad. Married, with a college degree (graduated from Lenin Naval Higher Engineering School in 1989), Senior Lieutenant, the commander of a rear guard group and VVD of military unit 40603; he lives on base.
He is accused of the crime stipulated under articles 17 part 6 and 223-3 of the criminal code of Russian Federation. From August until November 27, 1993 he was an accomplice in the theft of radioactive material - the active parts of the three fresh heat-extracting assemblies from storage unit #3-30 of military unit 31326, which cost is 17,934,000 rubles.

He was also an accomplice to the intentional damage of the military property that lead to grave consequences: the cost of the damage is 17,934,000. The crime is stipulated under articles 17 part 6 and 251 (b) of the Criminal Code of the Russian Federation.

The indictment was drawn up in Severomorsk, Murmansk Region.

Review
NONPROLIFERATION AND THE RUSSIAN MEDIA IN FALL/WINTER 1995
by Ildar Akhtamzyan

NUCLEAR STRATEGY

Studying modern scenarios of deterrence doctrine, analysts express opinions about their inadequacy in the new post-Cold War international situation. Sergei Kortunov, consultant to a presidential assistant, states that nuclear states have not worked out an effective deterrence doctrine with regard to nonproliferation (*Yaderny Kontrol, # 10, 1995).* "For example, the nuclear potentials of the five states did not prevent local armed conflicts using missile weapons," he says. "It did not prevent regional powers from acquiring these weapons, and even using them against the largest nuclear-weapon states during, for example, the Gulf War."

Dmitri Yevstafiev, senior scientific researcher of the Russian Institute for Strategic Studies, comes to the same conclusions. Having analyzed the role of the nuclear factor in regional stability *(YK # 10, 1995)*, he states:
"1. The nuclear factor has not been finally repudiated as an instrument of military-political stability of this or that state or regime.
2. At the regional level there are still serious subjective (e.g., depending on the political course of this or that country), as well as objective incentives (concerning the general political-military context) to acquire nuclear weapons."

Specialists believe that Russia should draw serious conclusions from the current transformations in U.S. nuclear strategy. In the 1990s it evolved into a doctrine that includes contingencies for a nuclear war in some, and probably, in all world regions Dmitri Yevstafiev and Yevgeni Kuznetsov *(YK # 11, 1995)* believe that "taking into account growing tension in bilateral U.S.-Russian relations, Russia should try these principles itself." The scenario of using a threat to use nuclear weapons in a conflict involving Russia in an «operational theater of war» (TVD) is closely comparable to the American scenario of a large regional conflict with a rogue state as the enemy. This point of view has been finding growing support among the Russian military. In June, 1994, Defense Minister Pavel Grachev stated that Russia and its neighbors are enclosed geopolitically by a semicircle of states that belong to the unofficial nuclear club and that constitute a hazy nuclear danger zone. He admitted that the principle of first use of nuclear weapons means, among other things, to deter possible nuclear proliferators.

Analyzing prospects of counteracting proliferation during a period of large-scale reductions of nuclear weapons, Mr. Kortunov

proposes to put the remaining nuclear forces under UN command to be used on the decision of the Security Council: “With this formulation of the problem, the nonproliferation regime might be turned into an obligatory pattern of international behavior. In some cases that pose a threat to peace and security, the UN Security Council could make decisions about introducing a mandatory nonproliferation regime in some countries and regions under the IAEA’s control.”

PROSPECTS FOR NONPROLIFERATION

Professor Roland Timerbaev, who is president of the Center for Policy Studies in Russia (the PIR Center), focuses on the prospects for nonproliferation after the NPT Extension Conference (*YK # 9, 1995).* He recalls that the decision on indefinite extension was adopted in “a package” with a number of demands of non-nuclear states that sought strict control over nuclear-weapon states’ fulfillment of their share of obligations under the NPT. Having studied the situation in specific areas, he does not see any grounds for optimism. In particular, the Geneva Disarmament Conference has not started talks on an international agreement on the cutoff of production of fissile material for the creation of nuclear weapons and no “further measures” to provide safeguards to non-nuclear-weapon-states party to the Nonproliferation Treaty have been elaborated. Prof. Timerbaev emphasizes that, “taking into account Russia’s geographical position and that it borders either declared nuclear states, the so-called “rogue” states, or states with the potential to acquire nuclear status, the task of preventing the proliferation of nuclear weapons is of special importance to Russia and touches the very core of its national security interests.

Mr. Kortunov believes that today it has become necessary to work out a long-term strategy in the area of proliferation that will combine diplomatic, economic and other measures. The development of new global and regional security structures, the improvement of cooperation between intelligence services and international safeguards mechanisms, as well as the elaboration of military-enforcement operations as an extreme measure, should be top-priority tasks.

Russia considers diplomatic efforts to be the priority tool of nonproliferation policy. These means have proved effective first and foremost in the containment of nuclear weapon proliferation. It suffices to remember the examples of the South African Republic, Ukraine, Belarus, Kazakhstan, Argentina, Brazil, Rumania, Algeria and, finally, North Korea. In each of the aforementioned cases, the benefits of cooperation with industrially developed countries outweighed the possible military and political advantages of acquiring nuclear weapons.

Mr. Kortunov considers the creation of a global system of early warning and monitoring the proliferation of weapons of mass destruction and their missile delivery systems to be an important measure that would facilitate the coordination of all nonproliferation. This objective may be attained through creation of a common automated system of global monitoring of nuclear weapons proliferation a
nd its use on the basis of existing U.S. and Russian automatic mechanisms for monitoring underground, under water and atmospheric nuclear tests.

COOPERATION BETWEEN RUSSIA AND THE UNITED STATES IN THE CONTEXT OF THE NEW AMERICAN CONCEPT OF "COUNTERPROLIFERATION"

Having studied the strategy of counterproliferation, Mr. Kortunov states that it differs from classic nonproliferation policy and reflects some stereotypes of the post-Cold War American mentality: «Americocentrism», the idea of being the only superpower in the world and underestimation of the role of international diplomacy. He notes that, "All this should have become the subject of a serious discussion between the two countries, although, unfortunately, this has not taken place."
From the Russian perspective, any military and coercive actions designed to counter proliferation must be legal from the point of view of international law, that is, to be UN sanctioned. Relevant functions should be given over to the UN, for example, to its Military Staff Committee.

Proposing a differentiated approach to various groups of states, Mr. Kortunov believes that only some terms and elements of control should be introduced when dealing with cooperating states. As far as sensitive states are concerned, the United States and Russia must introduce elements of strict control and establish numerous conditions. Finally, in regard to threatening states, there should be maximum control and embargoes.

Problems of nonproliferation are undoubtedly the most promising line in bilateral cooperation between Russia and the United States. Mr. Kortunov underlines that only the United States and Russia possess monitoring networks that are sufficiently developed and carry out 24-hour monitoring over a considerable part of the Earth's surface. Combining them into a global network, designating regions of responsibility and improving this system on a common technical basis, as well as the possibilities of sharing manpower and material resources, cooperation in elaborating mathematical and program software for this system, sophisticated technical systems and other expensive equipment are among the numerous issues with potential for close U.S.-Russian cooperation that can become a

powerful stabilizing factor and have a great influence on international relations.

THE FUTURE OF THE START-II TREATY

Prof. Timerbaev believes that ratification of the START-II Treaty would be an important step in maintaining the tempo of international efforts to strengthen the nonproliferation regime. However, experts are not unanimous regarding its ratification. Professor of the Moscow State Institute for International Relations Yuri Fyodorov, justifying the expediency of this treaty, stated that an acute economic crisis left Russia only one reasonable policy line: to use the treaty to make the United States reduce their strategic weapons to the level commensurate with those that Russia will have at the beginning of the 21st century. Otherwise, Russian arms will be reduced "on their own" (because of their aging) to approximately 3,000 warheads, while the United States, easily and without serious schedule changes, may have from 7,000 to 9,000 warheads on their strategic delivery systems (*YK* # 8, 1995).

Opposing this point of view, Anton Surikov, counselor at the Institute for Defense Studies, thinks that Russia has the possibility to reject the START-II Treaty and build up its own strategic nuclear forces (SNF) on the basis of the START-I Treaty and within the limits stipulated in it (*YK # 12, 1995*). Both analysts agree that it is unreasonable to make development of the Russian strategic potential dependent on the situation in Ukraine.

Prof. Fyodorov argues that while discussing START-II, Russia faced the choice of destroying aging missiles, including the most effective "heavy" SS-18 ones, or attempting to extend their life-span through the constant replacement of outdated components (that were produced in Ukraine). Mr. Surikov believed that there were two scenarios for the development of the Russian strategic forces after 2000. Under the first, intercontinental ballistic missiles (ICBM) with multiple independently targetable reentry vehicles (MIRV) would be kept in the Strategic Rocket Forces (SRF). For Russia it would mean the future modification of a submarine-launched ballistic missile (SLBM) that was being developed in the Mias machine building and designing bureau so that it could be used in the Navy as well as in the SRF. The second scenario, which was eventually chosen, stipulated a complete ban on MIRVed ICBMs and the deployment of a single warhead ICBM, the "Topol-M."

Mr. Surikov believes that this decision was influenced by the contemporary discussion of a top-priority issue for Russia: how to obtain U.S. aid in destroying the Soviet strategic nuclear weapons that were left in Ukraine, Kazakhstan and Belarus. Nevertheless, under the second scenario, Russia would have to produce two times more "Topol" ICBMs than the Soviet Union had planned. Also, most

expenses would occur in the near future (1997-2003). Expected large-scale Western investments in the Russian economy might have made this step easier for the Russian leadership. “For Russia, fulfillment of the START-II Treaty’s limitations would mean a radical and very costly rebuilding of the most important part of the Russian SNF,” stated Mr. Surikov. “While the United States will only destroy 50 MX ICBM beyond the START-I Treaty’s requirements and will put only a few dozen heavy bombers in storage sites in Arizona.”

According to Mr. Surikov, Russia can accept the START-II Treaty, provided some of its provisions are amended. First, the United States should eliminate grounds for fears regarding its overwhelming superiority in the “restoration capability” of its strategic forces. One of the options for solving this problem could be a change in the procedure for reducing the number of warheads on American strategic nuclear submarines by cutting in half the number of silos on the submarines. Second, it is reasonable to postpone the implementation deadline of the START-II Treaty from 2003 until 2007-2008. In this case, Russia would not have to decommission missiles before the end of their service lives.

A COMPREHENSIVE TEST BAN

Supporters and opponents of a comprehensive test ban (CTB) continue to actively discuss this issue. “The sooner a Comprehensive Test Ban Treaty (CTBT) is adopted, the more benefits the international community will receive. And, among other arms control issues, this is a top priority one for Moscow,” says Vladimir Orlov, Director of the Center for Policy Studies (*YK* # 11, 1995). Nevertheless, not everybody shares this point of view. Many experts in the Defense Ministry, as well as in Minatom, agree that computer modeling will not be enough to ensure the safety of accumulated arsenals. The October 19th edition, of the Kommersant-Daily newspaper published comments under the title, “Nuclear Abstention is Dangerous to Life.” The last section of the article was named “Never Say *Never.*”
Vladimir Belousov and Yuri Silkin, a leading researcher and a senior researcher from the Central Physical Technical Institute of the Defense Ministry respectively, argue the following: "The nuclear arsenals will, most probably, remain for quite a while, and in order to maintain their normal routine cycle it will take various researches and physical experiments, including explosive ones with a nuclear energy release that cannot be verifiably detected.” (*YK # 7, 1995)*

Valeri Menshchikov (Security Council of the Russian Federation) and Boris Golubov (Academic Secretary of the Council for the Biosphere in the Presidium of the Russian Academy of Sciences) are supporters of an early nuclear test ban. They have analyzed the environmental impact of underground nuclear explosions (*YK # 10, 1995)*. For four years already, Russia, succeeding the USSR, has not

conducted nuclear tests under the moratorium declared by the four nuclear-weapon states. “And at this moment opinions expressing various versions of ‘Underground nuclear explosions to improve the environmental situation’ appeared,” write Mrs. Menshchikov and Golubov. They distinguish between two major versions: destruction of chemical weapons and destruction of radiologically contaminated equipment with the help of underground nuclear explosive technology.

In this connection they note that almost all peaceful nuclear explosions were followed by the release of radioactive gas that had accumulated as a result of the evaporation of rocks in the area of a nuclear explosion under high temperatures equal to several million degrees. Methods of removing radio-nuclides, especially tritium, from those gasses have not been worked out and have never been utilized when underground test cavities were opened.

The first general conclusions based on accumulated data from underground nuclear explosions showed that there were unfavorable radiation and environmental situations at a number of facilities. The priority was given to the Astrakhan condensed gas field, which is known as Vega in classified projects, and two oil fields in the Perm region - the Osin and Gezh ones (the Geliy and the Griffon facilities). Key aspects of this environmental threat are: 1) radioactive contamination of mineral resources, other ecological systems, technical equipment and extracted products; 2) dangerous engineering and geological phenomena like movements of mountain mass and the flooding and gassing of below-ground nuclear explosion cavities.

Following the announcement in the first half of 1995 by Russian experts of the necessity to follow Jacques Chirac’s example and to make a political decision to conduct a series (four or six) of underground tests at Novaya Zemlya, Mr. Orlov warns, “the desire to show disrespect to international public opinion and the unanimous decisions of the NPT Review and Extension Conference (in particular, to the Resolution on Principles and Objectives on Nuclear Nonproliferation and Disarmament) would result in resentment of Russia by the international community and strengthening of the opinion that it is better not to deal with Russian diplomats because they are inclined go to extremes.”

NUCLEAR DIVERSIONS IN RUSSIA

Another topic that drew comments in Russia is the problem of the diversion of, and trafficking in, nuclear materials. Mikhail Kulik, detective for criminal cases of the Northern Fleet, analyzes in detail two cases of diversion of radioactive material from the Northern Fleet (*YK # 2 and # 11, 1995).*

Summing up the results of a General Prosecutor's Office investigation, Assistant General Prosecutor Alexander Mytzikov states: "Generally it should be admitted that there is a high level of physical protection, control and accounting of nuclear materials at Russian facilities (in Minatom, in the state defense industry and in the Defense Ministry). At the same time, results of the same General Prosecutor's Office investigations have shown that diversions of nuclear materials took place, and, what is more important, the possibility of such diversions is likely to remain in the future as well" (*YK # 9, 1995*). Among the noteworthy drawbacks of the control system, Mr. Mytzikov lists the current norm of irrecoverable losses of radioactive materials, as well as the lack of technical equipment to detect radioactive materials at the check-points of regime facilities. On receiving the report of the General Prosecutor's Office, Minister for Atomic Energy Viktor Mikhailov issued a special order that instructed the heads of directorates and divisions, committee chairmen and leaders of concerns and joint-stock companies to establish strict control on a regular basis, set up commissions and investigate accounting and storage of nuclear materials, strengthen material security services, etc.

Analyzing the causes of nuclear diversions, Alexander Bolsunovski, a nuclear scientist from Krasnoyarsk, and Valeri Menshchikov believe that the main reason lies in the poor economic situation of workers in the industry and the absence of a nuclear material physical protection, control and accounting system that meets international requirements (*YK # 9, 1995*).

Russian officials always pointed out that the Russian export control system is an effective one, that rumors about diversions of, and trafficking in, fissile materials from Russia are based on newspaper publications, that any publication of this kind is investigated by Russian special services and that, as a rule, these rumors are proven unfounded. There is no black market for nuclear materials; there has not been a single case of the delivery of weapons-grade plutonium from Russia. In this connection Mr. Surikov analyzes a notorious incident in the Munich airport on August 10, 1994 (*YK # 8, 1995*). He comes to the conclusion that it was an action of German special services, and its aim was to artificially create arguments for placing Russia's nuclear program and facilities under international control on the pretext that there are no reliable means for nuclear material control. He writes that, "The accompanying objective is to discredit Russia as a partner in peaceful uses of nuclear energy."