

China and Cuba: A Post Cold-war Marriage Part III: Collaboration in Biotechnology and Neurosciences

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Today China and Cuba have a “stable, strategic, and long-term alliance” (Arreola, 2004) whose three fundamental pillars are: 1.) a geostrategic partnership by which Cuba serves as a bridge to advance China’s interests in Latin America and the Caribbean; 2.) collaboration in military-intelligence, centered on radio-electronics (SIGINT) and information technology (I.T.); and 3.) collaboration in biotechnology/neurosciences. This paper addresses Part III of a 3-part series titled “China and Cuba: A Post Cold-War Marriage”; Part I addressed “The Economic Relationship,” and Part II, “Military-Intelligence Cooperation.”

Cuba’s collaboration with China in biotechnology and neurotechnology/bioengineering aligns with China’s government-mandated effort “to rival or surpass the scientific capabilities of the United States and other Western powers”. China is pouring billions into biotechnology to build dozens of laboratories while cutting-edge, and sometimes controversial, research has been encouraged in fields including genetic engineering and experimental vaccines and therapeutics. (The Washington Post, 2023)

China has embarked on a “military-civil fusion” (MCF) strategy, a national effort spearheaded by current President Xi Jinping, to fuse China’s military and economic development. It calls for all Chinese civil institutions, both public and private, to aid in advancing the military’s capabilities through the acquisition and application of critical and emerging technologies (O’Brien, 2021; Funaiolo et.al, 2022). The Chinese Communist Party’s (CCP) five-year plan for 1991-1995 already reflected an important shift from CMI (Civilian Military Integration) to MCF (Fritz, 2019) A Fact Sheet from the U.S. Department of State, published during the Trump Administration and currently archived (U.S. Department of State, 2017–2021), describes the MCF as an aggressive national CCP strategy to enable China “to develop the most technologically advanced military in the world”. It calls for eliminating barriers between China’s civilian research and commercial sectors, and its military and defense industrial sectors. Implementation is not just through China’s own research and development efforts “but also by acquiring and diverting the world’s cutting-edge technologies, including

through theft to achieve military dominance”. The document explains that “joint research institutions, academia, and private firms are all being exploited to build the PLA’s future military systems, often without their knowledge or consent”. The Director of the China Center at Brookings Institution, Chen Li, noted that “between 2016 and 2018, China created a capital fund of somewhere between \$55.6 billion to \$73 billion to invest in private sector companies that develop technologies with potential military applications”. (Li, 2022)

Even when civilian, not military, institutions and enterprises are involved in the collaboration projects, the PRC’s National Intelligence Law of 2017 obligates individuals, organizations, and institutions to assist the PRC security and intelligence services in carrying out a wide variety of intelligence work and to protect the secrecy of all state intelligence work of which they are aware. (O’Brien, 2021)

The US. Department of Defense’s 2023 Biodefense Posture Review states: “The PRC, Russia, North Korea, and Iran, probably maintain the knowledge and capability to produce and employ traditional pathogens and toxins. These countries historically pursued, and at least one country (North Korea) continues to pursue, pathogens that cause highly infectious or contagious diseases, such as anthrax, plague, and toxins, including botulinum toxin. These nations probably also retain the knowledge and ability to employ these agents if necessary. . . . Additionally, the most recent Compliance and Adherence Report with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments raises concerns with PRC compliance with the BWC, based on research and activities with potential dual-use applications. The United States has compliance concerns with respect to the PRC’s military medical institutions’ toxin research and development given their potential as a biothreat. The PRC has also released plans to make China the global leader in technologies like genetic engineering, precision medicine, and brain sciences. These Chinese publications have called biology a new domain of war”. (U.S. Department of Defense, 2023)

By 2022, Cuba and China reported 30 collaborative projects in biotechnology. (Padilla, 2022) The strategic alliance and cooperation in biotechnology were reaffirmed as “a fundamental pillar” of the relationship at the June 2022 XI Meeting

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of the China-Cuba Joint Working Group on Biotechnology (Fonseca, 2015). This strong collaboration merits scrutiny due to its inherent dual-use, civilian and military, nature. The Soviet Union concealed a huge biological weapons program, Biopreparat, for at least two decades after signing in 1972 the Convention that bans the development, use, and stockpiling of biological weapons. Ken Alibek, its top scientist and First Deputy Chief (1987-1992), has provided extensive accounts of the great lengths to which the Soviet Union went to keep the program compartmentalized despite employing at its height 60,000 to 70,000 people; it was even more closely guarded and secret than its nuclear weapons counterpart. In many cases, Alibek has explained, legitimate work on pharmaceuticals, biotechnology, and vaccines as well as dual-use facilities provided a cover for the secret BW activities (Alibek, 1998; Tucker, 1999; Preston, 1998; Tucker, 2001)

In November 1989, the governments of China and Cuba signed a Scientific and Technological Cooperation agreement said to be the first of many that have followed. In March 1990, a Joint Commission for Scientific-Technological Cooperation was created that held its first meeting that year in Beijing and meets biannually to formalize agreements for scientific-technological cooperation biannual plans. (China's Embassy in Cuba, 2009; Shicheng, 2010) In 2004, the Sino-Cuba Joint Working Group on Biotechnology was created to oversee the collaboration in biotechnology (Padilla, 2022)

Many collaboration agreements in this field are mentioned in the publications of government entities or the state media of either country, such as agreements of June 1993, April 2000, December 2005, June 2011, and June 2015. (Embajada de China en Cuba, 2012) Agreements that specifically include the production of "biotechnological medicines with Cuba's high technology" in China are mentioned going back to 1999 (Granma, 1999). By December 2005 "at least two" joint ventures in biotechnology had already been established and more were expected in three to five years. (Martinoticias, 2005). In June 2015, at the 7th meeting of the Cuba-China Joint Biotechnology Working Group, held in Havana, eleven more agreements were ratified that "opened the way for new collaborative projects" for 2015-2017. These included letters of intent to establish two joint enterprises in the Mariel Special Development Zone to produce and distribute biopharmaceuticals and focus on cancer medications, two agreements to represent and distribute Cuban-developed biosimilar antibodies and a pneumococcus vaccine, and agreements to introduce a rotavirus vaccine in China and throughout Latin America, to establish a joint laboratory to develop neuro-technological products, and for Chinese patients to receive treatment in Cuba through Cuba's Medical Services Enterprise. (Fonseca, 2015)

The priorities established for the current 2-year plan (signed in 2022) include the continued promotion of Chinese investments in Cuba to build plants to produce biopharmaceuticals, joint construction of laboratories and industrial development zones, and continued joint research and output of international information (such as the one ongoing in the scientific journals *Nature* and *NeuroImage*). At least two more joint ventures were approved to operate in China in 2022 for the two-year plan: (Fonseca, 2015)

1. A Cuba-China industrial complex to produce Policosanol (PPG) (Sotolongo; 2026), and other natural products in the new Wuhan West Lake High-Tech Development Zone.
2. The development of a China-Cuba Center for Joint Innovation in Biotechnology at the Yongzhou Economic and Technological Development Zone.

Very limited information has been found in open sources on at least five Cuba-China joint ventures located in China, of which four are in biotechnology:

1. Biotech Pharmaceuticals Ltd., located in a development industrial park in Beijing and apparently established in August 2000 (National People's Congress of the People's Republic of China, 2009) is "devoted to research, production and sales of monoclonal antibodies used in the diagnosis and treatment of cancer, as well as the development, registration and sales of vaccines and therapeutic recombinant proteins, using Cuban technology". Its leading product is reported as the monoclonal antibody Nimotuzumab, developed by Cuba to treat nasopharyngeal cancer (Ramos, 2023; Fonseca, 2015) The enterprise was founded by China's International Sciences Center and Cuba's Molecular Immunology Center, which owns a 46% share; they jointly built the Sino-Cuba Center for Molecular Immunology of Beijing, inaugurated in 2005.
2. Changchun Heber Biological Technology Co. Ltd., located in Changchun, where Cuba has a 30% share, reportedly sells and transfers technology to China for the tetanic toxoid protein for the Quimi-Hib vaccine (for prevention of Hib pneumonia and meningitis), World Health Organization, Pan American Health Organization, and European Commission (2015), which in 2022 was in Phase III clinical trials in China (Padilla, 2022).
3. Shandong Lukang Heber Biotech Co., located in Qihe, Jinan province, where Cuba has a 40% share, reportedly produces the enzyme fructosyltransferase for the sugar industry (Newman, 2019) An "innovation center" in the city of Yongzhou, Hunan province, inaugurated in May 2021 and reportedly set up with equipment and laboratories designed by specialists from Cuba, carries

out joint research in human and animal biotechnology with technologies obtained by Cuban scientists and trains scientists in post-doctoral programs. The leading manager, developer, and strategic partner on the Cuban side is the Center for Genetic Engineering and Biotechnology (CIGB). Two of the six initial projects are said to be linked to the joint development of the PanCorona vaccine to protect against various strains of the SARS-CoV-2 coronavirus (Juanes, 2021; Padilla, 2022) Information on Cuba's share has not been found.

China has relied on Cuba's know-how, experience, and technology transfers in biotechnology, as reported in the media of both countries. When Agustín Lage was Director of Cuba's Centre for Molecular Immunology, he boasted that China made its first monoclonal antibodies with Cuban technology Yaffe (2019). However, details of Cuba's biopharmaceutical industry are mired in secrecy. Revenues for Cuba from the joint ventures would be reported in the Current Account, which it does not publish.²

The best-case scenario would be for Cuba to be helping China advance in biotechnology for just civilian medical purposes, but Cuba has had biowarfare capacities since the 1980s and is reported to have shared dual-use technology with its allies. This author described, in a chapter of a 2001 book, U.S. government unclassified reports and testimony of Soviet and Cuban defectors regarding Cuba's biological capabilities and suspected/potential biowarfare (BW) program; the piece was entered into the congressional record at a June 2002 hearing of the U.S. Senate (Werlau, 2001; U.S. Senate, Subcommittee on Western Hemisphere, Peace Corps and Narcotics Affairs, 2002). In 2002, two U.S. Assistant Secretaries of State publicly acknowledged that the U.S. government believed that Cuba had "at least a limited, developmental offensive biological warfare research and development effort" and "has provided dual-use biotechnology to rogue states", expressing concern "that such technology could support BW programs in those states". (Ford, 2002). The Biological and Toxin Weapons Convention (BWC) forbids this.

Fidel Castro himself strongly denied the allegations (Rosenberg, 2002) and successive denials from Cuban government officials and institutions are standard fare. In October 2002, a U.S. non-technical delegation was invited to visit 9 out of a purported 53 biotechnology facilities in Cuba. While concluding that its members "didn't believe the socialist government was hiding anything", the trip's report confirmed defector accounts that Cuba had BSL-4 (biosafety level) labs that are rare and very costly to build, as they are meant to handle the deadliest

and most infectious pathogens (Kings College of London y George Mason University, 2023).³

From 2003 to 2010, unclassified versions of the annual report "Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments" (NCR)⁴, prepared by the Bureau of Arms Control, Verification and Compliance of the U.S. Department of State, reported on Cuba among the select nations examined, as required by U.S. law. However, the last NCR found online to include Cuba was for 2010, (U.S Department of State, 2010). and it took a different tone. Its "Findingreads: "Available information did not indicate Cuba's dual-use activities during the reporting period involved activities prohibited by the BWC. In the past, there were issues regarding some of Cuba's biological activities that were not resolved. " The NCR, at least, the public version, does not clarify how the U.S. had monitored Cuba's biotechnology collaborations with, for instance, Iran and China, or explained which issues were not resolved or how that impacted its findings or referred to any contrary opinions or defector accounts, past or present.

Concern over Cuba's potential BW program, which raised considerable congressional and media attention in 2002, has fallen almost entirely out of sight. It is possible that, if indeed Cuba had a BW program, it was mothballed after the public ruckus in the U.S., especially in light of the U.S. invasion of Iraq in March 2003 that had the express intent of eradicating chemical-biological weapons of mass destruction. Nonetheless, starting in the mid-2000s and for at least ten years, Cuba's financial situation greatly strengthened with Venezuela's huge subsidies. The Obama normalization, under the logic of engagement, helped end what remained of Cuba's political and diplomatic international isolation, allowing Cuba to access financial and humanitarian international support and consolidate, unperturbed, its alliances beyond the region, such as with Russia, China, Iran, Syria, and North Korea, including known biotechnology collaborations with at least China and Iran. If Cuba had a BW program that it mothballed after 2002, the improved international scenario might have led its government to reestablish it, enter into joint BW activities with

³Currently, only 69 such reported labs operate worldwide, in 27 countries (not counting Cuba's). "Global Biolabs Report 2023", Kings College of London and School of Policy and Government, George Mason University, <https://www.globalbiolabs.org/>

⁴The Department of State prepares the reports to comply with a statute (22 U.S.C. § 2593a) to assess the adherence of the United States and other nations to obligations undertaken in all arms control, nonproliferation, and disarmament agreements or commitments to which the U.S. is a participating state. The reports are prepared with the concurrence of the U.S. Intelligence Community in consultation with the U.S. Departments of Defense and Energy and the Joint Chiefs of Staff. (Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments (Compliance Report), Reports – Bureau of Arms Control, Verification and Compliance, U.S. Department of State, <https://2017-2021.state.gov/reports-bureau-of-arms-control-verification-and-compliance-2/index.html>)

²As confirmed by economist John Devereux, conversation with Maria Werlau, Miami, Aug. 6, 2023.

rogue states, and/or sell dual-use biotechnology to Iran and China, perhaps even to other regimes such as Syria's, North Korea's or Venezuela's.

Cuba has also promoted enhanced cooperation in health and biotechnology in Latin America and the Caribbean. One of its preferred vehicles is the ALBA, which calls for integration in the biomedical field (Carmona et.al, 2022) but non-ALBA members Argentina, Mexico, Colombia, and Brazil currently have governments that also have strong ties to Cuba and have engaged or are engaged in health/biotech collaborations (such as joint research, technology transfer, the sale of Cuban pharmaceutical products and vaccines, and/or Cuban medical brigades). A puzzling news story of September 2014 confirmed that Venezuela turned to Cuba for "medical experts in germ warfare" to investigate a suspected plot by the opposition to release a virus in a hospital in the city of Maracay (El Nuevo Herald, 2014) In March 2023, México, Colombia, and Cuba announced the creation of a Medications Agency for Latin America and the Caribbean (AMLAC for the Spanish acronym) with the stated objective of "consolidating the self-sufficiency of strategic inputs in the region" and "strengthening the authorization of drugs and vaccines during health emergencies through common regulatory frameworks".

Russia, which does not need Cuba for biotech or BW know-how, could add expertise and share equipment and materials, as it did during Soviet times with Cuba. In June 2023, it signed a collaboration agreement with Cuba that, among other things, will have Russia provide Cuba's biotechnology industry with raw materials, technology, and equipment while naming BioCubaFarma (Cuba's state-owned biopharmaceutical holding group) to represent Russia in Latin America and the Caribbean (14ymedio, 2023)

In 2015 Cuba's Neurosciences Center and the University of Science and Electronic Technology in China inaugurated a joint laboratory to develop five neuro-technological products (Fonseca, 2015; Padilla, 2022). In April 2023, an agreement was signed to open another joint laboratory for research in neurotechnology and bioengineering in the southwestern city of Chengdu, China (Cuba Debate, 2023; University of Electronic Science and Technology of China, s.f). Details have not been found on Cuba's share or of the products in development.

Nothing is known about the collaboration, but it could be inserted into China's brain warfare programs. The U.S. government has warned U.S. corporations that China is seeking to acquire technology to take over key sectors including biotechnology and in December 2021 imposed sanctions on China's Academy of Military Medical Sciences and eleven related Chinese "biotechnology institutes whose research, products, or services, including in brain-control weaponry, were found to

have a military application contrary to U.S. national security and foreign policy. The sanctions forbid U.S. firms from exporting or transferring goods to the banned entities without a license; they are meant to curtail the use of medical science and biotechnical innovation to control citizens and repress ethnic and religious minority groups including Uighur Muslims (Hodge, 2021; Atlamazoglou, 2022). In 2021, The Washington Times outlined three reports of the People's Liberation Army (Gertz, 2021). that shed light on China's brain warfare research and plans to merge four major technology fields for military purposes: nano, bio, information, and cognition. The research underway centers on brain control technologies including the "intelligentization" of warfare through brain-machine interface and enhancement of human capacities to take over the enemy's way of thinking to subdue the will to resist and control it. China is also conducting research in "neuro-defense" to defend against brain-control attacks including with wearable equipment to stimulate or manipulate the brain and brain implanted microchips.

According to a confidential source, a professor/researcher from Cuba (Werlau, 2018-2023) Cuba's interest in mind control, neurophysiology, and neuroscience can be traced to its very beginnings the Communist regime. This well-connected and well-informed individual reports that a covert mental-control research program was initiated early on at a newly established Brain Institute in Havana under the direction of Dr. José A. Bustamante, (Delgado, 2009) who had trained at the Brain Institute in Moscow and was a clandestine Communist in pre-revolutionary times. Bustamante advised the Interior Ministry and Intelligence services on the scientific torture of political opponents. (Riera, 1966) Mind-control studies, the source says, would have been easy to conceal under legitimate scientific-medical research in neuro-pathophysiology, psychology, and psychiatry.

Two Cuban doctors who are twin brothers lead Cuba's efforts in this field. Dr. Pedro Valdés-Sosa⁵, a world renowned otoneuroscientist, neuro-informatician, heads critical laboratories in Cuba and China, and Dr. Mitchell Valdés-Sosa, a leading expert in cognitive neuroscience, is Director of Cuba's CNEURO Neuroscience Center (Centro de Neurociencias de Cuba). Both are U.S. born Cuban citizens and reportedly elite officials of the Castro regime; they have led international efforts within

⁵Pedro Valdés-Sosa, trained in the U.S., is the Vice-Deputy for Research at Cuba's Neuroscience Center and heads the Laboratory for NeuroInformation at China's University of Electronic Science & Technology at the Chengdu Brain Institute of China's Ministry of Education. (Anonymous Source No.1, op. cit.) His subordinate in China is the Cuban neuropsychologist Maria L. Bringas-Vega, who since 2015, is the coordinator of the Joint China-Cuba Laboratory for Frontiers Research in Translational Neurotechnology at the University of Electronic Sciences and Technology of China UESTC and, since 2013, professor of neuroinformatics at the Key Laboratory for NeuroInformation of China's Ministry of Education ("Maria L. Bringas", Loop, <https://loop.frontiersin.org/people/125027/bio>)

the scientific community to discredit the Havana syndrome (Valdés-Sosa, 2023; Entous, 2018; Rozsa, 2021), brain and internal ear injuries of mysterious origin first afflicting U.S. and Canadian diplomats in Havana in 2016-2018 and in Guangzhou, China, in 2017 (Rej, 2020; Emery, 2023; Tau, 2023; Neukam, 2023). Their family has long been embedded into the highest Cuban elite and intelligence services. Their cousin, Eric Valdés Martínez, is also a Cuban intelligence official stationed overseas as a diplomat.

The Valdés-Sosas uncle, Eric's father, was the late Raúl Valdés-Vivó, a high-ranking Cuban intelligence official who had trained at the Soviet Union's Higher Communist Party School in Moscow (KGB run) before the Castros took power in Cuba in 1959. In the 1960s, he was Cuba's Ambassador to Vietnam, Laos, and Cambodia when Cubans tested a vicious experimental torture program including mind-control with the Viet Cong. "The Cuban Program" was applied on U.S. Air Force pilots at the Hoa Lo prison in 1967-68; POW Lt. Col. Earl Cobiell died as a result" ⁶. In 1969, Fidel Castro "rewarded Raúl Valdés-Vivó by putting him in charge of the new Communist Party School 'Nico López' in Havana, from where he led for decades the political indoctrination of Cuban society and trained Latin American leaders such as Venezuela's Nicolas Maduro in the dark art of mind-control of the masses to help advance socialism" ⁷.

Cuba's Neuroscience Center, CNEURO, is a research, development, and commercialization institution within Cuba's biopharmaceutical monopoly BioCubaFarma dedicated to Neuroscience, Neurotechnology, and other state-of-the-art technologies. It was officially established in 1990 but its work dates to the 1960s and is coordinated with other institutions within Cuba's national health and education state monopolies. CNEURO, with a staff of around 350, belongs to several international research consortiums such as the Global Brain Consortium, the International Brain Initiative and the Cuba-China-Canada Brain Mapping Project⁸.

Cuba's International Center for Neurological Restoration (CIREN) has, since 1989, been officially dedicated to "researching neurological diseases and the development of advanced technology for diagnosis and intervention in mental health problems". (World Health Organization, Pan American Health Organization & European Commission, 2015) However, it has a history of questionable, even abhorrent experimental practices. In 1995-2000, the Center used a model of fetal mid-brain cell transplantation of substantia nigra that was terminated due to poor results. (López-Lozano et.al, 2000; Bergado & Rodríguez,

2017). Starting around 1987, a neurosurgeon who witnessed it described it as "drilling into the brain ventricles of fetuses to remove tissue for implants that would infuse patients with Parkinson's disease with dopamine". (Díaz, 2016; Vincent, 2004; Acosta, 2022; Rubio, 2017). Reportedly, the substantia nigra was systematically harvested from aborted fetuses at maternity hospitals in Havana without the mothers' consent as many women in late stages of high-risk pregnancies were pressured into aborting, (Tafetán, 2005) which also helped keep the infant mortality rate low ⁹. Today, the Center performs "exclusive selective dorsolateral subthalamotomy", a highly questionable procedure of stem cell neural transplantation offered to health tourists for around \$23 thousand¹⁰. Its research into NeuroEPO, a drug in development in clinical trials in Cuba to treat Parkinsons and Alzeheimers, is funded by the University of Electronic Sciences and Technology of China (Pérez et.al, 2021; Bringas et. al, 2022).

Final Thoughts

Cuba helps China advance its economic and strategic interests in return for economic and technical support. Its collaboration in military-intelligence is essentially focused on providing China a presence to share in electronic espionage/-warfare against the U.S. and collaborating in dual use activities in biotechnology and neurosciences of a potential offensive nature. Because these activities are easier to hide than overt military actions, solid evidence of their existence seems lacking—at least, as evidenced in open sources.

Part II of this series recommended in-depth investigation of the risks and containing Cuba through multilateral actions and a full implementation of current U.S. laws and regulations. Those specifically pertaining to chemical and biological threats are addressed here.

Both China and Cuba are parties to the Biological and Toxin Weapons Convention, however, the Convention lacks mechanisms to verify compliance. The U.S. and Canada should lead an effort for the Member States to demand that a task force of independent international non-proliferation experts inspect all of Cuba's biotechnology facilities, its dual-use exports, and all other international "cooperation."activities, especially with China and Iran. If full compliance with the Convention cannot

⁹See "The truth about Cuba's infant mortality rates", CubaVerdad, Oct. 15, 2009; "Dr. Oscar Biscet: a profile in courage from Cuba", Washington Examiner, Jun. 10, 2016; and Gilbert Berdine, Vincent Geloso and Benjamin Powell, "Cuban infant mortality and longevity: health care or repression?," Health Policy and Planning, Vol. 33, Issue 6, Jul. 2018, pp. 755-757 (This study reports that in Cuba, which has one of the highest abortion rates in the world, doctors were forced to distort statistics to classify neonatal deaths as late fetal deaths to comply with the government's infant mortality goals and to force abortions without a clear consent from the mother to avoid risky births.)

¹⁰Cuba for Health, <https://www.cubaforhealth.com/parkinson.php>

⁶See "Earl Glenn Cobeil", Database of documented deaths and disappearances, Cuba Archive, <https://cubaarchive.org/database/?caseid=6556>

⁷M. Werlau, interviews with Anonymous Source No. 2, op. cit.

⁸Quiénes somos?, CNEuro, <https://www.cneuro.cu/index.php/quienes-somos/>

be verified, a determination of proliferation and multilateral sanctions should be considered.

Following is a non-inclusive list of U.S. laws and regulations that would apply if Cuba is not in compliance with the Chemical and Biological Weapons: U.S. (U.S. Department of State, s.f.).

1. Laws requiring sanctions:
 - a) Arms Export Control Act (22 U.S.C. 2798).
 - b) Export Administration Act (50 U.S.C. App 2410c).
 - c) Chemical and Biological Weapons Control and Warfare Elimination Act (22 U.S.C. 5604-5605).
2. Executive Order 12938 of November 1994, prohibiting the importation of goods, technology, or services produced or provided by foreign persons on which an import ban has been imposed due to WMD proliferation activities.
3. Executive Order 13382 of June 2005 providing authority to freeze the assets of proliferators of weapons of mass destruction and their supporters, and to isolate them financially. Designations prohibit all transactions between the designees and any U.S. person and freeze any assets the designees may have under U.S. jurisdiction.

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