



Book Review

State Secrets: An Insider's Chronicle of the Russian Chemical Weapons Program

Vil Sultanovich Mirzayanov,
Outskirts Press, 2008

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*State Secrets: An Insider's Chronicle of the Russian Chemical Weapons Program*¹ is Vil Mirzayanov's personal account of his experiences from being a country boy in the rural Tatar region in the Union of Soviet Socialist Republics (USSR) to a whistleblower to the Soviet's most advanced and covert chemical warfare nerve agent program. Mirzayanov, a member of the Turkic ethnic minority group in the Soviet Union, overcame systemic social discrimination due to his language barrier and the complicated relationship between Russians and Tartars over hundreds of years.

Upon graduating from high school and turning down a job offer with a unit at the local Committee for State Security, otherwise known as the KGB, Mirzayanov took a crowded train alone and arrived in Moscow on July 26, 1953, to explore opportunities for higher education. After homeless nights in Moscow, he was desperate to find a college that could immediately offer him shelter and a scholarship. As a result, he enrolled in the Department of Organic Synthesis with a focus on artificial gases and fuels at the Lomonosov Institute of Fine Chemical Technology. The Lomonosov Institute of Fine Chemical Technology is also known as MITKhT. Unlike the higher education system in the West, the USSR assigned college graduates to different research institutes and manufacturing plants based on the country's needs. In 1958, before he defended his undergraduate thesis, Mirzayanov received orders to the Institute of Organosilicon Compounds. At the time it was a secret plant producing boranes. Boranes are important chemicals for potential military use. They are made from boron and hydrogen and could be used as powerful rocket fuel. The Soviet military assigned the Institute of Organosilicon Compounds a

codename, "P.O. Box 4019," similar to how the United States (US) used "Project X" for the Manhattan Project.

However, two years of dangerous and labor-demanding work at the P.O. Box 4019 quickly eroded Mirzayanov's idealistic and romantic dream of unconditionally serving the Soviet motherland. He escaped out of the Box with a foMITrged document and managed to enroll in the Institute of Petrochemical Synthesis of the Academy of Sciences of the USSR as a graduate student in 1960, where he developed his lifetime passion in the research of chromatographic analysis. However, he was not able to earn his Ph.D. degree until more than twenty years later, because his study was soon interrupted by the financial crisis associated with his divorce. Without other choices, he had to suspend his academic research program and joined the State Research Institute of Organic Chemistry and Technology (GosNIIOKhT) in 1965. His main task was to develop gas chromatography testing methods to determine the concentrations of chemical warfare agents in different media. This officially marked the starting point of his 26-year scientific career in the Soviet chemical weapons development and testing program.

Under extreme secrecy, GosNIIOKhT was the umbrella organization for several satellite chemical weapons production facilities and testing sites. It conducted research and development activities with a wide range of chemicals with existing and potential military applications, from less toxic common riot control agents, CS and CR to highly lethal G- and V-series nerve agents. Later, GosNIIOKhT synthesized the Soviet analog of VX, code name Substance-33 (also known in the West as Russian VX), and turned it into

full scale production. In addition, Soviet chemists became interested in developing more advanced binary chemical weapons. According to the US Army Chemical Materials Activity, binary chemical weapons contain two non-lethal chemicals that mix together upon launch or in flight to form a lethal chemical agent. GosNIIOKhT later successfully developed a Russian VX-based binary chemical weapon rocket as the Soviet military's first approved binary chemical weapon system in 1990, arguably inspired by the FBI's Operation Shocker.² Meanwhile, GosNIIOKhT continued to conduct research and even publish results on legitimate organophosphate pesticides in open scientific journals to conceal its secret mission of chemical weapons development, very similar to the practice already adopted by the Soviet biological weapons program.

GosNIIOKhT invented the 4th generation nerve agents (also known in the West as Novichok agents and somehow mistakenly as A-series agents because several known A-series agents are not Novichok agents) which served as an exciting milestone for the Soviet military complex. In the early 1970s, scientists at GosNIIOKhT attempted to enhance the lethality of traditional German and British developed organophosphate-based nerve agents, e.g., sarin, soman, and VX. By replacing the isopropyl ether group on the phosphorus atom with different side chains, they discovered a nitrogen analog of sarin (Soviet code name: agent A-230) that was 5-8 times more toxic than Russian VX. Encouraged by the progress, GosNIIOKhT chemists later conducted more diverse functional group modification and synthesized a group of A-230 analogs (A-232, A-234, A-242, A-262, etc., all considered as Novichok agents). In comparison to the traditional G- and V-series nerve agents, Novichok agents exhibited either ultra toxicity or significantly improved resistance to extreme weather conditions commonly encountered in the field. More importantly, the synthesized group of A-230 analogs were not covered by the Chemical Weapon Convention (CWC) at the time and were easily hidden from the CWC inspectors due to the feature that some of them share the same moieties with legitimate commercial organophosphate pesticides.

The Soviet military conducted extensive field testing of Novichok agents containing munitions throughout the 1980s and Mirzayanov's team actively contributed by examining the effective ranges and penetrating abilities of Novichok agents by providing real-time gas chromatography analyses of agent concentrations in a broad range of natural and biological matrices. With the positive experimental results, A-230 was officially approved by the Soviet government to be

added in its chemical weapons stockpile in 1990 and other Novichok agents were included shortly after. After the USSR collapsed in December 1991, the Russian Federation carried on the USSR's secret binary weapons project and successfully developed an A-232-based binary chemical weapon system (Novichok-5), despite the fact that the Wyoming Memorandum of Understanding signed by the Soviet government in 1989 was still in effect at the time.

Mirzayanov's later career at GosNIIOKhT was to serve as the head of the Foreign Technical Counterintelligence Department. The purpose of establishing this separate sector was to keep the Soviet chemical weapons development program secret by eliminating any trace of chemical weapons research and production that could potentially be discovered outside GosNIIOKhT by foreign intelligence agents. GosNIIOKhT naturally relied on Mirzayanov's specialty to establish and maintain a chemical analysis and monitoring program to ensure the concentrations of the chemical warfare agents that escaped out of the laboratory buildings remained below the limits of detection by Western intelligence.

The urgency of the work drastically increased in 1989 when the Soviet government finally agreed to allow American inspectors to visit several industrial plants that were suspected by the West of involvement in chemical weapons production. GosNIIOKhT capitalized on the urgent status and convinced the Soviet government to provide a large amount of hard currency for purchasing Western-made advanced analytical instruments. Ironically, most of the instruments were later used for further Soviet and Russian chemical weapons development.

In Chapters 6 through 12 of *State Secrets*, Mirzayanov shifted from a personal narrative to a more technical, yet equally gripping, exposé of the Soviet chemical weapons program. While challenging for the average reader, the level of reading in this section is appropriate for personnel who work in chemical defense. The text offers a chilling glimpse into the scientific heart of a morally bankrupt system. With his chemist's background and expertise, Mirzayanov detailed the properties of various nerve agents, including the terrifying potency Novichok agents. He did not shy away from chemical formulas and technical jargon, making these chapters dense but essential reading for those seeking to comprehend the deadly ingenuity behind these weapons.

Beyond the science, Mirzayanov revealed the shockingly casual attitude toward safety and environmental concerns within the Soviet chemical weapons program. He described a system where production quotas and secrecy trumped human life and ecological well-being. This section demanded close attention and provided a sobering and essential understanding of the real-world consequences of unchecked scientific ambition. Mirzayanov began questioning the legality and necessity of chemical weapons in 1982, the year that coincides with the period when his team was deeply involved in the development of Novichok agents. His firsthand experience with these highly toxic substances, combined with the evidence of contamination he observed, likely played a significant role in his decision to eventually expose the program. Shortly after the collapse of the USSR, he started revealing the secret Soviet chemical weapons program and confirmed the existence of Novichok agents to Russian and foreign news media including *Moscow News* and *Baltimore Sun*. As a result, he was arrested by the KGB on October 22, 1992, assumedly for disclosing the state secrets. Without knowing the exact charges, he was detained at the notorious Lefortovo Prison for several months and later periodically harassed by interrogations organized by the Federal Security Service of the Russian Federation until his case was dismissed in March 1994 due to lack of adequate evidence. Mirzayanov later moved to the United States and continued to condemn the Russian chemical weapons program.

Good: The author offered highly valuable insights into many previously secret or little-known Soviet chemical weapons research, development, and production activities at GosNIIOKhT from the 1960s to the early 1990s. Mirzayanov's account revealed the three top priority tasks of the Soviet chemical weapons program: (1) mass production of traditional organophosphate nerve agents and their more lethal analogs, e.g., sarin, soman, and Russian VX; (2) development, production, and fielding of ultra-lethal nerve agents that can survive harsh field environment, defeat the North Atlantic Treaty Organization personnel protection equipment, and remain undetectable by international inspections performed under the CWC, e.g., Novichok agents; and (3) creation of highly mobile binary nerve agent weapon systems, e.g., munitions that can carry less toxic chemical precursor agents inside and rapidly generate Russian VX and A-232 upon launch.

In the book, Mirzayanov disclosed the detailed chemical structures of five Novichok agents. Although the structures for A-230, A-232, and A-234 were later

challenged by Hoenig and Ellison, which led to once extensive debates on whose version was correct, to date, Mirzayanov's description has received far more recognition based on the information published in the Russian internal investigation reports indirectly verified by the West.³ Mirzayanov also explains the different physical and toxicological properties of military significance among Novichok agents, including that A-230 easily freezes at temperatures below -10°C; A-232 is more volatile than A-230, the solid version of A-232; and A-262 is remarkably more lethal than A-232.

The book described how chemists at GosNIIOKhT manipulated the physical properties and biological activities of the nerve agents by deliberately modifying functional groups on the phosphorous center or side chains. It also provided the details on how the Soviet military took advantage of more sophisticated Western analytical instruments for testing the penetrating abilities of nerve agents against personnel protective gear and facilitating the development of binary weapons. In addition, Mirzayanov described extremely poor safety practices inside the Soviet military chemical complex including noncompliance with chemical hygiene standards. Mirzayanov discussed how the USSR deliberately transferred technology and instruments for chemical weapons production to its allies under the pseudo environment monitoring and protection projects since the 1970s. He claimed that the USSR delivered chemical weapons to the Mideast in the 1980s and Iraq most likely acquired Russian VX production technology directly from the USSR. Although not confirmed by US officials, the author suggested that US military and intelligence might have overlooked the presence of Russian VX in the Iraqi chemical weapons stockpile during the Gulf War, because Russian VX was not on the United Nations testing panel at the time. Since the Russian Federation directly inherited the chemical weapons doctrine and practice from the Soviet era without much change, the information in the book could be useful when the United States establishes strategies and policies to prevent the future proliferation of chemical weapons from Russia to other countries or terrorist organizations. The book also described the unnecessarily redundant and disorganized security measures and highly politically influenced personnel management in the Soviet military chemical complex. This could offer a unique opportunity for the West to utilize information warfare to deliberately create obstacles for Russia's illegal activities in chemical weapons development and production.

Mirzayanov discussed delayed symptoms associated with long-time exposure to nerve agents at low

concentration levels, which may contribute to Gulf War Syndrome. He offered a novel opinion that did not draw adequate attention from toxicologists or medical professionals in the West at the time when the book was published. The annexes of the book also presented many detailed Russian court documents that either quoted or cited information on the Soviet chemical weapons development program from official and classified Soviet records.

Bad: Out of the total 23 chapters in the book, only seven chapters (Chapters 6-12) are directly related to the Soviet chemical weapons program. The rest are merely lengthy and redundant descriptions of the author's trial and unfair treatment, government corruption, and political power struggles he had encountered in the USSR and Russia. It seems that better editing would make the book much more readable. Some parts of the book are particularly hard to follow for the readers who do not possess the knowledge of how Russian first, patronymic, and last names are used by Russian native speakers. Without explanation notes, the reader would easily become confused about whether the three different names the author just mentioned correspond to three distinct persons or the same one. In addition, it seems that the translation of chemistry terminologies was provided by poor-quality online translation software. Neither the software designer nor the translator had sufficient knowledge of organic chemistry vocabulary in English. Therefore, the resulting product is often inaccurate and confusing. The book has very limited discussion on the chemical synthesis of the novel nerve agents or how the Soviet scientists conducted structure-activity studies for designing new agents or modifying existing agents. This may be because either the relevant information is unavailable in the West or the author's specialty was analytical chemistry, not organic synthesis.

Overall: In *State Secrets*, Vil Mirzayanov, a former Soviet chemist, takes readers inside the secretive and deadly world of the Soviet Union and Russia's chemical weapons programs. More than just a memoir, the book recounts Mirzayanov's journey from an idealistic scientist to a disillusioned whistleblower as he witnesses firsthand the devastating environmental and human costs of developing nerve agents like Novichoks.

Mirzayanov's account is both a personal story of courage and a damning indictment of government secrecy and scientific complicity in creating weapons of mass destruction. The book offers a rare glimpse into a shadowy world, exposing the dangers of unchecked power and the moral dilemmas faced

by those who dare to speak truth to it. This chilling exposé, especially chapters 6-12, is also a must-read for anyone interested in Cold War history, arms control, or the ethical responsibilities of scientists. ■

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Notes

1. Vil Mirzayanov, *State Secrets: An Insider's Chronicle of the Russian Chemical Weapons Program*, (Denver: Outskirts Press, 2009).
2. David Wise, *Cassidy's Run: The Secret Spy War Over Nerve Gas*, (New York: Random House Publishing Group, 2000).
3. Jakub Opravil et al., "A-agents, misleadingly known as "Novichoks": a narrative review," *Archives of Toxicology* 97, (August 2023): 2587-2607, <https://doi.org/10.1007/s00204-023-03571-8>; Peter Chai et al., "Novichok agents: a historical, current, and toxicological perspective," *Toxicol Commun* 2, no. 1 (June 2018): 45-48, <https://doi.org/10.1080/24734306.2018.1475151>.