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Meeting of Working Groups of the US National Academy of Sciences and the Academy of Sciences of the USSR on Biological Weapons Control
Moscow and Leningrad, October 6-7, 1989

A meeting of working groups on biological weapons control of the U.S. National Academy of Sciences (Committee on International Security and Arms Control working group on BW) and the Academy of Sciences of the USSR took place on October 6, 1989, at the Shemyakin Institute in Moscow. On October 7, the American delegation visited the Institute of Military Medicine in Leningrad (see appendix A).

The members of the NAS delegation were: Joshua Lederberg, chairman; Robert Chanock; Thomas Monath; Alexis Shelokov; John Steinbruner and Lynn Rusten (see attachment #1).

The members of the Soviet Academy delegation were: Academician Vadim Ivanov, chairman; Corresponding Member Evgeniy Sverdlov; Academician Sergei Prozorovskiy; Academician Dmitry Lvov; V. Abarenkov; Col. K. Rayevskiy; and two interpreters (see attachment #2).

The Agenda included the following items (see attachment #3):

1. Organizational Structures for Internal, Bilateral and Multilateral Verification.
2. Classification and Characteristics of Pathogenic Agents of Diseases and Toxins.
3. Facilities to be Verified; Further Definition of Allowed and Forbidden Activities.
4. Confidence-Building Measures and Information Exchange.
5. Site Visit to Institute of Military Medicine in Leningrad.

This agenda derived from an outline presented by the Soviets at the outset of the meeting. The Soviets proposed that the two groups produce a joint document to present to their governments as recommendations from the scientific community. The American side declined to jointly author a document because it is an

explicit groundrule of the National Academy of Sciences committee not to issue joint documents, conclusions, recommendations or communiques with its Soviet counterpart committee, nor to publicly disclose the content of these meetings. It is understood, however, that each side is free to communicate the content of the meetings or make recommendations to its own government. Having reached agreement that there would be no joint document, the sides agreed the discussion should follow along the general outline initially presented by the Soviets since they were substantively prepared on many of those items.

Organizational Structures for Internal, Bilateral and Multilateral Verification

The primary Soviet presentation on this item was made by Prozorovskiy. His scheme appeared to flesh out some preliminary ideas suggested by Abarenkov at the last meeting held in April in London. Prozorovskiy's scheme proposed to set up committees in each country which would serve both functions of internal self-inspection and confidence-building and verification of the other country's activities.

Prozorovskiy suggested that each country establish a committee to monitor the implementation of the Biological Weapons Convention (BWC). The committees would be established under the auspices of the Foreign Affairs Committees of the two parliaments (U.S. Congress or USSR Congress of People's Deputies.) Members of the Foreign Affairs Committees would chair the committees. The committees' membership would include two or three members of the parliament; representatives of the State organs such as the Secretaries of State, Defense and Health; representatives from the Academies of Science, of Medical Science and of Agricultural Sciences; and ten to twelve independent scientists expert in epidemiology, virology, bacteriology and molecular biology. Members of the committees would be approved by the parliament for a term of 4 to 5 years. Throughout this term members of the committee would have permanent visas for entry to the other

country. The committees would each have a permanent technical staff of 3-4 people for analysis and preparation of necessary information and maintenance of permanent direct contacts with the other country's committee.

Each committee would have the following functions:

1. Monitoring of compliance with the BWC in its own country;
2. Verification and inspection in the other country's territory;
3. Implementation of the entire complex of measures for mutual trust, with the widest possible mutual information.
4. Further development and improvement of the system of verification and confidence-building between the two countries.

Prozorovskiy said the committees should be as similar as possible in status, rights, functions and composition. The work of the committees should be covered by the press and open to the general publics; the public should be actively involved in informing the committees of potential cases of prohibited activities.

The American side expressed general agreement with and enthusiasm for Prozorovskiy's proposed mechanism for internal self-inspection by parliamentary oversight and bilateral confidence-building. Believing it unnecessary and inappropriate to dwell on the details of how such committees might be established and operated, the American side said it would think further about the scheme and discuss it with appropriate individuals in the U.S. Lederberg noted that the internal changes taking place in the USSR made more credible these ideas for self-inspection and cooperative verification.

The American side enumerated existing mechanisms for self-inspection in the US such as the congressional requirement for an environmental impact statement on the BW defense program, the function of oversight committees, budget hearings, reports demonstrating programmatic compliance with international treaties, and independent congressional oversight agencies such

as the General Accounting Office (GAO), etc. A copy of the final EIS for the U.S. Biological Defense Research Program, a document weighing over 2 kg, was left for further perusal by the Soviet side.

The American side suggested that, as was the case with CW, it would be particularly important for the US and USSR to cooperate to cope with the potential for BW proliferation and that these measures would necessarily be very different from those designed for the bilateral relationship.

Both Lederberg and Abarenkov touched briefly on the idea that some measures developed for the Chemical Weapons Treaty could be looked at to see whether they might be applicable to the BWC. However, it was also noted that the two cases are not entirely analogous. Abarenkov said he had some specific proposals related to the prevention of proliferation of biological weapons and the capability to produce them; unfortunately time was short and the discussion never returned to this topic. Presumably Abarenkov will present his ideas at the next meeting.

Prozorovskiy suggested that there should be some agreement on joint measures of protection against BW threats from other parties. There was also a brief discussion of the degree of difficultly required to weaponize BW agents. In general, the Soviets emphasized that weaponization and development of tactics for use is quite difficult, whereas the Americans tended to emphasize that even small quantities of agent and relatively primitive means of dispersal could produce a devastating result. Rayevskiy and Prozorovskiy asked for specific information on which countries are alleged to be of concern regarding BW proliferation. Lederberg declined to respond, saying this was a topic more appropriate for inter-governmental discussions.

Classification and Characteristics of Pathogenic Agents of Diseases and Toxins

This item built on the discussion initiated at the London

meeting last April. In London, the American side presented a scheme which would help to define what is a permissible level of research for defensive purposes under the BWC. The American scheme suggested that all agents be categorized into one of three categories (E-extremely dangerous; S-serious; and N-normal) and that quantitative limits on permitted amounts of agent for research be associated with each category. At the London meeting the two sides worked together to assign all known agents to one of the three categories; in fact, they were able to agree on this categorization quickly and without contention.

At this meeting, Rayevskiy explained that the Soviets had reviewed the lists and categorizations with their experts and as a result proposed some amendments. Specifically, they thought Yersinia pestis, smallpox virus and pandemic influenza virus should be added to category E. They thought Pseudomonas mallei, Pseudomonas psuedomallei, legionella, and the virus causing hemorrhagic fever with renal syndrome, Issyk-Kul fever, and dengue fever should be added to category S, because they can be easily isolated from animals and transferred to humans, and are therefore potentially very dangerous. Rayevskiy also suggested that the quantitative levels originally suggested in the American scheme were too high. For instance, with anthrax in category S, it would be allowable to have as much as 500 agent tons, by his estimate. He said this quantity was too large.

In response, the American side reviewed the original rationale for each category. Monath recalled that agents in category S were to be both very serious and capable of being effectively weaponized. He said neither dengue or Issyk-Kul viruses are of great concern with regard to aerosol application and they were therefore excluded. He recalled that in London the two sides together had eliminated viruses of even greater concern on that very same basis. Monath argued that it detracted from the realistic nature of the list to add Issyk-Kul and dengue. Chanock recalled that category E was an empty set signifying a type agent which was as yet unknown: one that would spread

efficiently and fatally and could easily be weaponized. He argued that smallpox did not belong in that category because it spreads inefficiently and its incubation period is relatively long.

Lvov argued that it is better to have a pathogen on the list than to exclude it, and asserted that if one side felt it should be on the list, the sides would have to search for a reasonable compromise.

Steinbruner noted that the sides could agree to exercise the strictest controls on agents other than those in category E for other reasons, for instance because those agents are known publicly and feared.

Lederberg said he also agreed in principle with Lvov on erring on the side of inclusiveness, however one did not want to unnecessarily restrain legitimate medical research. For instance, one would not want to restrain research on influenza strains currently widespread.

Monath said that both the US and USSR are endemic for plague. Many labs work with it, albeit in small quantities. There is a need for work in diagnosis, so there is a risk in limiting the quantities for research. He recalled that the original scheme called for disclosure of category E agents in any quantity and a prohibition of amounts greater than 10^9 infectious doses. One would have to get special approval to work with greater quantities. He said this regime was okay for smallpox and special strains of influenza, but it was not realistic for plague. Category S has its own requirements which would not restrict the normal level of research at labs.

Rayevskiy responded that it was that higher quantitative limit of category S that concerned them for certain agents. For instance, it would permit 500 tons of anthrax, which he said was too much. He said there should be a differential approach for each agent taking into account the size of its infectious dose, virulence and mortality rate.

Lvov suggested establishing a category Very Serious for

things like plague, while keeping category E empty.

As a result of this discussion, it was agreed that the issue should be referred back to a technical working group which would exchange correspondence before the next meeting. The group will reconsider both the categorization of agents and the disclosure and prohibition levels for each category. The American side pointed out that the scheme was originally put forward precisely to stimulate this kind of discussion about its implications and that the author expected from the outset that the scheme would require modification based on these discussions.

Facilities to be Verified; Further Definition of Allowed and Forbidden Activities

On this item, Rayevskiy indicated that the Soviets agreed in principle with the thoughts presented by the American side at the last meeting on how a facility inspection should be conducted, what information should be exchanged in advance, etc. He noted that the remaining open questions revolved around the acceptability of such inspections and who would conduct them.

Lederberg took the opportunity to express his gratitude that the Soviet side had been able to arrange a visit for the American delegation to the Institute of Military Medicine in Leningrad. At the same time, he expressed disappointment that only Rayevskiy from the Soviet side would accompany the Americans, noting that per the discussion about self-inspection, it was as important for the Soviet scientists to see the institute as it was for the Americans. Prozorovskiy mentioned that he had been there several times because his institute collaborates on vaccines with the Leningrad Institute. Lvov had never been there; he said his colleagues' efforts at collaboration with the Leningrad Institute had not been very productive.

Following up on a commitment he had made at the London meeting, Rayevskiy presented for discussion a proposed list of allowed and forbidden activities under the BWC. The list of activities permitted included: studies of dangerous disease

pathogens; prevention, diagnostics and treatment of dangerous diseases; tests of BW reconnaissance and medical means of protection; studies of the structure and possible effects of biological weapons; study of the peculiarities of aerosol spread of weapons in chamber conditions; and the prevention of epidemic spread against troops and civilian populations. Rayevskiy suggested that the BWC should explicitly ban: testing and manufacturing of BW in quantities in excess of that needed for assessment of methods of defense and evaluation of efficiency; the testing, manufacturing and development of BW and means of their delivery; the equipment of arms with BW in a combat ready stage in storage and in arsenals; and the setting up of special military units with means of transport and delivery of BW. Rayevskiy stressed this list was for discussion only.

Similarly, Abarenkov stressed the need to define "peaceful purposes" in the BWC, specifically to define what is allowed for prophylactic purposes.

In response to these Soviet remarks, the American side reiterated that the point of the scheme to categorize agents and put quantitative limits on amounts of agents was precisely to define permitted levels of R&D. They stressed again the importance of balancing any restrictions against the level of interference with necessary research. Lederberg expressed his view that the BWC permits all research, and that therefore confidence-building measures are appropriate to allay concerns about each other's activities. He said ideally all research should be done in a publicly visible manner.

Abarenkov flagged the problem that many countries do not have open procedures such as environmental impact statements, etc. Lederberg agreed and stressed the importance of urging more BWC signatories to participate in the exchange of data. He said it would be useful to include in these declarations additional data on production facilities for pathogens.

Lederberg made a general offer to try to answer any questions the Soviets might have about the US program. Ivanov

then asked about the manufacturing of biologic products by private firms and by U.S.-owned labs outside of the U.S. Lederberg said there were hundreds of private firms producing biologics, and said he would try to answer a more specific question about that if they had one. He offered to look into the issue of whether there were U.S. owned labs outside of the U.S. involved in producing biological material or holding contracts under the BDRP. It was noted that the EIS mentioned private contractors and secondary foreign sites.

Confidence-Building Measures and Information Exchange

Prozorovskiy gave an update on Soviet efforts to improve and open the field of epidemiology in the USSR. He conceded that there was greater openness about research in the US, but said that the USSR was making strides toward greater openness. He said there was now practically no classified epidemiologic information in the USSR, but what is lacking is the adequacy of this information. They still have no analogy to the CDC Morbidity and Mortality Weekly Report. They will, however, soon be publishing a Bulletin of Epidemiologic Information which Prozorovskiy said would be beneficial for Soviet medical services and for the international exchange of information.

Prozorovskiy noted that conversion was taking place in military research and soon information on scientific research in the military would also be made public. He said one indicator of this was that many scientific researchers from military institutes were now presenting papers at conferences such as the recently concluded conference on Arboviruses in Moscow. He said they hoped to have current publications on research done at Soviet military institutes of potential concern to the U.S.

In the brief time remaining, Ivanov again raised the difficulty of getting information from private companies and from firms outside the US but funded by US agencies. He flagged this as a concern of the Soviet government, and said he would find out more about these concerns from their officials before the next

meeting.

In response, Lederberg reviewed how proprietary concerns were being dealt with in the CW treaty under negotiation. He said this would be a concern if there was to be an inspection regime under the BWC, but that he thought proprietary rights could be protected by legal means. He also mentioned legislation currently under consideration in the US Congress which would make it a criminal offense for anyone in the US to act in violation of the BWC.

Finally, Rayevskiy asked whether the U.S. Army was now opposed to contacts and joint collaboration between military epidemiologists. He asked whom the Soviets should contact to promote such contacts. Lederberg said he would look into the matter, noting that one Soviet proposal was currently being considered, as far as he knew.

General Observations

Due to the visit to the Institute of Military Medicine in Leningrad, the actual meeting of the delegations in Moscow was shortened to only one day, which was insufficient time. The Soviets were well prepared on many items, including on some which we did not get to due to the lack of time. It was agreed to exchange working papers before the next meeting to keep the momentum of discussions going. It is clear that the Soviets have been asked to provide advice to their government on a short timetable, presumably in advance of the next BWC Review Conference. In this regard, it is worth noting that Nikita Smidovich from the Ministry of Foreign Affairs joined the two delegations for lunch.

Following the session, the groups took a thorough tour of the Shemyakin Institute, which is equipped with world class lab equipment, largely Western made. It made an interesting contrast to the comparatively primitive labs and equipment at the Institute of Military Medicine in Leningrad. A report of that unprecedented site visit follows in Appendix A.

Lynn Rusten
November 7, 1989

Appendix A

PRIVILEGED

Visit of the NAS Working Group on Biological Weapons Control to the Institute of Military Medicine in Leningrad

On October 7, 1989, the NAS Working Group on Biological Weapons Control visited the Institute of Military Medicine in Leningrad. The American group included: Joshua Lederberg, chairman; Robert Chanock; Thomas Monath; Alexis Shelokov; John Steinbruner; and Lynn Rusten. They were received by Major General Victor G. Vladimirov, Director of the Institute; Col. K. Rayevskiy, a member of the counterpart Soviet Academy group; Col. Sveridov and four other uniformed officers from the Institute with evident medical expertise; two men in civilian clothes; two photographers; and one interpreter from the Soviet Academy of Sciences.

Major General Vladimirov, Director of the Institute, welcomed the Americans, noting that the changes brought about by glasnost made this visit possible. He said he would first describe the work of the Institute and then show the Americans a P-III containment lab.

Vladimirov said they did no classified work at this Institute, where they work on protection against infectious diseases. There are four major labs devoted to: 1) research on diagnosis and detection of infectious disease agents; 2) therapy and prophylactic measures; 3) disinfection/sanitation; and 4) immunoprophylaxis.

Vladimirov said in the first lab they studied natural foci and transmission of infectious diseases in the USSR and in areas where their military forces may be present. He said there were still many little-studied areas in the USSR where there are, for instance, new natural foci of tick-borne encephalitis and tularemia. In the Amur River area they found natural foci of several fevers which could be dangerous to military personnel.

Vladimirov said analogous work was done in Afghanistan when Soviet forces were there. He said they discovered agents previously unknown to be in Afghanistan such as Q fever, Rift Valley fever and typhoid fever. Hepatitis A was an acute problem in Afghanistan. He

said as a result of their work, they have developed about one hundred diagnostic reagents, including several immunofluorescent products.

Vladimirov said in lab 2 they develop antibiotics and emergency means of treatment of acute infectious disease. Antibiotics and chemotherapeutic agents developed here have been tested and approved. This lab works closely with Academician Prozorovskiy's Institute on the development of immunomodulators.

Vladimirov said in the third lab they test new disinfectants, repellents and insecticides. They have large scale equipment for mass disinfection by means of gas and ethylene oxide. They use large polyethylene sacks in chambers.

Vladimirov said in the fourth lab they develop modes of immunization by aerosol and jet injection. Regarding AIDS, Vladimirov said they were at first concerned that jet injection might be contraindicated, and they have seen this also noted in the world medical literature. However, he said they were now optimistic about the safety of jetgun injection and believe this method does not transmit HIV.

Lederberg then made some introductory remarks. He said the NAS working group on BW met regularly with its counterpart Soviet group from the Soviet Academy of Science and Soviet Academy of Medical Science. These BW groups are an off-shoot of the parent Committee on International Security and Arms Control of each Academy. The Soviet committee was chaired first by Evgeniy Velikhov and now by Roald Sagdeev.

Lederberg explained that the primary concern of the BW working groups was to strengthen the Biological Weapons Convention regime. This can be done in part through confidence building measures and higher security relating to proliferation.

Lederberg said he was pleased with the openness of the Director's remarks and said he would be pleased to answer any questions about the American group. He then introduced the Americans.

In response to a question from Lederberg, Vladimirov explained that while members of his Institute wear the uniforms of the Army, they work in the Ministry of Defense for all the military services.

They report to the Directorate of Military Medical Services in Moscow. Theirs is the only military medical research institute of its type and it serves all the services. Each service has its own clinicians who provide practical medical services, but they do not conduct scientific research work.

Vladimirov said his institute is also concerned with military occupational safety problems other than infectious diseases. He said he was a radiologist by training.

Vladimirov said that students from the Medical Military Academy normally go into the services as practical physicians. Those who show promise return to the Medical Academy for graduate work and some of those then come to this Institute as researchers.

Chanock asked if adenovirus infection was a problem in military recruits. Col. Sveridov responded that this was not a main problem for them. The civilian institutes are researching it, and they do not yet have an approved vaccine for it.

Chanock asked about a paper from their Institute on aerobiology which appeared a few years ago. It concerned the immunization of rabbits with a vaccinia virus delivered by aerosol to the lungs. Chanock said he was interested in this because a new approach to immunization involves vaccinia with a foreign gene inserted in it which stimulates antibody response. So far, it does not have sufficient immunogenicity.

One of the uniformed officers responded that one of his researchers conducted that study. He said they used a Soviet vaccinia virus and it was not a recombinant. The purpose was to show the effectiveness of aerosol vaccine. He said by using aerosolization, one can get the same effect with a dose smaller by two orders of magnitude than what would otherwise be needed. He said this work was done in a chamber which the Americans would see. It was done only with rabbits.

Lederberg asked if they did any aerosol vaccination to people. A uniformed officer said there had been some studies on humans on a small scale to check the immune response and side effects. They tried it with a flu vaccine, and to a limited extent, vaccinia virus.

Chanock expressed his interest in studying the effects on humans at a very early age. The American delegation requested more information concerning the response of human subjects to vaccinia virus delivered directly into the lungs by aerosol. However, Rayevskiy indicated that such information would not be made available until a satisfactory collaboration agreement had been established with USAMRIID. One Soviet noted that the main problem was not to exceed the immunizing dose. The particle size and dose are critical. He said they have not published their work with humans, but they found no toxicity or adverse effects on humans from aerosolization.

Lederberg turned the discussion back to broader issues. He said in the US some of the most pioneering research is being done in the military labs. He asked the Soviets whether they regarded as part of their mission defense against BW attack, as it is the mission of the US military medical labs? He asked whether tularemia was a research interest as a zoonosis or as a hostile BW agent? He asked whether if not here, then were there other institutes concerned about defense against BW attack?

Vladimirov responded that all the agents mentioned are zoonotic and therefore they were concerned with defense against naturally occurring zoonotic disease; however, should one of these agents be used in biological warfare, the measures they are developing would of course be applicable. He said in Afghanistan they encountered agents not endemic in the USSR, and some could be used as BW agents. Vladimirov said that therefore, willingly or not, they are facing this problem. He said their work would therefore "kill two rabbits with one bullet."

Steinbruner asked whether they were sure those agents were endemic in Afghanistan and not introduced? Vladimirov responded yes because the infections had been recognized in the population in the decade preceding the Soviet intervention.

Monath asked about the Rift Valley fever virus isolation in Afghanistan which someone from the Institute reported at the recent Arbovirus Symposium in Moscow (see attachment #4). He asked whether they were able to study its natural transmission cycle?

Rayevskiy responded that they did not because the virus was isolated from a patient's blood collected in 1987 and preserved frozen in liquid nitrogen. The virus isolation was accomplished later -- after the Soviets left Afghanistan. Rayevskiy said in 1988, "thank god," the decision was made for them to leave Afghanistan, so there was no opportunity to study the transmission cycle. He said there was no one left at that site to conduct the studies. [Their claim to have identified Rift Valley Fever was hotly contested by both American and Soviet delegates at the Arbovirus Symposium.]

Monath asked whether they had a multi-specialty field team to respond to questions such as those raised by this isolation? Vladimirov said no but they pull together such a team when the need arises and the opportunity exists.

Monath asked how they protect the lab workers who work on the putative Rift Valley Fever agent? Rayevskiy responded that they work in a glove box in a room at the P-II or P-III level. This work would be done in lab 4, their only P-III facility. The other labs are P-II. There is ultraviolet radiation in the boxes. They observe a high degree of personal protection. Rayevskiy said they have very rigid national regulations. They have had no intra-laboratory infection with Rift Valley fever virus. They check their employees by means of serum surveillance, depending on the frequency of exposure, to see if people are abiding by the rules. He said most of the time the agents are in the frozen collection; lab workers do not have daily exposure to dangerous pathogens. Severe punishment is enforced for violating safety regulations. A safety committee must approve an individual's competence to work with dangerous pathogens. They must past a test every two years. Sometimes there are unannounced "spot checks," especially if there is concern or suspicion about violations. Lab supervisors monitor safety compliance daily. Rayevskiy said the "Greens" were very active in the USSR, meaning citizens concerned about environmental issues. He said they were now facing environmental impact problems like the US has faced for many years.

Monath said he was pleased to hear that their controls for safety and environmental protection were so strict. He mentioned the concern

with Rift Valley fever virus -- a lab worker could pass it to a farm animal, so one must be concerned with inadvertent escape from the lab of agents that cause disease in livestock. He asked whether their authorities restricted contact between workers and farm animals when working on Rift.

Rayevskiy reminded Monath that the Rift Valley isolation was very unexpected and that the virus is not enzootic in the USSR. He said the two lab workers working on Rift were city-dwellers. Rayevskiy said they were considering sequencing the genome to verify the isolation. That would have to be done at the Ivanovskiy Institute because the military institute does not have the resources.

Lederberg said some of the confidence building measures the two Academy groups have discussed included exchanges of information and possible quantitative limits on the scale of production of biologics. He asked whether Vladimirov would be able to say what was the level of production of biologics in his institute? Lederberg said his colleagues were prepared to answer any questions they might have about NIH, Fort Detrick, etc. Vladimirov responded that they make no vaccines and have no manufacturing here, no fermentation. Their work is purely in test tubes, petri dishes, etc. They produce nothing in large quantities. Rayevskiy added that they use low pathogenic or vaccine strains of agents for diagnostics. [In the labs we were shown a tissue cell culture system of 1.5 liter capacity (manufactured by the Oncology Research Institute in Kiev). This is used to produce cells for small scale virus research.]

Lederberg said this was useful to the discussion of the working group on quantitative limits. It means that a limit of one liter of agent would not be too restrictive. Rayevskiy agreed and said that was why he could not fathom the large amount of anthrax being discussed in the previous day's meeting in Moscow.

Lederberg asked how they disinfected large equipment. Vladimirov said they did it in special aerosol chambers. For instance, if an ambulance transported an infected person, they would put the entire ambulance in a polyethylene bag and zap it with ethylene oxide.

Vladimirov suggested the Americans tour the lab. The group was

taken inside several buildings on the campus. One was lab #4 where the Americans were shown the P-III containment lab. They also saw parts of lab #1 and lab #2.

Following the lab tour, the two groups shared a meal together where they informally discussed a wide range of subjects including the prospects for Gorbachev and perestroika, the expanding US-USSR military exchanges, and the situation regarding defense spending and new definitions of national security on both sides.

What we were told had been planned as a two hour visit lasted for four hours. While the meeting started out very formally, the atmosphere grew more open and relaxed as the two sides talked before the lab tour.

Vladimirov confirmed that this was the first time ever that foreigners had visited his institute.

A Soviet Academy staff member later told the Americans that approval for the visit came only at the last minute and that it went all the way up to General Moiseyev, Chief of the General Staff.

Lynn Rusten
November 7, 1989