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A visit to Stepnogorsk

July 2000

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Conversion of former biological weapons facilities in Kazakhstan, A visit to Stepnogorsk July 2000

Abstract (not more than 200 words)

Report from the conference “Biotechnological development in Kazakhstan: Non-proliferation, conversion and investment” held in Stepnogorsk, Kazakhstan July 24-26 2000. The conference was sponsored by US DOD and organised by the Biotechnology Centre at Stepnogorsk in co-operation with the NIS Representative office in Astana, Kazakhstan of the Centre for Non-proliferation Studies, Monterey Institute of International Studies. The conference concentrated on the dismantlement and conversion of former BW producers. The intent was to present to a larger public the results of the US DOD CTR (Cooperative Threat Reduction) program at the Biotechnology Centre of Stepnogorsk and attract some potential partners to encourage conversion projects. The conference gave a good overview of the conversion projects in progress in Kazakhstan and scientific results were presented of research being funded by the US. An overview was given of how far the conversion process had come so far and the problems that remain. A visit to the former BW production facility was included.

The report also gives a background on which facilities and the test area on Vozrozhdeniye island that were involved in the former Soviet Union biological weapons programme in Kazakhstan and the ongoing activities to convert or dismantle these facilities. The problems connected with this conversion as well as some critical comments from Kazakhs are discussed. Financial support was requested past the dismantlement stage for the personnel involved.

Keywords

Biological weapons, BW-agents, conversion, Stepnogorsk, Biomedpreparat, Anthrax

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Konvertering av tidigare B-vapenanläggningar i Kazakstan, besök i Stepnogorsk juli 2000

Sammanfattning (högst 200 ord)

Rapport från konferensen "Biotechnological development in Kazakhstan: Non-proliferation, conversion and investment" vilken hölls i Stepnogorsk den 24-26 juli 2000. Konferensen sponsrades av det amerikanska försvarsdepartementet och organiserades av ett bioteknikcenter i Stepnogorsk i samverkan med "NIS Representative office in Astana, Kazakstan of the Centre for Non-proliferation Studies, Monterey Institute of International Studies". Konferensen koncentrerades på nedmontering och konvertering av tidigare producenter av B-stridsmedel. Avsikten var att för en större publik presentera USAs program for hotreduktion (CTR-program) och dess resultat av pågående verksamhet vid bioteknikcentra i Stepnogorsk samt att attrahera utländska investerare. Konferensen gav en god överblick över pågående konverteringsprojekt i Kazakstan. Forskningsresultat presenterades från projekt finansierade av USA. En översikt gavs av hur långt konverteringsprojekten kommit och återstående problem. Ett besök ingick vid den tidigare anläggningen för storskalig framställning av B-stridsmedel.

Rapporten ger också en översikt av vilka anläggningar och även testområdet på ön Vozrozhdeniye som var involverade i det forna sovjetiska B-vapenprogrammet i Kazakstan samt pågående arbete med konvertering eller demontering. Problemen förknippade med denna konvertering liksom kritiska synpunkter från kazaker diskuteras. Finansiellt stöd på längre sikt önskades förbi demonteringstadiet för den involverade personalen.

Nyckelord
Biologiska vapen, B-stridsmedel, konvertering, massförstörelsevapen, Stepnogorsk, Biomedpreparat

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Appendixes

1 Introduction

The former Soviet Republic of Kazakhstan seems to have played an important role in the former Soviet biological weapons (BW) programme with research, test and large-scale production facilities. One of the so far largest production facilities in the world was located in Stepnogorsk and is presently being converted or rather dismantled by agreement between Kazakhstan and the United States. In order to inform on this work and show the facility for the international scientific community a conference was organised in Stepnogorsk in July 2000. This report covers the conference and also provides background information on facilities and a test area that were involved in the previous Soviet Union biological weapons programme in Kazakhstan.

Stepnogorsk was established in 1964 as a closed secret city and has been designated as Makinut-2, Tselinograd-25 or Aksu and was under the authority of the Ministry for Medium Machine-Building (Minsredmash, the Soviet nuclear industry ministry), like all other closed/secret cities, but also under Glavmikrobioprom. The biological weapons (BW) facility was built close to the biotechnological plant called Progress.[1] The Stepnogorsk area also includes facilities for the extraction of uranium ore associated with the uranium deposit and mining areas and the Tselinnyy Uranium Mining and Chemical Combine (TsGKhK) and refinery centred in the Stepnogorsk area. The Stepnogorsk BW facility was built 1982 ten kilometres from the centre of the city of Stepnogorsk. The population in Stepnogorsk has today fallen to 48,000 from 70,000 in Soviet times, and about 500 scientists are estimated to have left. Stepnogorsk and this part of Kazakhstan has a large population of Russians, many who now are managing and staffing the scientific and production facilities. These people were closely linked to the Soviet/Russian Ministry of Defence. For a map of Stepnogorsk see Appendix 1.

The US Department of Defense Co-operative Threat Reduction (CTR) programme allocated US$ 172 million to Kazakhstan after it decided in the early 1990s to close its BW sites and hand its nuclear warheads back to Russia. This involved the closure of the world's largest BW production plant and of Semipalatinsk, once the world's largest nuclear testing ground. Each year enterprises like Stepnogorsk biotechnological facilities and the Almaty Anti-

[1] Former Soviet Biological Weapons Facilities in Kazakhstan: Past present and future, G Bozheyeva, Y Kunakbayev and D Yeleukenov, CNS, Monterey Institute of International Studies, June 1999, http://cns.miis.edu/pubs/opapers/op1/index.htm

Plague Institute receive US funding in order to use their knowledge for peaceful purposes. At Stepnogorsk three enterprises remain in place of the original - the Institute for Pharmaceutical Biotechnology, Progress and Biomedpreparat, which produce commercial drugs.

The United States approach for BW dismantlement is a multi-agency effort to demilitarize and redirect BW capabilities and personnel associated with the former BW production facility in Stepnogorsk. The US Department of Defense (DoD), consistent with its congressionally mandated role, is providing assistance to accomplish this demilitarization through the CTR programme. The aims are:

To reduce the threat of this facility ever being used again to produce hazardous pathogens.

To reduce the likelihood of proliferation of BW equipment and/or expertise by ensuring that former weapon's scientists remaining in Kazakhstan are gainfully employed.

To redirect the capability of the Stepnogorsk facility to peaceful purposes.

To instill confidence in Western companies that the Republic of Kazakhstan is committed to leaving the past behind, thereby improving the chances of foreign investment.

A comprehensive description of Kazakhstan's involvement in the former Soviet Union BW programme can be found in the Center for Non-proliferation Studies, Occasional Paper No. 1, also accessible on the internet.[2] In this report a detailed description is given of all facilities in Kazakhstan that were formerly part of the Soviet biological weapons programme including photographs. We will therefore not repeat its contents, but recommend readers to also study the Monterey report. The facilities in Kazakhstan involved in the former Soviet BW programme were subordinated to different ministries. The four main facilities were:

- the Vozrozhdeniye Island open-air test site in the Aral Sea,
- the Scientific Experimental and Production Base (SNOPB) in Stepnogorsk,
- the Scientific Research Agricultural Institute (NISKhI) in Gvardeyskiy, and
- the Anti-plague Scientific Research Institute in Almaty.

According to Rimmington another facility with large production capacity is the Joint Stock Company Progress, which was one of the largest microbiological complexes in the former Soviet Union. It had two production plants and at least

[2] Former Soviet Biological Weapons Facilities in Kazakhstan: Past present and Future, G Bozheyeva, Y Kunakbayev and D Yeleukenov, CNS, Monterey Institute of International Studies, June 1999, http://cns.miis.edu/pubs/opapers/op1/index.htm.

3000 personnel and is located beside the BW production facility in Stepnogorsk. It is also known by the name of the Kazak Science Industrial Complex and it was subordinated to Biopreparat in Moscow.[3] There is also information that Progress formely had a defence affiliation. The Anti-plague Insitute in Almaty, with seven anti-plague stations, played a so far unknown role in the former Soviet BW programme. It had a capacity to turn out 22 million doses per year of a dry plague vaccine. Other microbiological facilities that may have been linked to the defence complex are the M.A. Aitkhozhin Institute of Molecular Biology and Biochemistry in Almaty, the Institute of Physiology, Genetics and Bioengineering of Plants in Almaty and the Almaty Biocombine with large-scale production capacity for anthrax, brucellosis and foot and mouth disease vaccine.[4] The Institute of Pharmaceutical Biotechnology evolved from Biomedpreparat and was originally the research arm of the BW production facility.[5]

Ken Alibek, who was the head of the BW production facility before he defected to the West, mentions the Almaty Biocombinat as a reserve mobilization BW production facility primarily for anthrax. The Progress Scientific and Production Base (formely Kazakhstan branch of the Institute of Applied Biochemistry) in Stepnogorsk he describes as a mobilization BW production facility for anthrax, plague, glanders and tularemia with R&D on anthrax, glanders and Marburg. The Otar Railway Station, also known as the Scientific Research Agricultural Institute (NISKhI), was a scientific institute and test site for anticrop and antilivestock BW agents.[6]

2 Kazakhstan and the BTWC

In this connection it can be mentioned that Kazakhstan has not yet signed and ratified the BTWC (Biological and Toxin Weapons Convention) from 1972. This has caused some concern due to a media report in 1999. The then Kazakh Prime Minister Kazhegeldin said that Kazakhstan may launch the production of chemical and biological weapons and use money earmarked by the West for

[3] 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, 1999.

[4] Rimmington, A In Conversion of former BTW facilities, Eds Geissler E, L Gazso and E Buder, NATO Science Series, 1998..

[5] 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, 1999.

[6] Alibek, K. Biohazard, Random House, New York, 1998.

other purposes. A spokesman for the Kazakh National Security Committee, Kenzhebulat Beknazarov, denied this. He stated that Kazakhstan has no plans to develop chemical or biological weapons. He added that Kazakhstan strictly observes its commitments under international agreements on non-proliferation of nuclear, chemical and biological weapons.[7]

According to Dastan Yeleukenov, advisor to the Kazakh Minister of Foreign Affairs, the Kazakh government has decided not to enter into any more international agreements for economical reasons. It was also mentioned that once a control regime for the BTWC is in place Kazakhstan will acceed to the Convention. Furthermore, one of the problems with the BTWC perceived by Kazakhstan is the lack of definitions of what is prohibited and what is permitted. However, the government works for non-proliferation and was about to start preparing the documents to enter into the BTWC with US help. The plan was to acceed by July 2000 but now this has been delayed to probably December 2000.[8]

3 The Conference on Biotechnological Developments in Kazakhstan: Non-proliferation, Conversion and Investment, in Stepnogorsk July 24-26 2000.

The conference was sponsored by US DoD and organised by the Biotechnology Centre at Stepnogorsk in co-operation with the NIS Representative Office in Astana, Kazakhstan of the Centre for Non-proliferation Studies, Monterey Institute of International Studies. The conference concentrated on the dismantlement and conversion of former BW producers. The intent was to present to a larger public the results of the US CTR programme at the Biotechnology Centre of Stepnogorsk (dismantlement and decontamination) and attract some potential partners to encourage conversion projects. The conference took place on July 24-26 at Stepnogorsk, and gathered 108 participants with representatives from former BW facilities of Russia and Kazakhstan, US government, scientists and business representatives, former Soviet Union scholars and scientists. There were also one representative from the United Kingdom and two from Sweden (FOI, Swedish Defence Research Agency). For the programme and list of participants see Appendix 2.

[7] No plans to develop CBW weaponry, Moscow Interfax in English 1011 GMT, 12 November 1999.

[8] Interview with Dastan Yeleukenov, 25 July 2000.

The conference included presentations on the dismantling of the Stepnogorsk facility, a tour of the Stepnogorsk facility, as well as presentations on scientific work related to dangerous diseases. There was also a visit to the Institute for Pharmaceutical Biotechnology and the Environmental Monitoring Laboratory, both supported by US government funding.

The conference offered a good opportunity to meet and discuss with the participants both from the CIS countries and the West. Among the CIS participants there were both scientists, directors of scientific institutes as well as those representing government offices. Also, a journalist from the Washington Post, and a journalist and a photographer from Reuters attended the conference including the tour of the facility.

Figure 1. View of the facility (all photos in report by the authors if nothing else is indicated)

3.1 Facility background

The BW production facility at Stepnogorsk was built 1982 in the Soviet times but is now wholly the property and responsibility of Kazakhstan. Although the

production plant and site is massive, it escaped detection by US spy satellites.[9] It was first in 1992 when a high ranking defector, the deputy head of Biopreparat and head of the Stepnogorsk facility Ken Alibek (Kanatjan Alibekov), came to the United States that the world became aware of the existence of the facility. In 1983 Ken Alibek was appointed as head of the facility and in 1989 he was appointed first deputy chief of research and production in Biopreparat. Ken Alibek's deputy was Gennadiy Lepeshkin, who came from the Ministry of Defence facility in Kirov in 1984. The Kazakhstan government and the president of Kazakhstan Nazarbayev, former Soviet republic Communist Party Secretary, knew nothing of the existence of the facility prior to 1992. The facility was also closed down in 1992.

The Scientific Experimental and Production Base at Stepnogorsk was under the authority of the Biopreparat organisation. Known only by its post office box, No. 2076, this facility tested and certified pilot-scale and large-scale methods of producing BW agents developed in the laboratories of Biopreparat and the MoD, and issued technical documentation and recommendations. It is said that the facility never was used at full capacity, only test run(s) were made, due to financial cut-backs in the Soviet BW programme 1990. It was also one of six mothballed plants in the Biopreparat system designed for the large-scale production and weaponization of biological agents during the so-called "special time" mobilisation for total war.[10] The Soviet system with mobilization plants that could be rapidly activated also called for nuclear proof underground storage bunkers for the weaponised product. The material could be loaded into bomblets and transported for loading intercontinental missiles like SS-18 aimed at United States.[11]

The facility employed 350 people in 1984. By 1991, the staff had grown to about 800 people, among them 17 scientists with doctoral degrees and 100 researchers. The complex occupied an area of about two square kilometres, the facility consisted of 25 buildings. The location of the facility had been chosen with great care according to Alibek. All vegetation had been stripped around the facility. If necessary, any decontamination due to release of agents should not pose major problems. This was perhaps one of the lessons learnt from the

[9] Albuquerque (N.M.) Journal, on the United States turning a blind eye to bioweapon threat, The Associated Press, Online, 4 October 2000.

[10] Former Soviet Biological Weapons Facilities in Kazakhstan: Past present and Future, G Bozheyeva, Y Kunakbayev and D Yeleukenov, CNS, Monterey Institute of International Studies, June 1999, http://cns.miis.edu/pubs/opapers/op1/index.htm.

[11] Dobbs, M. Cold war spurred bioweapons, Detroit News, 14 September 2000.

accidental release of anthrax spores from a military compound in Sverdlovsk in 1979. The Stepnogorsk facility was, and still is, surrounded by high walls and electrical fence. Motion sensors were also used everywhere. Security was extremely high for the facility and separate entrances were used by civilian or military personnel.[12]

The following description of the main buildings is taken from the Monterey report[13] and listed in numerical order:

Building 211: Facility for preparation of nutrient media (17 types), annual capacity 30 000 metric tons, linked by underground pipes to Building 221.

Building 221: The main production facility, with large-scale fermentation of microorganisms (primary batches in 1 m^3 fermentors on the upper floor, transferred by gravitation to 20 m^3 production fermentors, in total 10 on the lower floor, then to seven centrifuges); also housed a genetics research lab. Selected strains of biological agents from the bacterial culture collection were transferred to a high-containment (Biosafety Level 3) laboratory on an upper floor of the building.

Building 231: Facility for drying and milling of microbiological products.

Building 241-244: Underground bunkers with reinforced-concrete walls two meters thick, reportedly capable of surviving a nuclear attack. for weaponization of the biological agents. These bunkers contained weaponization lines where special machines filled the concentrated slurry of pathogenic microorganisms into bomblets and then sealed them. Installing explosive bursters in the bomblets could complete weaponization.

Building 251-271: Underground bunkers for storing products from Building 231 at refrigerated temperature, down to -40°C, with nearby railway track and a helicopter landing pad.

Building 277: Facility for waste treatment.

Building 600: Facility for research and laboratory testing of agents. There was also 200 m^3 aerosol chamber, made of stainless steel with 1,6 cm thick walls for testing BW munitions.

Buildings 221, 241-244, and **231** were equipped with biocontainment systems for the protection of plant personnel and the surrounding environment. These buildings had high efficiency air filters, fans for maintaining negative air pressure, individual air supplies, sterilisation autoclaves, and submarine doors.

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[12] Alibek, K. Biohazard, Random House, New York, 1998

[13] Former Soviet Biological Weapons Facilities in Kazakhstan: Past present and Future, G Bozheyeva, Y Kunakbayev and D Yeleukenov, CNS, Monterey Institute of International Studies, June 1999, http://cns.miis.edu/pubs/opapers/op1/index.htm.

During the conference the layout of the facility and the production cycle was explained. There was a three-day production cycle, resulting in 1,5 tons of bacteria. This was started by pumping media from Building 211 to the upper floor of Building 221 where the smaller fermentors were inoculated with anthrax bacteria. After a period of growth, the contents of the smaller fermentors were used to inoculate the larger ones. This was done by draining the smaller fermentors and allowing the bacterial suspension to flow by gravitation to the large fermentors on the lower floors. After further fermentation the bacterial suspension were spun at 5000 rpm to remove culture medium and wastes, and the latter were possibly treated in Building 277. The bacterial slurry was then to be transported to Building 231, probably by underground pipes, for drying and subsequent milling. The finished weapons grade biological agents could be stored refrigerated in bunkers (Buildings 251-271). Loading of biological agent into ammunition was to be carried out in other bunkers (Buildings 241-244). The ready weapons were then loaded onto railway waggons using an overhead crane, and subsequently transported to their final destinations. Alternatively the finished BW munitions could be transported by road or even using helicopters.

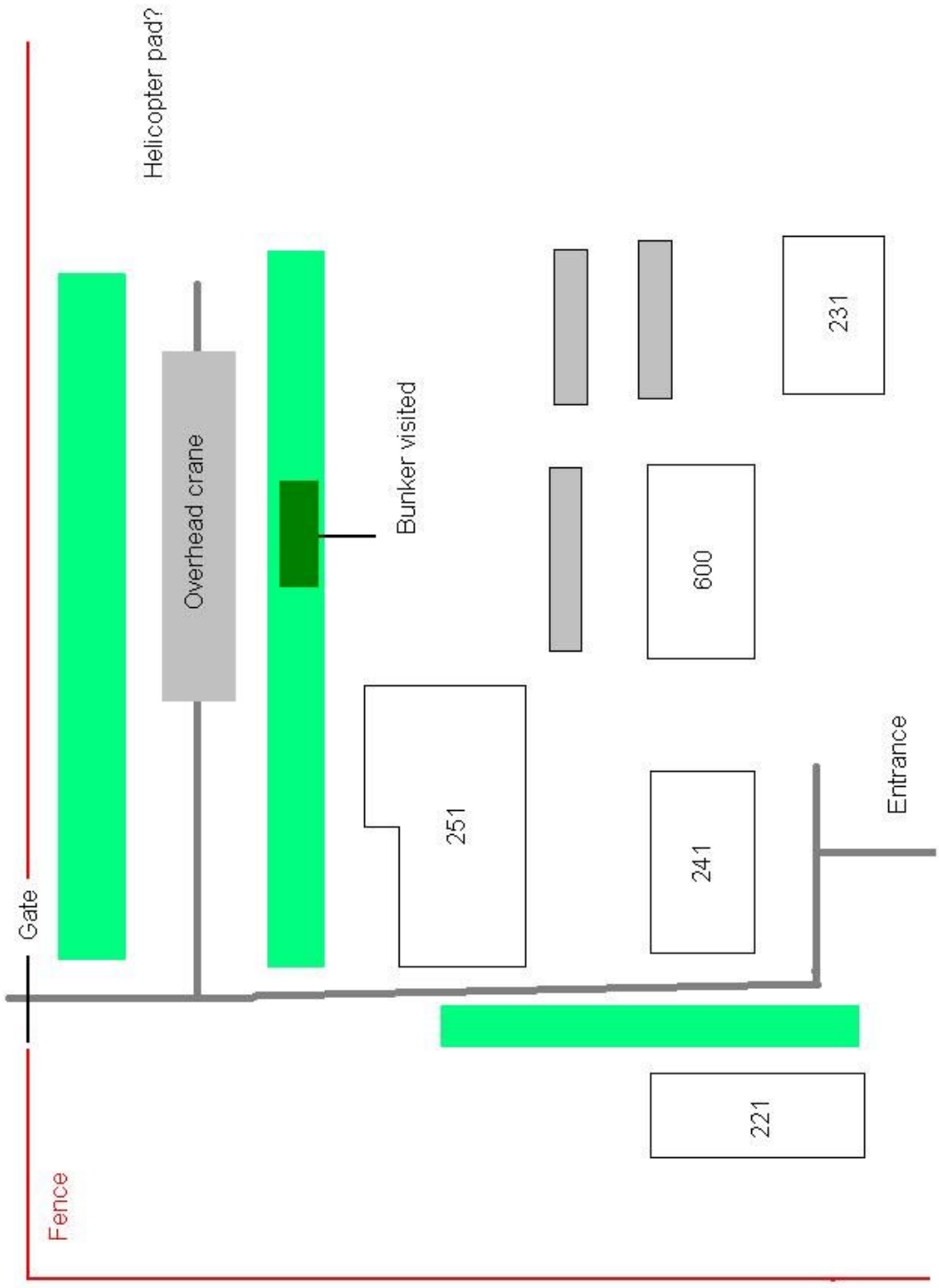

Figure 2. Sketch of the site

Figure 3. Bunker for storing biological weapons

3.2 Tour of facility

We observed that the compound consisted of about at least a dozen concrete buildings, very similar to Russian office buildings. Their exterior did not noticeably display ventilation outlets or similar signatures of a BW facility. The huge buildings are connected by criss-crossed pipelines for nutrient media, water or steam. It was also observed that the layout of the various overgound buildings and bunkers at the Stepnogorsk facility could be logical for transport in underground pipes at various stages of the production to finished weapons. The production building was 200 metres long and consisted of 6 storeys. On a direct question on what agents had been produced, Lepeshkin replied that this information was classified. At the tour/conference it was also mentioned that the aerosol chamber used was 300 cubic metres, but according to the Monterey report 200 cubic metres. It was also claimed during the tour that the equipment for drying and subsequent milling in building 231 never had been used. There were bunkers built between the buildings, allegedly in such a way as to be hard to recognize on aerial photos. The bunkers had entrances that were large enough for a lorry to enter. It was also stated that the size was around 20 x 40 metres. Throughout the tour, heaps of

metal scrap, pieces of equipment, and the like were seen in several places in the grounds. Railway tracks led into the area where an overhead crane was mounted, intended for loading railway waggons with the weaponized BW agents. Underground storage bunkers with two-meter (seven feet) thick walls ran along the railway tracks. A visit to such an undergound “tunnel” was included in the facility tour. Here, the processed BW agents were weaponized and the ammunition finished by adding the explosive charge.

During the visit to the bunker the weaponization was described more in detail. Loading the bomblets (or the like) with explosive was dangerous work. To avoid a blast that would set off all ammunition, loading the explosive was done individually for each piece of BW ammunition and in a separate room to contain any explosion. In the bunker, there was a small cubicle (each wall 2-2,5 m and high enough for a man to stand straight inside), perhaps a mobile unit, all the inside clad with metal sheeting. Inside it was a work bench (ca 2 m long) along one wall of the cubicle and a gas tube (ca 1,5 m tall) standing at the wall opposite the door. It is possible that this could be the type of “room” used for loading the explosive charges.

Figure 4. Loading area for BW ammunition

According to A. Weber, the facility cost about 1 billion Rubles to build (although prison labour was used), and he views it as a wholly misplaced investment by the Soviet Union.

Figure 5. Scraps of metal and equipment was dumped outside the buildings

3.3 The equipment

At the facility, the fermentors were still in place according to statements by B. Hayes. It was indicated by Yu. Rufov that the desiccators had been completely dismantled. These were manufactured in GDR (German Democratic Republic), and described as “many-ton-units”, each weighing over 200 tons. No equipment was shown on the general tour. However, the day after the general tour, there was an exclusive tour for the American representatives from the DoD (and a representative of the Monterey Institute) to the inside of some buildings. The number of people was restricted due to the need to wear protective suites. According to the presentations some buildings were to be destroyed and equipment removed from them. Some of the metal junk seen outdoors at the facility could be parts of this equipment.

3.4 The personnel and their knowledge

Generally the previous employees seem to have stayed on, some employed in the dismantling projects. There was no evident interest in leaving to go abroad, although the Russians would have liked to return to Russia if their financial situations had allowed it. There appeared to be no scientific activities and no recruitment of new scientists.

3.5 Current activities at the facility being dismantled

In December 1993 a US-Kazakhstani agreement about the facility was reached that included a conversion project. Originally the US plan was to convert the production facility and redirect the personnel to peaceful activities like producing pharmaceuticals.[14] The actual conversion started in 1995 and was a joint venture between the Stepnogorsk facility and the US company Allen & Associates. The latter was headed by John Allen, as reported a former US intelligence agent, who had good political connections but little experience of pharmaceutical production.[15] This 5,8 million US$ plan to convert the plant foundered in 1997. According to the Kazakhs the equipment delivered by Allen & Associates was obsolete (20 years old), whereas the head of the latter company says the Kazakhs had no experience in pharmaceutical production. In 1996 a new agreement was concluded with the aim to dismantle the Stepnogorsk facility. At this time, the DoD had been prevented by the US Congress from running actual conversion projects, and these were initiated by other US government bodies or non-governmental organizations, e.g. the DoE, IPP and CRDF.

The conference began by general remarks by G. Lepeshkin, the General Director for the National Centre on Biotechnology (Kazakhstan). This centre was presented and consisted of:
The Amatinskiy Biological Combine (ABC)
“Biomedpreparat” Joint Stock Company
The Institute of Plant Physiology, Genetics and Bioengineering (IPPGB)
The Institute of Pharmaceutical Biotechnology (IPB)
Monitoring laboratory
The Research Agriculture Institute (RAI)

[14] Associated Press On-line, 4 October 2000.

[15] Dobbs, M. Soviet-Era Work On Bioweapons Still Worrisome. Washington Post, p. A01, 12 Sept. 2000 (also accessible at http://washingtonpost.com/wp-dyn/articles/A25470-2000Aug25.html)

The Production Design Office (PDO)
Central Laboratory of Biological Researches of Medicinal Compounds (CLBRMC)
For further information see Appendix 3.

This was followed by A. Weber of the US DoD CTR-programme, giving the background to the conference and the ongoing activities in the biological area in Kazakhstan. The conference gave a good overview of the conversion projects in progress in Kazakhstan and scientific results were presented of research funded by the US. An overview was given of how far the conversion process had come so far and the problems that remain.

The dismantling of the BW facility was described at the conference in various aspects both by representatives of the DoD Threat Reduction Agency (DTRA) and persons at various professional levels working at Stepnogorsk. In 1996 the Kazakhstan government decided to dismantle the facility in co-operation with Pentagon. B. Hayes of the DTRA described the activities at Stepnogorsk as an "extreme success". The third out of four phases (elimination of all BW infrastructure such as electricity, water and sewage pipes etc.) had been completed three weeks before the conference. Phase four would now be started, that is complete elimination of buildings 221, 231 and 600, designated for production, desiccation and R&D, respectively. This implies that the fermentors should still be in place in the production building. About 60 people were involved in the dismantling work. The invoice from Biomedpreparat to the US was currently running up to over one million dollars with 58 000 dollars still outstanding according to T. Lychkovskaya.

Practical problems encountered during dismantlement were also described. One was the financial situation for the Kazakh government which meant that the process was slow and dependent on US support. Among more practical problems was for example the extreme cold in winter, with temperatures down to –30°C and very strong winds, combined with lack of money for heating. This meant that there was a need for special clothes and work could only be carried out in short shifts, about 30 minutes. They only had simple tools and no sofisticated lifting equipment to remove internal structures and equipment from the buildings. The pay was good though for Kazakh circumstances with 180 US$ per month for those working on the dismantling, compared to the current wage for a scientist in Russia of 40-50 US$ per month. It was voiced that the wage should at least be 500 US$ due to the difficult and dangerous

work. The problem for the people is that this work will only last for a couple of years until the facility has been destroyed.
The US Environmental Protection Agency (EPA) had set up a sofisticated laboratory for environmental monitoring costing 850 000 US$. The laboratory had the latest equipment available. In the next phase a microbiology laboratory would be added. There was an EPA team present to do some further work connected to their collaborative project. The laboratory should focus first on monitoring the situation in Stepnogorsk but later have the whole of Kazakhstan as field of work. The head of the laboratory was a medical doctor who had been working at the BW facility with pathogenic organisms. This laboratory which was visited was a good example of conversion. For further description see Appendix 4.

J. Noble is the new director for the Initiative for Proliferation Prevention (IPP) of the Department of Energy (DoE). In connection with the conference he announced DoE support for four projects in the biological area between US private industry, three DoE laboratories and Kazakhstan and Russian laboratories. The IPP grants had been improved, with more funding to the Russian and Kazakh partners and less to US laboratories, a stricter focus on commercialization of the projects, cooperation with other western organizations and agencies involved in conversion, as well as making the IPP contributions tax-free.[16] [17]

T. Nikolenka presented the activities of the International Science and Technology Centre (ISTC). Projects in the biotechnology area came first 1994. Under the auspecies of ISTC, 2000 projects at a cost of 45 million US $ have been carried out. Around 50% of the the most qualified staff had left from some institutes. In 1997 the partnership programme was introduced where a number of US agencies now are partners.

R Bennet from the US Department of Agricultural presented ongoing collaborative projects involving Plum Island and other US laboratories and the Scientific Research Agricultural Institute (NISKhI) in Gvardeyskiy.

There are also projects to improve the security for culture collections at some facilities in Kazakhstan for example the Anti-plague Institute involving Center for Disease Control, CDC at Fort Collins.

[16] Department of Energy, text Washington File 24 July 2000

[17] US State Department, FDCH Federal Department and Agency Documents, July 24, 2000

3.6 Scientific session

The scientific presentations were of varying quality and focus. However, several CIS (Commonwealth of Independent States) scientists, prominent in their fields, presented research that could be of interest to western scientists. It should be noted that due to a programme change, most if not all western conference participants and some Russians were given a tour of the environmental analysis laboratory and the Institute of Pharmaceutical Biotechnology, during the scientific session on Wednesday afternoon.

Figure 6. Visit to the Institute of Pharmaceutical Biotechnology to which some of the equipment from the BW production facility. Fermentor at the institute

V Nepranov, the Deputy Director for the State Establishment Volga-Vyatka Centre of Applied Biotechnology, gave a presentation of the institute's activities. It was the first technopark in the Kirov region in Russia involved in biotechnology, started in 1995. They combine scientific work and industrial applications, also participating in local and federal R&D programmes. They try to attract new financial resources, even private funding. The scientific base in the military complex in Kirov is utilized and help to market products. Examples of projects at the Centre are production of lignin hydrolases, extraction of sediments, treatment of waste water with ozone to kill pathogens, means of spraying for agriculture, treatments for medical or veterinary use, immunomodulators, growth stimulants for cattle, biostimulants for pigs, desalination by biological means, blood products from reindeer, a method for long term preservation of leukocytes, alternative methods for environmental clean-up, vaccines and alternative methods for destruction of chemical weapons. In response to a question posed, Nepranov did not want to disclose how much money they had taken in on

projects. Vaccines and nutrients bring in most money, but the amounts are subject to industrial confidentiality.
A number of posters were also presented connected to the Institute of Pharmaceutical Biotechnology dealing with effectiveness of the Roseofungin antibiotic in Candidosis treatment, composition and industrial production technology development of an instant soluble form of acetyl salicylic acid, clinical trials and the development of production technology of microbial polysaccharide as a gel base for pharmaceutical forms and its pre-clinical trials.

4 Kazakh critique of the dismantling project

Discussions after the presentations and one of the presenters made it clear that the Kazakhs question several aspects of the current dismantling. The destruction of equipment is questioned by the Kazakhs and the project is critiziced for removing assets that are valuable as a basis for new industry and employment. There is a feeling of disappointment and even resentment that at the end of the dismantling also employment and funding will end, and that current programmes do not provide possibilities for future industrial activities and employment. The US representatives countered these comments but were somewhat surprised by the Kazakh's comments. They also indicated that this critisism was aimed at increasing US funding to also include conversion and give the former weapons scientists in Stepnogorsk a future beyond dismantlement. This critique has also been reported by M. Dobbs of the Washington Post who participated in the conference, and also interviewed one of the scientist. Galiyev, who voiced these critical comments were repeated.[18] [19]

There was a wish among some Kazakh participants that the facility and its equipment should be converted and not destroyed. However, the equipment at the facility was apparently very large-scale and could therefore be unsuitable for industrial purposes. Pharmaceutical manufacture has to be optimized and will probably be performed in significantly smaller scales than the facility equipment allows.

[18] Dobbs, M. Plan to end Russian bioarms falters, former Soviet scientists complain they are lost in mare to disarmament, Detroit News, 14 September 2000.
[19] Dobbs, M. Soviet-Era Work On Bioweapons Still Worrisome. Washington Post, p. A01, 12 Sept. 2000 (also accessible at http://washingtonpost.com/wp-dyn/articles/A25470-2000Aug25.html

Figure 7. Photograph of participants outside conference building (photo by organisers)

This view was questioned by a Kazakh. (Ethanol production, requiring large fermentation capacity, is not profitable enough to be a realistic alternative.) The buildings were originally to be maintained, but due to their large size the cost of heating them in winter this is not feasible. Another problem was that 34 people were caught trying to steal material from the facility in July 2000. However, the Kazakh government had provided money for security guards.

Progress head Yuri Rufov at Stepnogorsk expressed the feeling that he was tired of marketing lessons and called for investment, also saying "we have seen too little money" and "we gave up everything we had and got nothing in return". He continued to say that they may not give up the last fermenter but lock up the facility and guard it. He also mentioned that at Biomedpreparat there were projects for producing syringes, 1,2 million/month but nothing serious that could be called conversion.
There was also resentment over the description of insufficient protection of a collection of microorganisms. However, some improvements and up-grades will be needed although the collection in fact is not untended. It was also mentioned that there were no success stories in the bio-area when it comes to commercialization in the IPP projects so far.

Figure 8. Map of Vozrozhdeniye island situated in the middle of the Aral Sea

5 Vozrozhdeniye Island

Vozrozhdeniye rebirth Island is situated in the middle of the Aral Sea, surrounded by large, sparsely populated deserts and semi-deserts that hindered unauthorised access to the secret site. The island has sparse vegetation, hot, dry climate, and sandy soil that could reach temperatures of 60° C (140° F). The northern one-third of Vozrozhdeniye Island, which Kazakhs call Mergensay, is on Kazakh territory. The southern two-thirds of the island is in the Karakalpak autonomous region of Uzbekistan.[20]

The island is of concern because it was used for BW tests using animals for decades up to 1990. Fears persist that strains of virulent diseases may still be viable at the former biological weapons test site. The test site in the southern part of the island was used for studying the dissemination patterns of BW agent aerosols and methods to detect them, and the effective range of aerosol bomblets with biological agents of different types including anthrax, tularemia, brucellosis, plague, typhus, Q fever, smallpox, botulinum toxin, and Venezuelan equine encephalitis. The experiments were conducted on horses, monkeys, sheep, and donkeys, as well as white mice, guinea pigs, and hamsters.[21] Following Yeltsin's decree in 1992, the Russian government declared that the Vozrozhdeniye site was closed, the special structures would be dismantled, and within two to three years the island would be decontaminated and transferred to Kazakhstani control.

The site was first developed for joint Soviet-German field trials in the late 1920's. Germany pulled out in the early 1930s and 1936 it was transferred to the Red Army's Scientific Medical Institute. Testing of biological weapons on the islands of Vozrozhdeniye and Komsomolskiy resumed in 1952 and a special test site called Aralsk-7 was built on Vozrozhdeniye Island. In 1960, US reconnaissance aircraft had identified the test area on the island.[22] After the outbreak of anthrax in Sverdlovsk 1979, and the concern it raised in the West over a possible offensive BW programme in the Soviet Union, a decision was taken to relocate BW agent production from Sverdlovsk to a new

[20] Former Soviet Biological Weapons Facilities in Kazakhstan: Past present and Future, G Bozheyeva, Y Kunakbayev and D Yeleukenov, CNS, Monterey Institute of International Studies, June 1999, http://cns.miis.edu/pubs/opapers/op1/index.htm.

[21] Former Soviet Biological Weapons Facilities in Kazakhstan: Past present and Future, G Bozheyeva, Y Kunakbayev and D Yeleukenov, CNS, Monterey Institute of International Studies, June 1999, http://cns.miis.edu/pubs/opapers/op1/index.htm.

[22] Concern over Anthrax island, Jane's Intelligence Review, 1 July, 2000.

secret facility in Stepnogorsk. In line with this, it was decided in 1988 to transport tons of weapons-ready anthrax to Vozrozhdeniye Island and after decontamination with sodium hypochlorite (bleach), to bury it in 11 pits with sand and bleach. After Moscow's refusal to inform the Uzbekistan government of biological weapons produced and tested the types of material buried on the island USA and Uzbekistan signed a bilateral agreement on the 25th of May 1995. In 1997 the Uzbekistan government invited experts from the Pentagon to take samples from the 11 pits where anthrax had been buried. A second visit was carried out in October 1998. The sampling by the US Army Medical Research and Material Command has shown that live organisms could be detected in six of these pits. Soil samples have shown that it was the military anthrax strain 836 developed for BW. The results from the analysis of the samples have not been made public except indications that the molecular structure is being studied. According to a senior US defence official, the Pentagon will begin providing assistance as early as summer 2000 to destroy the organisms. Electric power will be used to heat the soil to kill the anthrax bacteria.[23] Kazakhstani scientists have not carried out any investigations concerning this problem due to lack of funding.[24] [25]

As the Aral Sea dried up, the island grew 10-fold between the 1960s and 1990 and experts say it could reach the mainland by 2010, exposing humans to potential genetically-engineered strains of plague, anthrax, brucellosis, typhus and smallpox. All agents that were tested are currently not known. Some fear the dissemination process has begun due to migrating rodents. "Last year seven cases of plague were reported in south Kazakhstan, an unusually high figure," said Alim Aikimbayev, deputy head of Almaty's Anti-plague Institute and present at the conference. He did not view the spread of diseases from the island as a problem at the present time, due to the scarcity of animal life on the saline, desiccated shores of the Aral Sea and the low probability of contact with humans. Press comments have though indicated that officials in Northwest Uzbekistan fear serious contamination at the former BW test site. The Uzbek authorities have not obtained any official information from the Russian authorities on what agents were tested.

[23] Soviet military left anthrax behind on isle of Aral Sea, Japan Economic Newswire April 8, 2000

[24] Alarm sounded over malignant anthrax buried by Soviet, BBC Summary of World Broadcasts 7 April 2000

[25] Anthrax catastrophe brewing on island?, New York Times, 8-2-1999

They have not yet received information on the test results from US sampling on the island.[26] [27] There have been reports of anthrax outbreaks this year, that four districts in southern Kazakhstan have been put under quarantine and that the border to Uzbekistan has been closed to prevent spread of disease.[28] [29] [30] Other press sources have attributed the anthrax outbreak to the fault of the local veterinary service.[31]

6 Conclusions

The conference was well organised and the program was most interesting. It gave a good overview of the present situation in Kazakhstan and in particular concerning activities connected to prevent proliferation and on conversion. The personal contacts that the conference enabled us to take were most valuable.

Much less is known about the large biological weapons programme of the former Soviet Union than the nuclear weapons programme. Even though disclosures by defectors like Ken Alibek and Vladimir Pasechnik have given us their information, much probably remains as there is a lack of openess from Russian officials on the past activities. Due to this there has been a delay in the western response to the Soviet-era bioweapon threat. The 100 million US$ earmarked for bioweapon counter-proliferation programmes is small compared to the 2,4 billion US$ spent since 1991 on the security for Russian nuclear weapons and providing work for Russian nuclear scientists.[32] In connection with the conference US officials indicated that “we continue to have serious concerns that some elements of an offensive bioweapons program may continue in Russia and there are facilities we are denied access to”.[33]

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[26] United Press Internationl,Uzbekistan fears contamination from Soviet bacteriological warfare site, 25 September 2000.

[27] Concern over Anthrax island, Jane’s Intelligence Review, 1 July, 2000

[28] Kazakhstan quarantines four districts hit by anthrax epidemic, ITAR/TASS News Agency 10 August 2000.

[29] Uzbekistan taking steps to prevent anthrax spreading from Kazakhstan, BBC Worldwide Monitoring, 14 August 2000.

[30] Four villagers come down with anthrax in Kazakhstan, ITAR/TASS News Agency, 5 August 2000.

[31] Veterinary service blamed for outbreak of anthrax in Kazakh south, BBC Worldwide Monitoring, 11 August 2000.

[32] Dobbs, M. Plan to end Russian bioarms falters, former Soviet scientists complain they are lost in mare to disarmament, Detroit News, 14 September 2000

[33] Kazakh town’s bioweapons past haunts present, Russia Today, 24 August 2000.

To begin with, in the middle of the 1990s the scientists in Stepnogorsk insisted that the facility was only for "defensive purposes" and from officials in Russia there is still only mention of a defensive programme. It was said that the facility was used to produce vaccines. Later in contacts with US officials, and due to revelations by the former head of the facility Ken Alibek in his book Biohazard, it became clear that the facility had a mission to produce BW agents on a large scale when instructed to do so by the MoD.[34] It is still not clear if large-scale production took place, and if so, with what agents. Test runs with anthrax have been mentioned by Alibek. It is surprising that information on agent production is still declared as classified information. The US officials indicate that they have spent 4 million US$ on "redirection projects", in addition to 5 million US$ on dismantling the production plant in Stepnogorsk. The critical comments by a couple of Kazakhs at the conference were surprising, and a sign of their frustration over the situation with no big hopes of a long term US support but mainly for the dismantlement. These critical comments were made public worldwide through the article in Washington Post.[35] Andrew Weber, the Pentagon official in charge of the Stepnogorsk project, insists the United States won't abandon the 200 or so scientists with critical proliferation knowledge who remained at the plant after the 1991 collapse of the Soviet Union.[36] [37] [38] After the conference it has now become clear that the agreement between Kazakhstan and the USA for the destruction of the production equipment has not, for the time being, been extended. This is in line with what Yuri Rufov indicated at the conference.

There has been speculations that Russia still controls some of the facilities or activities but little evidence of this has so far been found. One aspect of the facilities in Stepnogorsk are that many managereal and crucial positions are held by Russians who have a military background and had strong links with the Ministry of Defence in Moscow and still seem to have good connections. To this can be added that Biopreparat in Moscow still is involved or controls some activities in Kazakhstan but no details of this could be obtained.

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[34] Alibek, K. Biohazard, Random House, New York, 1998

[35] Dobbs, M. Soviet-Era Work On Bioweapons Still Worrisome. Washington Post, p. A01, 12 Sept. 2000 (also accessible at http://washingtonpost.com/wp-dyn/articles/A25470-2000Aug25.html

[36] Dobbs, M. Plan to end Russian bioarms falters, former Soviet scientists complain they are lost in mare to disarmament, Detroit News, 14 September 2000.

[37] Soviet-era bioweapons threat lingers, International Herald Tribune, 13 September 2000.

[38] Pentagon team dismantles Russian chemical weapons plant, NBC News Transcripts, 31 May 2000.

The problems of dismantlement and conversion were highlighted at the conference. As almost all equipment is of dual use nature it is difficult to explain why the fermentors and separators have to be destroyed, as the counter-argument was that these were good quality and could be used for peaceful purposes. This dilemma is not unique to this facility. It is also important that the people involved can see a long term benefit from the dismantlement. There has to be support for quite some time before these facilities can compete on the open market, which their management have little experience of. Another aspect is that some Kazakhs are a bit hesitant to be solely dependent on US support and they would welcome that other countries also got involved. Especially now that the US Congress will not fund conversion projects but only dismantlement. One alternative could be that the European Union could get more involved than at present and take more active part in the conversion projects. The EU is already engaged through the ISTC in Moscow which funds mainly R&D projects.

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Appendixes

Appendix 1 Map of Stepnogorsk

Appendix 2 Conference program and list of participants

Appendix 3 The National Centre on Biotechnology

Appendix 4 Environmental monitoring laboratory