FOI-R—0841--SE
April 2003
ISSN 1650-1942
User report

FOI
SWEDISH DEFENCE
RESEARCH AGENCY

Support to Threat Reduction of the Russian Biological Weapons Legacy - Conversion, Biodefence and the Role of Biopreparat

Roger Roffey, Wilhelm Unge, Jenny Clevström and Kristina S Westerdahl

NBC Defence
SE-901 82 Umeå

Defence Analysis
SE-172 90 Stockholm

SWEDISH DEFENCE RESEARCH AGENCY

NBC Defence
SE-901 82 Umeå
Defence Analysis
SE-172 90 Stockholm

FOI-R--0841--SE

April 2003

ISSN 1650-1942

User report

Support to Threat Reduction of the Russian Biological Weapons Legacy - Conversion, Biodefence and the Role of Biopreparat

Roger Roffey, Wilhelm Unge, Jenny Clevström and Kristina S Westerdahl

Photograph on front cover shows a bunker, reinforced to survive a nuclear attack, that housed a secret BW laboratory at a former BW facility in Russia.
Photographer: Kristina S Westerdahl.

Issuing organization	Report number, ISRN	Report type
FOI – Swedish Defence Research Agency NBC Defence SE-901 82 Umeå Defence analysis SE-172 90 Stockholm	FOI-R--0841--SE	User report
	Research area code 3. Protection against Weapons of Mass Destruction	
	Month year April 2003	**Project no.** A 472
	Customers code 2. NBC Defence Research	
	Sub area code 32. Biological and Chemical Defence Research	

Author/s (editor/s)	Project manager
Roger Roffey Wilhelm Unge Jenny Clevström Kristina S Westerdahl	Lena Norlander
	Approved by
	Sponsoring agency Ministry of Defence
	Scientifically and technically responsible Kristina S Westerdahl

Report title

Support to Threat Reduction of the Russian Biological Weapons Legacy - Conversion, Biodefence and the Role of Biopreparat

Abstract (not more than 200 words)

Despite a decade of threat reduction and conversion efforts, Russia still has a considerable biological weapons (BW) legacy left. As a substantial increase in EU funding is anticipated under the EU Joint Action on Non-proliferation and Disarmament (to be renewed in 2003), this report has studied the BW threat reduction/non-proliferation programmes and their progress as a basis for policy recommendations. First, the context in which these activities take place, Russia's current security policy and conversion of military-industrial capabilities in the 1990s are reviewed. Then, ongoing BW threat reduction and cooperation programmes in Russia are described. A major concern is that these have not reached the Ministry of Defence microbiological facilities. The civilian BW facilities have been opened to foreign aid step-by-step, but tranparency remains incomplete. Support has mainly been given to redirect scientists to peaceful purposes, with less attention focused on the former large-scale BW production facilities. In contrast, the positive progress regarding destruction of Russian chemical weapons is outlined. The third part briefly describes the Soviet BW programme and its key organization *Biopreparat*. Some prominent persons of the former BW programme and their current biodefence positions are presented. A general discussion with recommendations concludes the report. Threat reduction and countering BW proliferation from the former Soviet Union should be placed high on the EU security policy agenda. Russia must acknowledge that the biological area is of concern, and increased support, whatever its form, must be linked to demands on increased transparency regarding the former BW sphere.

Keywords

Biological weapons, BTWC, Russia, EU, security policy, biodefence, bioterrorism, threat reduction, conversion, non-proliferation, weapons of mass destruction, Biopreparat, Yuri T. Kalinin

Further bibliographic information	Language English
ISSN 1650-1942	**Pages** 136 p.
	Price acc. to pricelist

Utgivare	Rapportnummer, ISRN	Klassificering
Totalförsvarets Forskningsinstitut - FOI NBC-skydd 901 82 Umeå Försvarsanalys 172 90 Stockholm	FOI-R--0841--SE	Användarrapport
	Forskningsområde 3. Skydd mot massförstörelsevapen	
	Månad, år April 2003	**Projektnummer** A 472
	Verksamhetsgren 2. NBC skyddsforskning	
	Delområde 32. B- och C- forskning	

Författare/redaktör	Projektledare
Roger Roffey Wilhelm Unge Jenny Clevström Kristina S Westerdahl	Lena Norlander
	Godkänd av
	Uppdragsgivare/kundbeteckning Försvarsdepartementet
	Tekniskt och/eller vetenskapligt ansvarig Kristina S Westerdahl

Rapportens titel (i översättning)

Stöd till hotreduktion avseende det biologiska vapenområdet i Ryssland – konvertering, B-skydd och Biopreparats roll

Sammanfattning (högst 200 ord)

Trots ett årtionde av ansträngningar för hotreduktion och konvertering, har Ryssland fortfarande kvar ett betydande arv från det tidigare B-vapenprogrammet. Eftersom en avsevärd ökning av EU-stödet förväntas inom "EU Joint Action on Non-proliferation and Disarmament" (som förnyas 2003), studerar den här rapporten program för hotreduktion/icke-spridning inom B-vapenområdet, och vad som åstadkommits inom dem, som en grund för politiska rekommendationer. För att förstå i vilket sammanhang dessa aktiviteter genomförs ges en översikt i rapportens första del av nuvarande säkerhetspolitik och konverteringen av den militär-industriella kapaciteten under 1990-talet i Ryssland. Därefter redogörs för pågående hotreduktion och samarbetsprogram i Ryssland inom B-området. En källa till oro är att dessa inte nått Försvarsministeriets mikrobiologiska anläggningar. De civila B-vapenanläggningarna har stegvis öppnats för utländskt stöd, men insynen är fortfarande ofullständig. Stödet har huvudsakligen gått till ominriktning av forskare till fredliga syften, medan de storskaliga anläggningarna för tidigare B-produktion har rönt mindre uppmärksamhet. Som kontrast visas på de positiva framstegen inom förstöringen av ryska kemiska vapen. Den tredje delen beskriver kortfattat det sovjetiska B-programmet och dess nyckelorganisation Biopreparat. Några framstående personer inom det forna B-programmet och deras nuvarande positioner inom B-skyddet beskrivs. En allmän diskussion med rekommendationer avslutar rapporten. Att minska hotet och motverka proliferation avseende B-vapen från det forna Sovjetunionen bör placeras högt på EUs säkerhetspolitiska dagordning. Ryssland måste bekräfta att det biologiska området är angeläget och ökat stöd, oavsett form, måste kopplas till krav på ökad insyn i det forna B-vapenområdet.

Nyckelord

Biologiska vapen, B-vapenkonventionen, Ryssland, EU, säkerhetspolitik, B-skydd, bioterrorism, hotreduktion, konvertering, icke-spridning, massförstörelsevapen, Biopreparat, Yuri T. Kalinin

Övriga bibliografiska uppgifter	Språk Engelska
ISSN 1650-1942	**Antal sidor:** 136 s.
Distribution enligt missiv	**Pris: Enligt prislista**

Executive Summary

Despite a decade of foreign cooperative threat reduction (CTR) support amounting to billions of USD and despite Russian conversion efforts, Russia still has a considerable NBC capacity and legacy left. During Vladimir Putin's presidency Russia has embarked upon a strategy of constructive engagement with both the West and China. As a result of this strategy substantial reductions of strategic nuclear weapons are taking place and the destruction of chemical weapons seems to finally be under way. Russia has also taken steps to improve security measures at facilities and adopted a more rigorous export control regime to combat proliferation of biological and chemical weapons know-how and technology. In many international fora, however, nuclear and chemical weapons have been given the highest priority, whereas initiatives relating to threat reduction support and conversion of the biological weapons complex have been given a much lower priority. Although no exact aggregate figures on how the international threat reduction support has been distributed, a qualified guess is that about 85-90% has gone to the nuclear and chemical sectors and the remaining 10-15% has gone to the biological sector. Since Yeltsin's decree in 1992 banning further offensive biological weapons (BW) activities, very limited progress regarding threat reduction and conversion in Russia has been made in ten years.

A major concern still is that threat reduction programmes have so far not been able to initiate a dialogue, let alone reach the military microbiological facilities subordinated to the Russian Ministry of Defence with support proposals. Scientists at these facilities are still prevented from international contacts or cooperation. In addition, the threat reduction programmes have so far only on a limited scale involved some of the many civilian former BW production facilities. The civilian facilities of the former Soviet BW programme, under the aegis of the organization Biopreparat, have been opened to foreign aid step-by step. In spite of this, there is still a marked lack of knowledge about and transparency of the historical, present and future activities at these facilities and Biopreparat, to the point where it is impossible to ascertain that offensive activities indeed have been terminated. Little is known about civilian former BW production facilities and activities subordinate to other organizations, for example the Ministries of Health and Agriculture. Foreign conversion has mainly been directed to research and to redirect scientists, and only to a small degree to the huge production facilities in the former Soviet Union. One example, though, is the production facility in Stepnogorsk, Kazakhstan. The total number of production facilities and how many of these are still operating or could be made operational is not known as no inventory has yet been carried out under the CTR-programmes. There is a need for such an inventory and this is

something the EU should initiate. Clearly, more transparency on the Russian behalf is necessary about the civilian components of the former BW complex.

Given the strategy of constructive engagement the political price for non-compliance with the chemical and biological weapons conventions is becoming increasingly higher. If Russia wants to be accepted as a full-fledged member of the western democratic world it has to rid itself once and for all of the suspicions of still developing chemical and biological weapons (CBW) in breach of international treaties. Should offensive CBW research and development exist in Russia today, it is highly unlikely that this could go on without the knowledge of the political leadership.

Threat reduction activities should be placed high on the EU security policy agenda and it has recently been given higher political profile through for example the G8 Global Partnership initiative. The struggle against the spread of weapons of mass destruction (WMD) from Russia and the former Soviet Union to other state or non-state actors is also a vital part of the struggle against international terrorism. It should not be displaced by the problems caused by Iraq or North Korea. The EU has to become more active and develop an independent and long-term strategy in this area. During the 1990s the EU's, Canada's and Japan's support have been on a much smaller scale than the US and directed to human and environmental aspects of the Russian WMD demilitarization effort. The US government cannot promote conversion projects (partly due to a 1996 Congressional restriction prohibiting any new CTR funds to be used for defence conversion) that are needed for a long-term sustainability of the redirection to civilian areas of activity. This is an area where the EU should take a lead that would also be a good complementary activity to the US activities. The transformation from a passive support recipient to an active partnership means that Russia should have a greater role in planning and execution of threat reduction activities. This also means that Russia must be convinced that the biological area is of concern and must be a priority. Here a change is needed as Russia presently does not admit having any former facilities for production of biological and toxin weapons and only talks of the nuclear and chemical areas, for example in connection with priorities for the G8 Global Partnership initiative. If Russia continues not to admit having inherited a Soviet BW programme, the EU biological threat reduction support has to be discussed and perhaps reconsidered.

Objectives for assistance programmes should be to pre-empt BW proliferation at its source and prevent unauthorized actors access to BW capabilities. It is important to create interaction at different levels that will promote greater transparency of activities. There are very few studies that have focused on evaluating the threat reduction and non-proliferation initiatives connected with

the former BW facilities and even fewer dealing with former BW production facilities in Russia. It can be concluded that the conversion of former BW facilities is a complex and difficult task and probably more so than for their chemical and nuclear counterparts due to political and economic problems and a lack of insight into the secretive BW sphere.

It is essential to find areas of mutual benefit where the vast knowledge base in Russia and the NIS (Newly Independent States) could be directed to specific areas that could also be commercialized in a number of years. The Russian government recently identified biotechnology as a target industry for the 21st century. This could provide a commercial platform for former BW facilities that could help to address the critical gaps in healthcare, and support the development of innovative medical techniques. The risk that Western interests only will exploit the know-how for a limited time period must be countered. A clear vision is needed from western partners on how to reach the proliferation aims so that cooperation is well focused on the areas of technology or institutes of most concern.

In a time with an increased cooperation between Russia and the US in the fight against terrorism, protection against bioterrorism should be promoted, as it can be a way forward in the biological defence area to reach the long-term goals of non-proliferation. This should also be an area for the EU or bilateral European initiatives. The EU programme on protection against NBC terrorism could be a vechicle to initiate cooperation. Joint R&D programmes could be initiated to develop improved protection for civilian populations and armed forces personnel using know-how in the Russian biodefence sector. The EU should take an initiative to sponsor workshops and seminars where the biodefence/bioterrorism communities could meet and discuss cooperation more in detail. There would also be a need for an umbrella agreement between EU and Russia to cooperate on protection against bioterrorism.

There is a need for a broad political discussion involving several areas to find a new and improved EU policy on threat reduction. One part of this is that Sweden recently has taken an initiative presenting ideas for a EU common policy on disarmament and nonproliferation of nuclear, biological and chemical weapons. It is pointed out that efforts to address threats posed by nuclear, biological and chemical weapons should be awarded higher priority and the profile of the EU with regards to disarmament and non-proliferation should be raised. A substantial increase in European Union funding under the 1999 Joint Action, which is to be renewed in 2003, will be possible in 2006 after EU expansion. However, increased threat reduction support, whatever form it takes, must be linked to demands on increased Russian transparency regarding the BW sphere. There is a need for an increased effectiveness and stronger coordination

under the heading of the EU Joint Action on Non-proliferation and Disarmament between EU's three pillars. A EU coordinator could be an alternative. Greater European involvement in the multilateral efforts would bring political advantages, as there is still some resistance in Russia to US involvement. One option could be to expand the scope of the EU Joint Action for Russia to coordinate a broadened range of threat reduction efforts, and there is a need for an enhanced and a more active EU strategy in this area on a global scale.

1 Introduction

A background to this report is that Sweden has taken an initiative presenting ideas for an EU common policy on disarmament and nonproliferation of nuclear, biological and chemical weapons presented in Brussels on 2 April 2003. In the Swedish initiative it is pointed out that efforts to address threats posed by nuclear, biological and chemical weapons should be awarded higher priority and the profile of the EU with regards to disarmament and non-proliferation should be raised. Disarmament and nonproliferation in Russia is of vital importance to the EU and there should be a long-term perspective on disarmament and nonproliferation efforts in Russia. The EU Joint Action should be extended in 2004 for a longer time period and the budget should be increased. [1] This report is an input to the upcoming discussions that will take place 2003 in the EU to discuss priorities for and prolong the EU Joint Action on disarmament and nonproliferation and Russia.

Another aspect is the increasing political emphasis being given to limit the risks of proliferation of weapons of mass destruction, and support for threat reduction and cooperative programmes in the former Soviet Union states. The EU is now taking a more active role now in this area, for example when it comes to nuclear security and destruction of chemical weapons. In 1999, the EU agreed on a common strategy to support disarmament in Russia and in the framework of the Non-proliferation and Disarmament Cooperation Initiative (NDCI) a series of meetings have been held between the EU and Russia. Under this programme, cooperation projects are funded aiming at the destruction of Russian WMD. As yet, very few activities have been proposed for the biological area, the major reason being that Russia does not admit that the Soviet Union had an offensive BW programme, so there is nothing to convert. In contrast to this, many projects in the biological area are funded through the ISTC (International Science and Technology Centre) in Moscow for which it is a requirement that scientists are former weapons scientists. The US has lately been trying to increase the burden of sharing and funding from European and other Western countries for the threat reduction programmes. A result of this was the latest G8 (Group of eight industrialized countries) meeting where it was agreed to fund 20 billion USD over ten years where the US funds 50%. The Center for Strategic and International Studies (CSIS) has launched an initiative to evaluate the threat reduction programmes so far and to promote more European support from governments and NGOs.[2]

[1] Weapons of mass destruction – Swedish ideas, Swedish Ministry for Foreign Affairs, Unit for Global Security, 2 April 2003.

[2] Einhorn R J and M A Flournoy, Agenda for Action, Volume 1, Protecting Against the Spread of Nuclear, Biological and Chemical Weapons, An Action Agenda for the Global Partnership, CSIS Report, January 2003, Internet http://www.csis.org/pubs/2003_protecting.htm.

With this background and knowing that the legacy from the former Soviet WMD programmes are still there posing a risk that know-how and equipment might end up in countries of concern or with non-state actors. In this report we will focus on the biological area as this has not been studied much and not enough is being done in this area although the risks with bioterrorism has now been placed high on the political agenda.

In order to describe the full context in which BW threat reduction and non-proliferation activities take place, Russia's current security policy and conversion of military-industrial capabilities throughout the 1990s are reviewed in chapters 2-3.

The second part of the report (chapter 4-5) describes some of the problems relating to Russian BW, giving an overview of ongoing threat reduction and cooperation programmes indicating some of the problems encountered. Much support has been given to redirect scientists from weapon research to peaceful purposes in the biological area. So far, not much attention has been given to conversion of the vast network of production facilities that were used or aimed to be used to produce biological weapons.

The third part (chapter 6-8) of the report briefly describes the development of the Soviet BW programme and Biopreparat*'s* role in the programme. Biopreparat, today a joint stock company, and its current activities and accusations against Biopreparat are then reviewed. Rosmedprom, another leading biotech organization, and some prominent personalities of the earlier BW programme and their current positions in the biodefence work, are also scrutinized.

In chapter 9, the authors end by some overall conclusions and political recommendations.

A list of abbreviations is found in Appendix 6.

The report has been produced for the Swedish Ministry of Defence through cooperation between two divisions at the Swedish Defence Research Agency (FOI), NBC Defence in Umeå and Defence Analysis in Stockholm. Chapters 2-3 have been written by Wilhelm Unge, FOI Defence Analysis, chapters 4-5 by Roger Roffey, FOI NBC Defence, chapters 6-8 by Kristina S. Westerdahl, FOI NBC Defence, with some support of Jenny Clevström, FOI Defence Analysis. The remaining chapters were written jointly by Roffey, Unge and Westerdahl. The whole report was edited by Westerdahl.

A number of other reports relevant to the area discussed are:

- P Lilja, R Roffey and K S Westerdahl, *Disarmament or Retention, Is the Soviet Biological Weapons Programme Continuing in Russia?*, FOA-R—99-01366-865--SE, December 1999.

- R Roffey and K S Westerdahl, *Conversion of Former Biological Weapons Facilities in Kazakhstan – A Visit to Stepnogorsk July 2000*, FOI-R--0082--SE, May 2001.

- K S Westerdahl and R Roffey, "Vaccine production in Russia: An update", *Nature Medicine Vaccine Supplement*, Vol. 4, No 5, May 1998.

- K S Westerdahl, *Building and Measuring Confidence – The Biological and Toxin Weapons Convention and Vaccine Production in Russia*, FOI-R--0189--SE, December 2001.

- W Unge, *The Russian Military-Industrial Complex in the 1990s – Conversion and privatization in a structurally militarized economy*, FOA-R—00-01702-170--SE, December 2000.

- J Leijonhielm, J Clevström, P-O Nilsson and W Unge, *Russian Military-Technological Capacity – Russian R&D, Critical Technologies and Weapons Systems*, FOI-R—0618--SE, October 2002.

- J Clevström, L Norlander and W Unge, *Russian Toxin and Bioregulator Competence – Security Policy and Weapons of Mass Destruction* (in Swedish) FOA-R—00-01703-170--SE, December 2000.

For excellent help with literature searches the authors would like to thank Carin Stenlund FOI NBC-Defence, Umeå.

2 Russia's strategy of constructive engagement with the West

This chapter outlines Russia's current international relations including the ends and means of its security policy.[3] It serves the purpose of describing the overall political environment in which the EU interacts with Russia in general, and in particular, within the field of WMD non-proliferation and threat reduction including the biological area. An understanding of the foreign and security policy setting in Moscow is essential if one wishes to engage constructively with Russia as far as WMD non-proliferation is concerned.

Reductions of strategic nuclear weapons are currently under way and some steps in the right direction have lately been taken with regard to the destruction of chemical weapons in Russia. There is therefore a ground for a cautious optimism that there may be a possibility that further positive advances also could be made as regards continued redirecting scientists and not least conversion of facilities of the former biological weapons complex. However, the first stumbling-block to progress is to overcome Russia's current denial of the existence of a former Soviet offensive biological weapons programme (cf section 2.1).

The following analysis of Russian politics basically covers Vladimir Putin's presidency. Whereas president Yeltsin's term in office can be described as divide-and-stop-the-communists-from-returning-to-power-policy, President Putin represents the long-wanted strong man able to govern and reform Russia. Even though Russia's national interests may be debatable and still somewhat blurred the development in Russia under Putin has a somewhat more clear-cut direction and Russian visions for the future can be distinguished. However, there are also serious limitations to freedom of action for Moscow in reforming Russia.

Already towards the end of president Putin's first year in power, in late 2000, it was clear that Russia 'grand strategy' was to avoid international isolation and at the same time tighten the regime in domestic politics. In other words, a strong state with the capacity to restore some of its earlier influence and reputation on the international scene. Russian foreign policy under president Putin is more active, pragmatic and coordinated than under Yeltsin's presidency.

From the mid-1990s a Russian foreign policy priority was the creation of a multipolar world order, with Russia as one of the poles. This policy was

[3] This chapter is based on the FOI report *Russian Military Capabilities in a Ten-Year-Perspective – A Renewed Estimate in 2002*, FOI-0811--SE, February 2003. Earlier estimates were published in 1998 and 2000. (All in Swedish.)

combined with efforts to create alliances to reduce US world dominance. An important element in this powerbalancing was the friendship and good-neighbour treaty with China signed in 2001. One of the treaty's objectives was strategic coordination of Russian and Chinese policies, often wrongly referred to as a strategic partnership. This policy cannot be said to have been very successful.

Following the 11 September 2001, and with the US ABM (Anti-Ballistic Missile) Treaty withdrawal and NATO expansion in sight, president Putin embarked on a new course. Realizing that Russia cannot in the long run survive as an isolated and self-sustaining pole without being politically, economically, technologically and industrially marginalized step-by-step, the multipolar ambitions have been replaced by a strategy of constructive engagement. This does not mean that Russia has given up its great power aspirations and its national interests. But, instead of attempting to counter-balance the influence of the most powerful poles, Russia is attempting to reach its objectives by joining forces with these poles and thereby increasing its leverage on world affairs. The western orientation can also be seen as an expression of a deep-rooted fear that China might pose the greatest threat to Russia in a long-term perspective despite the friendship and non-aggression treaty.

Maintaining its position as the second nuclear superpower alongside the USA is of highest priority to Moscow. According to Putin, Russia and the USA have a special responsibility for global stability and the current relation between them has a positive effect on the whole international system.

In accordance with its foreign policy concept, dated June 2000, Russian foreign policy is to a large extent focusing on promoting the economic development and raising living standards, which have sunken drastically during the 1990s and is substantially lagging behind other developed industrial nations. As a result president Putin has consequently striven to integrate Russia into the global economy in order to attract foreign investment, secure high-technology transfer and expanding the export market for Russian goods. WTO (World Trade Organization) membership has become an important goal, especially since China became a member in 2001, and Russia has promised to fullfil the necessary requirements. In order to support the Russian development the EU has officially declared Russia a market economy and it supports Russia's accession to the WTO. In combination with the improvement of legal, administrative, technical and other aspects of the trade relations between the EU and Russia this is an important prerequisite for further progress when it comes to conversion of former military-industrial assets including biological.[4]

[4] An example of conversion based on commercial viability is given in section 7.3.

Another main objective of Russian foreign policy is the war against terrorism, which in the Russian terminology in principle means Muslim fundamentalism. Russia fears that it might spread throughout its southern neighbours and among Muslims in Russia. Especially the separatists in Chechnya are labeled terrorists. After the 11 September 2001 Russia is stressing the foreign involvement in the conflict as a fact justifying Russian strategic cooperation especially with the USA in the fight against international terrorism. This desire to combat terrorism is first of all driven by Russia's self-interest in preserving the territorial integrity of the Russian Federation, and to a much lesser extent by a will to curb international terrorism worldwide. The Chechen hostage-taking at the Dubrovka theatre in Moscow in the autumn 2002 further increased Russian hopes for international support and cooperation in the fight against terrorism. The Russian way of dealing with the hostage situation unfortunately left much to be desired. As was the case with the Kursk accident in the year 2000, the authorities acted in an old-fashioned Soviet way.

A characteristic feature of Putin's foreign policy is the ambition to participate in and influence international organizations, the more exclusive the better. Russia defends the role of the UN and especially its Security Council in which Russia is one of the five permanent members with veto right. Russia criticized NATO for its attack on Yugoslavia in 1999 without a UN mandate and it demanded a UN resolution to intervene in Iraq. Together with the UN, USA and the EU Russia is participating in the newly created negotiator quartett to resolve the Israeli-Palestinian conflict.

As far as Iraq is concerned Russia opposed a US military attack. Russia demanded a political solution including continued UN disarmament inspections. Considering Russia's western-oriented course, hopes that Russia would not use its veto in the UN Security Council if it should have come to a voting about a second Iraq resolution in March 2003, were justified. However, when France and Germany took the lead to oppose a US military intervention in Iraq, Russia could not resist the temptation to join forces with the Europeans.

Russia values its membership in the G8 group among the world's leading industrial nations. Russia has been given the responsibility to organize the G8 meeting in 2006 and a full membership in the group is in sight. Putin praised the G8 meeting in 2002 in which everybody's equal participation in all discussions had been made possible, including a discussion about Russia's future WTO membership. The UN Security Council and the G8 can be seen as reflections of the multipolarity desired by Russia.

In 2002 the NATO-Russia Council (NRC) was created, replacing the earlier badly functioning Permanent Joint Council. In the NRC Russia is one of the co-

decisionmakers. Among the topics to be handled by the NRC are terrorism, non-proliferation and arms control. The inclusion of Russia in this exclusive club can also be seen as a substantial reward for Russia's constructive stance in world affairs in general and support of the war against terrorism in particular.

With the inclusion of Russia in the above important political foras or decision-making mechanisms Moscow's interest in the OSCE (Organisation for Security and Cooperation in Europe) as the prime organization promoting joint European security has diminished considerably. The OSCE's criticism of human rights' violations in Chechnya and demands for Russian troop withdrawals from CIS (Commonwealth of Independent States) has also contributed to Moscow's current lack of interest.

Russia's emphasized western orientation has led to a diminishing role for the CIS and allies in Asia, such as China. The EU is the number one trading partner of Russia, with the CIS as second. However, the CIS states are on a declaratory level of the highest importance in Russian foreign policy with the motivation that it is in these countries that Russian market competitiveness is the largest. Another reason is that the CIS can be seen as a sphere of influence while at the same time the most severe threats to Russian security comes through these states from the south.

The western orientation in Russian foreign policy does not stop Russia from maintaining and developing its relations with China, India and other countries in Asia, Africa and Latin America. Russian contacts or outright cooperation with countries like North Korea, Iran and Iraq is not designed to build confidence in the west. However, in contrast to the Soviet era the emphasis is put on economic benefits in these relations. That does not mean that a geostrategic philosophy is absent. It merely means that Russian geostrategic influence is to be achieved by economic rather than by military means as during the Soviet period.

The overview above shows that the conflict of interests between the perceived security needs and the real economic needs is a continued problem in Russian foreign policy. Because of Russian economic weakness during the 1990s the economic component has become more dominating. The Russian political leadership has realized that political and military power comes from economic power and not political directives and that Russia is lagging behind both the West and China. This has forced Russia to carry on a more pragmatic policy, adapting to and being dependent on the surrounding world.

2.1 Russia's non-constructive strategy in the sphere of CBW

In comparison with the overall constructive political behaviour of Russia under Putin, even if to some extent forced upon Russia because of its economic and military weakness, Moscow's behaviour when it comes to dismantlement of the chemical and biological weapons complex is somewhat of an anomaly. It can be described as a non-constructive strategy with considerable foot-dragging.

Recent Russian historical behaviour within the fields of CBW has been characterized by an almost total lack of transparency, withholding of information pertaining to the earlier Soviet offensive CBW programmes, the (non-) successes of conversion and a non-constructive positioning in multilateral arms negotiations.

In the FOI report *Disarmament or Retention: Is the Soviet Biological Weapons Programme Continuing in Russia?* in 1999, the weight of the above mentioned factors of influence was related to the potential political price for retaining a BW programme. It was concluded that the political drawbacks of retaining a programme would be less than the military benefits.[5]

Speculating about the possible motives for retaining a BW capacity at least a handful of arguments can be found. One is that by developing an offensive BW capacity in breach of the BTWC for almost two decades, the Soviet Union created a biowarfare superiority to the west. Such a capacity could still have its advantages in times of Russian conventional military weakness in general, and in particular in the light of an overwhelming US conventional superiority.

There have been speculations about the possibility that the military in defiance of political decisions has retained a BW capacity. Since Russia is not a monolith and differences of opinion on WMD can be detected within the Russian security policy establishment such speculations are justified. However, the authors of this report firmly believe that it is highly unlikely that the political leadership should not know of a retained BW capacity should one exist in today's Russia.

Another motive relates to deterrence. The BTWC (Biological and Toxin Weapons Convention) and the CWC (Chemical Weapons Convention) are important in that they contribute to non-proliferation and at the same time reaffirm the norm against development, production or use of CBW. However, from a strategic point of view their disadvantage is that they prevent the maximizing of deterrence since the numbers of alternative deterrence means are limited. Or to put it differently, the possibility of gradual escalation disappears

[5] Lilja P, Roffey R, Westerdahl K, *Disarmament or Retention: Is the Soviet Biological Weapons Programme Continuing in Russia?*, FOA-R—99-01366-865--SE, December 1999.

by removing CBW.[6] During a period of conventional military weakness and reformation of the Russian conventional military capability the importance of substrategic nuclear weapons, as a force multiplier, has increased. But, even though the current Russian thinking about the use of nuclear weapons includes the possibility of de-escalation of a conflict by using very small, tactical nuclear warheads,[7] the difference between even the minutest nuclear charge and conventional ammunition is huge. Biological and chemical weapons could fill this gap on the ladder of escalation.[8]

A third motive for retaining CBW could be the sinister possibility of internal use in case of serious uprisings in which the survival of the Russian Federation is threatened.

A fourth and very likely motive could be a wish to reciprocate US behaviour. Why should Russia show more transparency than the US, which blocked the adoption of a verification protocol to the BTWC? Moscow could be asking itself what the US is hiding in its huge biodefence programme. Russian reluctance is further increased by US unwillingness to declare the full extent and details of its biodefence programme.[9] Russia's possible willingness to cooperate in adopting a verification protocol that was not entirely toothless did not get the chance to pass its final test because of US intervention.[10]

A fifth motive could be to extort financial aid from the West by appealing to the risk of non-deliberate proliferation. Especially in the political setting after 11 September 2001 the risk of terrorists acquiring biological weapons scares most civilized governments. It is also a charactersitic feature of the threat reduction process so far, that once a number of facilites, activities etc has been declared and foreign financial support has been made available some additional activities needing support has been "found". This cat-and-mouse game has been going on

---

[6] Richard K. Betts, "The New Threat of Mass Destruction", *Foreign Affairs*, January/February 1998, p. 26-41 and Clevström J, Norlander L, Unge W, *Russian Toxin and Bioregulator Competence* (in Swedish), FOA-R—00-01703-170--SE, December 2000, p. 61-62.

[7] For a discussion on tactical nuclear weapons and de-escalation see for instance Arbman G et al, *US-Russian Nuclear Relations – Continuity and Change*, FOI—0113--SE, September 2001 (in Swedish).

[8] Leijonhielm J et al, *Russian Military Capabilities in a Ten-Year-Perspective – A Renewed Estimate in 2002*, FOI-0811--SE, February 2003.

[9] The US confidence-building measures (CBM) declaration to the UN are held on an aggregat level indicating main activities, but, during the BTWC Ad Hoc Group negotiations, the USA was unwilling to discuss declaring all the activities relating to high-technology research and development taking place in the biodefence programme.

[10] Leijonhielm J et al, *Russian Military Capabilities in a Ten-Year-Perspective – A Renewed Estimate in 2002*, FOI-0811--SE, February 2003.

ever since the foreign threat support programmes started in the early 1990s. This should serve as a warning to the EU when engaging in further support of conversion and non-proliferation.

Other concerns, which add to the picture of circumstantial evidence supporting the view that Russia could still be retaining the BW option, are the continued importance of Biopreparat (the lead organization of the Soviet BW programme) and staff continuity[11] since the Soviet period and military personnel occupying positions in biotech R&D and the pharmaceutical industry occupied by civilian managers in most countries.

Of special importance in the Western BW dialogue with Russia is Russia's approach now as if denying the existence even of a former offensive Soviet programme.[12] Hence, Russia could not have inherited any BW capacity. This is a very elegant way of diplomatically blocking any further discussions on this issue. Foreign ministry officials in many countries feel very uneasy and unwilling, therefore, to raise the issue in discussions with Moscow, whereas defence ministry officials are clearly worried by Russia's potential retention of a BW programme. At the same time former Soviet biowarfare scientists, screened by the Russian government, are financed through international threat reduction programmes such as the ISTC, where scientists declare participation in former weapons programmes to receive grants. This puts Russia in an akward position. Either the Russian government is not telling the whole truth about the Soviet programme or it is engaged in activities that under normal judicial circumstances would be labeled as fraud vis-à-vis the threat reduction programmes. It is of great importance that the EU demands clarification on this issue.

Since 1999, the *Russian Munitions Agency* (*Rosboyepripasy*) exercises the national control over execution of international agreements in the field of prohibition of biological weapons, legislative and other legal acts, participates in international cooperation, conducts works, providing the fulfillment of

[11] The whole idea of redirection of scientists is to keep them in place and stop them from selling their services to unwanted customers. One can therefore argue that staff continuity would be inevitable if former weapons scientists are redirected to civilian research. However, it would seem that this argument is true for "pure" scientists, but when "researchers" with an administrative management profile are kept in place this is bound to cause suspicion.

[12] Russia has not officially declared or in writing stated that the USSR did not have an offensive BW programme. However, representatives of the Russian Ministry of Foreign Affairs give the impression that this is the case when meeting foreign diplomats. According to general Valentin Yevstigneyev the Soviet programme was a BW defence programme (Dmitry Litovkin. Valentin Yevstigneyev on issues relating to Russian biological weapons. Yaderny Kontrol Digest, No. 11, Summer 1999). The Putin administration is silent about the BW issue and seems to hope that the world will forget about it.

convention obligations in the field of prohibition of development, production, stockpiling and use of biological weapons.[13] The control functions are being carried out in close cooperation with Ministry of Health, Ministry of Agriculture, Ministry of Defence, Ministry of Economic Development and Trade, Ministry of Industry, Science and Technologies, Ministry of Foreign Affairs, Russian Academy of Sciences, Russian Academy of Medical Sciences and other concerned departments and organizations.

On the Internet homepage of the *Russian Munitions Agency* it is explicitly stated that "Russia don't dispose of facilities for production of biological and toxin weapons and strictly observes the international obligations." [14] According to the head of the Department of NBC Defence at the Russian MOD, Kholstov, there are no biological weapons and they have never been "developed, produced, stockpiled or stored" in Russia. In connection with the anthrax scare in 2001, the Ministry of Defence stepped up security measures relating to the protection of chemical and biological substances and important military installations.[15]

No matter which, the EU should increase its political pressure and link future threat reduction support to increased transparency. The threat reduction programmes and the projects financed by them should be regularly reviewed to make sure that the allocated money is used in the proper way and the results of the projects evaluated.

Despite all the above it is encouraging to see that the destruction of chemical weapons has taken a substantial step forward. In 2001, Russia also adopted a more rigorous export control regime to combat proliferation of biological and chemical weapons. This fits into president Putin's current constructive and systematic policies designed to resurrect Russia's position and image in the world. Pursuing his current policies the political price for non-compliance with the CWC and the BTWC is becoming increasingly higher. If Russia wants to be accepted as a full-fledged member of the western democratic world and worthy of its G8 membership it has to rid itself once and for all of the suspicions of still developing CBW in breach of international treaties. Much more is at stake than in 1999. A future G8 and WTO membership, Russia's current status in the NATO-Russia Council, the war against terrorism and non-proliferation,

[13] Russian Munitions Agency Internet homepage http://www.munition.gov.ru/eng/b4.html, downloaded 12 March 2003.
[14] Russian Munitions Agency Internet homepage http://www.munition.gov.ru/eng/b4.html, downloaded 12 March 2003.
[15] There are no biological weapons in Russia, the head of the Russian Defence Ministry's radiation,
chemical and biological protection troops, Lt-Gen Viktor Kholstov, has said, FBIS-SOV-2001-1102, Moscow RIA in Russian, 2 November, 2001.

potential energy cooperation with the US, potential restructuring of the Russian foreign debt, increased international investments and technology transfers are among the most important.

2.2 Russian biodefence in a national security context

During the late 1990s, an increased awareness of the risk of bioterrorism could be noted in Russia. According to Russian officials the threat of bioterroism was real and increasing.[16] This was a parallel to the apprehensions entertained elsewhere in the world. Some concrete measures to counter the bioterrorism threat were taken by Russia at that time. International contacts were initiated with the USA and on a more limited scale with France and Poland.[17] A a center for the fight against bioterrorism was created in Volgograd and special center for diagnosis and treatment of dangerous and exotic diseases was created under the Ministry of Defence aegis at Sergiev Posad.

The cooperation between Russia and USA in the fight against terrorism[18] plays an important role in acheiving the long-term non-proliferation goals.[19] The exchange of information on biotechnology, biodefence and facilities where dangerous pathogens are produced or stored promotes cooperation. In October 2001, the head of the Department of NBC Defence at the Russian MOD, Viktor Kholstov, expessed his disappointment that no exchange of information yet had taken place on biological defence and he doubted if the US was ready to share information on bioterrorism. He also said that his department had created a special division tasked with protecting the Moscow's subways and other infrastructure from NBC attacks.[20]

Already in 1997 the Russian Ministry of Defence and the Ministry of Health are reported to have identified a dangerous lag in Russia's biological defence

---

[16] Westerdahl K S*, The Russian View on Bioterrorism*, working paper June 2001.
[17] Polish, Russian Security Council Talks "Not Political". PAP, 1330 GMT, 7 December 1999.
[18] The Russian Federal Security Service (FSB) has compiled a list of 15 Russian and international organisations officially deemed terrorist organisations by the Russian government. At least seven of them are on a similar list compiled by the USA. Al-Qaeda is one of them. The list was handed over to the prosecutor-general's office in February 2003, according to *Jane's Intelligence Review*, March 2003, p. 3.
[19] In March 2003 Russia undertook some organisational changes in which parts of the signal intelligence agency FAPSI and the Federal Border Troops were merged with the FSB. Among other things these changes were made to strengthen FSB's capabilities to fight terrorism and drug trafficking. See *Kommersant*, 12 March 2003, p. 1,3 and *Nezavisimoe Voennoe Obozrenie*, no 4, 7-13 February 2003, p. 7.
[20] Fighting Anthrax: A cold warrior's confesion, The Washington Quarterly, Vol 25, No 2, Spring 2002.

preparedness.[21] This caused the Russian Government to launch a Pathogen Defence Programme for the period 1999-2005.[22]

In the federal budget for the year 2000 the programme was scheduled to receive 35 million roubles or 14% of the federal budget funding envisaged in the programme for that year.
However, it appears that the actual allocated funding was even further reduced (i.e. a 10-fold decrease was reported in the Russian press).[23] And, in 2001 the programme was omitted from the 2002 federal budget.[24] In September 2002, the Government decided to suspend a number of programmes including the Pathogen Defence Programme.[25]

The overall objective of the programme was to develop means to protect the population and the environment against natural and man-made hazardous pathogens. Among the primary tasks of the programme was the development and improvement of diagnostics, prophylaxes and treatments, as well as the modernization of production facilities to manufacture the finished products. The programme was ambitious as can be seen in Appendix 1 and 2 where the RDT&E activities and refitting of equipment and buildings are presented. However, it is unclear whether there have been any significant achievements.

According to one press report the programme operated within the framework of the Ministry of Defence's research facilities. It embraced the work of 15 scientific-research institutes and approximately 100 other organisations.[26]

The authors do not know the reason behind the suspension. A combination of financial constraints and a possibility to coordinate the activities of the programme with other ongoing research programmes in order to increase cost-effectiveness seems to offer a likely explanation. According to a Russian source

[21] Private communication with Dr. Anthony Rimmington, University of Birmingham, Great Britain, 20 March 2003.
[22] Government of the Russian Federation. Resolution No. 737 Concerning the focused federal programme for "The creation of methods and means of defending the population and environment against hazardous and extremely hazardous pathogens in natural and manmade emergency situations from 1999 to 2005", 2 July 1999.
[23] Shleynov B R. We are not ready for the biological war. Novaya Gazeta, 1 July 2002.
[24] Kozlova Natalya, Irina Krasnopolskaya. Russian Officials' Responses to Worries About Security Threats Graded. Rossiyskaya Gazeta, 1 October 2001.
[25] Government of the Russian Federation, Resolution No. 630 "On changes, suspended activities and recognition of loss of power of some legal acts of the Government of the Russian Federation in connection with the federal law 'On the federal budget for the year 2002' ", Rossiyskaya Gazeta, 5 September 2002.
[26] Private communication with Dr. Anthony Rimmington, University of Birmingham, Great Britain, 20 March 2003.

the progamme was reorganized in late 2001 and at least some of the different activities of the programme were assimilated with other biotechnological research activities under the current name of *Living Systems Technologies*. The current research activities comprise, among other things, fundamental research, diagnostics for dangerous infections and the development of vaccines against bacterial and viral infections.[27]

Development of international cooperation in the fight against pathogens in natural or man-made emergency situations, including issues of bio-terrorism counteraction and consequence mitigation was mentioned as a primary programme measure in the programme of 1999. The programme also declared that all work on the programme would be conducted for peaceful purposes with emphasis on all aspects of transparency (openness) for Russian Federation citizens and the worldwide public.

Although the programme had hardly hatched before it apparently was reorganized, it is of interest because Biopreparat had a major role in it. The program was intiated by Biopreparat together with the Russian Academy of Sciences, and Biopreparat was to be one of the "primary programme developers" on an equal footing with the Ministry of Health, Ministry of Food and Agriculture, Ministry of Defence and the Russian Academy of Sciences. Biopreparat was to be the major recipient of funds for R&D and modernization of facilities, in total some 30% out of 1217 million rubles for the period 1999-2005. In addition, Biopreparat was to attract 153 million rubles from other sources.[28] However, funding under the new organizational programme setting seems to be more meagre.

On the one hand, taking into account the dire health and epidemiological situation in Russia and the state of the pharmaceutical industry,[29] both the

[27] Subprogrammes under the titles "Living Systems Technologies" and "Biotechnology" can be found in the two federal target programmes *R&D on Prioritized Fields of Scientific and Technological Development 2002-2006* and *National Technological Base 2002-2006*. Both programmes are presented in full length on the Internet homepage Plans and Programmes of the Russian Government. The latter programme aims at concentrating resources on defence-related critical dual-use technologies and is financed outside the military budget. (http://www.government.gov.ru/data/structdoc.html?he_id=100&do_id=156), downloaded on 13 March 2003.

[28] Government of the Russian Federation. Resolution No. 737 Concerning the focused federal programme for "The creation of methods and means of defending the population and environment against hazardous and extremely hazardous pathogens in natural and manmade emergency situations from 1999 to 2005", 2 July 1999.

[29] The Russian pharmaceutical industry was reviewed in Clevström J, Norlander L, Unge W, *Russian Toxin and Bioregulator Competence* (in Swedish), FOA-R—00-01703-170--SE, December 2000, pp.45-52.

pathogen defence programme and any efforts to support the biotech industry[30] could be regarded as highly motivated. It is also clear from the national security concept and other official doctrinal documents that Russia intends to carry on a protectionist policy as far as the medical and pharmaceutical industries are concerned.[31]

On the other hand, they could be a suitable platform for continued BW development. Because of a lack of transparency it cannot be excluded that that is not the case. A worrying feature of the programme was the fact that Biopreparat was to have prominent role in the programme. A detailed picture of which activities Biopreparat was to be engaged in and which buildings and equipment were to be refitted is given in Appendix 1 and 2.

In the future EU dialogue with Russia on continued threat reduction support and non-proliferation measures, the EU should engage Russia in biodefence activities including bioterrorism. A first step should be to elucidate current Russian activities in these fields.

[30] In April 2000, the Duma was preparing a bill to strengthen the biotechnology sector through state orders. In the motivation the Duma wrote that unless the government mobilizes substantial efforts, Russia could loose biotechnology as a strategic science field (Robert Serebrennikov, *State Duma to urge Putin to support biotechnology*, ITAR-TASS April 7, 2000).

[31] *National Security Concept*, Russian Security Council, Internet http://www.scrf.gov.ru/Documents/Decree/2000/24-1.html, p. 11.

3 Conversion of the military industrial complex (MIC)

This chapter on the general problems of conversion of the former Soviet military-industrial complex (MIC) inherited by Russia, gives a background to the specific problems of redirecting former biowarfare scientists and converting biological production facilities that were part of the Soviet biological weapons programme (see chapter 4).

The conversion of the vast Soviet military industrial complex (MIC) has involved and involves many problems and it is not a purely national problem for Russia. International support has been and still is, essential and crucial to the process of conversion and demilitarization.

When the perestroika thinking gained momentum in the late 1980s an increasing number of politicians and experts in Russia realised that lessening the military burden on the economy was of the highest priority. Western economic advisors together with Russian reform politicians argued that by switching the focus of the highly skilled personnel and machinery of the military-industrial complex (MIC) to civilian production and by reducing the defence expenditures in the budget, Russia could benefit from a peace dividend, which had been present in the West as a result of military and military-industrial down-sizing.

During the 1990s the Russian government launched four large conversion and restructuring programmes (1990-95, 1993-95, 1995-97 and 1998-2000). However, the approach has been ambiguous. When designing the policy instruments two concerns were of overriding importance and to a large extent shaped the instruments: National security and social issues (such as employment etc.). Therefore, despite a will to convert, a number of financial, organizational, military, social and production-related aspects have hampered the implementation of the programmes.[32] In general, the conversion of the military-industrial complex has been very slow and not very successful so far, although there are interesting examples of succesful conversion.

Despite large defence spending cuts and decreased military-industrial production there was no peace dividend for Russia. One of the biggest mistakes of the reformers was their failure to understand and remove the main obstacle, i.e. structural imbalances in the form of mobilisation preparedness plans for the Russian economy inherited from the Soviet era.

[32] The conversion of the MIC has been reviewed by Unge. This chapter is based on Unge W, *The Russian Military-Industrial Complex in the 1990 – Conversion and privatisation in a structurally militarised economy*, FOA-R—00-01702-170--SE, December 2000. Where other sources have been used they are explicitly referred to.

Almost all of the mechanisms, which hampered the implementation of the state conversion programmes can be assigned to the structural militarisation of the economy and the system of mobilisation preparedness. Among other things this system was characterised by centrally planned allocation of resources, priority of resources for defence needs to civilian needs, secrecy, control of citizens' (labour force) movements (the system of 'propiska'), state control of land, minimum production requirements, demands for uninterrupted production, preserving of dual-use technologies, up-holding civilian production within the MIC to partly finance the military sector, top priority of the natural resources complex, storing of physical resources and a separate and compartmentalised management system.

This structural militarisation of the economy did not, in contrast to what is generally believed, mean that the MIC used a lion part of the Soviet Union's physical resources. Not even at the height of the arms race at the end of the 1980s did the peacetime MIC use more than approximately 20% of various physical resources. The military industrial sector, characterised by a relatively high technological level, was far more efficient than the low-tech civilian sector of the industry. It was in the civilian sector that the real misuse/waste of resources took place.

During the years of transformation in the Russian MIC parts of the above mentioned system have stayed in force, others have been disrupted (such as for instance the management system). Unfortunately conversion has been hampered either by remaining parts of the old structurally militarised economy or by the disruption of vital parts of it (which paradoxically kept the system going).

The mobilisation requirements have prevented the conversion of machinery and equipment, labour force and premises. Neither has privatisation been able to off-set these problems nor to use military technology for civilian purposes or to solve problems of distribution of products and marketing. Conversion in most Western countries has a diffusion character where land, premises, machinery, labour force etc can be sold or moved. These resources can be transformed for conversion purposes. The structurally militarised economy with its mobilisation requirements puts severe constraints on this diffusion.

Conversion throughout the MIC has basically only concerned the defence industry companies and their production. This conversion has lead to diversification (partial conversion) rather than complete conversion. Whereas complete conversion contributes to demilitarisation partial conversion does

not.[33] This can largely be explained by the mobilisation requirements which are still in place, and which have prohibited the companies from taking certain measures when attempting to convert their production.

A presidential order from July 1994 ”On the reduction of mobilization capacities and mobilization reserves” provided for a scaling down of the vast system of facilities and capabilities that could be mobilized when required.[34] But, many pieces of circumstantial evidence suggest that the mobilisation preparedness requirements are still in place.

As late as in 2002 one of the most influential oligarchs, in a meeting with president Putin, complained about the mobilisation preparedness demands put by the state on companies in his sphere of influence. Preparing for large volumes of wartime production an untolerable burden is put on the companies and makes them, if not completely economically non-viable, less competitive, especially on the international markets.

From the Russian National security concept adopted in the year 2000 one can draw the conclusion that the guiding principle will be partial conversion (as earlier during the 1990s) and not complete conversion. This in turn means an upholding of Russia's military-technical capabilities. The Russian ambition is to focus on the development of high-technological arms.[35]

From the formulations in the military doctrine from the same year, one gets the impression that the Soviet mobilisation preparedness system has partly broken down, reserves have been emptied and some plants have deteriorated to a point beyond repair. It suggests that a reformed system of mobilisation preparedness should be built. Among other things the new system will, it seems, not be all embracing, but rather encompass a certain number of important companies.[36]

---

[33] Complete conversion means the complete transfer of resources from military to civilian use. Complete conversion would thus imply disarmament. However, all empirical evidence shows that this narrow definition is of limited practical use since almost all cases of conversion in reality are of a partial nature. This in turn implies that conversion is not always synonymous with disarmament. (W Unge, *The Russian Military-Industrial Complex in the 1990 – Conversion and privatisation in a structurally militarised economy*, pp. 31-32. For a more elaborate theoretical discussion see the Bonn International Center for Conversion (BICC), *Conversion Survey 1998 – Global Disarmament, Defense Industry Consolidation and Conversion*, Oxford University Press 1998, pp. 65-77.

[34] Cooper J, “Transformation of the Russian defence industry”, *Jane’s Intelligence Review*, pp.445-447, October 1994.

[35] The Russian Security Council Internet homepage, *Kontseptsiia natsionalnoi bezopasnosti Rossiiskoi Federatsii*, http://www.scrf.gov.ru/Documents/Decree/2000/24-1.html.

[36] The Russian Security Council Internet homepage, *Voennaia doktrina Rossiiskoi Federatsii*, http://www.scrf.gov.ru/Documents/Decree/2000/706-1.html.

As a part of the military reform a new programme for reforming the MIC 2002-2006 was launched in 2001.[37] Special emphasise is put on measures to secure the needed mobilisation capacity. However, an important step to decrease the burden on the MIC companies seems to be a reduction in mobilisation capacity. The future peacetime capacity usage taking mobilisation preparedness into account is planned to be around 70%.

To conclude, the Russian Federation inherited from the Soviet Union the world's most militarised economy, which for almost half a century planned and prepared itself for a protracted world war. Such a war would have demanded gigantic materiel resources, especially mobilisation reserves and a mobilisation capacity of the industry. On the one hand it is the release of these mobilisation resources that have contributed to the increased wealth of at least certain groups, if not the ordinary Russian citizen. On the other hand it is this structural militarisation that has prevented conversion, privatisation and other restructuring measures from contributing effectively to a peace dividend that could have brought increased welfare to the Russian society.

To summarise, during these years of transition a majority of the companies has adopted some kind of survival strategy rather than a constructive strategic reformation strategy. The overall picture is one of survival through exports, military-technical co-operation and limited state orders alongside conversion. This in turn means that Russia has retained more of the Soviet technological capacity than both intelligence communities and academic scholars worldwide judged possible in the early 1990s.

3.1 Retained Russian CBW Technology Capacity

In a recent in-depth study by FOI of (military) Russian R&D, critical technologies under development and weapons systems it was concluded that Russia has a more than sufficient technology capacity as far as biological and chemical weapons are concerned. The assessment also includes delivery systems.[38]

Russia has a more than sufficient capacity as far as CB weapon systems technologies and protection against CBW are concerned. In the case of

[37] Government of the Russian Federation, Resolution No 713, 11 October 2001, 'On the federal target programme "Reformation and development of the defence-industrial complex 2002-2006'.

[38] Leijonhielm J, J Clevström, P-O Nilsson and W Unge, *Russian Military-Technological Capacity – Russian R&D, Critical Technologies and Weapons Systems*, FOI-R—0618--SE, October 2002, p. 9.

detection, warning and identification Russia clearly possesses the necessary technologies with respect to CW. However, a question mark must be put around Russia's capacity to keep up with the international development on detection, warning and identification of biological agents since it is driven by modern genetechnology, electronics and data processing techniques. This is in line with the Russian apprehensions that Russia's biological defence preparedness was inadequate (cf. section 2.2)

Russia was also assessed as having a more than sufficient technology capacity regarding production of biological and chemical materials/substances including stabilization and delivery of biological agents.[39]

The R&D efforts in critical chemical technologies are substantial, whereas the R&D efforts in biological and biomedical technologies are noticeable but somewhat less substantial.
According to aggregate Russian assessments, civilian biotechnology is an R&D area of relative weakness, whereas a sufficient capacity is said to exist as far as chemical technologies are concerned.[40]

Looking ahead it is interesting to see that biological and chemical technologies are two of the prioritized science fields in today's Russian R&D policy. In 1996 the term 'critical technologies on the federal level' was coined for the first time in Russia. A key aspect was to consider which technologies have to be domestically developed in order for Russia to be able to compete with the industrially and technically well-developed countries. The second key aspect was to take into consideration the specifics of the Russian technology base and industry. The work to define critical technologies served as the foundation for the so-called Federal Target Programme for the *National Technological Base 2002-2006*.[41] The programme aims at concentrating resources on defence-related critical dual-use technologies and is to be financed outside the military budget.

[39] Leijonhielm J, J Clevström, P-O Nilsson and W Unge, *Russian Military-Technological Capacity – Russian R&D, Critical Technologies and Weapons Systems*, FOI-R—0618--SE, October 2002, p. 110.
[40] Leijonhielm J, J Clevström, P-O Nilsson and W Unge, *Russian Military-Technological Capacity – Russian R&D, Critical Technologies and Weapons Systems*, FOI-R—0618--SE, October 2002, p. 110.
[41] Government of the Russian Federation, Postanovlenie no 779, 8 November 2001, *Ob utverzhdenii federalnoi tselevoi programmy „Natsionalnaia tekhnologicheskaia baza" na 2002-2006 gody* [On the confirmation of the federal target programme „ *National Technological Base* " for the years 2002-2006], Internet http://www.government.gov.ru/data/structdoc.html?he_id=100&do_id=191, downloaded 17 February 2003.

Among the prioritized technologies are biotechnology and chemical technologies.[42]

A Soviet capacity, very little discussed, is represented by all the production facilities for biological agents. How much of this capacity has been retained is highly uncertain since conversion and threat reduction support has been concerned almost entirely with the elements of technology and human beings, whereas most of the serial production plants for various biological agents have been closed to foreign observers. One exception is Stepnogorsk, today in Kazakhstan, where among others American, British and Swedish researchers have visited one of the world's largest production plants for anthrax bacteria. [43] [44] A more detailed account of the facility in Stepnogorsk is given in section 5.2.

[42] Leijonhielm J, J Clevström, P-O Nilsson and W Unge, *Russian Military-Technological Capacity – Russian R&D, Critical Technologies and Weapons Systems*, FOI-R—0618--SE, October 2002, pp. 99-101.
[43] Roffey R and K S Westerdahl, *Conversion of former biological weapons facilities in Kazakhstan – A visit to Stepnogorsk*, July 2000, FOI R 0082-SE, May 2001.
[44] Ouagrham S B and K M Vogel, Conversion at Stepnogorsk: What the future holds for former bioweapons facilities, Cornell University Peace Studies Programme, Occasional Papers, 28 February 2003.

4 Conversion of facilities and redirecting scientists from the former Soviet offensive biological warfare programme

Foreign support to Russian R&D in general can be divided into on the one hand support to construct a new civilian society, foster democracy and save fields of scientific excellence, and on the other hand support threat reduction and the non-proliferation aims for WMD-related areas.[45] In order to counter the risk of proliferation the West has taken a number of initiatives to increase financial support to Russia.[46] The US focus has been on threat reduction and the EU more on civil R&D so far. There are a number of US agencies involved in supporting cooperation with Russia like USAID, DOD (Department of Defense), DOE (Department of Energy), Department of Commerce, USDA (US Department of Agriculture), NSF (National Science Foundation) NAS (National Academy of Science), CDC (Center for Disease Control), DARPA (Defense Advanced Research Projects Agency), NASA (National Aeronautics and Space Agency). Funds are provided through the Enhanced Threat Reduction Initiative (ETRI) with around 800 million USD per year. Since 1991, The Nunn-Lugar programme has developed into a complex and comprehensive foreign policy and national security mechanism. It has helped to eliminate 5970 strategic nuclear warheads, 446 ballistic missiles, 483 long-range air-to-surface missiles with nuclear warheads, 432 booster rockets, 322 submarine-launched missiles, 24 strategic nuclear-powered submarines and 184 silos for nuclear tests in Russia according to Russian news agency.[47] The objectives of the CTR programme are:[48]

1) Avoiding a nuclear exchange through fostering the implementation of strategic arms reduction agreements and other measures,

2) preventing the theft or diversion of WMD or materials,

3) preventing the leakage of WMD know-how,

4) downsizing WMD inventories and production capacity, and

5) preventing WMD accidents and environmental disaster.

---

[45] Leijonhielm J, J Clevström, P-O Nilsson and W Unge, Russian military-technological capacity, Russian R&D, critical technologies and weapons systems, FOI-R—0618--SE, October 2002.

[46] Clinton reportedly to propose more aid to Russia, AFP January 19, 1999.

[47] US Senator Richard Lugar discusses disarmament with Russian Defence Minister Ivanov, Associated Press, 23 August, 2002.

[48] Einhorn R J and M A Flournoy, Agenda for Action, Volume 1, Protecting Against the Spread of Nuclear, Biological and Chemical Weapons, An Action Agenda for the Global Partnership, CSIS Report, January 2003.

The efforts to reduce the threat from the Russian legacy of the Soviet BW programme has mainly been in the form of support to research and development and redirection of scientists. Several initiatives have been taken as outlined in this chapter. A comparison is made to the process of Russian chemical weapons destruction. The progress made and the problems encounteredin the biological area (reviewed in chapter 4.11) have to be understood against the background of the size and structure of the Soviet BW programme, which is briefly described below.

4.1 The offensive biological warfare programme of the Soviet Union

The Soviet Union built up what became the world's largest biological weapons' programme. Bacteriological weapons first attracted attention in the Soviet Union in the mid-1920s and its first BW programme was initiated in 1928. Since then until its demise, the Soviet Union was committed to develop fully functional biological weapons. The pursuit of BW was systematical and, already from the start, on a large scale in terms of money, facilities and personnel. Moreover, from the start, it had the political support of the highest Soviet leadership, but has with one or two exceptions never been officially acknowledged. For an overview, important dates and milestones in the Soviet BW programme are presented in Appendix 3. The three major sources on information about the Soviet programme are two defectors, Vladimir Paseschnik and Ken Alibek, and a retired BW scientist, Igor Domardskiy. Paseschnik built up one of the leading BW institutes from start and headed it for 15 years. [49] Alibek was deputy director of Biopreparat and worked for 16 years in the programme.[50] Domaradskiy, who worked throughout the last phase of the Soviet BW programme, openly published his knowledge about it after his retirement.

Until 1972, the secret BW programme mainly involved Ministry of Defence facilities, some research institutes under the Ministries of Health and Agriculture, respectively. Some existing institutions were partially utilized for offensive work, for example the anti-plague institutes, and some civilian facilities were established as a cover for such activities, such as several foot-and-mouth research institutes. A new phase came in the 1970s when scientists and politicians began to realize the potential of genetic engineering. Especially the scientists were keen to perform leading-edge genetics and leave the dogma of Lysenko behind.[51] The core of the new organization was a civilian research

[49] Adams James. Chapter 20: The weapons of special designation. The New Spies - Exploring the Frontiers of Espionage, pp. 270-283; Hutchinson, London, 1994.
[50] Alibek, K. Biohazard Hutchinson (London), 1999
[51] The Soviet scientist Lysenko won acceptance for his theory that the environment is more important than genetics for heritage and evolution during the 1930s. The experiments to prove this theory were rigged but as his thinking was politically correct, Lysenko's theories

and production organization, called Biopreparat that would focus on fundamental problems in molecular biology and genetics, and the development of advanced technology for the military.[52]

The size of the former BW programme and the number of facilities involved is still not clear due to the lack of openness and transparency from the Russian authorities. Revelations in the open press surprised many observers in the West. Figures of 20-50 facilities and 20 000-100 000 persons involved have been mentioned. A report from the Stimson Centre estimates that the Soviets employed around 65,000 personnel within its biological warfare complex including 40,000 in Biopreparat, 15,000 in the Ministry of Defence and an additional 10,000 in the Ministry of Agriculture's facilities.[53] The number of facilities were 150 enterprises **(**according to Anisimov) of the biological industry, which were capable of producing biological warfare agents and 50 of these were in Ukraine.[54] Around 40,000 persons were employed by the, at that time, secret organization Biopreparat. US experts estimate that 9,000 of those people have substantial bioweapons expertise. It's unclear how many remain in the former Soviet states and how many can have left for research jobs in the USA and Europe or other countries, but the numbers are less than anticipated in the beginning of the 1990s. About 50 different human and animal pathogens, from plague, anthrax, brucella and tularemia bacteria to smallpox, Marburg and Ebola viruses were being studied. Some strains were genetically altered to increase potency or resist antibiotics and vaccines. The Soviet BW programme reached the stage where weapons were produced. According to Pasechnik and Alibek, the Soviet military developed a range of tactical and strategic weapons for delivery of its biological weapons.[55] Biological warheads for the ICBMs were only to be assembled and loaded at nominated Biopreparat's production plants (Berdsk, Omutninsk and Stepnogorsk) during a period of mobilisation before an anticipated war.

---

dominated Soviet genetic science until the 1970s. Alibek, K. Biohazard Hutchinson (London), 1999.

[52] Rimmington, A. Invisible Weapons of Mass Destruction: The Soviet Union's BW Programme and its Implications for Contemporary Arms Control. Journal of Slavic Military Studies, Vol. 13, No. 3, pp. 1-46, September 2000.

[53] Smithson, A.E., Toxic Archipelago: Preventing Proliferation from the Former Soviet chemical and Biological Weapons Complexes, Report No. 32, p. 9, The Henry L. Stimson Center, December 1999.

[54] Chornous S, Ukraine: Kiev daily on biological weapons issue, FBIS-TAC-99-013, 13 January 1999.

[55] Alibek, K. Biohazard Hutchinson (London), 1999 James Adams. Chapter 20: The weapons of special designation. The New Spies - Exploring the Frontiers of Espionage, pp. 270-283; Hutchinson, London, 1994.

In 1992, President Yeltsin acknowledged in a decree, ”on ensuring the implementation of international pledges in the sphere of biological weapons”,[56] that there had been a breach of the BTWC (Biological and Toxin Weapons Convention) and that further offensive BW work would be banned. It was also stated that the number of personnel working in this area would be decreased by half and the funding by 30%.[57] This was formulated in the joint statement by UK, USA and Russia from 1992. This trilateral process that resulted in visits to four civilian facilities in Russia has not made any progress since 1994. The Presidents Committee on Convention Problems of Chemical and Biological Weapons that was then created has been entrusted with the oversight of the implementation of the BTWC and also the formulation and implementation of Ministry of Defence facilities conversion.[58] These responsibilities have been taken over by the Russian Agency of Munitions.[59] In an interview with the Russian Ministry of Defence Biological Protection Directorate, where the US was criticized for blocking any agreement on a multilateral instrument to strengthen the BTWC, it was also stated that in the Soviet programme 37 agents had been studied, prototypes of US BW were tested (once tested with humans), but no batch production was carried out or strategic stocks created.[60] It can also be noted that Russia in May 2001 established the Interdepartemental Scientific Council for Conventional Problems of Chemical and Biological Weapons within the Presidium of the Russian Academy of Sciences and the Russian Munition Agency. It is a scientific council to serve in an advisory capacity, the Russian government on matters regarding chemical and biological weapons issues and facilities. The council is composed of several directors from former chemical and biological weapons institutes and well-known “hawks”.[61] Anatolyi D. Kuntsevich, who has a long background in the Soviet chemical weapons programme, was appointed as Chairman of this council.[62] Members of this council include the head of Vektor Lev S. Sandakhchiev and the former Director

[56] Decree of the President of the Russian Federation, Edict no 390, B Yeltsin, Moscow, 11 April, 2002.
[57] Leitenberg M, The possibilies and limitations of biological weapons conversion, pp. 119-133, In Conversion of former BTW facilities, Ed Geissler E, L Gazso and E Buder, NATO Science Series, 1 Disarmament Technologies - Vol 21, Kluwer Academic Publishers, the Netherlands 1998.
[58] Rimmington A, From military to industrial complex? Conversion of biological weapons facilities in the Russian Federation, Contemporary Security Policy Vol 17, No 1, pp. 80-112, April 1996.
[59] Russian Agency of Munitions, homepage, http://www.munition.gov.ru, 11 March 2003.
[60] Russian paper suspicious of US withdrawal from biological weapons talks, BBC Worldwide Monitoring, 28 July, 2001.
[61] Ouagrham S B and K M Vogel, Conversion at Stepnogorsk: What the future holds for former bioweapons facilities, Cornell University Peace Studies Programme, Occasional Papers 28, February 2003.
[62] Anatolyi D. Kuntsevich has been reported to have died in the spring of 2002.

General for the Russian Munitions Agency Zinovyi P. Pak, as well as 40 other academicians.[63]

4.2 Conversion of facilities and redirecting scientists

Conversion in the BW area is old, transfer of military technologies from BW facilities to the civilian sector including processes for production of antibiotics and vaccines began in 1990. But such transfers have not lead to immediate reduction in military production capabilities. Many facilities were seeking to commercialize ”spin-offs” from ongoing defence R&D.[64] The absence of approved international manufacturing standards like Good Manufacturing Practices (GMP) and subsequent inferior products have made Western pharmaceutical companies hesitant to invest. In some cases they have instead constructed new buildings and just use the know-how of the personnel. One other way has been to focus on the markets in the developing world. Some facilities have for the time being settled for only packaging and marketing Western generic drugs. Another limiting factor is that many of the former BW facilities were highly specialized in topics that did not have immediate civilian applications. For a discussion on conversion of former BW facilities, see also a recent study by Ouagrham and Vogel.[65] Concerns over the ongoing conversion in Russia have been raised by the US. Three key risks in funding conversion were identified in a report by the General Accounting Office (GAO):[66]

- Maintaining a potential BW infrastructure,

- maintaining or even improving know-how in BW relevant areas, and

- possible misuse of funding.

One part of the industry that has a central role in this area is the vaccine industry and that has been reviewed by Westerdahl. The Russian vaccine industry provides the country with almost the whole range of human and veterinary vaccines needed. All together it represents a huge capacity for production of

[63] On the An Interdepartemental Scientific Council for Conventional Problems of Chemical and Biological Weapons within the Presidium of the Russian Academy of Sciences and the Russian Munition Agency, Resolution 32/70 dated 4/7 May 2001.
[64] Rimmington A, From military to industrial complex? Conversion of biological weapons facilities in the Russian Federation, Contemporary Security Policy Vol 17, No 1, pp. 80-112, April 1996.
[65] Ouagrham S B and K M Vogel, Conversion at Stepnogorsk: What the future holds for former bioweapons facilities, Cornell University Peace Studies Programme, Occasional Papers 28, February 2003.
[66] Biological weapons, Effort to reduce former Soviet threat offers benefits, poses new risks, GAO report, NSIAD-00-138, 000428, April, 2000.

bacteria and viruses, where the major part of the capacity appears to be in the facilities for veterinary vaccines. The standard of the facilities and equipment vary and during the last decade improvements have been initiated both at individual facilities and for the industry as a whole. It should though be mentioned that the majority of vaccine producers in Russia active during the 1990's had no connection with the offensive BW production of the former Soviet Union. Four of the major vaccine facilities, with a production capacity that was to be used for BW production, are only to a limited extent involved in conversion projects, if at all. The extent to which know-how of the Russian vaccine industry could be utilized for other than peaceful purposes is difficult to assess. The transition of the vaccine industry towards a demand and profit oriented production probably lessens the risk. This is also the underlying rationale of the various foreign assistance programmes to stem brain drain from Russia.[67] [68] Some people have though raised concern that there might remain from the former BW programme large production and research capacity or even stockpiles that have not been destroyed that could be misused.[69]

In the mid-1990s the United States began engaging biological research and production centers throughout the former Soviet Union in four kinds of cooperative projects aimed at preventing proliferation of BW capabilities:[70]

- Collaborative research projects to prevent former BW scientists from selling their expertise to terrorist groups or proliferating states,

- biosafety enhancement projects are intended to make facilities safe places to work,

- biosecurity projects consolidate and restrict access to pathogens, and

- dismantlement projects target excess infrastructure and BW equipment at facilities for permanent dismantlement.

The US priorities for redirecting former Soviet BW expertise and facilities the non-proliferation objectives are:[71]

---

[67] Westerdahl K S, Building and Measuring Confidence, The Biological and Toxin Weapons Convention and Vaccine Production in Russia, FOI-R—0189--SE, December 2001.
[68] Westerdahl K S and R Roffey, Vaccine production in Russia: An opdate, Nature Medicine Vaccine Supplement Vol4, No 5, May 1998.
[69] Threat seen in Russia's biological agents, The Washington Times, 10 October 2000.
[70] Cook M S and A F Woolf, Preventing proliferation of biological weapons US assistance to former Soviet states, CRS Report to Congress, Congressional Research Service, The Library of Congress, Code RL31368, 10 April 2002.
[71] Presentation in Stockholm 24 September 1999, Redirecting former Soviet BW expertise and facilities, by A Harrington and A Weber, US Department of State.

- Pre-empt BW proliferation at its source and deflect proliferant access to BW capabilities, secure national and multinational commitment and also utilize as many channels as necessary.

- Build levels of interaction that will promote greater transparency of activities.

4.3 The European Union's (EU) initiatives and support programmes

In December 1999, the European Council decided on a Joint Action (OJ L331/11 of 23.12.99 – Council Joint Action of 17 December 99) in the framework of the Common Foreign and Security Policy of the Union, and the Union Strategy on Russia[72], with the practical objective to launch an EU Co-operative Programme to support the Non-proliferation and Disarmament in the Russian Federation. The programme was designed to support the dismantling and destruction of chemical, nuclear and biological weapons, and/or re-conversion of infrastructure or equipment. The objectives are: to provide a legal and operational framework for an enhanced EU role in cooperative threat reduction activities in the Russian Federation through project oriented cooperation, and to promote coordination as appropriate of programmes and projects in the field, at Community, Member States and international level. The EU programme is coordinated with activities performed and financed bilaterally by the Member States of the European Union and internationally by the European Community or others (US, Japan) to avoid duplication of efforts. The programme was budgeted for 8.9 million euros for the years 1999-2000. For implementation four experts, Joint Action Team, were designated stationed in Brussels. The Joint Action was set up for the same duration as the European Union Common Strategy on Russia, up to June 2003. In February 2003 it was decided to prolong the Joint Action with one year.

In order to intensify international cooperation with Russia and other NIS to reduce the risks of proliferation of weapons of mass destruction, weapons related materials, technology and expertise the US and then the Netherlands organized two *ad hoc* meetings Expanded Threat Reduction Initiative together with the EU. Then the EU Commission organized a meeting in March 2001 and in December 2002. The title of the initiative was also changed to the Non Proliferation and Disarmament Cooperation Initiative (NDCI). These conferences had the aim to "promote coordination as appropriate of programmes and projects in the field of WMD non proliferation and disarmament in Russia, at Community, Member State and international level". These meetings have had

[72] Common Strategy of the European Union on Russia, 4 June 1999.

their focus on information exchange at the expert level. At the conference in December 2002 the US State Department presented a new BioIndustry Initiative aiming at giving financial support to develop former biological facilities and knowledge to be used in modern production facilities for different biological products that could be an interesting development for support in the biological area. This initiative can be seen as a second phase in the US support where the first involved mainly R&D in the biological area. It has been proposed to hold the third NDCI Conference in London in within one to two years.

The European Union Joint Action has allocated 15 million euros for four areas:
1) Start up of chemical destruction facility at Gorny, 6 million euros.

2) Infrastructure building on the chemical destruction site at Schuschye, 2 million euros.

3) Project management at the Russian Munitions Agency responsible for chemical weapons destruction programmes, 0.7 million euros.

4) Support for licensing of the facilities required for the disposition of the Russian weapons grade plutonium of 34 tonnes, 5 million euros.

European contributions committed (by the EU Joint Action, EU Community and Member States) in total for 1992-2002 is 627 million euros, consisting of chemical weapons destruction 90 million euros, nuclear weapons dismantlement 333 million euros, non-proliferation 34 million euros, former weapons experts 166 million euros and re-conversion of facilities 4 million euros. For Sweden 11.6 million euros, CW destruction, Kambarka 1993-2000 0.6 million euros, possible projects Gorny/Schuchye 0.8 million euros, biosafety 2000-2001 0.16 million euros and control non proliferation 10 million euros.[73] Of a total committed funding of 616.7 million euros (1992-2002) the biological area 0.2 million euros, CW destruction/re-conversion 94.3 million euros and ISTC/STCU 166 million euros.

The Community support for nuclear safety in NIS countries is guided by the TACIS (Technical Assistance for the Commonwealth of Independent States) regulation of December 2000, the Communication on Nuclear Safety of December 2000 and the Strategy Paper on Nuclear Safety Cooperation of December 2002, setting the framework for the cooperation with NIS countries. The TACIS nuclear safety covers projects on nuclear submarines dismantlement NDEP (Nordic Dimension Environmental Program) and non-proliferation

[73] Deffrennes M, Contribution of the European Union in the fram of the G8 Global Partnership, Presented at the NDCI 2002 Conference Brussels, 16-17 December 2002.

activities in the field. TACIS aims at assisting the partner countries in their reform process to market economy and democracy primarily though grant assistance. The TACIS economic support in total 1991-1999 was 6 billion euros[74] and to ISTC/STCU was 1992-2006 around 300 million euros. TACIS has also in the past supported some projects related to the chemical weapons destruction field.[75] It can be noted that the EU assistance programmes for Russian CW destruction is designed around project areas in which the US is precluded by law from participating, like infrastructure building support.[76] TACIS was initiated in 1991 and also supports innovation centres and Science Cities programmes involving consultation and training. Other European programmes, INTAS (International association for the promotion of cooperation with scientists from the Independent States of the former Soviet Union) and the EU's COPERNICUS programme with Russian participation in.[77] The INCO-COPERNICUS started in 1994 and supports joint applied projects in selected areas with three to six European partners from at least three countries for up to three years with projects in health care, environment problems or production technologies. The budget 1998-2002 was 28 million euros. The Royal Society UK, the Netherlands Organization for Scientific Research (NOW), the German Academic Exchange Service (DAAD) also provides support.

4.4 The US State Department

The US State Department implements programmes to pay scientists who once developed weapons of mass destruction to conduct peaceful research. From fiscal years 1992-2003 Congress authorised 6.4 billion USD for these programmes.[78]

4.5 The US Cooperative Threat Reduction Programme, CTR

The US cooperative threat reduction programme consists of at least 100 different initiatives under the control of the Department of Defense, Energy and State. The Department of Defense has for over ten years through the CTR program had the primary responsibility for many of the programs and has been the focal point for dealing with the former Soviet Union's chemical and

[74] Thornton C L, The G8 Global Partnership against the spread of weapons and materials of mass destruction, The Non-proliferation Review, fall/winter Vol 9, No 3. pp. 135-152, 2003.
[75] Deffrennes M, Contribution of the European Union in the fram of the G8 Global Partnership, Presented at the NDCI 2002 Conference Brussels, 16-17 December 2002.
[76] Thornton C L, The G8 Global Partnership against the spread of weapons and materials of mass destruction, The Non-proliferation Review, fall/winter Vol 9, No 3. pp 135-152, 2003.
[77] Astreina M K and Ye B Lenchuk, Science & technology, FBIS-UST-96-004, (from Vestnik Rossiyskoy Akademi Nauk in Russian 95, no 10, pp 886-890), 2 February 1996.
[78] Weapons of mass destruction: Additional Russian cooperation needed to facilitate US efforts to improve security at Russian sites, GAO Report 03-482, March 2003.

biological warfare programmes. The US CTR programme is designed to provide the assistance for the safe, secure and ecologically sound destruction of weapons stockpiles and production infrastructure. To prevent the proliferation of the former Soviet biological weapons activities and technology base through assistance to projects such as collaborative research, enhanced safety and security measures at biological research institutes and the consolidation and dismantlement of infrastructure associated with biological weapons production or research. DOD officials have testified to Congress that stopping bioterrorism is a new top priority for the threat reduction programme.[79] Within the CTR programme the main initiatives have been initiated under the Biological Weapons Proliferation Prevention:

- Biosecurity and Biosafety enhancement,

- collaborative research, and

- facilities dismantlement.

The US Department of Defense (DOD) Defense Cooperative Threat Reduction Programme (CTR) includes the Biological Weapons Proliferation Prevention Programme (BWPP). Funding for this was 17 million USD 2002. The DOD supports only demilitarization including dismantlement but not any defence conversion as a result of a Congress decision in 1996.[80] Currently there are at least six DOD biosafety and biosecurity projects and six more being planned with a funding of around 5 million USD.[81] Then there are BWPP Dismantlement Projects like the one in Stepnogorsk, Kazakhstan, with a funding of around 10 million USD.[82]

4.6 The US Department of Health and Human Service (DHHS) Biotechnology Engagement Programme (BTEP)

This is a programme that engages former biological weapons scientists in collaborative projects. Involved institutes are Army Medical Research Institute of Infectious Diseases (USAMRIID), Centre for Disease Control (CDC), the

[79] Einhorn R J and M A Flournoy, International responses, Volume 3, Protecting Against the Spread of Nuclear, Biological and Chemical Weapons, An Action Agenda for the Global Partnership, CSIS Report, January 2003.
[80] Smithson A E, Toxic archipelago: Preventing Proliferation from the Former Soviet Chemical and Biological Weapons Complexes, Henry L Stimson Center, 1999.
[81] Cook M S and A F Woolf, Preventing proliferation of biological weapons US assistance to former Soviet states, CRS Report to Congress, Congressional Research Service, The Library of Congress, Code RL31368, 10 April 2002.
[82] Roffey R and K S Westerdahl, Conversion of former biological weapons facilities in Kazakhstan, A visit to Stepnogorsk July 2000, FOI-R--0082--SE, May 2001.

National Institute of Health (NIH) and the Food and Drug Administration (FDA) with a funding of 10 million USD for 2003 [83]. Research is focused on high priority public health problems and redirecting their biotechnology expertise. DHHS is a partner to ISTC with a funding level of 25 million USD and the priorities are tuberculosis, hepatitis, HIV/AIDS, smallpox, epidemiological training and some other infectious diseases. In 1998 the Agricultural Research Services (ARS) of the US Department of Agriculture became involved in the Redirection of Biotechnology Scientist Programme by launching the ARS-Former Soviet Union Scientific Cooperation Programme. In December 2001 there were nine on-going projects in Russia and four in Kazakhstan with a funding level of 5 million USD for 2002.

4.7 The US Department of Energy's programme IPP, Initiative for Proliferation Prevention

The Initiative for Proliferation Prevention was initiated 1994 with the aim to give employment for weapons related scientists and use their knowledge for peaceful purposes on commercial grounds and for mutual benefit to participants. IPP is mainly targeted towards the nuclear field. In December 2000 DOE had obligated 110 million USD for the IPP programme. Funding was 54 million USD for 2002 and in recent years roughly 20% has gone to the BW engagement programme. The IPP has engaged 20 biological institutes and almost 600 scientists, approved more than 55 projects and allocated over 12 million USD for collaboration with former biological weapons facilities.[84] From the programmes start 15% of projects and just over 16% of funding has been dedicated to the biotechnology area.[85] This programme is still smaller than the ISTC.

4.8 Other organizations

The Civilian Research and Development Foundation (CRDF) for the Independent States of Former Soviet Union programme aims to facilitate commercial utilization of research in the interest of all involved parties.[86] It has

[83] The US Department of Health and Human Service (DHHS) Biotechnology Engagement Programme (BTEP), Information sheet BTEP Secretariat, June 2001.
[84] Cook M S and A F Woolf, Preventing proliferation of biological weapons US assistance to former Soviet states, CRS Report to Congress, Congressional Research Service, The Library of Congress, Code RL31368, 10 April 2002.
[85] Einhorn R J and M A Flournoy, The Challenges, Volume 2, Protecting Against the Spread of Nuclear, Biological and Chemical Weapons, An Action Agenda for the Global Partnership, CSIS Report, January 2003.
[86] Leijonhielm J, J Clevström, P-O Nilsson and W Unge, Russian military-technological capacity, Russian R&D, critical technologies and weapons systems, FOI-R—0618--SE, October 2002.

recently announced funding for 11 joint US/NIS workshops aimed at identifying R&D that can provide solutions to protect civilians from terrorist acts, of which three relate to pathogens and toxins.[87] Others are ISF (International Science Foundation) that is privately funded by Georg Soros. There are also a number of foundations like Soros, McArthurs, Fullbright and Mitterand for the support of scientists[88]. The Fogarty International Center of the National Institutes of Health supports scientists in the health care from the former Soviet Union republics. The Howard Hughes Medical Institute gives five-year grants to Russian researchers in the biomedical field.[89] A new non-proliferation foundation (the Nuclear Threat Initiative) has been initiated by Ted Turner and Sam Nunn that will spend 6 million USD helping Russia reduce the NBC-threat.[90] The foundation has a staff of 32 and planned to spend 30 million USD on projects 2002 and 25 million USD in 2003. The initiative was founded almost two years ago with a pledge of stock that Mr. Turner held of about 250 million USD. Since January 2001, the group has spent roughly 37 million USD on projects such as helping secure nuclear material stored in Russia, helping create a revolving fund to respond quickly to infectious disease outbreaks through the WHO and, most recently, removing highly enriched uranium from a poorly secured reactor in Belgrade to a safer site.[91] Recently Israel announced that it would also fund Russian scientists involved in former weapons of mass destruction programmes to prevent them from accepting offers of work in Iran.[92]

4.9 The International Science and Technology Centre (ISTC) in Moscow and the Science and Technology Centre in Ukraine (STCU)

For the conversion and demilitarisation process to be successful international initiatives providing for long-term financing and management of civil projects and production within institutes and production facilities are required. The International Science and Technology Centre (ISTC) in Moscow plays an important role in supporting scientists involved in the former programmes for Weapons of Mass Destruction (WMD). ISTC was founded ”to develop,

[87] Einhorn R J and M A Flournoy, The Challenges, Vol 2, Protecting Against the Spread of Nuclear, Biological and Chemical Weapons, An Action Agenda for the Global Partnership, CSIS Report, January 2003.
[88] Simanovskiy S I, International cooperation in the defence industry conversion, FBIS-SOV-97-219, (from Konversiya in Russian Feb 97, No 2, p5-8), 7 August 1997.
[89] Leijonhielm J, J Clevström, P-O Nilsson and W Unge, Russian military-technological capacity, Russian R&D, critical technologies and weapons systems, FOI R 0618, October 2002.
[90] US foundation spending 6 million USD to help Russia control weapons of mass destruction, The Associated Press, 8 February 2002.
[91] Warren Buffett, Moves to Help Group Trying to Reduce Nuclear and Biological Threats, The New York Times, 4 October, 2002.
[92] Israel to use Russian scientists, Washington Post, Associated Press, 23 February 1999.

approve, finance, and monitor science and technology projects for peaceful purposes" in former Soviet states. The ISTC was founded by USA, EU, Japan and Russia. Later Norway and South Korea have joined as funding partners. Armenia, Belarus, Georgia, Kazakhstan and the Kyrgyz Republic have acceded to the agreement. This also includes scientists in the biological area. There is also the Science and Technology Centre in Ukraine (STCU) Founded by Canada. Sweden, USA and Ukraine that so far has had only a few projects in the area of biotechnology and life sciences.[93] It has a smaller volume of support and up to 1998 27 million USD had been spent.

ISTC was initiated in 1992 and started to give grants in 1994, now in its 9th year and some comments can be made on support being granted in the biological area. ISTC was tasked with preventing "brain drain" of weapons scientists to proliferant or rogue states as a result of the financial collapse of the former Soviet defence research and development. The idea of ISTC came as a result of the concern US nuclear scientists felt that the deteriorated conditions in Russia for nuclear scientists might lead to a mass exodus from the country. A total of 313 projects has been funded, involving a total of 21 275 persons up until 2000.[94] As of December 2001 US had funded a total of 590 projects conducted at 431 research institutes, mostly within Russia and Ukraine, but also in Armenia, Georgia, Kazakhstan, Uzbekistan, and the Kyrgyz Republic. The projects range in length from 6 months to more than 3 years. The scientists receive cash payments for their work that are sent directly from ISTC to their personal bank accounts. On average the daily grant payment for senior weapons scientists is 20-22 USD per day, tax-free.[95] Many of the senior scientists work 4 months or less per year in the supported ISTC project and on average only 50% are former weapons scientists.

Until April 2001 ISTC gave 1250 grants totaling 335 million USD.[96] In order to improve the chances of commercialization of projects the ISTC initiated a "partners program" for cooperation with foreign institutes and companies. In 2001 there were 135 partners in ISTC partnership programme. No Swedish organization though. From 1994 to 1998 150 million USD have been spent. To begin with funding was limited to the nuclear related areas but later it has been

[93] Annual report for the Science and Technology Center in Ukraine for 1997, Kyiv 1998.
[94] From internet ISTC, http://www.istc.ru/istc/website.nsf/html/00/en/summary.htm from 25 March 2002.
[95] GAO Weapons of Mass Destruction, State Department Oversight of Science Centers Programme, Report to the Chairman and to the Ranking Member, Subcommittee on Foreign Operations, Committee on Appropriations, US Senate, May 2001.
[96] Leijonhielm J, J Clevström, P-O Nilsson and W Unge, Russian military-technological capacity, Russian R&D, critical technologies and weapons systems, FOI-R—0618--SE, October 2002.

expanded also to the area of biotechnology. From 1994 to 2000 the United States funded about 45% and the EU 35% of all projects.[97] During 1994-1997 57 projects were funded at a cost of 12.9 million USD in the area of biotechnology and life sciences.[98] [99] [100] Up until November 1998 220 out of a total of 1593 project proposals registered were in the area of biotechnology. 88 projects out of 653 have been approved at a cost of 18.5 million USD which amounts to 9,8% of the total funds. It can be noted that the activities in the biotechnology sector is slowly increasing each year.[101] During 1994-1999 grants for biological projects amounted to a total of 13.3 million USD of a total 89.9 million USD that means that 14.8 % were biological projects.[102] The numbers of projects in the areas of biotechnology and life sciences are so far 531 out of a total of 1569 projects.[103] There is a difficulty to monitor supported projects and one reason is that senior scientists for example in 2000 about 75% of them worked less than 4, 5 months on US funded projects. It is impossible to know what the scientists do remaining time. From the review of projects no or very limited knowledge is gained of activities outside supported programmes.[104] Only 50 % of the senior scientists in supported projects are former weapons scientists. More than 50 institutes have been involved and the most active have been the State Center of Virology and Biotechnology Vektor, Koltsovo, the State Research Center for Applied Microbiology, Obolensk and the Institute of Engineering Immunology, Lybuchany.[105] Of the recent funding of projects half were in the group of biotechnology and this was partly due to funding through the US National Academy of Sciences programme on dangerous pathogens.[106] [107] [108]

---

[97] GAO Weapons of Mass Destruction, State Department Oversight of Science Centers Programme, Report to the Chairman and to the Ranking Member, Subcommittee on Foreign Operations, Committee on Appropriations, US Senate, May 2001.

[98] Alessi V and R F Lehman, Science in the pursuit of peace: The success and future of the ISTC, Arms Control Today, pp. 16-22, June/July 1998.

[99] The International Science and Technology Center, Annual Report, Moscow, 1997.

[100] Rimmington A, International initiative aims to integrate Russian researchers into global scientific community, Microbiology Europe, Vol 4, No 1, January/February 1996.

[101] Compton J, ISTC personal sommunication and ISTC Fact Sheet January 1999.

[102] Smithson A E, International cooperation to prevent biological weapons research and development, Public Health Reports, Supplement 2, Volume 116, §pp. 23-26, 2001.

[103] Einhorn R J and M A Flournoy, The Challenges, Volume 2, Protecting Against the Spread of Nuclear, Biological and Chemical Weapons, An Action Agenda for the Global Partnership, CSIS Report, January 2003.

[104] Weapons of Mass Destruction, State Department Oversight of Science Centers Programme, GAO Report to the Chairman and to the Ranking Member, Subcommittee on Foreign Operations, Committee on Appropriations, US Senate, May 2001.

[105] Review of ISTC-BIO projects, ISTC/WHO Conference on Public Health in Russia organised by SMI and FOI, Bergendal, Stockholm, May 11-14, 2001.

[106] Controlling dangerous pathogens, A blueprint for US-Russian cooperation, National Academy of Sciences/Institute of Medicine/National Research Council, A report to the Cooperative Threat Reduction Programme of the US Department of Defence, October 1997.

The US National Academy of Sciences has a cooperation programme with Russia since 1997 involving joint research on dangerous pathogens funded by the Cooperative Threat Reduction Programme (CTR). Collaboration on projects on dangerous pathogens can help to identify opportunities, equipment or parts of facilities for dismantlement. It can also open up new contacts to facilities part of the former BW programme that can be targeted if required in further cooperation. Another aspect is that this cooperation can give the US new knowledge concerning several BW-related pathogens previously unknown outside Russia. There is also the hope that this initiative could provide new opportunities for US industry to invest in Russia.[109] The NAS is a partner in the ISTC.

4.10 The G8 Global Partnership against the spread of weapons and materials of mass destruction

In 27 June 2002 the G8 announced the launch of "the global partnership against the spread of weapons and materials of mass destruction".[110] With the main objective to "support specific cooperation projects initially in Russia, to address non-proliferation, disarmament, counter-terrorism and nuclear safety issues". The G8 statement provides six principles and nine guidelines intended to facilitate implementation of the non-proliferation assistance programmes.[111] Priority concern was disposition of fissile material, the destruction of chemical weapons, the dismantlement of decommissioned nuclear submarines and employment of former weapons scientists. US had so far spent about 1 billion USD per year on threat-reduction programmes. Now it had committed itself to continue doing this for the next 10 years.[112] [113] [114] Japan has said it can offer 200

[107] Compton J and D Pobedimskaya, Redirection of BW experts in the framework of the International Science and Technology Center (ISTC), In Ed Geissler E, L Gazso and E Buder, NATO Science Series, 1 Disarmament Technologies - Vol 21, Conversion of former BTW facilities, pp. 157-165, Kluwer Academic Publishers, the Netherlands, 1998.
[108] Smithson A E, International cooperation to prevent biological weapons research and development, Public Health Reports, Supplement 2, Volume 116, pp. 23-26, 2001.
[109] Howson C P, Controlling dangerous pathogens: A blueprint for US-Russian cooperation, p135-147, In Conversion of former BTW facilities, Ed Geissler E, L Gazso and E Buder, NATO Science Series, 1 Disarmament Technologies - Vol 21, Kluwer Academic Publishers 1998.
[110] Statement by G8 leaders, The G8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction, Press release, Kananaskis, June 27, 2002.
[111] Thornton C L, The G8 Global Partnership against the spread of weapons and materials of mass destruction, The Non-proliferation Review, fall/winter Vol 9, No 3. pp. 135-152, 2003.
[112] G8 pledges non-proliferation package, but some question group's commitment, Nuclear Fuel, Vol 27, No 14 p. 6, 2002.
[113] Russia strikes rich with G8 plutonium deal with no strings attached, TASS, 28 June, 2002.
[114] G8 to commit 20 billion dollars in Russia non-proliferation, 28 June, 2002.

million USD for non-proliferation projects in the framework of the G8 agreement.[115] The Foreign Minister of Russia announced that the G8 are ready to allocate 15 billion USD for carrying out the programme of Russia's nuclear and chemical disarmament, approved at the latest summit in Canada 2002. The remaining 5 billion USD may be written off Russia's foreign aid.[116] In January 2003 there are pledges amounting to 18 billion USD.[117] The G8 have outlined six principles to prevent terrorists from acquiring or developing nuclear, chemical, radiological and biological weapons, missiles, and related materials, equipment and technology:[118] [119]

- Promote the adoption and implementation of multilateral treaties to prevent the proliferation.

- Develop and maintain appropriate effective measures to account for and secure such items.

- Develop and maintain appropriate effective physical protection measures applied to facilities that house such items.

- Develop and maintain effective border controls, law enforcement efforts and international cooperation to detect, deter and interdict in cases of illicit trafficking.

- Develop, review and maintain effective national export and transshipment controls over items on multilateral export control lists, as well as items that are not identified on such lists but which may nevertheless contribute to the development, production or use of nuclear,chemical and biological weapons and missiles.

- Adopt and strengthen efforts to manage and dispose of stocks of fissile materials designated as no longer required for defence purposes, eliminate all chemical weapons, and minimize holdings of dangerous biological pathogens and toxins, based on the recognition that the threat of terrorists acquisition is reduced as the overall quantity of such items is reduced.

---

[115] Japan offers $200 mil. For non-proliferation project, Japan Economic Newswire, 26 June, 2002.
[116] Izvestie Russia, RusData Dialine, 23 October, 2002.
[117] Zourabichvili S, Presentation at Conference, Strengthening the Global Partnership, Protecting Against the Spread of Nuclear, Biological and Chemical Weapons, An Action Agenda for the Global Partnership, International Institute for Strategic Studies, London, January 20, 2003.
[118] A Strategy for the G8 Global Partnership, Presented at the NDCI 2002 Conference Brussels, 16-17 December 2002.
[119] Nuclear Threat Initiative, Information, G8 10 plus 10 over 10, www.NTI.ORG.

President Putin's adviser was glad to announce that there were no links between the G8 aid and the issue of limiting Russia's nuclear cooperation with Iran.[120] In addition to pledging additional resources the leaders agreed on a comprehensive set of non-proliferation principles as well as to a specific set of guidelines for new or expanded cooperation projects that were designed to remove impediments that have hindered the pursuit of CTR projects to date. The G8 members also invited other countries that are prepared to adopt the principles and guidelines to enter into discussions with them on participating in and contributing to the initiative. A key issue is the prioritization and coordination of activities. The non US G8 nations have somewhat different perspectives from the US on how to address the proliferation threats from Russia and the NIS.

To meet the G8 target of 20 billion USD poses a major challenge why a variety of funding mechanisms will be required. The US would bear the cost of half of this. Expanding bilateral assistance programmes will help; since the summit, the United Kingdom (750 million USD), Canada (650 million USD), Germany (1.5 billion USD) Italy (400 million USD) and Japan (initially 200 million USD) have already announced intentions to contribute additional funds and France will do so soon.[121] If an EU contribution of 1 billion USD over ten years is added in, as it has been reported, then the percentage contribution is raised if it is not the same as what is funded on bilateral programmes as above. Russia has announced that it will allocate 2 billion USD over a period of ten years to finance the programmes of G8 and for 2003 204 million USD have been allocated.[122]

The EU contribution to the G8 Global Partnership is provided through two different mechanisms. The first is the European Community TACIS programme; the second is the more recent European Union Joint Action on non-proliferation and disarmament in Russia. The last framework allows for a global perspective of what is done at global EU level, integrating both the Community and the Member States programmes. The EU contributions are coming from two areas, nuclear safety and the European contributions to the ISTC and STCU. Funding for nuclear safety 2002-2006 525 million euros and for ISTC 100 million euros and STCU 25 million euros.[123]

[120] No link between G8 aid and Russia's ties with Iran, says Putin's adviser, BBC Worldwide Monitoring, 28 June, 2002.
[121] Lugar R G, The next steps in US non-proliferation policy, Arms Control Today, December, 2002.
[122] Interfax AVN 10 January 2003.
[123] Deffrennes M, Contribution of the European Union in the fram of the G8 Global Partnership, Presented at the NDCI 2002 Conference Brussels, 16-17 December 2002.

The second meeting of the Senior Officials of the G8 took place on 13 December 2002. The main outcome was: The Russian Federation had established a formal interagency coordination mechanism under the prime-minister Kasyanov and each ministry has nominated a deputy minister for these questions, Russia maintained that the priorities were the Chemical Weapons Destruction 1.7 billion USD and the Submarine Dismantlement 0.3 billion USD. At the end of January 2003 a plan was handed over by Russia at a meeting of the coordinating group of senior G8 officials indicating work in these two priority areas.[124] In a press release from the Ministry of Foreign Affairs in Russia on 4 February 2003 it was indicated a Global Partnership coordination mechanism headed by the prime minister and decision on fixed financing for this programme of 2 billion USD over 10 years. The preparedness of the Russian Federation to exempt donors from taxation was also mentioned which has been an important question for Russia to solve.[125] In a recent analysis of the G8 partnership initiative it was pointed out that if it is to be considered an expansion of the US Nunn-Lugar cooperative security model, the more successful projects are likely to be bilateral rather than multilateral, with solid coordination by the partnership's oversight body. The effectiveness of the programme could be increased if the Russian Federal Assembly could be pushed to approve the principles and guidelines in order to legitimate the programme throughout the entire Russian government. The Russian official's reactions to the G8 partnership initiative have been mixed but President Putin has been in favour of it.[126]

On January the 20th 2003 a conference **"Strengthening of the Global Partnership against the Spread of Nuclear, Biological and Chemical Weapons" organized by the Center for Strategic and International Studies CSIS (Washington D.C)** was held in London at the International Institute for Strategic Studies (IISS). The conference brought together high-level officials from the United States, Europe, and Japan, including former Senator S. Nunn and former Finnish President M. Ahtisaari, former Russian defence minister, as well as international experts and a group of journalists. The conference marked the end of the first phase of a three-year project, called *Strengthening the Global Partnership*, led by the CSIS with the support of fourteen partner organizations, think tanks, from in total eleven countries, as well as SIPRI (Stockholm International Peace Research Institute) and UI (The Swedish Institute for

[124] Russia gives G8 partners specific plans for developing global partnership, BBC Monitoring, 3 February 2003.
[125] Concerning the implementation of the Global Partnership accord against the spread of weapons of mass destruction, Press release, Ministry of Foreign Affairs of the Russian Federation, 4 February 2003.
[126] Thornton C L, The G8 Global Partnership against the spread of weapons and materials of mass destruction, The Non-proliferation Review, fall/winter Vol 9, No 3. pp 135-152, 2003.

International Affairs) from Sweden. The first phase produced four reports on national and multinational efforts to account for, secure and dismantle nuclear, biological and chemical weapons, agents, materials and infrastructure in the Russian Federation. The work has been funded by the NTI (Ted Turner Fund for WMD non proliferation and disarmament). This work can also be seen in the framework of the G8 initiative. The purpose of the study was to assess the threat reduction programmes being supported in various countries. The reports can be found at CSIS.[127] Objectives of the conference were three-fold: To launch the reports, to publicise the importance of the Global Partnership Against the Spread of Weapons of Mass Destruction (WMD), an initiative launched by the Group of Eight Nations (G8), and to ensure that the Global Partnership receives the requisite pledges by countries and organizations in the run-up to the Evian, France summit of the G8 in June 2003.

The main conclusions of the conference were three-fold:
1) The struggle against the spread of WMD from Russia and the former Soviet Union is a vital part of the struggle against international terrorism. It should not be displaced by the problems raised by Iraq or North Korea,

2) The June 2002 G8 agreement to raise 20 billion USD must be carefully monitored to ensure that this amount is a floor and *not* the ceiling of international assistance. In addition, the pledges made already by the EU, the US and a number of other countries, must be clarified before the Evian Summit,

3) Since June 2002, Russia has made an effort to ensure better cooperation with WMD threat reduction projects. In late 2002, Putin charged the Russian Prime Minister with the task of following the dossier on a monthly basis. The government has also drafted a resolution clarifying the taxation problem that held up previous projects. However, serious problems remain with regard to the legal framework for international assistance projects in Russia, as well as access to relevant sites.

Sam Nunn, former Democrat senator, described the threat from nuclear, biological and chemical weapons as the gravest danger in the world today. Preventing their spread, he said, should be the "central organizing security principle for the 21st century". Such weapons are more likely to be used by terrorists than so-called "rogue states", he warned. "If terrorists gain access to nuclear, chemical and biological weapons, they can destroy lives, destabilize economies and change history."[128]

[127] http//www.csis.org/isp/sgp/events.htm.
[128] Nunn S, Preventing catastrophic terrorism, Presentation at Conference to strengthening the Global Partnership, IISS, London, 20 January 2003.

The former Finnish President Ahtisaari posed a question. “But have we in Europe and elsewhere fully realized the political, security and psychological implications of the challenge? Have we placed cooperative threat reduction in its proper place in the scale of priorities for our foreign and security policies? Assistance to, and as it should increasingly be partnership with, Russia remains a huge task. The outcome of this cooperative effort will be an important contribution to the overall transformation of Russia itself, as well as being crucial to the global non-proliferation effort”.[129]

One of the reports noted, that the Russian government identified biotechnology as a target industry for the 21st century. This could provide a "commercial platform" for former biological weapons experts, who could also help to address the critical gaps in healthcare, and support the development of innovative medical techniques.[130]

Finally, the conference raised questions regarding the nature of the pledge of 1 billion euros by the European Union to the Global Partnership: Is this pledge simply a re-packaging of previous funds already allocated? What specific projects will the EU seek to support? Related to this, questions were raised about the status of the EU Joint Action on Disarmament and Non-Proliferation in the Russian Federation, which is due for renewal in June 2003: Has progress been made on a renewed Joint Action? How will the new Joint Action fit in with the Global Partnership? The conference stressed that the EU should become more involved in WMD cooperative threat reduction programmes in the former Soviet Union.

4.11 A short description of recent developments on the destruction of chemical weapons

One example of where progress has been possible due to political pressure is the destruction of chemical weapons that can serve as a background when discussing the BW area. This has though for CW been a time-consuming process due to a number of reasons, not least political and administrative, but now destruction of chemical weapons has begun. From the Russian side, a number of other questions must first be solved like improving the infrastructure round the facilities and promote safety. Donor countries have been focused on getting the destruction plants finished and operational. One reason for the progress is that the CW munitions were transferred from the Ministry of Defence to the civilian Agency of Munitions, including the troops for protecting

[129] Ahtisaari M, Presentation at Conference to strengthening the Global Partnership, IISS, London, 20 January 2003.
[130] The vast and unguarded stockpiles of weapons of mass destruction in the former Soviet Union pose a far greater threat than Iraq, The Guardian, 31 January 2003.

the stockpiles. This process is though limited to destruction of CW munitions and does not include conversion of the entire former CW complex.

To achieve a better internal Russian coordination including with foreign donors, in May 2001, the former prime minister Sergey Kiriyenko was appointed head of the Commission on Chemical Disarmament.[131] In July 2001, a new version of the Presidential Programme "Chemical Weapons Destruction in the Russian Federation" was approved. The Russian activities and programmes for destroying chemical weapons have been reviewed.[132] In this 2012 was specified as deadline for chemical weapons destruction in conformity with the CWC.[133] In August 2002 the Russian Foreign Minister gave a positive response to President Bush's decision to continue to finance programmes helping Russia to eliminate WMD.[134] In July 2002 the Russian parliament indicated that a further cut of funding to the construction of a facility for the destruction of CW in Shchuchye in Kurgan Region. The US had promised 286 million USD but in reality only provided 36 million USD by 2002. A stop in funding could mean that Russia might not be able to comply with its commitments under the CWC according to sources in the Duma.[135] [136] [137] [138] [139] The chairman of the state commission on chemical disarmament said Russia would allocate more funds for the federal programme to eliminate chemical weapons. "We expect the finances to total about 6 billion rubles in 2003, while the finances amounted to 500 million in 2000".[140]

The OPCW agreed to postpone the dates for Russian destruction of chemical weapons so the deadline of the initial phase is moved forward to the 29 April 2007 and Russia has pledged to destroy over 20% of its chemical arms stock

[131] Sergey Kiriyenko was chosen as chairman of the commission for chemical destruction. News agency of the Perm region, http://perm.urfo.org/lenta/art/24356.asp, 7 May 2001.
[132] Katsva M, Russian Chemical Weapons Proliferation or Destruction? The Journal of Slovak Military Studies, Vol 15, No 1, pp. 1-17, March 2002.
[133] Information on the implementation of the plans related to chemical weapons destruction in the Russian Federation, OPCW, Executive Council, EC-29/NAT.3, 25 june 2002.
[134] Russia welcomes Bush decision to continue weapons disposal funding, 9 August, 2002.
[135] Russia parliament says US funding cut threatens weapons treaty, BBC Worldwide Monitoring, July 12, 2002.
[136] Plan to destroy Russian weapons nears collapse, USA Today, 1 October, 2002.
[137] Russia might suspend membership in anti-chemical weapons convention, Gazeta, ru, 8 October, 2002.
[138] Russia may withdraw from the chemical weapons convention, Defense and Security, 9 October , 2002, (Interfax, October 7, 2002).
[139] Russian official fears "unjustified" costs of chemical weapons scrapping, BBC Worldwide Monitoring, 21 June, 2002.
[140] Russia earmarks more funds for chemical weapons elimination, TASS November 10, 2002.

within the initial phase, which consists of two stages.[141] [142] [143] The US will contribute 866 million USD to help start the Schcuch'ye facility.[144] Russia spent for chemical weapons destruction 3 billion Rubles in 2001, 5.4 billion rubles in 2002, and allocated 5,36 billion rubles in the 2003 budget.[145] Under the new programme, the first stage of the Shchuchye facility should be built and commissioned by 2005 with the US aid and about 500 tonnes CW will be recycled per year. The second stage will be built at Russian expense. This will recycle about 1 600 tonnes a year.[146] It has been indicated that a decision has been taken for financing the federal programme for CW destruction with 160 million USD during ten years.[147]

On the 21 August Russia opened the new destruction plant for chemical weapons in Gorny, Saratov Region, that was supposed to start operating in December 2002.[148] [149] [150] [151] [152]
It started operating on the 19 December 2002.[153] Russia will destroy its first batch of CW, 400 tonnes or 1%, by 29 April 2003. A total of 180 tonnes of mustard gas had been destroyed by February and 350 tonnes by 10 April

[141] Russian munitions chief on chemical weapons destruction, BBC Worldwide Monitoring, 8 October, 2002.
[142] Russian official hails chemical disarmament extension, BBC Worldwide Monitoring, 11 October, 2002.
[143] Duma expects OPCW to extend term of scapping chemical weapons in Russia, Interfax-AVN, 9 December, 2002.
[144] US review to aid Russia's WMD legacy programmes, Janes Defense Weekly, 9 January, 2002.
[145] The full Russian federal budget for 2003 presented in *Rossiiskaia Gazeta* on the 28 December 2002, Prezidentskaia programma "Unichtozhenie zapasov khimicheskogo oruzhia v Rossiiskoj Federatsii", p. 25.
[146] Russian deputy says country's chemical weapons will be destroyed by 2012, BBC Monitoring 4 February 2003.
[147] Russia complying with chemical weapons convention, TASS 14 February 2003.
[148] Russian chemical disposal plant to start working in December, BBC Worldwide Monitoring, 28 August, 2002.
[149] Sergei Kiriyenko announced date of launching plant for chemical weapons destruction, Economic News, 29 July, 2002.
[150] Russian munitions chief on chemical weapons destruction problems, BBC Worldwide Monitoring, 8 October, 2002.
[151] Russian munitions boss reports on new chemical disarmament plant, BBC Worldwide Monitoring, 23 December, 2002.
[152] Russia to destroy first 10 tonnes of chemical weapons by end of year, BBC Worldwide Monitoring, 30 December, 2002.
[153] On the start of the Operation of Russia's first plant for the destruction of chemical weapons, Press release, Ministry of Foreign Affairs of the Russian Federation, 25 December 2002.

2003.[154] [155] The chairman of the state commission on chemical disarmament, Sergei Kiriyenko, has said that the plant in Gorny, Saratov region, had destroyed 80% of 400 tonnes to be scrapped by April 29, 2003. According to experts estimates the cost of the Russian federal programme of chemical disarmament is 3.5 billion US dollars.[156] The Russian government defence order for the construction of chemical weapon destruction facilities in Russia in 2003 is 1.1 billion rubles. In accordance with the updated governmental programme approved 5 July 2001, the industrial area in Kambarka has to be built in 2001-05. The site will begin operation in 2005, and all the stockpiles of yperite and lewisite are to be processed by 2011.[157] According to the Russian Munitions Agency the total cost for destruction of chemical weapons has been estimated to 90.2 billion rubles and Western assistance could make up 30% of this. The remaining 70% will be provided by Russia within the framework of the G8 Global Partnership. Russia has requested 17 billion rubles for 2003. The US Congress has earmarked 50 million USD for 2002 and 133 million USD for 2003.[158] Among 11 donor countries, Germany has earmarked 30 million USD, the United Kingdom 18 million USD[159] and Canada 5 million USD for support of the destruction of CW in Russia.[160] [161]

During the last two years, security measures have been improved for the facilities storing CW for destruction.[162] The Novocheboksarsk facility is to be converted before 2007. A number of decisions have been taken that concerns primarily the Joint-stock company Khimprom so Russia can comply with the CWC.[163] The five former facilities, which produced chemical weapons, have now been merged to one single plant. The "reprofiling" of the facilities must be

[154] Russia may meet commitment on chemical arms destruction says official, BBC Worldwide Monitoring, 28 February 2003.
[155] Russian Munition Agency, EU discuss disposal of chemical weapons, BBC Monitoring worldwide 11 April, 2003
[156] Russia to finish first stage of chemical disarmament, TASS, 7 April, 2003.
[157] Russian official details development of chemical arms destruction sites, BBC Worldwide Monitoring, 28 February 2003.
[158] Russia to destroy first batch of chemical weapons in April 2003, BBC Worldwide Monitoring, 17 June, 2003.
[159] Russian official urges more funds for chemical weapons destruction, BBC Worldwide Monitoring, 21 June, 2002.
[160] 5 million to destroy chemical weapons, Diplomatic Panorama, 26 November, 2002.
[161] Canada helps Russia fund chemical weapons destruction, TASS, 26 November, 2002.
[162] Security tight at Russian chemical weapons installations, BBC Monitoring International Reports, 4 December, 2002.
[163] Recommendation on a request by the Russian Federation for approval to use a chemical weapons production facility at OJSC Khimprom, Volgograd for purposes not prohibited under the Convention, Report to the Director-General, Executive Council, EC-28/DG.2, 15 February, 2002.

completed before the end of April 2003.[164] It can also be mentioned that the OPCW has confirmed that the Russian destruction technology is safe and the destruction is irreversible.[165] The Russian first deputy chief of the General Staff, Y. Baluyevskiy, has in February 2003 confirmed that all chemical weapons have been removed from the Russian armed forces to the Agency of Munitions.[166] Prime Minister Mikhail Kasyanov appointed general Viktor Kholstov replacing Zinovy Pak as new Director General for the Russian Ammunition Agency.[167] The DOD has also initiated work in 2001 to improve the security against external threats at two storage facilities for nerve gas munitions that are small and portable. But limiting it to only two facilities means that the issue of site security, for the majority of storage sites for CW, is left unresolved.[168]

It can be concluded that the CW destruction has started and due to the foreign support it will perhaps be possible to keep the time frames according to the OPCW. More pessimistic analysts believe it will take much longer, probably 40 years.[169] This area has been given high priority in the statement from the G8 meeting in 2002 why it can be assessed that the CW destruction will probably become a successful threat reduction activity. Many lessons have also been learnt so far on how to organize donor support and what is required on the Russian side to improve efficiency that is of value for threat reduction and conversion activities in the biological area.

[164] Major Russian chemical weapons producer to be fully converted by 2007, BBC Worldwide Monitoring, 28 November, 2002.
[165] Russian official confident in chemical weapons destruction technology, BBC Worldwide Monitoring, 29 November, 2002.
[166] All chemical weapons now under government control – Russian chief of staff, BBC Worldwide Monitoring, 19 February, 2003.
[167] Russia's new chemical weapons chief profiled, BBC Worldwide Monitoring, 23 April 2003.
[168] Weapons of mass destruction: Additional Russian cooperation needed to facilitate US efforts to improve security at Russian sites, GAO Report 03-482, March 2003.
[169] Weapons of mass destruction: Additional Russian cooperation needed to facilitate US efforts to improve security at Russian sites, GAO Report 03-482, March 2003.

5 Progress of international support programmes

The generally accepted assessment of this foreign support shows that the threat reduction and non-proliferation efforts have succeeded to a large degree. The expressed fears at the beginning of the 1990s that Russian WMD scientists and technicians would emigrate in large numbers have not materialized. Nevertheless, rumours maintain that a few scientists have sold their services to states of concern. Generally, however, former Russian WMD scientists have been unwilling to leave Russia. The internal brain drain has been much larger than the external. Nearly all of those who left Russia for a shorter or longer period went to the US or other western countries where the laboratories are well-equipped and financial resources available.[170]

The Bush administration had 2001 planned to reduce the funding for threat reduction programmes and even to terminate some but when this became public, the Congress strongly criticized this and a review was initiated. A comprehensive review was carried out of all assistance programmes for Russia and the former Soviet republics and it was concluded that most programmes should be continued. The review also called for a shift in philosophy from "assistance to partnership" with Russia. For this Russia would need to demonstrate a willingness to make a financial and political commitment to stop proliferation of WMD. The administration would carefully monitor any Russian attempts to weaken the programmes by restricting access to weapons plants or by erecting obstacles to meeting non-proliferation commitments. The review covered 30 programmes with an annual cost of 800 million USD. It was concluded that the DOD CTR programme was effectively managed and would advance US interests. The State Departments programmes for support of Russian scientists through the ISTC were to be expanded. The Nuclear cities initiative would be scaled back. It was recommended to accelerate efforts to destroy chemical weapons. The administration had also earlier deferred a decision to help Russia build facilities to destroy chemical weapons in Russia. In February 2002 Russia announced that it would greatly increase its budget for this and the US administration viewed it in response as a "significant change".[171] [172] [173] For a short description of recent developments on destruction of chemical weapons in Russia, see chapter 4.

---

[170] Leijonhielm J, J Clevström, P-O Nilsson and W Unge, *Russian Military-Technological Capacity – Russian R&D, Critical Technologies and Weapons Systems*, FOI-R—0618--SE, October 2002, p. 12.

[171] US Review on Russia urges keeping most arms controls, The New York Times, 16 July, 2001.

[172] US review to aid Russia's WMD legacy programmes, Janes Defense Weekly, 9 January, 2002

Between 1993 and 2000, EU support to science and technology cooperation has amounted to about 185 million euros, enabling some 45 000 Russian scientists to be involved in EU-funded programmes. According to the European Commission, TACIS has contributed about 100 million euros, mostly through the ISTC. The EU reached a Science and Technology Agreement with Russia in May 2001 to improve the access of Russian scientists to European programmes and ensure EU scientists a reciprocal access to Russian research projects. Technical assistance will support the commercialization of Russian research results and the development of related small- and medium-sized businesses.[174]

5.1 Conversion of BW facilities

The conversion of former BW facilities might be thought to be easier than for chemical or nuclear facilities due to the dual-use nature of biotechnology but the biological area presents unique problems also politically why conversion of BW facilities is probably more difficult than for other defence facilities. The historical record shows that there are few examples of successful commercial conversion involving former BW facilities. The defence industry and not least the BW facilities have a number of unique characteristics making conversion complex. Transforming facilities into civilian businesses requires that they adapt to a system where cost becomes a major element of decision, where competitiveness ensures their durability, where competition is high and sales techniques are almost as important as the product itself, and where clients are numerous and changing. Unique for the Soviet system was that the production was organized in so-called “Scientific Production Associations” or NPO. The individual facilities comprising the NPO were characterized by their large size. Research institutes employed on an average 2000 people with production sites employing about 10 000 people located in several geographical areas. The facilities were also social agents, organizing education, health and leisure.

The Soviet defence industry was based on the principle of redundancy resulting in the creation of oversized facilities, providing for a mobilization capacity. This also meant that production sites and research institutes could be duplicated. The NPOs formed production chains distinct and separated from each other. The facilities were also dual-purpose entities, usually composed of a military and a civilian component. Another unique feature was that due to the secrecy of the work some facilities were located in isolated areas. The break-up of the Soviet Union has resulted in the destruction of the NPO structure why the individual

[173] Bleek P C, Threat reduction boosted by policy review, spending bills, Arms Control Today, January/February 2002.
[174] Thornton C L, The G8 Global Partnership against the spread of weapons and materials of mass destruction, The Non-proliferation Review, fall/winter Vol 9, No 3. pp. 135-152, 2003.

facilities have had to reorganize their production network, for example find new partners, supplies and clients in order to convert. At the same time as they try to keep their skilled workers and make some profit. One problem that should be mentioned is that in order to carry out pharmaceutical production for sale on the international market stringent quality control standards must be used such as Good Manufacturing Practices (GMP) and Good Laboratory Practices (GLP) These practices govern all aspects of production and these far exceeds what kind of standards used in former BW facilities. Such regulations are now being introduced in Russia and should be fully implemented in the production of medical preparations and pharmaceutical substances by 2005 and 2008, respectively.[175] A further problem is to be able to guarantee that there is no residual contamination of agents from previous BW production and this might not be a simple matter. In many cases this can mean being forced to construct new buildings or buy new equipment to be on the safe side. [176]

The US Department of Defense funding for BW non-proliferation increased from 2 million USD 1999 to 12 million USD for each year 2000 and 2001 and 17 million USD for 2002. It has been proposed in a report by GAO to boost it to 220 million USD for 2000-2004. The State Departments funding for the BW Expertise Redirection Programme for 2002 of 37.7 million USD to 52 million USD for 2003. The Department of Agriculture has increased its BW-related funding from 0.55 million in 1998 to 5 million USD for 2002. The Health and Human Services funding of 4.8 million USD in 1998 has increased to 10 million USD requested for 2003. As a result of this increased funding biotechnology and life sciences has emerged as the best funded ISTC field over the period 1994-2002.[177] Thus there is a clear trend in increasing US funding for BW-related projects.

The ISTC has emerged as the main multilateral source of funding specially for the biological area. By 2000 more than 2200 former Soviet BW personnel were funded, including more than 745 senior scientists and access had been gained to 30 of about 50 non-military BW-related institutes. ISTC projects were funded at 29 institutes, including 19 where BW research was developed and managed, and 10 other supporting facilities. The IPP had also funded contracts with 15 former

[175] The Ministries of Health and Economics. Order of 3 Dec. 1999 "On the introduction of branch standard OST 42-510-98, Assurance of organizatin of production and quality control of medical preparations (GMP)". Minzdrav and Minekonomiki, http://www.medinfo.ru/price/de1999_42.shtml, accessed 11 March 2003.

[176] Ouagrham S B and K M Vogel, Conversion at Stepnogorsk: What the future holds for former bioweapons facilities, Cornell University Peace Studies Programme, Occasional Papers 28, February 2003.

[177] Einhorn R J and M A Flournoy, The Challenges, Volume 2, Protecting Against the Spread of Nuclear, Biological and Chemical Weapons, An Action Agenda for the Global Partnership, CSIS Report, January 2003.

Soviet BW-related institutes, 10 of which have also been funded by the ISTC. Together these have provided access to 15 out of 20 key former BW institutes. A substantial part of the funding has gone to key institutes belonging to the organization Biopreparat. Pronouncements by US government agencies have indicated that they believe no offensive BW research is carried out at funded partner institutes.[178]

Even if the ISTC can be said to be successful, it must be remembered that the financial support is fairly limited, especially in the area of biotechnology. For example the Vektor Centre for Virology and Biotechnology that has received a high proportion of the funding in this area anyway only amounts a small part of the institute's total funding. The Vektor pharmaceutical plant has been relocated from BW-capable buildings. Around 80% of its income is from commercial contracts. These contracts are so far only restricted to the final stages of drug production like pre-packing and quality control. The problem for Vektor at present is not survival but to be able to keep the basic science. Previously, the institute to 90% was financed by Ministry of Defence as a participant in the BW programme.[179] With grants of 3.45 million USD, Obolensk has become the second largest recipient of US support after Vektor.[180] Security of the facility has improved now due to US help but there is still some concern in this respect in general.[181] There has also been some dismantlement of infrastructure and equipment at Vektor and the Scientific Centre of Applied Microbiology in Obolensk and plans for three other facilities exist. Around 50 scientists are believed to have left Vektor for other work abroad but it is unclear to where. Contacts between Vektor and Iran have been confirmed. Information recently was presented to President Bush that the smallpox virus from Russia has earlier been transferred to Iraq. This information influenced the development of the US plans for smallpox vaccination.[182] [183] Russian officials though deny the transfer of a smallpox strain to Iraq.[184] In a report to Congress in January 2000, it was concluded that the access gained to Obolensk and Vektor gave the US high confidence that these facilities were not now engaged in activities related to

[178] Einhorn R J and M A Flournoy, The Challenges, Volume 2, Protecting Against the Spread of Nuclear, Biological and Chemical Weapons, An Action Agenda for the Global Partnership, CSIS Report, January 2003.
[179] Science in Russia, The diamonds in the rubble, The Economist, 8 November, 1997.
[180] In a gamble, US supports Russian germ warfare scientists, The New York Times, 20 June, 2000.
[181] Russia's poorly guarded past: Security lacking at facilities used for Soviet bioweapons research, Washington Post, 17 June 2002.
[182] Security shambles as we go inside smallpox factory, Sunday Mirror, 8 December 2002.
[183] Russian sold smallpox strain to Iraq, The Daily Telegraph, 4 December 2002.
[184] Soviet scientist never sold smallpox to Iraq, Russian report, Agence France Presse, 5 December 2002.

biological weapons. The US administration maintains that the risk of not helping Russian scientists far outweighs the risk of doing so.[185]

5.2 Examples of conversion of specific biological facilities

Vektor has been very active in the international arena to promote continued and expanded R&D at the facility. Since 1991, its research has been redirected towards public health, veterinary medicine and environmental protection. This has also involved creating a new production facility and cooperation with western pharmaceutical companies. One initiative that is promoted by the head of Vektor is to make the institute into an international center for for study of viral pathogens. The WHO should be involved in this and organizations such as CERN could be a model.[186]

The Institute of Applied Microbiology, Obolensk began its conversion from defence in 1996, when commercial activities were allowed resulting in limited government funding. The US has spent 1.2 million USD to install an electronic security system and 1 million USD on salaries for the 300 scientists. According to the Director Urakov the facility has not received any government funding for the last five years. Currently, 25 businesses work on the centre's premises, including a successful cosmetics company and a bottling plant for ketchup. Recently a report was published on the situation at this facility that illustrates reality in Russia.[187] The facility is under the strain of dwindling government finances and allegations of mismanagement, and has been a focus of US concern since the mid-1990s. The Kremlin, citing security concerns, said the centre was too important to have electricity shut off. The utility companies sued to force bankruptcy immediately after the blackout incident. Under Russian law, creditors can sue to bankrupt their debtors and receive control of their assets. There are other former BW facilities that have are finding themselves in similar situations.

One other example of progress being made on conversion is the Pokrov Biologicals Plant (under the Ministry of Agriculture) where a number of US funded projects are actively working in cooperation with the plant management.

---

[185] In a gamble, US supports Russian germ warfare scientists, The New York Times, 20 June, 2000.

[186] Netesov S V and L S Sandakhchiev, Restructuring of the State Research Center of Virology and Biotechnology VECTOR towards public health interests: International Centers for BSL-4 agents research as a way for transparency and BTW Convention strengthening, Presentation at NATO Advanced Research Workshop, The role of biotechnology in countering BTW agents, Prague, 21-23 October 1998.

[187] Russian cash crisis unleashes bio threat, The Atlanta Journal and Constitution, 19 October 2002.

At this plant, the lack of security measures has been pointed out as a problem. Here, another common divergent view can be noted. The director has indicated that the facility was only used for developing vaccines and other civilian products. The row of nuclear-hardened bunkers for storing filled BW weapons and information from defectors tell another story.[188] [189]

There have been a number of initiatives from within and foreign to integrate the former BW facilities in Kazakhstan into the international community. One example of a study trying to analyze the conversion of a former BW facilitiy and understanding the problems this involves, is the Scientific and Experimental Production Base in Stepnogorsk, 200 kilometres from Astana.[190] [191] The facility was established by a 1982 secret edict from the Communist Party Secretary General Brezhnev, in spite of the fact that the Soviet Union had signed the BTWC in 1975. The Progress Scientific and Production Association were composed of one civilian part, the Plant Progress that should produce plagueicides and serve as a cover for the military the Scientific Experimental and Production Base (renamed in 1993 to Biomedpreparat). This was one of the world's largest production facilities for biological warfare agents and weapons. Here 500 tons of anthrax bacteria could be produced in 300 days. The aim of the facility was to improve and develop production capacity for anthrax as a biological weapon. From 1987, when R&D and scale-up of large-scale anthrax production was completed, activity and personnel at the facility started to decline. Later some work on glanders and Marburg, mainly R&D, was carried out.

When Kazakhstan became independent 1991 the facility still remained under the administrative subordination of Biopreparat in Moscow until 1992 when financial support ended. All documentation on BW was taken back to Russia.[192] [193] Most Russians returned to Russia and to other Biopreparat facilities. In 1995

[188] Security fears raised at Russian biological factory, The Sunday Age (Melbourne), 23 June 2002.
[189] Russia's poorly guarded past, security lacking at facilities used for Soviet Bioweapons research, The Washington Post, 17 June, 2002.
[190] Roffey R and K S Westerdahl, Conversion of former biological weapons facilities in Kazakhstan, A visit to Stepnogorsk July 2000, FOI-R--0082--SE, May 2001.
[191] Ouagrham S B and K M Vogel, Conversion at Stepnogorsk: What the future holds for former bioweapons facilities, Cornell University Peace Studies Programme, Occasional Papers 28, February 2003.
[192] Ouagrham S B and K M Vogel, Conversion at Stepnogorsk: What the future holds for former bioweapons facilities, Cornell University Peace Studies Programme, Occasional Papers 28, February 2003.
[193] Rimmington A, Conversion of BW facilities in Kazakhstan, pp.167-186, In Conversion of former BTW facilities, Ed Geissler E, L Gazso and E Buder, NATO Science Series, 1 Disarmament Technologies - Vol 21, Kluwer Academic Publishers, the Netherlands, 1998.

the US and Kazakh governments signed agreements on conversion through the DOD CTR (the Cooperative Threat Reduction Program). This project has been aimed at the Biomedpreparat complex.[194] Several buildings have been dismantled and discussions are continuing on dismantling remaining structures. The first phase was to identify items and equipment that must be removed or destroyed to eliminate the BW capacity that was completed by September 2000. The second part of this was aimed at the dismantlement and this project was delayed. A third phase involved getting rid of residual contamination from pathogens. There was also a final fourth phase that should be completed including the demolition of buildings by 2004. There have been some delays in the negotiations and the final part had not been agreed in December 2002.[195] The production facility and capacity has been dismantled and production resources have been redirected to civilian use. A number of mainly short-term projects have been initiated for redirecting the remaining scientific work force but without resulting in true economic conversion such as creating a profit. According to Ouagham and Vogel[196] the following approaches could be followed for conversion of BW facilities:

- Conduct a technical and financial audit of existing resources to see what resources are available for conversion. Included would be an inventory of equipment and buildings but also the work force competence.

- Identify potential products and activities.

- Conduct feasibility studies.

- Conduct market research.

The former biological weapons test site, the Vozrozhdeiye Island, is being cleaned up and investigated for residual dangerous pathogens. On the Kazakh part of the island studies will begin 2003 but so far no information on performed previous tests have been possible to receive from Russia. The large amounts of Anthrax bacteria from Sverdlovsk that were buried on the island have recently in the summer of 2002 been destroyed with US help including 6 million USD and Uzbek support as it was on the Uzbek part of the island. There were ten burial

[194] Russians dismantle germ warfare plant: Promise of plant's conversion to civilian use appears to have been put on hold, Sun-Sentineal, 2 November 2001.
[195] Ouagrham S B and K M Vogel, Conversion at Stepnogorsk: What the future holds for former bioweapons facilities, Cornell University Peace Studies Programme, Occasional Papers 28, February 2003.
[196] Ouagrham S B and K M Vogel, Conversion at Stepnogorsk: What the future holds for former bioweapons facilities, Cornell University Peace Studies Programme, Occasional Papers 28, February 2003.

pits with anthrax and they have all been decontaminated. Remaining buildings and equipment had earlier been destroyed.[197] [198] [199] [200] [201] [202] Due to threat reduction support the Kazakhstan Institute for Research on Plague Control has secured the strain collections, removed excess infrastructure and a perimeter has been erected around the site.[203]

5.3 Analysis of conversion efforts

The early assumptions that there would be a mass exodus of weapons scientists from Russia has proved wrong even if many have left at least for some years. Instead, the risks of proliferation of know-how comes from inside as scientists are approached for information, technology or strains. There are also very few if any cases of prosecution of export control violations in Russia.[204] In response to criticism by the US the Russian administration has admitted that there is a need to improve the implementation of present export controls and former Prime Minister Primakov had also urged an increase in funding to military research to present ”brain drain”.[205] A new development is also that if it is detected that an institute or its personnel has leaked sensitive information then sanctions can be imposed on the institutes and that has been done by the US in several cases.[206] As an example a man was arrested in a former biological warfare facility in Almaty, Kazakhstan attempting to steal potentially dangerous microorganisms.[207] WHO has declared that it is satisfied with Russian laboratory safety at the facility Vektor, Novosibirsk where strains of smallpox virus are stored.[208] The WHO inspection also noted five years ago that the facility in

[197] Kazakhstan to investigate Soviet biological weapons test site from 2003, BBC Worldwide Monitoring, 20 November 2002.
[198] Burial place of anthrax at Soviet bio testing ground destroyed – Kazakh expert, BBC Worldwide Monitoring, 20 November 2002.
[199] Tucker J, Khamrakulov S and A Karimova, Biological decontamination of Vorozhdeniye Island: The US-Uzbek agreement, Briefing Series, Monterey Institute of International Studies, Center for Non-proliferation Studies, 2002.
[200] Former Soviet republic agrees to clean up stockpile of anthrax, biochemical weapons, Boston Globe, 23 October 2001.
[201] Panel to plan cleanup of former Soviet anthraxdump, The Record, 22 November 2001.
[202] US eyeing Soviet-era germ warfare site, Stratfor, 26 October 2001.
[203] Einhorn R J and M A Flournoy, The Challenges, Volume 2, Protecting Against the Spread of Nuclear, Biological and Chemical Weapons, An Action Agenda for the Global Partnership, CSIS Report, January 2003.
[204] Hoffman D, Where have Russian arms scientists gone? Salt Lake Tribune, 24 January 1999.
[205] Russia warns on weapons leaks, Washington Post, 11 February 1999.
[206] Russian official: US can’t prove allegation, The Stuart News, 16 January,1999.
[207] Kazakhstan – man arrested in bio weapons center, Almaty Herald, 11 November 2002.
[208] WHO declares itself satisfied with Russian lab safety procedures, Associated Press, 25 October, 2002.

general seemed half empty and only guarded by a handful of guards that had not been paid for months. In response to this and to make it more difficult for terrorists to get hold of BW-related materials the Russian government has taken steps to establish a firmer control over facilities by improving security.[209] The US has also allocated specific funds to improve security at the State Centre for Virology and Biotechnology Vektor, Koltsovo. The problem of ”brain drain” is not only the fact that personnel with sensitive knowledge can leave the country. Already in the mid-1990s fears were raised that improved means of modern telecommunications could offer a possibility to communicate with the outside world without physically leaving Russia, for example via e-mail.[210] However, the Federal Security Service's (FSB) SORM system monitors all Russian Internet providers on line. The authors do not know how good the FSB's surveillance of Russian telecommunications is. A guess is that it is relatively good, but it is hardly completely water-tight which leaves some cause for concern.

Recently, in March 2003, the US General Accounting Office (GAO) presented a review of US efforts to improve security at Russian WMD related sites.[211] [212] [213] [214] It was concluded that after more than four years of effort, DOD has made little progress in addressing security concerns at the 49 biological sites, many former BW sites, where Russia and the United States have collaborative programmes. As of December 2002, when DOD began to to help secure Russia's dangerous pathogen collections in 1998, it has focused its efforts on providing and installing equipment at the largest former biological weapons facilities that had the most dangerous pathogens and that the Russians have been willing to let DOD to assist. DOD has installed upgrades at two sites, (the State Centre for Virology and Biotechnology, Vektor and the State Centre for Applied Microbiology) and plans to upgrade security at two additional sites, (the Russian Research Institute of Phytopathology at Golitsino and the Pokrov Biological Plant, Pokrov) at a cost of 14 million USD. While the installations of fences, sensors and video surveillance cameras have enhanced security against external threats, they have so far not improved physical security to address

[209] Associated Press, Russian government calls for crackdown on terrorism, 16 February, 1999.
[210] Cooperman A and K Belianinov, Moonlighting by modem in Russia, US World & News Report, 17 April, 1995.
[211] Weapons of mass destruction: Additional Russian cooperation needed to facilitate US efforts to improve security at Russian sites, GAO Report 03-482, March 2003.
[212] Russian restrictions hampering programs to help safeguard nuclear, biological material report says, The Associated Press, 25 March, 2003.
[213] Russia stonewalling on weapons security: report: US barred from visiting sites. Nerve gas and nuclear material still not secure against theft by terrorists, The Gazette, 9 April, 2003.
[214] US sounds alarm on Russia's chemical, biological arms, Philadelphia Inqurier, 8 April, 2003.

insider threats. DOD still has limited information on the location and security of sites that house collection of dangerous biological pathogens in Russia and it is thus uncertain which sites should receive security improvements. Despite years of US support, the Russian government still keeps many biological sites closed to US security assistance programmes. For example, the Ministry of Health has not allowed DOD to five of its antiplague institutes. The biological security programme has thus taken longer and accomplished less than expected. One reason given was the limited Russian cooperation and the US Administration's temporary suspension of the CTR programmes from January to August 2002. The GAO also recommended that DOD clearly should articulate criteria to identify which biological sites pose the greatest security risks and should therefore receive the most extensive US assistance.

In an earlier review by the US General Accounting Office, it was found that some of the financial support given by the DOE may have been used by scientists still working in Russian weapons programmes and that only one third of the funds were reaching Russian scientists. "Some scientists currently working on Russia's weapons of mass destruction are receiving programme funds" and these projects "may not be adequately reviewed by the US". About 51% of the funds went to DOE national laboratories. Congress requested the report at a time when the Clinton administration proposed to increase the support to Russia with 4.5 billion USD.[215] [216] [217] [218] It has also been reported concerns raised by US officials that funds were diverted for continued offensive BW work and that Biopreparat was implicated in this.[219] It has also been indicated that the Congress recently cut spending on the cooperative exchanges with Russian scientists involved in the former BW programme from 14 million USD to 7 million USD because of persistent doubts about Russian intentions and to punish Moscow for selling nuclear and missile technology to Iran.[220] A primary concern is that CTR programmes have not reached certain military microbiological facilities subordinated to the Russian Ministry of Defence. Another difficulty is that sources indicate that there might be more military facilities in this area unknown to the west.[221]

---

[215] GAO criticizes effort to keep Russian weapons scientists at home, Washington Post, 23 February, 1999.
[216] Hebert J H, Russian scientists getting US money, Associated Press, 23 February 1999.
[217] Reducing Russian dangers, The New York Times, 21 January, 1999.
[218] Soviet germ warfare still threatens US, United Press International, 5 May 2000.
[219] US aid is funding Russian weapons, Investigative report, Insight, 29 January, 2001.
[220] Miller J and W J Broad, Soviet defector tells of germ-warfare research: West may have access to four installations, Cincinnati Enquirer, 28 December, 1998.
[221] Einhorn R J and M A Flournoy, The Challenges, Volume 2, Protecting Against the Spread of Nuclear, Biological and Chemical Weapons, An Action Agenda for the Global Partnership, CSIS Report, January 2003.

In a CIA report to Congress, the US accused Russia of supplying nuclear technology and missiles to countries hostile to America. Russia angrily denied this and underlined that Russia meets its international obligations to control export of sensitive technology.[222] In a US government review it was noted that countries of proliferation concern, since 1997, had intensified their efforts to acquire biological weapons expertise from at least 15 former Soviet biological weapons institutes.[223] In particular Iran had aggressively been recruiting former Soviet BW scientists. The director of the former BW production facility in Stepnogorsk has also related examples of this. An advisor to President Khatami and a delegation of clerics visited several former Soviet BW facilities seeking research collaboration involving a variety of pathogens, as well as exchanges for broader scientific training in genetic engineering techniques. At least five scientists had left for Iran. The Russian Ministry of Science and Technology sponsored a biotechnology trade fare in Tehran, to which more than 100 scientists from former BW institutes participated.[224] [225] [226] Iraq is also known to have sought dual use biological equipment and know-how from Russia as UNSCOM (United Nations Special Commission) discovered from a confidential document 1997. This included an outline for a single cell production facility with 50 000 litres fermenters. Both Russia and Iraq state that it was only aimed at producing animal feed. It is though well known that the Iraqi facility for producing single cell animal feed at Al Hakam was used for BW production and was destroyed by UNSCOM. There were also discussions between Russian and Iraqi officials in 1995 to negotiate a deal on biological equipment.[227] [228]

The US then notified Russia in April 2002 that the US could not certify Russian compliance with the CWC and the BTWC thus not fund new disarmament projects under the CTR programme. The restrictions were lifted in August 2002 but the outstanding concerns remained. The decision was attributed to alleged

---

[222] Russia protests CIA report that questions Moscow's willingness to stem spread of dangerous technology, Associated Press, 7 February, 2002.
[223] Biological Weapons: Efforts to reduce former Soviet threat offers benefits, poses new risks: Report to Congressional Requesters, US General Accounting Office, GAO/NSIAD-00-138, Washington DC, April 2000.
[224] Miller J and W J Broad, Iranians, bioweapons in mind, lure needy ex-Soviet scientists, New York Times, 8 December 1998.
[225] Miller J, Flying blind in a dangerous world, New York Times, 6 February 2000.
[226] Ouagrham S B and K M Vogel, Conversion at Stepnogorsk: What the future holds for former bioweapons facilities, Cornell University Peace Studies Programme, Occasional Papers 28, February 2003.
[227] Ouagrham S B and K M Vogel, Conversion at Stepnogorsk: What the future holds for former bioweapons facilities, Cornell University Peace Studies Programme, Occasional Papers 28, February 2003.
[228] Russian official denies Russia implicated in Iraq, BBC Worldwide Monitoring, 7 April, 2003.

"concerns over the observance by Russia of conventions banning chemical and biological weapons". According to a Russian ministry of foreign affairs spokesman "What is especially disturbing is that the Americans made this decision without an exchange of views with us or identifying specific facts that gave rise to questions. The reference made to the BTWC is even more surprising. It is unclear how this fits into the joint statement on cooperation in the fight against bioterrorism, which was adopted by the presidents of Russia and the US in Washington on November 13, 2001". According to the Russian Foreign Ministry spokesman, Russia is faithfully abiding by these documents (the conventions), but if their observance is in doubt, the issue must be resolved through the existing mechanisms of bilateral and multilateral consultations.[229] What mechanisms are referred to, was not made quite clear. The DOD CTR programme requires the US President to annually certify that Russia is "committed" to several key standards such as complying with all relevant arms control agreements. Similar requirements apply to State Department or Department of Agriculture. The DOE programmes will though continue. 2002 the US Administration identified "serious concern about Russian chemical and biological weapons activities". In an interview a key State Department spokesman official cited the low level of access Russia has provided to its "military biological weapons facilities", concerns that Russia retains the ability to manufacture biological weapons agents, the fact that former offensive biological weapons personnel continues to occupy key defence establishment posts, and the fact that Russia has not accommodated a US desire for high-level bilateral meetings to discuss biological weapons. Recntly, a US State Department official again pointed to certain serious difficulties without specifying them, which face Russian-US programmmes for chemical and biological weapons disposal.[230]

Concerning chemical weapons destruction in 1999 the US Congress froze the US participation in the destruction facility at Shchuschye based on concerns that the objectives for the destruction could not be met. When many of the conditions set by Congress later were met by Russia the US assistance was resumed.[231] US officials 2002 highlighted concerns over the completeness of Russia's chemical weapons declarations under the Chemical Weapons Convention and that Russia had not yet provided a satisfactory plan for the destruction of its chemical weapons stockpiles (see also chapter 4). In order to allow threat reduction programmes to continue the administration is seeking authority from Congress

[229] Moscow disappointed at US decision to freeze aid to Russia in destroying weapons of mass destruction, Diplomatic Panorama, 9 April, 2002.
[230] US official in Moscow says mass destruction weapons pose disposal problems, BBC Worldwide Monitoring, 5 March, 2003.
[231] Thornton C L, The G8 Global Partnership against the spread of weapons and materials of mass destruction, The Non-proliferation Review, fall/winter Vol 9, No 3. pp. 135-152, 2003.

to waive the certification requirement's provisions.[232] Officials have said that the bulk of the 1.3 billion USD in projects intended to reduce the threat of conventional weapons would not be affected by the lack of certification. For example the 500 million USD in disarmament projects supervised by the Department of Energy do not require certification. The Clinton administration issued certification every year and the last in January 2001. It has also been mentioned that Russia has to acknowledge that it made in Soviet times "fourth generation" chemical weapons agents, which are many times more lethal than the most advanced nerve agents the US produced. The US is also insisting to visit some former chemical weapons plants to which Russia refuses entry due to national security reasons.[233] To this can be added that two days before the Putin – Bush summit US was notified that Russia's Export Control Commission had refused to let Russian scientists share with US, a genetically modified strain of Anthrax that its scientists said seemed to defeat Russia's anthrax vaccine, at least in hamsters. Under a scientific strain exchange agreement concluded during the Clinton administration, Russia was supposed to provide a sample of the strain. Since then, Russia's deputy prime minister has reaffirmed the commission's decision not to share its strain according to American official (for more details, see chapter 5.4).[234]

5.4 Problem with exchange of modified antrax strain

In May 2002, President Bush and Russian President Vladimir Putin renewed a mutual pledge made the year before to expand joint work on biodefence. The lack of US access to specific facilities, including those where pathogenic microorganisms are stored, from the Soviet biological weapons programme, has caused problems in the US – Russian relations. One outstanding question is that the US has tried to get a sample of a genetically modified anthrax strain because it was said to circumvent vaccines, but Russia has refused repeated requests. The US government has spent years seeking to get this specific sample.

US scientists first understood how advanced the Russian research had been, when two Obolensk scientists reported that they had transferred genes from *Bacillus cereus* into anthrax. When hamsters were given the new agent they did not respond to Russia's own vaccine against anthrax.[235] According to US officials, Russia has failed to fulfill two contracts in which an institute agreed to

[232] Bleek P C, Bush refuses to certify Russian Chem-Bio compliance, Arms Control Today, May 2002.
[233] Russia refuses to open some chemical weapons sites to US experts, BBC Worldwide Monitoring, 23 December, 2002.
[234] US warns Russia of need to verify treaty compliance, The New York Times, April, 2002.
[235] In a gamble, US supports Russian germ warfare scientists, The New York Times, 20 june, 2000.

provide a sample of this Anthrax strain including genetic data in exchange for hundreds of thousands of dollars in US grants to study its vaccine resistance. In 1995, scientists from the Institute of Applied Microbiology at an international conference presented and 1997 published data on the altered anthrax's DNA. Work on the strain began after 1992 and the goal was to study the disease-causing properties of the anthrax bacteria from the Soviet collection in an effort to improve vaccines according to an institute official.

US scientists first knew of the anthrax work in 1995. The Institute had then received about 2 million USD in US aid and more was to follow for additional studies and to upgrade the security system. Still in 2002, the United States has not yet received the strain or the genetic code. The United States and Russia have no formal agreement on exchanging dangerous pathogens, and Russian export rules bar their shipment. The export controls were adopted 2001 after US complaints that Russia needed tougher laws to prevent proliferation of bioweapons technology.[236] [237] These export control rules supersede the aid contracts according to a Russian official. The strain-exchange question has reached top US and Russian officials, but still, it has not been resolved. [238]

Russia has also introduced export control of biological agents in 2001.[239] The ukase includes the lists of bacteria, viruses, toxins and genetically modified organisms, as well as equipment and technologies, agreed on by the Australia Group. This ukase means a harmonization with EU laws and a sign that Russia wishes to live up to the standards of the Australia Group. However, no information is available about the actual implementation of the export control in the biological field.

In November 2002, the Congress granted the President the right to waive for three years congressionally mandated conditions that were holding up funds for the Cooperative Threat Reduction Programme. Congress has allocated 416.7 million USD for the CTR programme for 2003.[240] In January 2003, President Bush signed the special order to release 500 million USD for CTR Programmes

[236] On the approval of the regulation on foreign economic activity controls for chemicals, equipment and technologies that can be used in creation of chemical weapons, Ministry of Foreign Affairs of the Russian Federation, Daily News Bulletin, 3 October 2001.
[237] List of human, animal and plant pathogens, genetically modified organisms, toxins, equipment and technology subject to export control, Ukase No. 1004. Rossiyskaya Gazeta, p. 15, 11 August 2001.
[238] US, Russia tussle over deadly anthrax sample, USA TODAY, 19 August, 2002.
[239] List of human, animal and plant pathogens, genetically modified organisms, toxins, equipment and technology subject to export control, Ukase No. 1004. Rossiyskaya Gazeta, p. 15, 11 August 2001.
[240] Congress gives Bush three-year waiver for threat reduction, Arms Control Today, p 24, December 2002.

that ends a yearlong hold on spending.[241] It freed 150 million USD for the chemical destruction plant at Shchuchye.[242] President Bush issued in September 2002 the National Strategy to Combat Weapons of Mass Destruction, which lists three pillars:

- Counter proliferation to combat WMD use,

- strengthened non-proliferation to combat WMD proliferation and

- consequence management to respond to WMD use.

It also indicates that threat reduction and assistance programmes to Russia are a high priority. The US will encourage friends and allies to increase their contributions to these programmes, particularly through the G8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction.[243] The Russian Foreign Minister said in a statement on the US strategy that it would strengthen US-Russian cooperation in the area.[244]

[241] Bush authorizes further financing of Nunn-Lugar programme, BBC, Monitoring, TASS, 14 January 2003.
[242] Bush frees cash to secure Soviet arms US wants to stop foes from getting weapons, USA Today, 10 January 2003.
[243] President Bush National Strategy to Combat Weapons of Mass Destruction of the United States, 17 September, 2002.
[244] Russia hails US strategy on Weapons of Mass Destruction, BBC Monitoring International reports, 15 December, 2002.

6 Biopreparat – lead organization in the Soviet BW Programme

In 1972, the third and final phase of the Soviet BW programme can be said to have started. The earlier phases of the BW programme mainly involved military facilities and personnel, where civilian institutions supplemented these. In contrast, from 1972 the core of the new organization was a civilian research and production organization, called Biopreparat that would focus on fundamental problems in molecular biology and genetics, and the development of advanced technology for the military.[245] [246]

Notably, 1972 is the very year that the Soviet Union ratified the Biological and Toxin Weapons Convention (BTWC), prohibiting development, production and stock-piling of such weapons. The renowned British analyst Anthony Rimmington points out the parallell with the start-up of the Soviet BW programme in 1928, concomitant with the Soviet Union's accession to the Geneva Protocol that prohibits first use of bacteriological and toxin weapons.[247] Another similar occurrence is the advocation to abolish smallpox by Russian epidemiologist Zhdanov in 1958 at the annual meeting of the World Health Assembly and later adopted by the WHO. Soon after smallpox was announced as eradicated by WHO in 1980, the Soviet Union re-launched development of the smallpox virus as a weapon.[248] In the 1960s, Zhdanov was a member of a special commission that probed the possibilities to use new scientific discoveries in the Soviet Union's offensive BW activities. The findings of this commission contributed to the creation of the Biopreparat organization, and for a few years in the beginning of the 1970s, Zhdanov was the first chairman of a secret council that managed the BW activities of Biopreparat.[249] [250]A Soviet field test

[245] Rimmington, A. Invisible Weapons of Mass Destruction: The Soviet Union's BW Programme and its Implications for Contemporary Arms Control. Journal of Slavic Military Studies, Vol. 13, No. 3, pp. 1-46, September 2000.
[246] Domaradskiy, Igor (foreword by V. Yankulin). The history of one risky venture [Istoriya odnoi avantyury] (part I). Znanie - Sila [Knowledge Is Power], No. 11, pp. 60-72, November 1996.
[247] Rimmington, A. Invisible Weapons of Mass Destruction: The Soviet Union's BW Programme and its Implications for Contemporary Arms Control. Journal of Slavic Military Studies, Vol. 13, No. 3, pp. 1-46, September 2000.
[248] Preston Richard. The demon in the freezer. The New Yorker, pp. 44-61, 990712. Alibek, K. Biohazard Hutchinson (London), 1999.
[249] Rimmington, A. Invisible Weapons of Mass Destruction: The Soviet Union's BW Programme and its Implications for Contemporary Arms Control. Journal of Slavic Military Studies, Vol. 13, No. 3, pp. 1-46, September 2000.
[250] Domaradskiy, Igor (foreword by V. Yankulin). The history of one risky venture [Istoriya odnoi avantyury] (part I). Znanie - Sila [Knowledge Is Power], No. 11, pp. 60-72, November 1996.

of weaponized smallpox in 1971 caused an outbreak of smallpox killing three people.[251]

Over time, Biopreparat grew to encompass a large number of institutes and facilities that have their own names, and in the following the name "Biopreparat" is used as the name of the whole organization and all its subordinate entities. After the fall of the Soviet Union and the creation of various non-proliferation support regimes, Biopreparat has been a major recipient of such support in the biological weapons field. Therefore, a more detailed description of Biopreparat and its components is presented below.

When Biopreparat was established, a number of facilities were transferred to the organization, including the following facilities that became prominent in the Soviet BW research and production: Berdsk Chemical Factory, the Omutninsk Chemical Factory, the "Progress" Factory, and the Special Design Bureau of Biologically Active Substances. Two new facilities were also incorporated, the All-Union Scientific-Research Institute of Especially Pure Biopreparations (St. Petersburg) and the All-Union Scientific-Research Design Institute of Applied Biochemistry (Obolensk).[252]

The Biopreparat network underwent rapid expansion in the 1970s with the construction of a number of new dedicated BW R&D facilities which were vast in size. The first facility to be commissioned in April 1974 was the All-Union Scientific-Research Institute of Applied Microbiology (VNIIPM), Obolensk. It was quickly followed by the creation in August 1974 of the All-Union Scientific-Research Institute of Molecular Biology (VNIIMB) at Koltsovo near Novosibirsk. In 1980, the Laboratory of Molecular Immunology of VNIIPM was spun off from its parent facility to form the Institute of Immunology at Lyubuchany, near Chekhov in the Moscow oblast. At its peak, the Biopreparat structure involved some 40 institutes across the Soviet Union, 50 factories-manufacturers and more than 60,000 people according to Ken Alibek.[253]

There was a substantive transfer of senior military personnel to key positions in the Biopreparat network. Biopreparat's first head, Vsevolod I. Ogarkov, for

[251] Tucker, J.B. and R. Zilinskas. The 1971 Smallpox Epidemic in Aralsk, Kazakhstan, and the Soviet Biological Warfare Program. *Occasional Paper No. 9*, Center fpr Nonproliferation Studies, June 2002.
[252] Rimmington, A. Invisible Weapons of Mass Destruction: The Soviet Union's BW Programme and its Implications for Contemporary Arms Control. Journal of Slavic Military Studies, Vol. 13, No. 3, pp. 1-46, September 2000.
[253] Rimmington, A. Invisible Weapons of Mass Destruction: The Soviet Union's BW Programme and its Implications for Contemporary Arms Control. Journal of Slavic Military Studies, Vol. 13, No. 3, pp. 1-46, September 2000. Alibek, K. Biohazard Hutchinson (London), 1999.

example, held the rank of general and had been employed formerly as the Director of the Ministry of Defence Institute of Microbiology in Ekaterinburg (formerly Sverdlovsk). In 1979 he was replaced by Yuri T. Kalinin, who at the same time was promoted to general, and formerly a senior member of staff at the Ministry of Defence facility for virology in Sergiev Posad (formerly Zagorsk).[254] [255]Kalinin held his post as director until 2001 and was probably a leading figure in promoting BW armament, as well as a forceful influence in directing the conversion efforts at Biopreparat.[256]

Biopreparat's deputy director, responsible for scientific matters, during the period 1978 to 1988, was Major-General Anatolii A. Vorobev, who also was the deputy head of the Main Directorate of the Ministry of Medical and Microbiological Industry (Glavmikrobioprom) at this time. Vorobev has a background in military medicine and early in his career he started work in the field of immunology, and became an expert on mass vaccination of for example smallpox, plague and Q-fever.[257] During 1956 to 1978, he was a Deputy Director at the Ministry of Defence facility in Sergiev Posad (then Zagorsk).[258] However, a senior BW scientist has said that he was incompetent and had a poor understanding of science.[259]

Another leading figure during the last years of the programme, 1988 to 1991, was the First Deputy Director of Biopreparat, Kanatjan B. Alibekov, then a full Colonel in the Soviet Army. Incidentally, Vorobev was Alibek's mentor for his dissertation.[260] Alibekov, now known as Ken Alibek, defected in 1992 to the US and has revealed much what is today known about Biopreparat and it's role in the Soviet BW programme, notably in his book *Biohazard*.[261] Military personnel

[254] Alibek, K. Biohazard Hutchinson (London), p. 22, 1999.
[255] Rimmington, A. Invisible Weapons of Mass Destruction: The Soviet Union's BW Programme and its Implications for Contemporary Arms Control. Journal of Slavic Military Studies, Vol. 13, No. 3, pp. 1-46, September 2000.
[256] Smithson, A.E. Toxic Archipelago: Preventing Proliferation from the Former Soviet Chemical and Biological Weapons Complexes. Henry L. Stimson Center, 1999.
[257] Alibek, K. Biohazard Hutchinson (London), 1999 Journal of Microbiol., Epidemiol. and Immunol., No. 11-12, pp. 124-125, Dec. 2002.
[258] Rimmington, A. Fragmentation and proliferation? The fate of the Soviet Union's offensive biological weapons programme. Contemporary Security Policy, Vol. 20, No.1, pp. 86-110, April 1999.
[259] Domaradskiy, Igor. The history of one risky venture [Istoriya odnoi avantyury] (part II). Znanie - Sila [Knowledge Is Power], No. 12, pp. 54-64, December 1996.
[260] Domaradskiy, Igor. The history of one risky venture [Istoriya odnoi avantyury] (part II). Znanie - Sila [Knowledge Is Power], No. 12, pp 54-64, December 1996.
[261] Alibek, K. Biohazard Hutchinson (London), 1999.

also held senior positions within key Biopreparat research and production facilities.[262]

Lieutenant General Valentin I. Evstigneev is another leading figure from the Soviet BW establishment. He is an expert on plague and was the former head of the Fifteenth Directorate of the Soviet Defence Ministry, the directorate responsible for biological weapons. He took part in the negotiations that lead up to the tri-lateral agreement for inspections of potential BW facilities in 1992,[263] but in spite of this he opposed opening the military BW facilities.[264] In 1998, he stated that the USSR had no biological weapons,[265] whereas a year later he acknowledges that biological weapons were produced to develop BW protection, until banned in 1992.[266] When the Fifteenth Directorate was disbanded, what remained of it transformed into the Biological Defence Department of the Russian Ministry of Defence's Radiation, Chemical and Biological Defence Troops.[267] [268] Evstigneev became the head of the new department as well as deputy director of the Russian Ministry of Defence's Radiation, Chemical & Biological Defence Troops.[269] Moreover, Evstigneev is on the Biopreparat board of directors.[270]

One of the key components of the new Soviet BW network was its "mobilisation capacity", which comprised fully outfitted, tested, and ready-to-operate BW production plants, with weapon-filling lines. The Biopreparat organisation possessed mobilisation facilities located on Russian territory at Berdsk, Kurgan, Omutninsk and Penza, and on Kazak territory at Stepnogorsk. In addition however, mobilisation capacity was also retained at the Ministry of Agriculture's Pokrov Factory of Biopreparations in Vladimir oblast. These production plants incorporated capacity for the wartime production of hundreds of tonnes of a

[262] Rimmington, A. Invisible Weapons of Mass Destruction: The Soviet Union's BW Programme and its Implications for Contemporary Arms Control. Journal of Slavic Military Studies, Vol. 13, No. 3, pp. 1-46, September 2000.
[263] Press briefing of deputy foreign minister Grigory Berdennikov. Official Kremlin International News Broadcast, 14 September 1992.
[264] Alibek, K. Biohazard Hutchinson (London), 1999.
[265] Gerasimenko Sergei. Everything that people are saying about us is a lie. Noviy Izvestia, p.4, 980303.
[266] Litovkin Dmitry. Valentin Yevstigneyev on issues relating to Russian biological weapons. Yaderny Kontrol Digest, No. 11, pp. 43-51, Summer 1999.
[267] Article Blames Russian Virus on Bacteriologic Leak; "Viruses in Uniforms". Argumenty i Fakty, 990727.
[268] Litovkin Dmitry. Valentin Yevstigneyev on issues relating to Russian biological weapons. Yaderny Kontrol Digest, No. 11, pp. 43-51, Summer 1999.
[269] Alibek, K. Biohazard Hutchinson (London), 1999.
[270] Primakov. Decree of 8 May 1999 on appointing government representatives on the boards of directors of open share enterprises [OAO] in the medical industry. Rossiyskaya Gazeta, 8 May 1999.

range of biological agents that included the pathogens causing plague, tularaemia, glanders, anthrax, smallpox and Venezuelan equine encephalomyelitis. Alibek reports that the Pokrov plant alone had sufficient capacity to manufacture up to 100 tonnes of smallpox virus and 40 to 80 tonnes of Venezuelan equine encephalitis virus.[271]

Already in 1992, Biopreparat was accused of offensive activities related to bacteriological (biological) weapons. Biopreparat's director Yuri Kalinin, in an interview in Russian press, circumvented these allegations, saying that Biopreparat's "powerful and modern scientific-production potential" was used to defend the country against weapons of mass destruction. For a wartime period, the Biopreparat enterprises had mobilization orders to manufacture medications, blood transfusion products, disposable syringes, and other items. Research was performed in the fields of biological aerosols, diagnostics, and vaccines for the prevention of dangerous viral and bacterial diseases.[272]

The rumours about Biopreparat's connection with biological weapons, alluded to in Pravda in 1992, continued. More tangible information emerged in 1994, when the defector Vladimir Pasechnik made public some of his knowledge about the Soviet BW programme.[273] A retired BW expert, Igor Domaradsky, decided to speak out when he was denied to travel abroad but his revelations did not become widely known in the West.[274] The full extent of Biopreparat's role did not become publicly known until Alibek's book "Biohazard" appeared in 1999.

The state concern Biopreparat and its network played a major role in developing and implementing the Soviet Union offensive biological weapons programme. Since then, Biopreparat has undergone a bewildering series of organizational changes and has spawned a number of associations and companies which now play a key role within the civilian Russian biopharmaceutical industry. Many of the BW facilities subordinate to Biopreparat, have themselves created a multitude of spin-off companies which are also playing a key role. In the face of the seemingly endless transfers from ministry to ministry of Biopreparat and its

[271] Alibek, K. Biohazard Hutchinson (London), 1999.
[272] Pravda, p. 4 Russica Information Inc. – RusData DiaLine Russian Press Digest, *Medication For Defense Or Weapons?* Byline: Vitali Kaisyn. 15 October 1992.
[273] James Adams. Chapter 20: The weapons of special designation. In: The New Spies - Exploring the Frontiers of Espionage, pp. 270-283; Hutchinson, London, 1994.
[274] Domaradskiy, Igor (foreword by V. Yankulin). The history of one risky venture [Istoriya odnoi avantyury] (part I). Znanie - Sila [Knowledge Is Power], No. 11, pp. 60-72, November 1996. Domaradskiy, Igor. The history of one risky venture [Istoriya odnoi avantyury] (part II). Znanie - Sila [Knowledge Is Power], No. 12, pp. 54-64, December 1996. Vyacheslav Yankulin. The plague syndrome or the purgatory of one of the creators of bacteriological warfare. Izvestiya, p. 5, 15 October 1997.

subordinate facilities the organisation has been undergoing dramatic transformations.[275] Due to this, a review has been carried out concerning Biopreparat today and what could be found on its activities.

[275] Rimmington A, Fragmentation and proliferation? The fate of the Soviet Union's offensive weapons programmes, Contemporary Security Policy, Vol 20, No 1, pp.. 86-110, April, 1999.

7 Biopreparat today

In 1994, Biopreparat became a joint stock company (JSC).[276] Until the middle of 1999, the state, through the Ministry of State Property, was the sole owner of the shares in Biopreparat, and according to a draft to a presidential decree in August 1998, Biopreparat would remain under State control until 2001.[277] However, in 2001 the state still maintained control of the company, now owning 51% of the stocks. It has not been possible to arrive at who the remainder has been transferred to.[278]

In 2000, Biopreparat was described as encompassing production companies, and several scientific research institutes that specialized on research in molecular biology, biotechnology, genetics and pharmacology.[279] Biopreparat produced pharmaceuticals and about 1000 vaccines, medicines and biotechnology products, such as antibiotics, finished medical preparations, pharmaceutical containers and single-use syringes.[280] [281] Biopreparat's financial result for the first 11 months of 2000 was about 9.4 billion roubles and corresponded to 30% of the Russian pharmaceutical market.[282]

How many facilities does Biopreparat include today and what are these facilities? At its peak Biopreparat included some 40 institutes and about 150 domestic factories according to Alibek.[283, 284] However, more recent information

[276] State Committee RF for the Management of State Property, Order No. 2927-r, 28 December 1994 to execute the decree of the RF Government 1 October 1994 No. 1117 "About measures to organization and state support to the Russian stock company Biopreparat". Inforis, http://black.inforis.nnov.su/infobase/wwwr.exe/a/90.new/?doc=6683, accessed 11 March 2003.
[277] Biopreparat to remain public, Vremya, No. 57, p. 4, 25 August 1998.
[278] Butrin Dmitry, Health Ministry Engaged in Reorganizing Biopreparat, Kommersant, No. 61, p. 5, 6 April 2001.
[279] Kalinin Tainstvennyi, Kompania delovoi ezhenedelnik, No. 11 (107), 28 March 2000, http://www.ko.ru/document.asp?d_no=1505&p=1&pg=2, Internet September 2001. Tainstvennyi Kalinin, No. 11 (107), 28 March 2000, http://www.ko.ru/document.asp?d_no=1505&p=1&pg=2, Internet September 2001.
[280] RAO Biopreparat announces preliminary results for year 2000. PR News, 27 December 2000, http://www.prnews.ru/companies/Biopreparat/0001.asp, Internet February 2001.
[281] Miller, J. US Aid Is Diverted to Germ Warfare, Russian Scientists Say, The New York Times on the Web. 25 January 2000, http://www.nytimes.com/learning/general/featured_articles/000126wednesday.html, Internet September 2001.
[282] RAO Biopreparat announces preliminary results for year 2000. PR News, 27 December 2000, http://www.prnews.ru/companies/Biopreparat/0001.asp, Internet February 2001.
[283] Miller, J. US Aid Is Diverted to Germ Warfare, Russian Scientists Say, The New York Times on the Web. 25 January 2000,

on the number of facilities subordinate to RAO Biopreparat varies.[285] The New York Times in 2000 cited a Biopreparat brochure that stated that the organization included some 20 research institutes and other enterprises.[286] That same year, the periodical Kompania says RAO Biopreparat is an association of 34 companies.[287] According to the daily Kommersant, it has been managing 20 domestic pharmaceutical enterprises.[288] The reason the numbers are vague may be that there are many sub-branches and joint stock companies of these facilities. One of the companies, "Vektor", alone incorporates at least 5 institutes, 6 joint stock companies, as well as production plants, farms etc.[289] To illustrate this complexity, a list of facilities tentatively identified as subordinate to Biopreparat is found in Appendix 4.

The Insitute for Applied Microbiology (Obolensk) and State Scientific Center Vektor (Koltsovo) were Biopreparat's key institues for microbiology and virology. These two institutes together with the Insitute of Immunology (Lyubychany) were the first three BW facilities to approach the ISTC for non-proliferation grants.[290] As can be gathered from the review on progress made in conversion, the Insitute for Applied Microbiology and Vektor have been highly successful in securing grants (cf. chapter 4, pp. 48-49).

Below, three Biopreparat facilities of that are less well-known but of special interest regarding the BW conversion, are presented in more detail. The first facility is an institute that was accused of carrying out potentially offensive research, using money for conversion and non-proliferation. The second facility became the centre of a controversy between Biopreparat and a ministry that

---

http://www.nytimes.com/learning/general/featured_articles/000126wednesday.html, Internet September 2001.

[284] Transcript from the plenary session of the State Duma; evening session 19 April 2000. State Duma of the Russian Federation, 19 April 2000. http://www.economics.ru/gd/PLEN_Z/2000/s19-04_v.htm Internet November 2000.

[285] Transcript from the plenary session of the State Duma; evening session 19 April 2000. State Duma of the Russian Federation, 19 April 2000. http://www.economics.ru/gd/PLEN_Z/2000/s19-04_v.htm Internet November 2000.

[286] Miller, J. US Aid Is Diverted to Germ Warfare, Russian Scientists Say, The New York Times on the Web. 25 January 2000, http://www.nytimes.com/learning/general/featured_articles/000126wednesday.html, Internet September 2001.

[287] Kalinin Tainstvennyi, Kompania delovoi ezhenedelnik, No. 11 (107), 28 March 2000, http://www.ko.ru/document.asp?d_no=1505&p=1&pg=2, Internet September 2001.

[288] Butrin Dmitry, Health Ministry Engaged in Reorganizing Biopreparat, Kommersant, No. 61, p. 5, 6 April 2001.

[289] Rimmington, Anthony, e-mail correspondence 14 September 2001.

[290] Schweitzer Glenn E., Moscow DMZ. The Story of the International Effort to Convert Russian Weapons Science to Peaceful Purposes. M.E. Sharpe, Armonk New York and London, England; 1996.

Biopreparat apparently won. The third facility is an example of an apparently successful conversion project involving Biopreparat, despite the suspicions surrounding this organization.

7.1 AOOT Biokhimmash

AOOT Biokhimmash was originally established as the Scientific-Research Design and Construction Institute of Applied Biochemistry (Biokhimmashproekt) in 1974, and since then subordinate to Biopreparat.[291] [292] Alibek was its director in 1991.[293] To this institute belonged the Science Production Association (NPO) Biomash that equipped the BW production facilities in Pokrov, Omutninsk and Stepnogorsk with fermenters.[294] Alibek describes Biomash as a scientific conglomerate and "one of the largest Biopreparat facilities in Moscow" with branches in four other cities.[295]

This institute now says it handles production and introduction of advanced technologies in the microbiology and pharmaceutical industry.[296] Its activities are in the areas of biotechnology for agriculture, ecology, medicine and space biotechnology. The Director General is Andrei G. Moshkin, the scientific director Anatolii D. Ukraintsev and deputy general director on new technologies, Tatiana A. Nugmanova. In 2000, at a tour of the institute guided by Dr. Nugmanova, it appeared that its building housed subunits of the institute as well as budding companies commercializing technology developed at the institute.[297]

Biokhimmash's principal sponsors are the US Department of Energy (DOE), the International Scientific and Technology Centre (ISTC), the National Aeronautics and Space Administration (NASA), the Russian Federation Ministry of Industry, Sciences and Technology Policy, the Russian Federation

[291] Rimmington Anthony. Fragmentation and proliferation? The fate of the Soviet Union's offensive biological weapons programme. Contemporary Security Policy, Vol. 20, No.1, pp. 86-110, April 1999.
[292] Biokhimmash homepage, Aktsionernoe obshchestvo otkrytogo tipa Biokhimmash http://www.biotechnology.orc.ru/aoot_ru.htm Last Modified 3 June 2002. Internet February 2003.
[293] Alibek, K. Biohazard Hutchinson (London), 1999.
[294] Rimmington Anthony. Fragmentation and proliferation? The fate of the Soviet Union's offensive biological weapons programme. Contemporary Security Policy, Vol. 20, No.1, pp. 86-110, April 1999.
[295] Alibek, K. Biohazard Hutchinson (London), 1999.
[296] Biokhimmash, Bioplaneta http://www.bioplaneta.ru/cgi-bin/show.pl?lang=ru&article=main Last updated 1 October 2001. Internet October 2001.
[297] Personal communication: Kristina S Westerdahl, who participated in the tour as part of the conference "Biotechnology – for Public Economy 2000".

Ministry of Economy, the Russian Federation Ministry of Health, and the Moscow Government ”Ekotekhprom”.[298]

One unique feature of this institute is its biological experiments in space. Biokhimmash has been engaged in this area for at least 15 years, during which biotechnological experiment programmes were performed. The results were implemented in technologies for production of different biologically active substances (antibiotics, immunostimulators, etc.), and a range of medical and diagnostic preparations were developed. More technical details are presented on page 85.

A dedicated laboratory of space biotechnology was established at the Institute in 1997. It works closely with the Russian Space Agency, Korolevs Rocket-Space Corporation Energia and a series of Russian State Scientific Centers.[299] However, already in 1989, Energia and Biopreparat established joint laboratories for space biotechnology. The leading institutions of Russian Space Agency (Rosaviakosmos), the Ministry of Medical Industry and the Russian Academy of Medical Sciences participated in the work to enable biotechnological experiments under orbital flight conditions.[300] Ground and space experiments have apparently been performed at the Mir station. Yuri Kalinin is the scientific supervisor of the space biotechnology programme in his capacity as a professor and the chairman of the section Space biotechnology of Rosaviakosmos and the Russian Academy of Sciences (RAS). JSC Biopreparat, through JSC Biokhimmash, has played an integral role in the space biotechnology research together with “Energia” and the Y.A. Gagarin State Research Development and Training Center for Cosmonauts, by coordinating the work, developing onboard scientific equipment, and providing biological materials, treatment and analysis of the results obtained.[301]

[298] Biokhimmash, Aktsionernoe obshchestvo otkrytogo tipa Biokhimmash, http://www.biotechnology.orc.ru/aoot_ru.htm. Last modified 16 June 2000. Internet October 2001.
[299] Biokhimmash, Space Biotechnology, http://www.orc.ru/~biochim/sp_en.htm. Last modified 16 June 2000. Internet October 2001.
[300] Biokhimmash, Space biotechnology cooperation project, http://www.orc.ru/~biochim/sp_en1.htm Last modified 16 June 2000. Internet October 2001.
[301] Biokhimmash, Aktsionernoe obshchestvo otkrytogo tipa Biokhimmash, http://www.biotechnology.orc.ru/aoot_ru.htm. Last modified 16 June 2000. Internet October 2001.

A space for biology: Biotechnology in space

According to Biokhimmash, some of the most interesting directions of space biotechnology development are:

The production of high-quality crystals of biological substances
High qualitative crystals of biologically valuable substances that are produced under micro-gravity conditions allow high precision studies of for example various biopolymers for determination of their spatial structure. This allows subsequent development of new qualitatively new medicinal, prophylactic and diagnostic preparations for medicine, veterinary, pharmacology and other industry branches. There are several commercial projects with foreign partners in this area.

Production and selection of microorganisms
The production and selection under micro-gravity conditions of the improved, and recombinant large-scale strains of microorganisms is performed to identify the bacterial producers of biologically active substances for medicine, pharmacology, agriculture and ecology. This work with microbiological cultures has allowed obtaining variants of cultures that significantly exceeds the activity of the initial strains.

Production of bacterial hybrids
Experiments on bacterial recombination under orbital flight conditions have shown a possibility for total (100%) transfer of genetic material between distant species that allowed to obtain unique hybrids with novel properties.

Electrophoretic purification and separation
Electrophoretic purification and separation of protein and cellular bioobjects carried out under micro-gravitation conditions has enabled production of extremely pure and highly homogeneous biologically active substances. In particular, this has been applied to high efficient purification of gene-engineered and virus proteins, mainly for medical purposes, and also isolation of specific cells, characterized by desirable secretory functions.

A more sinister view of the space biology research is taken by Ken Alibek. Between 1994 and 1997, NASA spent about 1 million USD on 13 biotech research projects at five labs run by Biopreparat according to a recent NASA Inspector General (IG) report. One project, at a Biopreparat institute for 50 000 USD to study the freeze-drying of biological materials in space, may be applicable to freeze-drying food or other materials in orbit said Ken Alibek. According to him, in the late 1980s top officials in the Soviet government were discussing using this process to make dry biological-weapons agents in an orbiting module on the Mir station, as an alternative if their ground-based bio-factories were bombed or revealed as violating international treaties. The idea was abandoned when one of the project's leaders (Vladimir Paseschnik) defected to England. The freeze-drying process is a "regular procedure for producing biological weapons" but not unique to this field according to Alibek. Similarly, another project, also funded by NASA, and conducted at the same lab, studied "optimisation of expression of recombinant polypeptides", "could be used to develop pharmaceutical products or genetically engineered biological weapons" according to Alibek. Biopreparat could retain a mobilisation capacity according to Alibek.

In his view, the NASA funded research into freeze-drying might well be peaceful, but it illustrates the inherently dual-purpose nature of much biotech research.[302]

In January 2000, a serious accusation against Biopreparat appeared in American press, and was repeated in Russian media. The New York Times reported that money to support peaceful biological research had been used to unknown ends at Biopreparat. Grants were awarded by the National Aeronautics and Space Administration (NASA) and the United States Agency for International Development (USAID) to a joint venture involving Kalinin and Biopreparat. NASA and USAID were unaware of Biopreparat's key role in the Soviet BW programme. Russian scientists said that at least 10% from several NASA grants had been shifted to Biopreparat by Kalinin. Biopreparat officials refused to comment on these allegations.[303]

NASA research administrator Arnauld Nicogossian was questioned by a White House Subcommittee in March 2000, and stated that he had no knowledge of Kalinin's background or Biopreparat's offensive biological research.

[302] King Communications Group (2000), Defense Week, *US-Funded Projects In Russia Had Biowar Uses, Defector Says*, Byline by John M. Donnelly, 30 October 2000.
[303] Miller, J. US Aid Is Diverted to Germ Warfare, Russian Scientists Say, The New York Times on the Web. 25 January 2000, http://www.nytimes.com/learning/general/featured_articles/000126wednesday.html, Internet September 2001.

Nicogossian added that a review of the used grant money had shown that none had been diverted.[304]

In the USA, the debacle over the NASA grants was also fueled by the question how much NASA was supposed to know about Kalinin and Biopreparat. On the one hand, intelligence officials had not shared their information on Kalinin and Biopreparat but "USAID and NASA were essentially running their own foreign policy" according to a national security official.[305] In contrast, other reports indicate that intelligence information on Biopreparat was made available to NASA already in 1994. In 1995, the State Department sent NASA a memo advising the space agency on how to deal with former Soviet bioweapons labs, including a list of labs of concern that listed the five Biopreparat institutes with which NASA was working. The State Department recommended NASA that proposals should be vetted carefully and research actively reviewed down to visiting the sites. Apparently, NASA supervision was rather lax in all these aspects according to a report reviewing these activities.[306]

What were the reactions in Russia to these accusations? In an interview in the Russian daily Segodnya, Kalinin refuted all accusations against Biopreparat. He said that US experts found no violations of the BTWC when they visited Biopreparat.[307] The veracity of this statement may be questioned since US officials and analysts have persistetly suspected Russia to be in breach of the covention, or at least doing little to dispel such suspicions. Kalinin continued to say that Biopreparat's space research is not supported by US grants. This is rather surprising as Biokhimmash openly declares to cooperate with the US (see above). The accusations are interpreted by Kalinin as an anti-Russian campaign in the US, or possibly reflecting a controversy between Russia and USA over the use of the Mir space station.[308]

---

[304] Hearing on NASA's FY 2001 Budget Request for Life and Microgravity Research before the Subcommittee on Space and Aeronautics of the House Committee on Science. NASA, 22 March 2000. Internet, http://www.hq.nasa.gov/office/legaff/memo3-22.html, 28 February 2003.

[305] Miller, J. US Aid Is Diverted to Germ Warfare, Russian Scientists Say, The New York Times on the Web. 25 January 2000, http://www.nytimes.com/learning/general/featured_articles/000126wednesday.html, Internet September 2001.

[306] King Communications Group (2000), Defense Week, *US-Funded Projects In Russia Had Biowar Uses, Defector Says*, Byline by John M. Donnelly, 30 October 2000.

[307] Sokolova Viktoria. "Infectious" Money. Izvestiya, pp. 1, 3, 26 January 2000.

[308] Segodnya Agency WPS, p. 1, *US and Russia fighting for Mir*, 26 January 2000.

In December 2000, Biokhimmash held a symposium on the subject of ”Biotechnology - for Public Economy 2000”.[309] Main trends of biotechnology development in Russia such as strategy of biotechnology development and commercialization of research-and-technological developments; biotechnology and agriculture; urgent biotechnological problems of regional stations of plant protection; peculiarities of scientific and technical documentation development and registration of biopreparations in Russia; biotechnology - to solve urgent ecological problems of Russia; and urgent biotechnological points in food industry, were discussed. Reports of ISTC and IPP representatives were given.

7.2 FGUP Moskhimfarmpreparaty imeni Semashko

The Federal State Unitary Enterprise (FGUP) Moskhimfarmpreparaty is the largest manufacturer of medicines in the Moscow region, and indeed one of the largest in the country with a market share of ca. 5%. It is apparently a Biopreparat company, although its subordination has been controversial.

In the beginning of 2000, in connection with dissatisfaction over poor management of the plant, the question arose about its subordination. The then director Vladimir Fedorov refused to step down when the Department of Medical Industry of the Ministry of Economics wanted to replace him, saying that the plant was not under their control but belonged to Biopreparat and subordinated to the Ministry of Health. According to Federov all decisions about the plant had to be co-ordinated with Biopreparat. However, as Federov was nearing retirement, he was replaced by Anton Parkanskiy, appointed by the Minister of Economics Andrei Shapovalyants in February 2000. The latter was not approved by the workers at the plant and after an armed skirmish between workers and guards at the plant Parkanskiy resigned.

After consultations with president Putin over the situation at the plant, Shapovalyants and deputy Prime Minister Ilya Klebanov chose the first deputy director of Biopreparat Mikhail Grigoryev to head the plant. At the same time, Federov was appointed deputy director of the plant.[310] The incident appears to be a struggle between the Ministry of Economics and Biopreparat for control

[309] Biokhimmash, Russian symposium ”Biotechnology- to public economy 2000” http://www.biotechnology.orc.ru/prog_en.htm , 14 December 2000. Internet October 2001.

[310] The director of the Semashko plant surrenders, Lenta.ru, 11 February 2000, http://www.lenta.ru/russia/2000/02/11/semashko/, Internet September 2001. Director Appointed to Moskhimfarmpreparaty. Farmatsevticheskiy Vestnik, No. 8, 29 February 2000. The Ministry of Economics in good order orders the change of director general at the Semashko factory, Allnews.ru, 16 February 2000, http://www.allnews.ru/economy/2000/02/16/semashko/, Internet 26 April 2000., Dimitri Butrin , Pharmacist-Colonel and Privatizer-Revolutionary, Kompania No. 11 (107), 28 March 2000, http://www.ko.ru/document.asp?d_no=1505&p=1&pg=1, Internet September 2000.

over a potentially profitable facility. The outcome can be interpreted as a victory for Biopreparat. Perhaps it can be seen as a measure of Kalinin's power that this conflict needed the interception of the Russian president before it was resolved.

7.3 Searle Pharma - All-Russian Center for Molecular Diagnostics and Therapy

This is interesting as a conversion project, where a commercial company and a BW organization join forces for peaceful purposes. Notably, personnel, know-how and land have been invested by Biopreparat, whereas equipment and design and other services were contributed by Searle. New, presumably modern buildings were erected. The project apparently has been successful in the meaning that the plant actually is operating, in contrast to a number of other conversion projects that never reach finalization.

In January 1997, Searle Pharma (a subsidiary of the US-based Monsanto Company) announced that it had signed an agreement with Biopreparat's Russian Research Center for Molecular Diagnostics and Therapy (RCMDT) for a joint venture to build a pharmaceutical plant in Izvarino, near Moscow. Formerly, this institute was part of Ministry of Health Third Directorate and the programme Flute for studies of biological substances that could cause irreversible mental damages.[311] The project is an offspring of a commission established by US Vice President Al Gore and Russian Prime Minister Viktor Chernomyrdin that aimed at economic and technical cooperation between the two countries.[312]

The creation of the plant was supported by USAID that contributed of 1.6 million USD, i.e. half of the project's design expenses. The Russian Ministry of Health also supported it fully, from the erection of the buildings to supplying equipment and primary materials. Searle would contribute 6 million USD and equipment, as well as construction, engineering and design services. Searle will also provide product and equipment technology, training and other assistance for building and operating the manufacturing site. Biopreparat contributed 6045 square meters of production space and service lines. The total commitment of both parties was 30 million USD.[313] [314] Biopreparat owns 25% of the stocks of Searle Farma Ltd., and the rest is owned by the American company.[315] [316]

---

[311] Alibek, K. Biohazard Hutchinson (London), 1999.

[312] Searle forges partnership to nurture pharmaceutical industry in Russian Federation, The Moscow Times 22 January 1997, http://www.searlehealthnet.com/pr/russia.html, Internet November 1997.

[313] Searle forges partnership to nurture pharmaceutical industry in Russian Federation, The Moscow Times 22 January 1997, http://www.searlehealthnet.com/pr/russia.html, Internet November 1997.

According to Searle, this was the first facility of its kind to be built in conjunction with a Russian partner. In 1997, construction was begun and the plant opened in September 1999. It has the capacity to produce high-quality pharmaceuticals at GMP standards, and originally it was planned to manufacture for example cardiovascular, gastrointestinal and anti-infective drugs. However, the economic crisis of 1998 led to the decision to produce cheaper generic drugs. [317] [318] [319]

[314] Humphreys Brian. $ 30M Pharmaceutical Plant Opens. The Moscow Times, 16 September 1999.
[315] Kozhakhmetova Almira, Searl and The Biopreparat Joint-stock Company Are To Put Up A Pharmaceutical Factory, Segodnya, No. 98, p. 6, 17 May 1997.
[316] Humphreys Brian. $ 30M Pharmaceutical Plant Opens. The Moscow Times, 16 September 1999.
[317] American Searle opens pharmaceutical plant in Moscow Region, Interfax Daily Business Report, Volume VIII, Issue 177 (2100), 17 September 1999.
[318] Humphreys Brian. $ 30M Pharmaceutical Plant Opens. The Moscow Times, 16 September 1999.
[319] American Searle opens pharmaceutical plant in Moscow region. Interfax Daily Business Report, Volume VIII, Issue 177 (2100), 17 September 1999.

8 The Leadership of Biopreparat in the 1990s

In an overview of the former BW programme, the well-known analyst Anthony Rimmigton identifies the persons from the BW programme remaining on leading posts as a current problem in building confidence that disarmament has actually taken place.[320] The directors of Biopreparat since its conception in 1974 until 2001 were two generals, Vsevolod I. Ogarkov and Yuri T. Kalinin, with backgrounds in the BW programme. Kalinin headed the organization for 21 years, from the time when it was the key organization of the BW programme, and during the times of cover-up and later conversion. As a leading person in the last phase of the Soviet BW and for the decade that followed, he is a focus of interest here, and a brief biography is also given in Appendix 5.

8.1 General Yuri Tikhonovich Kalinin

In response to American protests in 1992 over Russia's germ warfare activities, Boris Yeltsin assured Washington that he had ended his country's germ warfare programme.[321] He also promised to dismiss Kalinin as Biopreparat's director. But for unknown reasons he was unwilling or unable to fulfil that pledge. Kalinin himself says the promise was conditional: He would only be dismissed if Biopreparat was found to be in breach of the BTWC.[322]

Kalinin and other senior officials from Biopreparat were also instrumental in covering up the program's existence after the first key scientists defected to the West in 1989, according to Alibek. Russian scientists said Kalinin had supervised Biopreparat's transition to civilian work after the Soviet Union collapsed in 1991.[323] Not least, Kalinin also appears to have influenced the direction of grants for conversion of BW research. In connection with the alleged shifting of NASA grants from space research to Biopreparat (described in chapter 7.1), Arnauld Nicogossian, head of NASA's joint research programme with Russia, stated that he had no knowledge of Kalinin’s background or

[320] Rimmington, A. Invisible Weapons of Mass Destruction: The Soviet Union’s BW Programme and its Implications for Contemporary Arms Control. Journal of Slavic Military Studies, Vol. 13, No. 3, pp. 1-46, September 2000.
[321] Miller, J. US Aid Is Diverted to Germ Warfare, Russian Scientists Say, The New York Times on the Web. 25 January 2000, http://www.nytimes.com/learning/general/featured_articles/000126wednesday.html, Internet September 2001.
[322] Sokolova Viktoria. "Contaminated" money. Izvestiya, pp. 1, 3, 26 January 2000.
[323] Miller, J. US Aid Is Diverted to Germ Warfare, Russian Scientists Say, The New York Times on the Web. 25 January 2000, http://www.nytimes.com/learning/general/featured_articles/000126wednesday.html, Internet September 2001.

Biopreparat's offensive biological research.[324] Radio Svoboda's correspondent in New York proposed that Kalinin, by referring to himself not by military rank but as a "professor, doctor of science" had been able to mislead the American officials in charge of grant giving.[325]

Pictured above: Yuri T. Kalinin[326]

[324] Hearing on NASA's FY 2001 Budget Request for Life and Microgravity Research before the Subcommittee on Space and Aeronautics of the House Committee on Science. NASA, 22 March 2000. Internet, http://www.hq.nasa.gov/office/legaff/memo3-22.html, 030228.
[325] Radio Svoboda *Biopreparat – V Rossii prodolzhaiutsia razrabotki biologicheskogo oryzhiia?* http://www.swoboda.org/programs/LL/2000/ll.012600-1.shtml, 26 January 2000, Internet September 2001.
[326] Photos of Yuri T. Kalinin from: Kalinin, Y. Orientation - the growth of domestic pharmaceutical industry. Farmatsevticheskii Vestnik, No. 4, 1 February 2000, http://fv.bionika.ru/ISSUES/0155/Documents/0155_003.htm, Internet September 2001. M. Shchetinina, The most important is to learn how to sustain the blow, Farmatsevticheskii Vestnik No. 34 (185), 19 September 2000, http://fv.bionika.ru/ISSUES/0185/Documents/0185_003.htm.

Kalinin's deception goes back to 1995, when NASA awarded 1.6 million USD to civilian institutes for biological research in space, and the executive committee set up by Russia and the United States to distribute the money included a scientist identified in documents only as Y. Kalinin. More specifically, Kalinin, only known as "Dr. Kalinin", had influenced which institutes were to receive the grants according to Nicogossian.[327] A similar accusation against Kalinin appeared in 1999. According to ISTC staff and a Russian scientist, Biopreparat screened the applications of biological research institutes before allowing submission to the ISTC. The reason given was that defence sercrets would not be compromised, and it was not known if this procedure was applied to all biological institutes or not.[328] Furthermore, Kalinin is said to be the person who authorizes foreign travel by employees, and that he had tried to prevent institutes from developing independent relations to Western institutes and companies.[329]

In May 2000, a new board of directors for Biopreparat was appointed with Kalinin as the Biopreparat representative, the Russian Surgeon General G.G. Onishchenko, also First Deputy Minister of Health, V.I. Evstigneev from Ministry of Defence, together with a representative each from the Ministry of Economy and the Ministry of State Property.[330] Lieutenant-General Valentin I. Evstigneev has long been involved in the military BW programme of the Soviet Union, and was presented in chapter 6. Evstigneev and Onishchenko both took part in the consultation between Russia, USA and UK that resulted in the agreement on the trilateral process.[331] Otherwise, Onishchenko apparently has no other ties to the former BW programme.

Kalinin is also a member of other fora where he may be influential. He became a member of the Interdepartmental Commission for Health Protection of the

[327] Miller, J. US Aid Is Diverted to Germ Warfare, Russian Scientists Say, The New York Times on the Web. 25 January 2000, http://www.nytimes.com/learning/general/featured_articles/000126wednesday.html, Internet September 2001.
[328] Smithson, A.E. Toxic Archipelago: Preventing Proliferation from the Former Soviet Chemical and Biological Weapons Complexes. Henry L. Stimson Center, 1999.
[329] Miller, J. US Aid Is Diverted to Germ Warfare, Russian Scientists Say, The New York Times on the Web. 25 January 2000, http://www.nytimes.com/learning/general/featured_articles/000126wednesday.html, Internet September 2001.
[330] Rossiyskaia Gazeta. Decree of 8 May 1999 on appointing government representatives on the boards of directors of open share enterprises in the medical industry.
[331] Press briefing of deputy foreign minister Grigory Berdennikov. Official Kremlin International News Broadcast, 14 September 1999.

Russian Federation Security Council in 1996.[332] He was not among those relieved of their duties on the commission in 1997 and may well still be a member of it.[333] This Commission serves the Security Council and three of its main tasks are to:[334]

- Identify potential threats to the lives and health of the population, and prepare proposals to the Security Council to avert them;

- review projects of Federal targeted programmes, directed to protect the lives and health of the population, evaluate their efficiency, and prepare corresponding proposals; and

- make prognoses of the effects of extreme situations (catastrophes, accidents, natural catastrophes, outbreaks of disease, epidemics and other) on the health of the population and make recommendations to the Security Council to prevent such situations.

The Pathogen Defence Programme (see section 2.2) was probably one of the federal targeted programmes to be reviewed by the Commission, and possibly it may have originated in the Commission.

Kalinin (as is Vorobev) is a member of the Interdepartmental Scientific Council for Conventional Problems of Chemical and Biological Weapons within the Presidium of the Russian Academy of Sciences and the Russian Munitions Agency, established in May 2001. The aims of this commission are: "Within the areas covered by the CWC and the BTWC, to analyse the current status of domestic and foreign studies, conduct a scientific analysis and forecast of potential trends of development and implementation of CWC and BWC requirements in the Russian Federation with respect to possible options of international and domestic development in political, economic, and military areas, as well as a scientific analysis and forecast of efficacy of CWC implementation." The Commssion will also give scientific advice on a number of areas like safety, environment, legislation and destruction of CW. Another aim is to evaluate foreign research and identify areas detrimental for CWC and

[332] Rimmington A, Fragmentation and proliferation? The fate of the Soviet Union's offensive weapons programmes, Contemporary Security Policy, Vol 20, No 1, pp. 86-110, April, 1999. The President of the Russian Federation. Ukase No. 577 "About the Members of the Russian Federation Security Council Interdepratmental Commission for the Protection of Public Health". The President of the Russian Federation, , 21 April 1996.

[333] The President of the Russian Federation. Ukase No. 1037 "About the Interdepartmental Commissions of the Security Council of the Russian Federation". The President of the Russian Federation, 19 September 1997.

[334] The President of the Russian Federation. Ukase No. 1037 "About the Interdepartmental Commissions of the Security Council of the Russian Federation". The President of the Russian Federation, 19 September 1997.

BTWC goals and objectives, as well as to assess the implementation of these Conventions by other states.[335]

8.2 Kalinin demoted or promoted?

Kalinin has been involved in numerous disputes with the authorities and the Ministry of Health was dissatisfied with the performance of Biopreparat for a long time. Kalinin is said to have hampered the attempts of the Industry, Science and Technologies Ministry to replace the management at the FGUP Moskhimfarmpreparaty and the Moscow Endocrine Plant. In addition, Biopreparat charged the Ministry of Health with blocking the import of substances earmarked for drug production. In their turn, the authorities charged Kalinin with the failure of the insulin and antibiotic substances production projects. The former has been a project where Biopreparat has invested much prestige and substantial government resources. In fact, it is said that the percentage of outdated drugs manufactured by Biopreparat is inadmissibly high. Biopreparat apparently had little control over some of its subsidiary entities, which may have contributed to the dissatisfaction with Kalinin as a director. For example, Biopreparat was said to hold only 10% or slightly more of the stocks in most of its subsidiaries. Furthermore, Biopreparat did not pay dividends to the state although it recorded sufficient earnings at the end of the 1990s. [336]

Probably as a consequence of the conflicts between the authorities and Kalinin described above, the next major change in the Biopreparat leadership took place in April 2001. On the general meeting of Biopreparat's shareholders that month, it was decided to end Kalinin's term as a general director before the appointed time. Ramil Khabriyev, who hitherto headed the department in charge of quality control over medicinal preparations and medical equipment at the Ministry of Health, was appointed as the new general director.[337]

When newly appointed as Biopreparat's director, Khabriyev said he aimed to revive Biopreparat's management.[338] A dispute with three former subsidiary joint-stock companies, whose management allegedly had been transferred to a

[335] Resolution No. 32/70, 4/7 May 2001 On the Interdepartmental Scientific Council for Conventional Problems of Chemical and Biological Weapons within the Presidium of the Russian Academy of Sciences and the Russian Munitions Agency. Russian Academy of Sciences and Russian Munitions Agency, 4 May 2001.
[336] Butrin Dmitry, Health Ministry Engaged in Reorganizing Biopreparat, Kommersant, No. 61, p. 5, 6 April 2001.
[337] Farmatsevticheskii Vestnik, http://pharmvestnik.ru/issues/0213/Dokuments/Shortstring/0213_002.htm, Internet September 2001.
[338] Butrin Dmitry, Health Ministry Engaged in Reorganizing Biopreparat, Kommersant, No. 61, p. 5, 6 April 2001.

Gazprom subsidiary, was resolved by their retention of their status as independent enterprises and Biopreparat components at one and the same time. Khabriyev also planned that Biopreparat should regain control over AO Krasfarma, where Biopreparat nearly had lost influence and that was managed by a court-appointed interim trustee at the time. The output of outdated drugs manufactured by the Biopreparat companies was apparently high, and unacceptable according to Khabriev.[339] At this time, the newly appointed CEO saw license agreements with leading world pharmaceutical companies as a possibility to expand Biopreparat's range of products. His appointment can be perceived as a victory of the Ministry of Health that had long been dissatisfied with the performance of Biopreparat.[340]

It should also be noted that the move to replace Kalinin at Biopreparat does not mean that he fell into disgrace. On 19 March 2001, it was announced that a number of scientists including Kalinin, were awarded the prize and title of laureate of the Government of the Russian Federation for the development and production of a domestic human recombinant interferon alpha-2.[341] This positive recognition of Kalinin's work came only about two weeks before the meeting of Biopreparat shareholders. A month after his replacement at Biopreparat, he was appointed to the Interdepartmental Scientific Council of the Agency of Munitions and the Russian Academy of Sciences. Kalinin has apparently also retained his place on the board of directors of Biopreparat, and possibly on the Interdepartmental Commission to the Russian Security Council, both influential positions. In view of this information it is still unclear if Kalinin's influence in the former BW sphere has diminished, or continues as before. Transparency regarding the roles of Kalinin and other prominent persons from the Soviet BW programme, has been virtually non-existant but could substantially contribute to confidence-building.

8.3 Rosmedprom – another platform of power for Yuri T. Kalinin?

Rosmedprom is an association of producers and distributors of medical preparations, hardware and technology,[342] and can be influential in an important market sector in Russia. Possibly, the association provides a new civilian platform of power, and a shift away from the military sphere, for its chairman Yuri T. Kalinin.

---

[339] Vremya Novostey No. 61, p. 4, *Biopreparat Executives Replaced*, Oleg Volkov and Anastasiya Naryshkina, 4 June 2001.
[340] Vremya Novostey No. 61, p. 4, *Biopreparat Executives Replaced*, Oleg Volkov and Anastasiya Naryshkina, 4 June 2001.
[341] Government of the Russia Federation Decree No. 230 on awarding the Government of the Russian Federation prize year 2000 in the area of technology and science, 19 March 2001.
[342] Meditsinskaya Gazeta No. 77, 1999 electronic version.

Rosmedprom was first brought to the attention of western security policy analysts in 1999.[343] At that time, the relationship between Biopreparat and Rosmedprom was unclear. The association was formed in 1995 by a majority of the Russian pharmaceutical manufacturers for the survival of their companies. Kalinin is said to have become the president of Rosmedprom simply because he was head of Biopreparat that had weathered the times better than most.[344] Rosmedprom cooperates with a similar association, Rosfarma, headed by A.D. Apazov, who is also the head of the company Farmimeks.[345]

The production companies within the Biopreparat concern form the base for the Rosmedprom association.[346] However, more than 90 companies of Rosmedprom are said not to be owned by, or under the rule of, Biopreparat.[347] Rosmedprom controls, according to the representative of the association one third of the Russian pharmaceutical production. Biopreparat greatly influences some of the production policy among the Rosmedprom members, and it is almost as important as the company Akrikhin, owner of the holding company Vremia and the state giant Tatkhimfarmpreparaty.[348]

Kalinin in his capacity as Rosmedprom's chairman comments in the media on the pharmaceutical sector in Russia. For example, at a conference devoted to the pharmaceuticals industry and the production of medicines and medical equipment in the country he reported that Russia's medical industry produced 33 billion roubles worth of output in 2000, up 28% compared to 1999.[349] Russia's pharmaceuticals market was estimated at nearly 2 billion USD in 2001, with an annual growth rate of 25%. It was predicted that by 2003 the market would have grown to around 3 billion USD. This indicates that Rosmedprom can be an influential actor in an important market sector in Russia, and possibly providing

---

[343] Anthony Rimmington. Fragmentation and proliferation? The fate of the Soviet Union's offensive biological weapons programme. Contemporary Security Policy, Vol. 20, No.1, pp. 86-110, April 1999.

[344] Farmatsevticheskii Vestnik No. 34 (185), *The most inportant is to learn how to sustain the blow*, M. Shchetinina, 19 September 2000.

[345] PR News *Leading Russian producers sum up the preliminary results for year 2000. http://www.prnews.ru/companies/rosmedprom/0002.asp,* 27 December 2000. Internet February 2001.

[346] Kalinin Tainstvennyi, Kompania delovoi ezhenedelnik, No. 11 (107), 28 March 2000, http://www.ko.ru/document.asp?d_no=1505&p=1&pg=2, Internet September 2001. Tainstvennyi Kalinin, No. 11 (107), 28 March 2000, http://www.ko.ru/document.asp?d_no=1505&p=1&pg=2, Internet September 2001.

[347] Kalinin Tainstvennyi, Kompania delovoi ezhenedelnik, No. 11 (107), 28 March 2000, http://www.ko.ru/document.asp?d_no=1505&p=1&pg=2, Internet September 2001.

[348] Kalinin Tainstvennyi, Kompania delovoi ezhenedelnik, No. 11 (107), 28 March 2000, http://www.ko.ru/document.asp?d_no=1505&p=1&pg=2, Internet September 2001.

[349] Interfax Russian News *Russia's medical industry produces 27,9% more output in 2000*, 23 February 2001.

a new civilian platform of power and a shift away from the military sphere for Kalinin.

9 Concluding discussion and political recommendations

During the 1990s the Russian government launched four large conversion and restructuring programmes. However, the approach has been vacillating between retention of military-industrial capabilities and the irreversible transformation of these to civilian use. A number of financial, organizational, military, social and production-related aspects have hampered the implementation of the programmes. In general, the conversion of the military-industrial complex has been very slow and not very successful so far, although there are interesting examples of succesful conversion.

Almost all of the mechanisms, which hampered the implementation of the state conversion programmes, can be assigned to the structural militarisation of the economy and the system of mobilisation preparedness. Conversion in most Western countries has a diffusion character where land, premises, machinery, labour force etc can be sold or moved. These resources can be transformed for conversion purposes. The structurally militarised economy with its mobilisation requirements puts severe constraints on this diffusion. At the same time this in turn means that Russia has retained more of the Soviet military-technological capabilities than most analysts worldwide judged possible in the early 1990s.

After a decade of international threat reduction support to Russia and the NIS focusing to a large extent on nuclear and chemical weapons disarmament and disposal it is high time to focus on the biological area. Russia's current strategy of constructive engagement creates a window-of-security for Russia and at the same time a window-of-opportunity for the EU to initiate a dialogue on biological threat reduction support to Russia. The fact that Russia has finally started to destroy its chemical weapons inventories is a positive sign that justifies a cautious optimism that positive advances could also be made within the biological field.

Moscow's current position is that Russia has not inherited any BW capacity from the Soviet Union. Russia maintains that it does not dispose of facilities for the production of biological and toxin weapons and strictly observes its international obligations. At the same time former Soviet biowarfare scientists, screened by the Russian government, are financed through international threat reduction programmes such as the ISTC, where scientists declare participation in former weapons programmes to receive grants. This is only one of several circumstances that cause many experts around the world to suspect that Russia might still be retain some BW capacity in breach of the BTWC.

The EU's first task should therefore be an effort to overcome this stumblingblock in order to be able to proceede to substantial discussions about

continued support for redirecting former biowarfare scientists and conversion of BW production facilities.

Based on the findings in this report the authors recommend two basic directions of action for the EU to pursue BW threat reduction and non-proliferation in Russia. The first direction is continued and enhanced support for conversion. The second direction is to engage Russia in cooperation on biodefence including bioterrorism and biosecurity.

For reasons of clarity we first list the practical recommendations for future action of the EU in the area of BW threat reduction support and cooperation on biodefence. Thereafter the issues are discussed in more detail.

Political recommendations

- The EU should put the biological weapons area higher on the agenda for continued threat reduction support.
- The EU should initiate a process with Russia to intensify and extend the BW threat reduction activities.
- A cooperative approach in line with the G8 initiative Global Partnership against the Spread of Weapons and Materials of Mass Destruction allowing Russia a greater role in planning and execution of the threat reduction activities, is recommended.
- The increased threat reduction support should be part of a long-term strategy involving financial and political commitment on both sides to improve confidence-building and commercial collaboration.
- The EU should work out strategies for limiting and achieving the conversion of the vast Russian BW infrastructure and identify prioritized activities. A clear vision is needed so that the support is well focused on the areas of technology and institutes of most concern.
- The EU should strive to elaborate conversion activities on a commercial basis for long-term viability and self-sustainability. This includes elucidation of areas of mutual benefit to the cooperating partners, identification of commercial opportunities and viable products, elaboration of realistic business plans, identification of markets and provision of training.
- The EU should also work out exit strategies, i.e. when should the threat reduction activities be terminated?
- Increased threat reduction support should, however, be linked to demands for greater Russian transparency in the BW field.
- The threat reduction programmes and the projects financed by them should be regularly reviewed to make sure that the allocated money is used in the proper way and the results of the projects evaluated.
- BW threat reduction has hitherto focused almost solely on redirecting scientists. An increased effort should be made to convert biological production facilities.
- An inventory of biological production facilities in Russia should be made to evaluate their potential for biotech commercial activities and thereby to counteract their potential misuse.
- The EU should make an effort to increase transparency as far as the microbiological facilities subordintaed to the Russian Ministry of Defence is concerned.
- The EU should initiate cooperation with Russia within the field of biodefence including bio-terrorism counteraction and consequence mitigation.
- An umbrella agreement between the EU and Russia would be needed.
- The EU should sponsor workshops and seminars where biodefence/bioterrorism communities could discuss cooperation in more detail.

Today the proliferation of weapons of mass destruction to states or non-state actors, know-how, technology and materials is a major threat that only international cooperation can prevent. The collapse of the Soviet Union with its large WMD legacy and the rise of a more active and global terrorism are of major concern. These threats face all nations and no single nation is able to solve the problems alone. Therefore international cooperation is essential. The leaders of the G8 countries took an important step in the right direction at the Kananaskis summit in Canada in June 2002 by adopting a G8 Global Partnership against the Spread of Weapons and Materials of Mass Destruction. This placed the questions high up on the political agenda. One drawback, however, is that this initiative mainly concerns the nuclear and chemical sectors. The G8 also invited other countries to join in the initiative. There is a need for countries, like Sweden and other EU members, not part of the G8, to decide on policy direction and to become more involved and active when it comes to threat reduction and non-proliferation initiatives. Whether the ambitions of the G8 will be reached or not, depends on the determination of the G8 and other governments. The question is if the political will is present and strong enough to transform the promises and pledges given, into concrete and well-focused actions that will achieve the goals. The political momentum has to be strengthened and the EU should become more active and a driving force in this area.

Russia is now becoming more integrated politically and economically with the EU and the rest of western industrialized democracies, a new CTR partnership can develop and provide opportunities for all involved to share the burden. Strategies are needed for limiting and achieving the conversion of the vast WMD infrastructure, develop lists of priorities when it comes to support in the nuclear, chemical and biological areas and ensure that the threat reduction activities can be sustained even after assistance programmes are reduced and eventually terminated. 11 September, 2001 made it clear that WMD proliferation, particularly to terrorist groups but also to potentially hostile states, is a clear and present danger that outweighs the risks posed, for example, by delays in Russia not meeting its arms reduction obligations. Russia's and NIS's WMD infrastructure remains a prime target for those interested in illicitly acquiring weapons, material or know-how.

In an analysis of 10 years of the Nunn-Lugar CTR programme the Carnegie Endowment in a report had some critical comments. Much of the agenda has lost its urgency and many fundamental problems persist with no clear plan for their solution. The programmes have never had more than superficial political support in USA or Russia. The overall effort is not guided by any integrated or comprehensive strategy. It still remains to take care of around 7000 biological weapons scientists. The G8 pledge of funding is positive but there has been little

action on that pledge since, and it is unclear if or how the G8 nations will follow up on it by the time they meet next June in France 2003.[350]

A transformation to a partnership would mean that Russia should have a greater role in planning and execution of threat reduction activities. Russia's funding for these programmes has already increased. A number of tools can cope with the effects of downsizing, including commercialization, retraining and retirement. Maintaining security will also be important for the WMD infrastructure that remains after downsizing. It will also mean to overcome barriers that so far have hampered cooperation, such as tax and administrative burdens etc. The multilateralization of the CTR cooperative security model is a positive way forward in the fight against non-proliferation.

It is essential to find areas of mutual benefit where the vast knowledge base in Russia and the NIS could be directed to specific areas that could also be commercialized in a number of years. The risk that Western interests only will exploit the know-how for a limited time period must be countered. A clear vision is needed from western partners on how to reach the proliferation aims so that cooperation is well focused at the areas of technology or institutes of most concern.

For many reasons the support so far has been focused mainly on the nuclear and chemical areas. The compilation, in this report, of different support programmes to Russia and the NIS countries shows that the biological area so far has received limited attention and funding even if there are a number of initiatives. This area has mainly been supported concerning R&D and then through the ISTC. It is a problem that suspicions still exist that some part or elements of the former Soviet offensive BW programme are maintained in some form. Apart from the fact that Russia is perhaps not complying with the BTWC, this might also give state or non-state actors a possibility to acquire technology and know-how and this has to be solved on the political level by putting pressure on the Russian political leadership. How this should be done is difficult to elaborate on here, but it should be a critical priority for the future international and G8 global partnership. A key factor is still to be seen if the Russian administration is willing and has the power to force the military establishments for example the facilities within the Ministry of Defence to become more open and transparent on their present activities.

Since Yeltsin's decree in 1992 banning further offensive BW activities, only limited progress has been made when it comes to openly declaring previous BW activities or involved facilities and to promote transparency of on-going BW

[350] 10 year old Nunn-Lugar at crossroads, The Moscow Times, 18 November, 2002.

defence research in ten years. It can be noted that none of the four main microbiological facilities, the West knows of, under the Ministry of Defence have applied for any international funding for conversion or cooperation through for example the ISTC.[351] No visits have been allowed from the West. It has also been indicated that scientists from these facilities have not been allowed to participate in international cooperation or even conferences sponsored by the ISTC. Another aspect is that the number of scientists, according to Russian reporting to the UN in the framework of agreed CBMs (Confidence-Building Measures for the BTWC), has not decreased but rather increased somewhat at these facilities.

In recent years there have been signs that a change was coming. It was reported that Pentagon experts had met their Russian counterparts and agreed on a scientific exchange programme involving the Russian Ministry of Defence facilities that so far have not been visited by Western experts.[352] This was the first sign of openness transparency about present MOD activities. This exchange programme was, however, never initiated. Recently, Russian officials denied US senator Lugar access to these four well-known Ministry of Defence biodefence facilities in August 2002. A US congressional delegation was stopped from visiting one of these facilities when arriving in Kirov. The delegation had flown to Kirov to visit Kirov-200 after receiving signals that a visit might be granted but this was not the case. The Russian Defence Minister had no explanation for the refusal the next day in Moscow.[353] [354] [355] The Kirov-200, at Strizhi 40 kilometres from Kirov, is a former BW production plant that was part of the Institute of Microbiology in Kirov. It is a special case since it is one of the former BW facilities under the Ministry of Defence that has been transferred to the Ministry of Education.[356] The transfer was planned to be completed by June 2001. The discussions of potential cooperation between the US and other potential governments have not made much progress since 2000. At that time there were discussions of potential projects and a conference planned for July 2001 for donors (the conference has still not taken place). A Swedish delegation also visited Kirov in 2000 to discuss potential cooperation. At this time, no visit to Kirov-200 or the Institute of Microbiology, or meeting with scientists from it

[351] Former Soviet biological warfare plants still pose threat, despite transfer to peaceful research, Cornell researcher says, Science Daily, 19 February 2001.
[352] Miller J and W J Broad, Soviet defectors tell of germ-warfare research, West may have access to four installations, Cincinnati Enquirer, 28 December 1998.
[353] Russia denies US access to bioweapons, The Washington Post, 8 September 2002.
[354] Periscope Daily Defence News Capsules, 10 September 2002.
[355] US Senator Richard Lugar discusses disarmament with Russian Defence Minister Ivanov, Associated Press, 23 August, 2002
[356] Order, about the transfer of facilities of the cantonment No 992 of the Russian Ministry of Defence to the Vyatka State Technical University, Ministry of Education, No 451, 25 August 2000.

took place. This was an opportunity for the Russian side to be transparent and open. However, other facilities involved in microbiology and biotechnology in the Kirov area were visited as had been planned. To improve the cooperation a military-to-military exchange programme has been initiated between Sweden and Russia in the NBC defence area. A Swedish visit was made to the Russian Radiation, Chemical and Biological Defence Troops in Noginsk and the military Academy in Moscow in October 2001 followed by a visit by a Russian delegation to the Swedish NBC Centre in 2002. These two first visits served the purpose of mutually elucidating the counter-parts aims and goals and how to continue the future cooperation. This type of working level exchange and cooperation is of mutual benefit and can also be confidence-building.[357]

Still, several of the leading Soviet generals from the Soviet (offensive) BW programme are in charge of the present BW defence programme. In order to build transparency and to eventually redirect present activities and prevent future misuse, a new leadership and structure should be promoted. One example of this was the comprehensive Russian biodefence programme that was presented in 1999. The EU should begin a confidence-building process in cooperation with others countries including the USA. The initial focus should be on common threats by establishing programmes between the Ministry of Defence and other organizations in Europe or the US for dealing with bio-terrorism. The US has initiated such an activity but very limited information on this cooperation on bioterrorism is yet known. If such a process is successful, it may be possible to pursue dismantlement of potential BW production sites in the military complex and redirect work to peaceful activities such as the production of vaccines and the development of antiviral drugs and other projects to meet pressing health problems in Russia and the Third World. The cooperation should also include entities belonging to the Russian Ministries of Health and Agriculture as well as RAO Biopreparat. Russia's former BW infrastructure remains a prime target for those interested in acquiring agents or know-how. One urgent problem is therefore to further increase security of microbial pathogens in culture collections in Russia and NIS. Another aspect is that the implementation of export regulations should be improved and countries could lend more active support in this respect when it comes to training and control measures as well as how to control intangible technology transfers.

One area of the conversion that has not received much attention yet is the biological production facilities. As pointed out by Alibek[358] and Anisimov[359] as

[357] Besök i Österled, Draken Informationmagazine from National NBC-Defence Centre, No 2, 2001.
[358] Alibek K with S Handelman, Biohazard, The chilling story of the largest biological weapons programme in the world – told from the inside by the man who ran it, Arrow Books, Random House, 2000.

well as our own studies[360] there are a large number of facilities that could produce biological warfare agents. It is not known how many of these facilities were part of the former Soviet BW programme and very little is known about their status today. Many were used as a mobilization capacity that could be activated at short notice but they appeared to be carrying out legitimate civilian work.

There have so far been no studies to find out what has happened with the facilities belonging to Biopreparat since 1992. (Research for this report found only scant information in the last two years about Biopreparat and its former director, Kalinin in media sources.) In a number of cases, it is known that Western companies have shown interest to invest in and use this vast production capacity. In most cases though, it has been found that the technical and production standards are far from those in the West for pharmaceutical production, like the lack of GMP (Good Manufacturing Practices). One option has then been to use the know-how of the personnel and the infrastructure round the facility but not the present buildings as renovation and decontamination could become too expensive. The international efforts like the ISTC have not to a large extent focused on this type of production facilities. The US CTR programme has so far not been able to do much yet in this area in Russia. This type of facilities must be included in Western support programmes for conversion due to their potential for misuse. The first step should be to make an inventory of facilities with Russia to evaluate their potential for biotech commercial activities. This is an area where the EU could lend support. At the NDCI conference in December 2002 the US presented a "Bioindustry" initiative.[361] The Congress has approved 30 million USD for reconfiguration of former BW production facilities and accelerated drug and vaccine development. The focus will be on economic viability and greater self-sustainability including analysis of their current capabilities, market and business potential of current and proposed products. Accelerated drug and vaccine development for example against tuberculosis will involve research and training in quality control, GMP or GLP. There are similar initiatives to promote the fight against infectious diseases and one is the World Bank that has concluded agreement on tuberculosis and AIDS control projects supported by a 150 million USD loan.[362]

---

[359] Ukraine Ministry of Foreign Affairs Department for Conversion of Chemical and Biological Weapons and earlier active in the former Soviet BW programme.
[360] Westerdahl K S and R Roffey, Vaccine production in Russia: An update, Nature Medicine Vaccine Supplement Volume 4, No 5, May 1998.
[361] Scharl E, Engagement Strategies for the Biological Production Facilities in the Former Soviet Union: Progress and Perspectives, Session C, NDCI Conference, Brussels 16-17 December 2002.
[362] Russian Federation and World Bank concluded negotiations on Tuberculosis and AIDS control project, Press release 23 December 2002.

Some lessons from the support projects so far can be learnt. It has become clear that the infrastructure of the Soviet/Russian BW complex was more extensive than most analysts realized when the United States initiated its efforts to prevent proliferation of BW capabilities from former Soviet states. Projects have helped to open a few doors to new facilities. Since 1995, more than forty facilities in Russia have been involved with the US. Due to this cooperation US participants have discovered that interpersonal and institutional relationships resulting from these cooperative efforts may play a powerful role in preventing proliferation of BW capabilities from former Soviet states.[363] In spite of the cooperation for a long period between the West and Russia/NIS, some remaining differences on interpretation of compliance with CWC and BTWC and support of technology to, for example, Iran and what this might include, may undermine support efforts if the questions are not taken care of in a reasonable way. These differences should be dealt with in the framework of increasing the financial support from, for example, the EU.

Non-governmental organizations can play an important role in building and analyzing the necessary support for cooperative threat reduction initiatives. For the past year, the Center for Strategic and International Studies in Washington working with 14 partner institutes in Europe including Sweden, Russia, Ukraine as well as Japan and Canada, has been studying these issues. The Strengthening Cooperative Threat Reduction Project, funded by the Nuclear Threat Initiative and the Carnegie Cooperation of New York, seeks to raise public awareness and understanding of CTR issues, to facilitate international cooperation in meeting the challenges ahead, and to build support internationally for sustaining and strengthening CTR programmes. A series of reports have been produced that evaluates the CTR efforts to date and makes recommendations for the future.[364] One such recommendation is to establish a parallel G8 effort to broaden the coverage of current BW threat reduction efforts: Many Russian and NIS civilian facilities that still possess pathogen culture collections and dual-use equipment have received little or no outside assistance. A number of European countries for example, Britain, France and Sweden, have highly developed biotechnology industries as well as experience working on biodefence and with infectious diseases. In the short-term, with proper coordination, they could fan out and work to increase security for pathogen collections. The G8 countries could also help institutions make long-term transitions focusing on civilian applications.

[363] Cook M S and A F Woolf, Preventing proliferation of biological weapons US assistance to former Soviet states, CRS Report to Congress, Congressional Research Service, The Library of Congress, Code RL31368, 10 April 2002.
[364] Einhorn R J and M A Flournoy, Agenda for Action, Volume 1, Protecting Against the Spread of Nuclear, Biological and Chemical Weapons, An Action Agenda for the Global Partnership, CSIS Report, January 2003, Internet http://www.csis.org/pubs/2003_protecting.htm.

Institutions need help to make long-term transitions from militarily related work to programmes with civilian applications. The easiest avenue for this new effort would be to channel increased contributions through the International Science and Technology Centers for use on biotechnology and life sciences programmes. Commercial opportunities should be identified and exploited. Help is needed for example with realistic business plans, identify viable products, identify markets and provide training. For specific R&D questions or topics centers of excellence could be established. In a time when bioterrorism is in focus R&D programmes could be initiated to develop improved protection for civilian populations using know-how in the biodefence sector. The G8 countries should move beyond the practice of the past and set priorities, analyse how the cooperation projects will support the aims for non-proliferation. Here the consortia of independent research institutes can be of great value and that they continue their joint work.

The Russian side seems so far to have been more interested in maintaining a steady stream of funding for work at institutes and facilities and keeping employment up. There is a need to get the Russian side more actively involved and working towards the same non-proliferation aims. There is also a need for the EU to work out exit strategies for the threat reduction support programmes, which cannot go on forever. They have to be terminated at some scheduled point in time. However, Russia must first acknowledge the biological problem area as such. One way could be to develop conversion projects with counter-terrorism objectives like measures to prevent and protect against bioterrorism. Part of this could be projects focusing on measures to secure pathogen collections, strengthen pathogen or biological equipment export control and implementation, development of rapid identification and detection methods, develop medical counter-measures or support basic research on priority pathogens. The EU should take an initiative to sponsor workshops and seminars where the biodefence/bioterrorism communities could meet and discuss cooperation more in detail. There would also be a need for an umbrella agreement between EU and Russia to cooperate on protection against bioterrorism.

The US Congress cannot fund conversion as such, why this could be a suitable complementary area for the EU. The US can get involved in facilities and projects that indirectly promote conversion but not directly. This should be an area where the EU could develop proposals that would focus more on long-term sustainability of the support activities. In a recent study, it has also been shown that piecemeal research and dismantlement activities, although important for short-term non-proliferation priorities, do not necessarily promote long-term

economic stability at facilities, thus preventing long-term brain drain. There is a need for more action and discussion on how to address the long-term issues.[365]

So far, the European funding has focused mostly on nuclear safety and destruction of chemical weapons with a small amount provided for other threat reduction efforts. The most promising avenue would be an expansion of funding for cooperative threat reduction under its Common Security and Foreign Policy (CSFP). During the spring of 2003 there will be a policy discussion about the EU strategy on Russia that includes disarmament and non-proliferation actions. One part of this is that Sweden has taken an initiative presenting ideas for an EU common policy on disarmament and nonproliferation of nuclear, biological and chemical weapons presented in Brussels on 2 April 2003. It is pointed out that efforts to address threats posed by nuclear, biological and chemical weapons should be awarded higher priority and the profile of the EU with regards to disarmament and non-proliferation should be raised. Disarmament and non-proliferation in Russia is of vital importance to the EU and there should be a long-term perspective on disarmament and nonproliferation efforts in Russia. The EU Joint Action should be extended in 2004 for a longer time period and the budget should be increased.[366] These discussions in the EU have to be preceded by discussions in each member state, leading up to a common political signal from the EU in the framework of the G8 Global Partnership initiative. The EU Joint Action Team is for the future so far only looking at potential projects in the biological area dealing with development of fast and reliable techniques for the early detection of biological warfare agents and toxins. This is a step forward indicating that the biological area is being studied, but the scope of potential projects is too limited. The present Joint Action ends in June 2003 and the decided projects will be continued up to their end. No new projects will be added under the present Joint Action. Recently the Joint Action has been prolonged for one year. The decision on the future of the Joint Action must be taken now without delay, including an in-depth analysis of the priorities for support and the aims of potential projects and that a Council Decision can be taken soon. It should also be discussed how funding from other EU pillars, for example dealing with public health and improving export control, could be used for threat reduction projects. There are other areas like agriculture that could benefit from cooperation in biotechnology with Russia and NIS. There is an urgent need to look at potential mechanisms by which such cooperation could be achieved keeping the non-proliferation aims of the activities. There is a need for a broad political discussion involving several areas to find a new and improved

[365] Ouagrham S B and K M Vogel, Conversion at Stepnogorsk: What the future holds for former bioweapons facilities, Cornell University Peace Studies Programme, Occasional Papers 28, February 2003.
[366] Weapons of mass destruction – Swedish ideas, Swedish Ministry for Foreign Affairs, Unit for Global Security, 2 April 2003.

EU policy on threat reduction. A substantial increase in European Union funding under the 1999 Joint Action, which is to be renewed next year, will be possible in 2006 after the EU expansion. There is a need for a stronger coordination under the heading of the EU Joint Action on Non-proliferation and Disarmament to foster better coordination between EU's three pillars and increase effectiveness. An EU coordinator could be appointed. Greater European involvement in a multilateral effort would bring political advantages, as there is still some resistance in Russia to US involvement. One option could be to expand the scope of the EU Joint Action for Russia to coordinate CTR efforts and there is a need for a more active EU strategy in this area on a global scale. How to best use the ad hoc NDCI conferences to achieve the political aims should also now be analyzed and discussed.

Given that there are no instant solutions to proliferation problems, cooperation programmes should be part of a long-term strategy involving financial and political commitment on both sides to improve confidence-building and scientific and commercial collaboration.

Appendix 1: Planned activities of the Pathogen Defence Programme 1999-2005

	Executive Organization Ministry	**Budget Funds** (millions of rubles)	**Expected Results**
		1999-2005	
1. Oriented fundamental research and investigative work (conditionally named ”Search”)	Russian Academy of Sciences, RF Ministry of Health, Russian Academy of Medical Sciences, RF Ministry of Agricultural Production, Russian Agricultural Academy	308	Fresh fundamental knowledge about: Causative agents of infectious human and animal diseases, their genetic makeup and molecular basis of pathogenicity; human and animal genomes; human and animal immune systems and the regulatory mechanisms of specific immune responses by natural and artificial inductors: biological toxic substances and how they affect living organisms; micro organisms and the by-products of their vital functions which damage the environment. Algorithms for obtaining new and highly effective means of defence from known, new and recurring pathogens and hazardous bio contaminants in the environment will be based on the results of this work.
2. Mathematical prediction and scenario modelling of outbreaks of infectious diseases, epidemic and epizootic developments in natural and manmade emergency situations, Systemic analysis and evaluation of potential hazard of pathogens in emergency	RF Ministry of Health, RF Ministry of Defence, Russian Academy of Medical Sciences, Russian Academy of Sciences, Russian Joint Stock Company “Biopreparat”.	14.6	Applied mathematical programmes, scenario models of the development of epidemic outbreaks of hazardous and extremely hazardous infections. Mathematical programmes to evaluate the effects of bioterrorist acts, epidemics and epizootics.

situations ("Mathematical Prediction and Modelling")			
3. Development of new methods of rapid detection and making devices for rapid discovery of hazardous pathogens and bio agents that damage the environment ("Detection and Monitoring").	RF Ministry of Health, RF Ministry of Defence, Russian Academy of Medical Sciences, Russian Academy of Sciences, Russian Joint Stock Company "Biopreparat".	217.9	Modern methods and devices for rapid, highly sensitive delection of hazardous pathogens and bioagents which damage the environment (remote indicator systems, automatic alarm systems and systems for specific identification).
4. Improving and developing new means and methods of specific diagnosis of causative agents of hazardous and highly hazardous infectious human and animal diseases ("Diagnosis")	RF Ministry of Health, RF Ministry of Defence, Russian Academy of Medical Sciences, RF Ministry of Agricultural Production, Russian Agricultural Academy, Russian Joint Stock Company "Biopreparat"	63.7	Rapid-acting, highly sensitive means and methods for specific diagnostics for the most wide-ranging hazardous, infectious diseases of humans and animals.
5. Developing means and methods of specified prophylaxis against hazardous and extremely hazardous infectious human and animal diseases (Prophylaxis and Immunocorrection").	RF Ministry of Health, RF Ministry of Defence Russian Academy of Medical Sciences, RF Ministry of Agricultural Production, Russian Agricultural Academy, Russian Joint Stock Company "Biopreparat".	192.5	New generation of vaccines (recombinant, combined, therapeutic, DNA and others) as well as preparations of specific immunoglobulin against human and animal pathogens. New preparations from natural and artificial immune response modifiers with the potential for an immune response to causative agents of infectious human and animal diseases.
6. Development of new means and methods of decontamination from hazardous pathogens and biocontaminants with the goal of establishing conditions for human activities, defence of territory and	RF Ministry of Health, RF Ministry of Defence, RF Ministry of Agricultural Production, Russian Agricultural Academy, Russian Joint Stock Company "Biopreparat".	32.2	New highly effective methods and means for cleaning (decontamination) and disinfection of the environment which will ensure rapid elimination of hazardous pathogens and bioagents that cause damage to the environment including damage to military and civilian equipment.

agricultural structures in emergency conditions ("Disinfectants and Biocides").			
7. Development of methods, technical means and technologies for defence of food products, animal feed and other agricultural products from hazardous pathogens, biological toxins and other hazardous biocontaminants during natural and manmade emergency situations. ("Technical Means of Protection")	RF Ministry of Agricultural Production, Russian Agricultural Academy, RF Ministry of Defence, Russian Joint Stock Company "Biopreparat".	40.5	New means and technologies for defence of food products, and animal feed, and other agricultural products in natural and manmade emergency situations.
8. Computerized analytical support for Program measures, scientific research projects and development of technology for obtaining the means to protect the population and territory of the Russian Federation from hazardous and extremely hazardous pathogens and aggressive biocontaminants ("Information Search").	Scientific Research Institute "Medstatiska" (Ministry of Health).	17.3	Provide systemic support to executive organizations and executive federal organs – Government Clients of the Program in the form of information materials and analytic references about how other countries are dealing with problems of defence against pathogens and ecopathogens.
Note: Budget funding is subject to change when the federal budget bill is passed.			

Appendix 2: Facilities and productions of the Pathogen Defence Programme 1999-2005

List of facilities and measures	**Budget Financing** (millions of rubles)	**Time for full scale production**
	1999-2005	
RV Ministry of Health facilities:	31	
Reconstruction of Bldg 1 at the State enterprise "Virion", in Tomsk	4	By 2001 – 60.000 doses of VEE vaccine
Reconstruction of Bldg 3 at the State enterprise "Biomed", in Perm	9	By 2000 – 2.5 million doses of typhus and Q-fever vaccine
Equipment refitting of the finish Bldg at the State Unitarian Enterprise "Immunopreparat", in Ufa	2	By 2000 – 350 litres of anti-rabies human immunoglobulin
Reconstruction of Bldg 1 at the Omsk Bacteriological Preparations Production Enterprise, in Omsk	2	By 2000 – 500.000 doses of chemical vaccine against brucellosis
Reconstruction and equipment refitting of the laboratory bldg at the Institute of Immunology, in Moscow	14	By 2001 – a non-experimental final form of new conjugated vaccines against typhoid fever and brucellosis; trivalent vaccine against dysentery (up to 500.000 doses/year) as well as natural immune response modifiers
Russian Academy of Medical Sciences facilities:	23	
Equipment refilling of the laboratory bldg at the D.I. Ivanovskij Scientific Research Institute of Virology, in Moscow	13	By 2001 – experimental production of test systems for diagnosis of arboviral infections, for 60.000 assays/year
Equipment refilling of experimental production at the N.F. Gamaley Scientific Research Institute of Epidemiology and Microbiology, in Moscow	10	By 2001 – experimental series of Q-fever vaccine (up to 500.000 doses/year), new test systems for diagnosis of bacterial infections

RF Ministry of Defence facilities:	55	
Reconstruction and equipment refilling of Bldgs 1 and 6 of the Scientific Research Institute of Microbiology, in Kirov	18	By 2001 – 1.500 diagnostic kits for anthrax; by 2004 – up to 20 million doses of anti-plague and anthrax vaccine
Reconstruction and equipment refilling of Bldgs 14 and 122 and the Centre for Military-Technical Issues, Anti-Bacteriological Defence, Scientific Research Institute of Microbiology, in Yekaterinburg	20	By 2001 – 1.5 million doses of live recombinant vaccine against Hepatitis B in tablet form; by 2004 – up to 5 million doses of vaccine against hazardous viral infections
Russian Academy of Agricultural Sciences facilities:	7	
Equipment refilling of the Physical Science Virology laboratory bldg at the All-Russian Scientific Research Institute of Veterinary Virology and Microbiology, in Pokrov, Vladimirskaya Oblast	7	By 2001 – up to 10 million doses of vaccine against hazardous animal diseases and diagnostic kits to detect causative agents of hog cholera, malignant catarrhal fever, Rift Valley fever and rinderplague (up to 20 million assays/year)
Russian Academy of Sciences facilities:	120	
Equipment refilling and reconstruction of the pilot plant at the M.M. Shemyakin and U.A. Ovchinnikov Institute of Bioorganic Chemistry	80	By 2001 – 3 million doses of domestic recombinant yeast vaccine against Hepatitis B (put out by the Scientific industrial company “Kombiotekh”), by 2003 – 5 million doses of domestic recombinant yeast vaccine against Hepatitis B (put out by the scientific industrial company “Kombiotekh”) and 150 kg of new antiviral preparations and immune response modifiers
Completion of construction of the bldg for preclinical medicine trials at the branch of the M.M. Shemyakin and U.A. Ovchinnikov Institute of Bio-organic Chemistry, in	40	By 2001 – conduct preclinical trials on 10 medicinal immunobiological preparations and drugs per year, by 2003 – conduct preclinical trials on 20 medicinal immunobiological preparations and drugs per year

Pushchino, Moskovskaya Oblast		
Facilities of Joint Stock Company "Biopreparat", in Moscow:	94	
Reconstruction and equipment refilling of Bldg 1 at the State Scientific Centre for Applied Microbiology , in Obolensk, Moskovskaya Oblast	21	By 2001 – 12 million doses of liquid combined and recombinant veterinary vaccines against hazardous animal diseases, 5 million doses of molecular and recombinant medical vaccines against plague, brucellosis and anthrax, as well as 12.000 diagnostic kits for malleus, meliodosis, tularaemia, anthrax, salmonellosis and meningitis
Reconstruction of Bldg 1 at the State Scientific Centre for Virology and Biotechnology "Vector", in Koltsovo, Novosibirskaya Oblast	21	By 2000 – 250 litres of gamma globulin preparation against tick-borne encephalitis, 20 tons of dry growth media for virological research; by 2001 – 5 million doses of dry recombinant antiviral vaccine Revaks-VT, 1.5 million doses of immune response modifier
Reconstruction of Bldg 2 at joint Open Stock Company "Institute of Engineering Immunology", in Lyubuchana, Moskovskaya Oblast	15	By 2003 – 2 million doses of molecular vaccine against anthrax; by 2005 – 2 million doses of molecular vaccine against Hepatitis B
Equipment refilling of the laboratory bldg at the State Scientific Centre of the Russian Federation – State Scientific Research Institute of Highly Pure Biopreparations, in St. Petersburg	18	By 2002 – 4.000 doses of synthetic peptide divaccine against Hepatitis B and C; by 2005 – 6.000 doses of complex inactivated vaccine against cholera, typhoid fever and paratyphoid
Reconstruction of Bldg "D" at the Joint Open Stock Company "Biokhimmash", in Moscow	6	By 2001 – 4 tons of bacterial growth media, 500.000 packets of the new miramestin disinfectant; by 2005 – 10 tons of bacterial growth media based on the autolysate of food yeast
Reconstruction of the laboratory bldg at the State Scientific Centre of the Russian Federation – State Scientific Research Institute for making Biological Instruments	13	By 2001 – 4 million portable units for indicating and identifying causative agents for hazardous infectious diseases, 100. 000 reagent sets for diagnosis of anaerobic infections, 10 million disinfectant tablets and 150 tons of dry disinfectant, both based on hydrogen dioxide; by 2004 – 200.000 temperature

		indicators for storage and transportation of medical and veterinary immunobiological preparations, 5,000 sets of personal protective equipment for workers of the epidemiological oversight service.
Note: Budget funding is subject to change when the federal budget bill is passed, taking into account money brought in by the organizations named in this attachment.		

Appendix 3: Brief chronology relating to the Soviet biological weapons' programme 1918-2003

This chronology is taken from Anthony Rimmington's article "Invisible Weapons of Mass Destruction: The Soviet Union's BW Programme and its Implications for Contemporary Arms Control", Journal of Slavic Military Studies, No. 3, September 2000, pp. 23-28 with Dr. Rimmington's kind permission. The authors of the current report have supplemented and extended the original chronology, which covered the period up till 1999.

1918	Establishment of a Central Veterinary Bacteriological Laboratory (*Tsentralnaya veterinarno-bakteriologicheskaya laboratoriya*) under the Red Army.
1925	Yakob Moiseevich Fishman, Director of the Red Army's Military-Chemical Directorate (*VOKhIMU*), initiates the first Soviet BW research at one of its laboratories based in Moscow.
1928	The Soviet Union accedes to the Geneva Protocol. In February Yakob Moiseevich Fishman prepares a report on BW preparedness of the Soviet Union for Kliment Voroshilov, Commissar for Defence. The Soviet Union's first major BW programme is launched on the basis of its recommendations. The United State Political Administration (*OGPU*), a forerunner of the KGB, establishes a secret bacteriological laboratory for the study of BW agents at the Pokrovskii Convent I Suzdal(Vladimir *oblast*). Creation by the Red Army of a new BW facility, the Vaccine-Sera Laboratory, in Vlasikha, close to the Perkhushkovo railway station in the Moscow *oblast*. Professor Ivan Mikhailovich Velikanov (Head of the Department of Microbiology at Moscow State University) is appointed Director of the Laboratory.
1931	Ivan Mikhailovich Velikanov decorated under the terms of the USSR Revolutionary Military Council's Order No. 306.
1932	Ivan Mikhailovich Velikanov awarded the Order of the Red Star on 27 October.

1933	On 16 April the USSR Revolutionary Military Council issues an Order which amalgamates the Vaccine-Sera Laboratory with the Suzdalbacteriological laboratory to form the Red Army's Military Scientific-Medical Institute (*Voennyi nauchnyi meditsinskii institute RKKA*) at Vlasikha with Velikanov being appointed as its first Director. The new facility, which is also known as the Biotechnical Institute (*Biotekhnicheskii institute*), receives direct BW assignments from the higher Soviet and party authorities and carries out a range of tests on BW simulants at the existing Central Army Chemical Proving Ground (*TsVKhP*) at Shikhany on the Volga.
1934	Establishment of a branch of the Biotechnical Institute known as the Velikanov Institute or Institute No. V/2-1094 on Gorodomyla Island (Lake Seliger) close to the town of Ostashkov in Tver (then Kalinin) *oblast*.
1935	The Soviet authorities select a 10,000 km^2 tract of land on Vozrozhdenie Island (Ostrov Vozrozhdenie or "Island of Rebirth") in the Aral Sea as a new BW proving ground.
1937	Arrest on 6 July of Ivan Mikhailovich Velikanov, chief architect of the first major Soviet BW programme.
1938	Execution on 8 April of Ivan Mikhailovich Velikanov.
1941	Biotechnical Institute relocated to Saratov to prevent it being captured by advancing German Forces.
1942	Biotechnical Institute evacuated from Saratov to Kirov in September 1942 in face of continuing German advance.
1942	Biotechnical Institute evacuated from Saratov to Kirov in September 1942 in face of continuing German advance.
1945	Soviet forces take possession in Berlin of the severely damaged Bacteriological Department of the Military Medical Academy's Institute for General and Military Hygiene (the Kliewe Laboratory) which had been engaged in work on offensive use of biological weapons in combination with chemical weapons.
1947	Construction of new military BW facility in Ekaterinburg (formerly named Sverdlovsk) based on designs developed for Japanese biological weapons programme. New military BW facility for the study of viral and rickettsial agents constructed in Sergiev Posad (formerly named Zagorsk).
1953	Colonel General Efim Ivanovich Smirnov is appointed head of the Red Army's Fifteenth Administration which now manages Soviet BW facilities.
1954	Resumption of testing of biological weapons on Vozrozhdenie Island. A secret base, Aralsk-7 with a population of more then 1,000 is established at the site.

1958	Decree to establish a network of specialized anti-crop and antilivestock BW facilities under the USSR Ministry of Agriculture issued in August by the Central Committee of the Communist Party of the Soviet Union (CPSU) and the Council of Ministers.
1963	Rostov-on-Don Anti-Plague Institute is made lead facility for BW research within the civil anti-plague network. Among the projects underway at this facility is the production of an EV plague strain which is resistant to the majority of antibiotics in current use.
1964	USSR Ministry of Health establishes Specialized Anti-Epidemic Teams (*Spetsilizirovannye protivoepidemicheskie brigady or SPEB*) within the anti-plague network. The *SPEBs*, which remain in existence to this day in the Russian Federation, are mobile units comprising epidemiologists, bacteriologists and so on, capable of operating independently and are tasked with a specific BW role.
1969	In September the Ministry of Defence's Institute of Military Medicine is established in St Petersburg (then Leningrad). The institute's Third Directorate (Bacteriology) is concerned directly with biological weapons.
1971	A Soviet field test of weaponized smallpox caused an outbreak of smallpox killing three people.[367]
1972	Soviet Union signs the Biological Weapons Convention on 10 April.
1973	All-Union Science Production Association Biopreparat officially established on 24 April. This is the lead organization for the management of the new Soviet offensive BW programme. General Vsevolod Ivanovich Ogarkov is appointed Director.

[367] Tucker, J.B. and R. Zilinskas. The 1971 Smallpox Epidemic in Aralsk, Kazakhstan, and the Soviet Biological Warfare Program. *Occasional Paper No. 9*, Center for Nonproliferation Studies, June 2002.

1974	The All-Union Scientific-Research Institute of Applied Microbiology, Biopreparat´*s* most important bacteriological BW research centre, is created in Obolensk (*Moscow oblast*) on 18 April by a decree of the Central Committee of the Communist Party. A decree issued by the CPSU Committee and USSR Council of Ministers in May notes that ´… the general level and scale of research in molecular biology and molecular genetics in our country is still not satisfactory´and that fundamental discoveries in this area have major theoretical and applied significance. In August the All-Union Scientific-Research Institute of Molecular Biology (*VNIIMB*) is established at Koltsovo near Novosibirsk. The facility is Biopreparat´s premier BW centre engaged in research on viruses. The All-Union Institute of Ultra Pure Biological preparations are established by Biopreparat in Leningrad. The new institute researched and developed techniques for the testing and application of biological weapons.
1975	Soviet Union deposits its instruments of Ratification of the Convention on the 26 March.
1979	On Monday 2 April there is an accident at a BW laboratory located within the USSR Ministry of Defence's Compound 19 in Sverdlovsk (now renamed Ekaterinburg) and an anthrax aerosol is released which is responsible for the deaths of at least 68 people. At the time Soviet experts place the blame on ingestion of anthrax-infected meat but this version of events is scientifically refuted by a Western team which gathers key evidence (including pathological samples of victims) during a visit to Ekaterinburg in 1992. Major General Yuri Tikhonovich Kalinin appointed as Director of Biopreparat.
1980	Establishment of the Institute of Immunology at Lyubuchany near Chekov. This facility is Biopreparat´s key centre for the development of defensive medical preparations against BW agents.
1982	Construction of the Scientific Experimental-Industrial Base in Stepnogorsk, Kazakstan, is initiated. This facility is scheduled to become the most important of Biopreparat´s mobilization facilities and possesses enormous capacity for the production of anthrax and other biological weapons.
1983	Arrest in January of the alleged Soviet spy, Professor Marcus Klingberg, Deputy Director of the Israel Institute of Biological Research at Nes Ziona.
1985	In August 1985 the CPSU Central Committee and the USSR Council of Ministers publish a second decree which further underpins the BW programme by calling for the implementation of large-scale measures in order to accelerate the development of biology and biotechnology.

1989	Vladimir Artemovich Pasechnik, Director of Biopreparat´s Institute of Ultra Pure Biological Preparations (Leningrad), defects to the UK and reveals extensive details of the Soviet offensive BW programme.
1991	As part of a new trilateral process, in January US/UK inspectors visit four key Biopreparat BW facilities at Chekhov, Obolensk, Koltsovo and St Petersburg. The inspection team conclude in their report that "the Soviets had a massive, offensive biological warfare programme run by Biopreparat and the military. It was the largest such programme that the world had ever known. A reciprocal Soviet inspection of four BW sites in the USA begins on 7 December 1991. The USSR ceases to exist on 31 December. The Russian Federation absorbs the bulk of the facilities comprising the Soviet BW programme.
1992	Committee on Convention Problems of Chemical and Biological Weapons established in February. In April Boris Yeltsin issues decree "On ensuring the implementation of international pledges in the sphere of biological weapons". In September a team of US/UK policy- makers arrive in Moscow to negotiate a memorandum of understanding on biological weapons, the Trilateral Agreement. This envisaged *inter alia* a series of reciprocal visits to non-military facilities. In October Kanatzhan Baizakovich Alibekov, First Deputy Director of Biopreparat from 1988 to 1992, defects to the USA and provides an authoritative account of the Soviet BW programme.
1993	On 19 January the US Arms Control and Disarmament Agency notes that "the Russian offensive biological warfare programme, inherited from the Soviet Union, violated the BWC through at least March 1992. The status of the programme since then remains unclear". As part of the Trilateral Agreement, in October a joint US/UK inspection team visit Russian BW production facilities at Pokrov and Berdsk.

1994	On 10 January a second US/UK team begin another series of inspections under the terms of the Trilateral Agreement. The inspectors visit Russian BW facilities at Omutninsk and Obolensk. On 11 February a Russian team arrives in Washington for a Trilateral inspection of three sites in the USA. As part of the ongoing Trilateral process a Russian inspection team visits Evans Medical Laboratories, a vaccine facility in Speke, UK. The state-owned scientific-production association NPO Biopreparat is transformed into a joint stock company under the name RAO Biopreparat.
1997	Searle invest 6 million USD in a new 32 million USD joint venture with Biopreparat´s All-Russian Centre for Molecular Diagnostics & Therapy. Igor Domaradskiy, retired BW scientist, gives a detailed account of his work in the Soviet BW programme in the Russian daily Izvestiya.[368]
1999	Alibek's book "Biohazard", revealing a substantial part of the Soviet BW programme, was published in January. On 24 May at a meeting in Tambov between Russian and US representatives it is agreed that scientists from BW facilities belonging to the Russian Ministry of Defence will participate in a series of reciprocal visits in order to explore the terms of collaborative projects. On 2 July, the Russian government adopts resolution no 737 concerning the creation of a "Pathogen Defence" Programme. It is a so called specially targeted federal programme (*federalnaya tselevaya programma*). Its full title is "The creation of methods and means of defending the population and environment against hazardous and extremely hazardous pathogens in natural and man-made emergency istuations from 1999 to 2005". An initiator of and a lead organisation in the implementation of the programme is Biopreparat, now reformed to a joint stock company. In August, the Committee on Convention Problems of Chemical and Biological Weapons is disbanded and absorbed within the new Russian Agency for Munitions (*Rosboepripasy*). In September, the Searle-Biopreparat joint venture for conversion starts operating its pharmaceutical production facility. The state sold out 49% of the shares in *RAO* Biopreparat.

[368] Vyacheslav Yankulin. The plague syndrome or the purgatory of one of the creators of bacteriological warfare. Izvestiya, p. 5, 15 October 1997.

2000	In January, the New York Times reported that Biopreparat was accused of diverting non-proliferation grants to unknown, and possibly offensive, activities. Kalinin denied these accusations. In February, the Ministry of Economics and Biopreparat clashed over the *Moskhimfarmpreparaty* facility, and after presidential consultation, Biopreparat emerges victorious. In May, a new board of directors for Biopreparat was appointed, including Yuri Kalinin (Biopreparat), G.G. Onishchenko, (the Russian Surgeon General and First Deputy Minister of Health), V.I. Evstigneev (Ministry of Defence), and a representative each from the Ministry of Economy and the Ministry of State Property. In April, the shareholders of Biopreparat, replaced Yuri Kalinin with Ramil Khabriyev as Director.
2001	The US decides not to continue negotiations on a Protocol to the BTWC why the negotiations collaps. Russia could keep a low profile during this cirisis saying that it supported a Protocol. The Interdepartmental Scientific Council for Conventional Problems of Chemical and Biological Weapons within the Presidium of the Russian Academy of Sciences and the Russian Munitions Agency is formed. A.D. Kuntsevich, who has a long background in the Soviet chemical weapons programme, was appointed as Chairman of this council. Members of this council include the head of Vektor L.S. Sandakhchiev and the Director General for the Russian Munitions Agency Z.P. Pak, Y.T. Kalinin (former Director General of Biopreparat) and A.A. Vorobev (former Deputy Director of Biopreparat), as well as 40 other academicians.
2002	The US Administration freezes the Nunn-Lugar threat reduction support. Key motives for this decision are Russia's inability to meet its obligation of CW destruction in accordance with the CWC, Russian unwillingness to allocate the needed financial resources for the destruction of CW and conversion and dismantlement of former CBW facilities and a lack of transparency in the CBW fields.
2003	In November 2002, President Bush prevailed on Congress to authorize spending the 466 million USD it originally earmarked for the Nunn-Lugar program, and in January 2003 Bush signed two waivers to free those funds. One third of these funds will be spent on building a plant for destruction of chemical weapons, near the town of Shchuchye in the Kurgan region.

Appendix 4: Tentative list of Biopreparat companies and institutes

Nota bene, this list of companies and institutes, in alphabetical order, is an attempt to compile the names of Biopreparat companies and institutes, and may not be complete or correct since it is very difficult to obtain information and to verify it. Duplications due to changes and varying translation of names may also occur.

Name and location of facility	**Ref.**
AKO Sintez, Kurgan	1
Akrikhin	2
All-Russian Centre of Molecular Diagnostics and Therapy, Moscow	3
All-Union Science Research Institute of Molecular Biology, Koltsovo, Novosibirsk oblast	4
All-Union Scientific-Research and Project-Construction Institute of Biological Technology, Moscow	5
AOOT Biokhimmash, Moscow	6, 7
AOOT Novosibirskii ZMP	1
Berdsk, production plant, Novosibirsk oblast	8
Biosintez Science and Production Association, Obolensk, Moscow oblast	4
Efremovsky Experimental-mechanical Factory, Efremov, Tulskaya oblast	5
Experimental Factory, Moscow	3
Experimental-Construction Bureau "Control & Automation Instruments" Yoshkar-Ola, Republic of Mari El	3
Experimental-Design Bureau of Fine Biological Engineering Kirishi, Leningrad oblast	3
Factory for Production of Bacterial Preparations, Krasnoe Selo, St. Petersburg	3
Factory of Biopreparations, Berdsk, Novosibirsk oblast	3
Factory of Endocrine Preparations, Moscow	3, 5
Factory of Enzyme Preparations Zelenogorskii, Vyshnii Volochek raion, Tver oblast	3
Institute for Biological Instrument Design, Moscow	5, 8
Institute for the Design of Enterprises of the Biological Industry ("Giprobioprom"), Moscow	3
Institute of Biochemical Engineering, Moscow	3
Institute of Immunological Engineering, Lyubuchany	3, 4, 6
Institute of Immunology, Vilnius, Lithuania	9
Joint Stock Company "Marbiofarm", Yoshkar-Ola, Republic of Mari El	3

Joint Stock Company State Factory of Biological Engineering, Kirishi, Leningrad oblast	3
Moscow Design Institute of Applied Biochemistry, Moscow	3
Moscow State Scientific Centre of Antibiotics	3
Moskhimfarmpreparaty N.A. Semashko (Moscow Chemical-Pharmaceutical Production Company), Moscow	5
Novosibirsk Medical Preparations Plan (=Joint Stock Company "Medpreparat", Novosibirsk?)	9
OAO Biokhimik, Saransk, Republic of Mordovia	10
OAO Biosintez, Penza	10
OAO Krasfarma, Krasnoyarsk krai	10
OAO Medsteklo, Klin, Moscow oblast	10
OAO Medsteklo-Borisovskoe, Borisovskii, Tverskoi oblast	10
OAO Organika, Novokuznetsk	1
OAO Solnechnogorsky Glass Factory, Solnechnogorsk Moscow region	10
Omsk Biocombine, Omsk,	4
Omutninsk Chemical Factory, Omutninsk, Kirov oblast	7
Privolzhye Biofactory, Novokuibyshev, Samara oblast	4
Progress Scientific and Production Base, Stepnogorsk, Tselinograd oblast, Kazakstan	11
Science Production Association "Biomash", Moscow	3, 4
Science Production Association "Immunopreparat", Tuimazy, Republic of Bashkortostan	3
Scientific AND Experimental-Industrial Base, Omutninsk	3
Scientific and Production Base, Siberian Branch of the Institute of Applied Biochemistry, Berdsk, Novosibirsk oblast	9
Scientific-Research and Design Institute for the Biotechnology Industry "Biotin", Kirov	3
Scientific-Research Institute of the Biosynthesis of Protein Substances, Moscow	3
Scientific-Research Technological Institute of Antibiotics and Enzymes, St. Petersburg	3
Searle-Farma, Izvarino	12
Sibbiofarm Production Company, Berdsk, Novosibirsk oblast	5
Special Design Bureau for Precision Machinery Building, Kirishi, Leningrad region	8
Special Design Bureau of Controlling Instrument and Automation, Yoshkar-Ola, Mordovia Autonomous Republic	8
St. Petersburg Scientific-Research Institue of Vaccines and Sera and its enterprise for production of bacterial preparations, St. Petersburg	5
State Scientific Centre for Toxicology and Hygienic Regulation of Biopreparations, Bolshevik	3

State Scientific Centre of Applied Microbiology, Obolensk	3-6
State Scientific Centre of Virology and Biotechnology "Vektor", Koltsovo	3-6
State Scientific Centre Scientific-Research Biological Instrument Building, Moscow	3, 6
State Scientific Centre Scientific-Research Institute for Highly (Ultra) Pure Biopreparations, St. Petersburg	3-6
Subsidiary Farm "Druzhba" Nizhnyaya Kamenka, Ordynskoe raion, Novosibirsk oblast	3
Tatkhimfarmpreparaty, state gigant	2
Technological Institute of Biologically Active Substances, Berdsk, Novosibirsk oblast	4, 8
The Anzhero-Sudzhensk complex	13
The Purin complex at Kemerovo	14
Tuymazinsky Factory of Medical Glass, Tuymazy, Republic of Bashkortostan	5
Usolye-Sibirsky khimiko-farmatsevtichesky kombinat, Usolye-Sibirskoye, Irkutsk oblast (a modern drug production unit)	3, 5
Vremia Holding company	2

References for appendix 4

1 Media.ru (2000) http://www.medi.ru/news January222bioprep.htm 22 December 2000, Internet September 2001.

2 Tainstvennyi Kalinin, Kompania delovoi ezhenedelnik, No. 11 (107), 28 March 2000, http://www.ko.ru/document.asp?d_no=1505&p=1&pg=2, Internet September 2001.

3 These facilities are included in Biopreparat. ”Currently, the following facilities appear to be subordinate to RAO Biopreparat. The list is incomplete and there are many sub-branches and joint stock companies of these facilities. "Vektor" alone incorporates at least 5 institutes, 6 joint stock companies, production plants, farms etc.” Rimmington, Anthony, e-mail correspondence 14 September 2001.

4 Rimmington, A. Ex-USSR Biotechnology Industry, Technology Detail, York, UK, first revised edition August 1993.

5 Biopreparat became owner to 10% of the stocks in these companies in 1994. State Committee RF for the Management of State Property, Order No. 2927-r, 28 December 1994 to execute the decree of the RF Government, 1 October 1994, No. 1117, "About measures to organization and state support to the Russian stock company Biopreparat".

6 Government of the Russian Federation. Resolution No. 737 Concerning the focused federal programme for "The creation of methods and means of defending the population and environment against hazardous and extremely hazardous pathogens in natural and manmade emergency situations from 1999 to 2005", 2 July 1999.

7 Rimmington, A. Fragmentation and proliferation? The fate of the Soviet Union’s offensive weapons programmes, Contemporary Security Policy, Vol. 20, No. 1, pp 86-110, April, 1999.

8 Alibek, K. Biohazard. Hutchinson (London), 1999 pp. 299-300.

9 Interfax Eurasia Business Report for 28 February - 5 March 2000, Volume No. 10 (326), http://wnc.fedworld.gov/cgi-bin/retrieve.cgi?IOI=FBIS_clear&docname=0fr1z8s0370fdh&CID=C890716552734375200111416, Internet September 2001.

10 Gosudarstvennaia Duma (2001) Podkomiteta po organizatsii farmatsevticheskoi dejatelnosti i lekarstvennomu obespecheniiu, 25/1 2001, http://www.pharmacom.ru/work/14.html Internet September 2001.

11 R Roffey and K S Westerdahl, *Conversion of Former Biological Weapons Facilities in Kazakhstan – A Visit to Stepnogorsk July 2000*, FOI-R--0082--SE, May 2001.

12 M. Shchetinina, The most important is to learn how to sustain the blow, Farmatsevticheskii Vestnik No. 34 (185), 19/9 2000.

13 Farmatsevtichesky Vestnik (1997) No. 5, p.5 Russica Information Inc. RusData DiaLine- BizEkon News I Want Us To Be Heard... Byline: R. Sadchikova. 3 April 1997.

14 These facilities are possibly included in Biopreparat according to Information Access Company, Marketletter Publications Ltd. (UK), Marketletter, Russia Gets Hooked On Imported Drugs, 14 October 1996.

Appendix 5: Brief biography of Yuri T. Kalinin

Born: 17 September 1938

Education, etc.[369]
Engineer
Candidate of Chemical Sciences
Doctor of Technical Sciences
Professor (institute and faculty not specified)
Member of the Academy of Medico-Technical Sciences.
Laureate of the Lenin Premium of USSR for his work in the area of medical biotechnology.
Author of more than 190 scientific publications and inventions.

Career in chronological order[370]

1958 Lieutenant in the Army, activities included training for radiation reconnaisance.

In the Army Chemical Corps he rose "swiftly" according to Alibek.

Lab chief in Zagorsk (now Sergiev Posad) before appointment as head of Biopreparat.

Ovchinnikov was the "deciding factor" in transferring Kalinin from the Chemical Corps to Biopreparat in 1973.

1974 Appointed as Deputy Director of the All-Union Scientific-research Biotechnological Institute, and then (at unspecified date) he became Director of the VNII of Biological Instrument Building.

---

[369] Alibek, K. Biohazard. Hutchinson (London), 1999 M. Shchetinina. The most important is to learn how to sustain the blow. Farmatsevticheskiy Vestnik, No. 34 (185), 19 Sept. 2000, http://fv.bionika.ru/ISSUES/0185/Documents/0185_003.htm.

[370] Alibek, K. Biohazard. Hutchinson (London), 1999 M. Shchetinina. The most important is to learn how to sustain the blow. Farmatsevticheskiy Vestnik, No. 34 (185), 19 Sept. 2000, http://fv.bionika.ru/ISSUES/0185/Documents/0185_003.htm. Judith Miller. Russia: Germ-warfare expert replaced. The New York Times, 5 April 2001. A new director general at RAO Biopreparat. Farmatsevticheskiy Vestnik, 13 April 2001. Government of the Russia Federation Decree No. 230 about awarding the Government of the Russian Federation prize year 2000 in the area of technology and science. Government of the Russia Federation, 19 march 2001. Kalinin, Y. Orientation - the growth of domestic pharmaceutical industry. Farmatsevticheskii Vestnik, No. 4, 1 February 2000, http://fv.bionika.ru/ISSUES/0155/Documents/0155_003.htm, Internet , 23 March 2001.

In the mid1970s, he took part in the creation of the first RIA test system for especially dangerous infections in the USSR, although officially this work was performed after he was appointed as Minister (see below).

General in 1979 when he succeeded Ogarkov as chief of Biopreparat.

Appointed Urakov to Obolensk in 1982.

1986 Appointed as Deputy Minister of USSR Medical and Microbiological Industry (under Valery Bykov), when the Glavmikrobioprom was placed under the new Ministry of Medical and Microbiological Industries.

At the Ministry he was responsible for the introduction of the successes of research in molecular biology, genetics and gene ingeneering into applications in health care, e g production of recombinant immuno-biological preparations.

Regularly took part in meetings with the Ministry of Health's 3rd Directory responsible for programme "Flute".

In 1995, a majority of the Russian pharmaceutical manufacturers formed the association "Rosmedprom" for their survival. Kalinin became president of "Rosmedprom", simply because he was head of "Biopreparat" that had weathered the times better than most.

In 1996, Kalinin became a member of the Interdepartmental Commission for Health Protection of the Russian Federation Security Council.[371]

19 March 2001 Kalinin was awarded the prize and title of laureate of the Government of the Russian Federation in the area of technology and science for developing technology to obtain human recombinant interferon alpha-2, preparing medical preparations on its basis and introducing it in medical practice.

On or before April 5, 2001, Kalinin replaced as the omnipotent director general of RAO Biopreparat by the company shareholders.

In May 2001, Kalinin became a member of the Interdepartmental Scientific Council for Conventional Problems of Chemical and Biological Weapons within the Presidium of the Russian Academy of Sciences and the Russian Munitions Agency. [372]

---

[371] Rimmington A, Fragmentation and proliferation? The fate of the Soviet Union's offensive weapons programmes, Contemporary Security Policy, Vol 20, No 1, pp. 86-110, April, 1999. The President of the Russian Federation. Ukase No. 577 "About the Members of the Russian Federation Security Council Interdepratmental Commission for the Protection of Public Health". The President of the Russian Federation, 21 April 1996.

[372] Resolution No. 32/70, 4/7 May 2001 On the Interdepartmental Scientific Council for Conventional Problems of Chemical and Biological Weapons within the Presidium of the Russian Academy of Sciences and the Russian Munitions Agency. Russian Academy of Sciences and Russian Munitions Agency, 4 May 2001.

Appendix 6: List of abbreviations

AO	Joint-Stock Company (in Russian: Aktsionernoe obshchestvo)
AOOT	Open Type Joint-Stock Company (in Russian: Aktsionernoe obshchestvo otkrytogo tipa)
BTWC	Biological and Toxin Weapons Convention
BW	Biological weapon(s)
CBMs	Confidence-Building Measures for the BTWC
CBW	Chemical and Biological Weapons
CIS	Commonwealth of Independent States
CSFP	Common Security and Foreign Policy of the European Union
CTR	Co-operative Threat Reduction
CW	Chemical weapon(s)
CWC	Chemical Weapons Convention
DOD	Department of Defense (USA)
DOE	Department of Energy (USA)
FGUP	State Unitary Enterprise
GAO	General Accounting Office (USA)
GLP	Good Laboratory Practices
GMP	Good Manufacturing Practices
G8	Group of eight industrialized countries (i.e. USA, Canada, Great Britain, France, Germany, Italy, Japan and Russia)
ICBM	Intercontinental ballistic missile
IPP	Initiative for Prevention of Proliferation
ISTC	International Science and Technology Center (Moscow)
JSC	Joint Stock Company
MIC	Military Industrial Complex
MOD	Ministry of Defence
NASA	National Aeronautics and Space Agency
NDCI	Non-proliferation and Disarmament Cooperation Initiative
NGO	Non-Governmental Organization
NIS	Newly Independent States
NPO	Scientific Production Organization
OJSC	Open Joint Stock Company
OPCW	Organization for the Prohibition of Chemical Weapons
OSCE	Organization for Security and Co-operation in Europe
RAO	Russian Joint-Stock Company (in Russian: Rossiyskoe aktsionernoe obshchestvo)
STCU	Science and Technology Centre in Ukraine
TACIS	Technical Assistance for the Commonwealth of Independent States
USAID	United States' Agency for International Development
USD	US dollar(s)

VNIIMB	All-Union Scientific-Research Institute of Molecular Biology
VNIIPM	All-Union Scientific-Research Institute of Applied Microbiology (Obolensk)
WHO	World Health Organization
WMD	Weapons of mass destruction (i.e. biological, chemical and nuclear weapons)
WTO	World Trade Organization