

THE IMPACT OF GOVERNMENT RESTRUCTURING ON CHINESE NUCLEAR ARMS CONTROL AND NONPROLIFERATION POLICYMAKING

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Beginning in fall 1997, accelerating through 1998, and still continuing today, the Chinese leadership has been carrying out an extensive restructuring of the country's military and government bureaucracies, and the administration of its defense industries.² Caught in these changes are the organizations associated with China's "nuclear establishment." The term is used in this paper to capture all organizations engaged in work involving nuclear technologies, such as weapons development, material production, commercial power generation, etc.

The establishment grew out of the original nuclear weapons program. With the advent of economic reform in 1979, it has since split into two nominal sectors: military and civilian. Prior to restructuring, key organizations in the military sector were the Commission on Science, Technology, and Industry on National Defense (COSTIND) and the nuclear weapons research laboratories under its control. Representing the civilian sector were the China National Nuclear Corporation (CNNC) and its research laboratories.

Reflecting a national trend that started in the mid-1980s, the nuclear establishment has nurtured a small, but growing, core of arms control and nonproliferation experts over the past 15 years. This community has dis-

tinguished itself from other experts in China by being the only group with a solid grasp on both strategic and technical aspects of the subject. This uniqueness has made the group an influential player in China's nuclear arms control and nonproliferation decisionmaking process.

This community has performed important roles in recent years. Experts from the military sector participated in negotiations on the Comprehensive Nuclear-Test-Ban Treaty (CTBT). The civilian sector has been tasked to implement China's recent commitments to nonproliferation. But despite their contributions, the overall arms control and nonproliferation communities were for many years disjointed and lacking cohesiveness. This was caused, to a large degree, by the historical development of the nuclear establishment, and the stove-piped nature of Chinese organizations (meaning they are tightly integrated vertically but highly autonomous from other organizations). Furthermore, the intermixing of government and commercial functions in the civilian nuclear sector tended to promote a regulatory approach that relied more on good faith than on setting comprehensive guidelines for enforcement.

This report will suggest that the current restructuring in the military sector could reduce these institutional

barriers. COSTIND, the nuclear weapons research laboratories, and the arms control groups from other military departments are being consolidated into the new General Equipment Department (GED), a process that should go a long way toward developing a unified arms control entity that speaks for the whole military. In the civilian sector, the recent formation of State COSTIND (SCOSTIND) promises to solidify the regulatory and supervisory authority of the nuclear industry in a new government entity divorced from commercial interests. Both changes could in the long term help China develop a more formal and institutionalized arms control and nonproliferation community in the military and civilian sectors.

The report begins with a discussion of the motives behind the current restructuring. The next section reviews the historical development of the nuclear establishment and its arms control and nonproliferation community. The report continues by describing changes that have been instituted, the roles of the new players, and the new structure and relationships created. Lastly, the report speculates on long-term implications of the restructuring for the arms control and nonproliferation community within the nuclear establishment. In light of recent concern in the US Congress that exchanges of US nuclear laboratory personnel with this Chinese expert community might risk the loss of sensitive information, this report also weighs the advantages and risks of such contacts. It argues that continued contacts are important to enhance the knowledge and influence of the Chinese arms control and nonproliferation community.

This report touches upon many organizations, each with its own acronym. To help readers, a list of acronyms is attached as an appendix. The report is based largely on press reports from official Chinese news agencies associated with the government or the military. The author's private discussions with Chinese contacts are used to supplement this information.

MOTIVES FOR RESTRUCTURING

It should be recognized at the outset that the primary motive for restructuring was to ensure that recent Chinese economic growth would be sustained into the foreseeable future. This effort was not a singular event; rather, it was but the latest in a continuing series of initiatives that started in the late 1970s. Indeed, the

changes instituted in 1998 marked the fifth major restructuring of the Chinese defense industrial base.³ The past reforms almost never reached their stated goals, and chances are the current effort will also fall short.

The basic motivation of the restructuring was spelled out by Jiang Zemin at the 15th National Congress of the Communist Party of China on September 12, 1997.⁴ Several elements of his strategy are of interest to this analysis. One was to reduce government controls on state-owned enterprises (SOEs) to improve their efficiency and make them more responsive to market demands. Those most in trouble were the defense industries, where plant capacity utilization supposedly dropped to as low as 10 to 30 percent.⁵ These enterprises evolved from activities that were originally functions of government units. With the start of economic reform, these activities were spun out as enterprises and many of them took on the title of corporations. However, they continued to be tightly linked to the government units from which they originated. In cases where the whole government unit was transformed, the new corporation assumed the government functions it had before. What changed was that the new enterprises gained more latitude to negotiate business deals, set up new business activities, and attract investments. However, the tight control maintained on the enterprises forced their top officials to focus more on managing the government bureaucracy than on market competitiveness. The result was that SOEs became bloated and inefficient, produced products of poor quality, and generally did not meet the needs of the economy or the military.⁶

Another element of the strategy was to enforce a separation between government and commercial functions. In the past, some defense industries were tasked to regulate themselves or represent the country as government officials. As one can imagine, this mixing of roles could lead to conflicts of interest. Jiang wanted to see government duties taken out of these enterprises.

Finally, Jiang stated the need to reform the military. Apparently the poor performance of the defense industries and the organizations in charge of weapons development had raised great concern. The emphasis was thus "to strengthen the army by relying on science and technology, put more effort into research in defense-related science and technology, adapt the defense industries to the socialist market economy, and gradually upgrade weapons and other equipment."⁷ The plan for imple-

mentation of this strategy was announced at the 9th National People's Congress on March 8, 1998. The new premier, Zhu Rongji, has been tasked to carry it out.

THE NUCLEAR ESTABLISHMENT PRIOR TO RESTRUCTURING

Before discussing what changes were announced, it is instructive to look at how China's nuclear establishment had evolved up to then. A feature common to all Chinese bureaucracies is that the organizations are highly stove-piped and protective of their jurisdictions. The importance of personal ties in Chinese society further exacerbates the problem. This has made inter-organizational interactions extremely difficult. An underlying purpose of many past re-organizations was, in fact, to overcome these institutional barriers. Another problem is that after the civilian nuclear power industry was formed there was a continuous mixing of government and commercial functions within the same organization. In essence, the nuclear power industry was tasked to pursue commercial interests, but at the same time regulate itself. Restructuring has also sought to change this situation.

Historical Development

China's nuclear establishment was formed in 1955 to support the nuclear weapons program. Ever since it was created, the nuclear establishment has undergone constant reorganization: new offices were created to replace existing ones or several were merged to form more powerful commissions. The changes were driven largely by competition among factions within the military over the allocation and control of defense funds. The contest was played out over two related funding issues: the relative emphasis on strategic versus conventional weapons, and on defense research versus armament procurement. The formation in 1982 of COSTIND was an attempt to resolve these disputes. This commission was formed by merging three principal organizations that handled military equipment: the Defense Science and Technology Commission, which was in charge of scientific research; the National Defense Industrial Commission, which was in charge of production; and the National Defense Industry Office, which was in charge of coordinating research and production. The authority to make decisions on all aspects of weapons development—research, development, testing, and production—was now in the

hands of one super commission. COSTIND's jurisdiction included the nuclear weapons program.⁸

But even before COSTIND was formed, the economic reform started by Deng in 1979 had become another factor driving organizational change. A few months before COSTIND was formed, the Second Ministry of Machine Building was renamed the Ministry of Nuclear Industry (MNI).⁹ The mandate of the new ministry was to develop a nuclear power industry that would support the civilian economy.¹⁰ The Second Ministry had been responsible for managing the nuclear weapons program. It directed nuclear fuel production, weapons research and design, and the construction of facilities needed to support these activities. The Second Ministry had always been controlled by COSTIND's predecessors, but as MNI, and with a new mandate, it began to gain some autonomy. Along with this change, much of the nuclear infrastructure—uranium mining, nuclear material production, reactor operation, etc.—was placed under the management of MNI and taken out of the direct control of COSTIND. In essence, the decision in May 1982 created a new power structure within China's nuclear establishment. MNI's authority was further solidified at a high-level meeting held on January 21, 1986, when top Chinese leaders (including Hu Yaobang, Li Peng, and Yang Shangkun) announced to the attending leaders of the nuclear establishment (including COSTIND Director Gen. Ding Henggao and MNI Minister Jiang Xinsong) that "MNI would from then on be entrusted with the responsibility of developing nuclear power."¹¹

Along with the split at the high level, the dependent nuclear research laboratories also split. Research and design organizations with expertise that could support the nuclear power industry became aligned with MNI, while those with weapons design expertise remained under the control of COSTIND. The China Institute of Atomic Energy (CIAE), the Beijing Institute of Nuclear Engineering, and the Shanghai Nuclear Research and Design Academy were representative of those research organizations that began drifting to the civilian side. The China Academy of Engineering Physics (CAEP), the Institute of Applied Physics and Computational Mathematics (IAPCM), and the Northwest Institute of Nuclear Technology (NINT) were those that remained under the control of COSTIND.

Another factor that caused the research organizations to take two separate paths was the issue of budgetary

control. Apparently, the nuclear weapons research laboratories (CAEP, IAPCM, and NINT) were part of MNI when it was first formed. They, however, felt that part of their budget was being diverted to other purposes. It also became harder for them to get the attention of ministerial administrators who had shifted their focus to nuclear power development. The weapons research organizations therefore opted to move under COSTIND's control.¹² The fact that the nuclear weapons research laboratories could dictate what agency they wanted to be associated with points to the considerable influence they exerted.

The military-civilian split was only partial, however. The nuclear material production facilities that came under the management of MNI were still needed to produce materials for military use, and COSTIND continued to exert strong influence on both sides of the house.

The Military Sector

COSTIND's role in weapons development included not just nuclear weapons, but also missiles, nuclear submarines, fighter planes, and ordnance. Like the nuclear industry, these other industries similarly evolved from a position of total subordination to government ministries to one of partial independence.

Many China scholars believe that even while COSTIND's control over the defense industries was weakening, it was also losing credibility within the military itself. Many weapon systems, such as fighter aircraft and missiles, suffered from long development times, constant delays, and poor product quality.¹³ COSTIND's failure to meet these needs appears to have exasperated the service branches.

One reason it proved difficult for the military to resolve the problem was that COSTIND was never fully under its control. In the 1950s and 1960s, then-Premier Zhou Enlai—who headed the State Council—was intimately involved with the nuclear weapons program. These interactions gave COSTIND's predecessors their own channel of communication with China's leadership. When COSTIND was formed, the directive that it should also report to the State Council¹⁴ formalized that measure of independence from the Central Military Commission. In a culture where authority, tradition, allegiance, and behind-the-scenes support (*hou tai*) are important attributes of social interactions, COSTIND's

semi-independence probably made it a stepchild in the inner circle of the military and undercut its position and influence within the military.¹⁵

A first indication of changes to come was the appointment of Lieutenant General Cao Gangchuan as director of COSTIND in December 1996.¹⁶ The appointment of Cao was a departure from tradition. Even though COSTIND was formed by the merging of three organizations, its creation was really a triumph for Marshall Nie Rongzheng.¹⁷ Nie had been the main driving force behind the development of many strategic weapon systems, including nuclear weapons, missiles, and nuclear submarines. Since its creation, COSTIND had always been led by Nie's proteges: first by General Zhang Aiping, then by General Ding Henggao. Cao was the first to be tapped from outside of COSTIND or Nie's social network to head that organization. This break from tradition pointed to dissatisfaction with the status quo. Cao's background also suggested how things might change in the future. Cao rose through the ranks in the Military Equipment Bureau of the General Staff Department, eventually becoming the deputy director of that bureau. Later, he was promoted to deputy director of the General Staff Department, serving under General Zhang Wannian. Zhang is now the military's top leader. Cao was promoted to Lieutenant General in July 1993, elected to be a member of the CPC Central Committee in September 1997, and promoted to General in March 1998.

The Civilian Sector

At the same time as the military establishment was evolving, the steady transformation of the nuclear power industry also continued. On September 16, 1988, the decision was announced at the National People's Congress that MNI would be reorganized as the China National Nuclear Corporation (CNNC).¹⁸ Since then, CNNC has built and managed completely new nuclear facilities, not just carryovers from the days when the predecessors of COSTIND controlled the nuclear establishment. These new facilities include nuclear power stations at Qinshan and Daya Wan, the Yibin nuclear fuel fabrication plant, and the gas-centrifuge uranium enrichment plant recently acquired from Russia. By the mid-1990s, CNNC had grown to a corporation with 300,000 employees, and it managed over 200 enterprises and institutions.

Another government decision that supported the trend toward a civilian nuclear industry was the formation in

1984 of a nuclear power safety regulatory agency called the National Nuclear Safety Administration (NNSA).¹⁹ The role of this agency, similar to the Nuclear Regulatory Commission in the United States, was to regulate the safety of nuclear facilities and their operations. The basis of its power rested on its authority to issue licenses for civilian nuclear installations based on compliance with nuclear safety guidelines. It was created as an entity independent of CNNC and operated under the authority of the State Science and Technology Commission. NNSA has a staff of approximately 100, a tiny fraction of that of CNNC. When NNSA took an unpopular stand, CNNC was known to exert its influence. For example, during the licensing for construction of a pilot reprocessing plant, NNSA wanted to examine the full design before issuing the license. CNNC, however, was pressed for time, and the compromise was that NNSA would review and approve the license on a piecemeal basis.²⁰

China's leaders also recognized that the country could not accomplish economic reform on its own; it needed technical and capital assistance from foreign sources. Not surprisingly, the international community placed demands on how China should conduct its economic and political affairs in return for assistance. Propelled by its internal needs and external demands, China was slowly nudged toward adopting international norms and committing itself to binding agreements. In the nuclear arena, China became a member of the International Atomic Energy Agency (IAEA) in 1984, and acceded to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) in 1992. These commitments required a bureaucracy to administer China's interactions with the IAEA and foreign states.

When MNI existed, it was natural to have the ministry handle the interactions with IAEA. But when MNI became CNNC, it meant that a commercial entity would be representing the state in important international matters. To endow CNNC with the proper authority, it was given another name: the China Atomic Energy Authority (CAEA). The CNNC brochure stated that "CNNC is also known as CAEA to deal with matters between China and the IAEA."²¹ In fact, one official could be representing both organizations; many CNNC officials would carry two different business cards, one representing CNNC and another CAEA. The former would be used when conducting commercial business and the lat-

ter when conducting government business. This began a new mixing of government functions and commercial activities.

THE ARMS CONTROL AND NONPROLIFERATION COMMUNITY

As China emerged from isolation and took its first steps onto the world stage, its nuclear establishment started to take notice of the role of arms control and nonproliferation in international relations.²² In the mid-1980s, China's perception of the destabilizing effect of the US Strategic Defense Initiative pushed its top leaders to develop a position on arms control.²³ China was concerned that missile defense would lead to an arms competition that could get out of hand and deflect China from the path of economic development. It was also concerned that the resulting arms race would further reduce the deterrence credibility of China's limited nuclear forces. This impetus gave rise to the start of arms control studies in many organizations.

Reflecting the national trend, several organizations within the military sector of the nuclear establishment began to engage in arms control studies. Their expertise steadily grew, and in recent years they have played important roles in arms control negotiations. Organizations in the civilian sector, by the nature of their work, focused on regulatory and nuclear material control issues. Regulatory activities were not labeled as nonproliferation, but in essence the two concepts are complementary. Despite these contributions, the overall arms control and nonproliferation community appeared disjointed and lacking cohesiveness. Each organization had parts of the relevant knowledge, but the insulated and compartmentalized nature of Chinese organizations hindered the formation of a centralized system. Furthermore, the intermixing of government and commercial functions resulted in a regulatory approach that relied more on good faith than on setting comprehensive guidelines for enforcement.

The National Scene²⁴

A growing number of organizations in China do work related to arms control, but true expertise on nuclear arms issues remains highly concentrated. The State Council's Ministry of Foreign Affairs (MFA) was the first organization in China to interact with the international arms control community. China first joined the Conference

on Disarmament (CD) in Geneva in 1980. Representation came primarily from the Department of International Organizations within the MFA. In fall 1997, a new Department of Arms Control and Disarmament was formed and led by Sha Zukang, former Ambassador to the Conference on Disarmament. This department is comprised of four divisions: nuclear, chemical/biological, conventional/missile, and comprehensive issues. Its role is to build consensus and develop an official position on international issues, represent China at UN conferences, and conduct treaty negotiations.

Several ministerial level organizations in the State Council have think tanks that analyze geopolitical issues where arms control might be a contributing factor. The China Institute for International Studies (CIIS) is a think tank for the MFA, the China Institute of Contemporary International Relations (CICIR) serves the same role for the Ministry of State Security, and the Institute of American Studies and the Institute of World Economics and Politics are both part of the Chinese Academy of Social Sciences (CASS).

The People's Liberation Army (PLA) has two think tanks: the China Institute of International Strategic Studies (CIISS), an academic arm of the General Staff Department, and the Institute of Strategic Studies at the National Defense University. Both institutes analyze a broad range of defense issues. Their studies have not focused on arms control, but analyze how arms control might affect Chinese defense posture and force structure.

Within the last decade, the academic community has begun to offer programs on arms control and nonproliferation studies. The two most notable ones are the Center of American Studies at Fudan University and the Institute of Asian and African Studies at Beijing University. Other institutes, such as the Shanghai Institute of International Studies associated with the Shanghai Municipality,²⁵ have also begun presenting papers on political-security issues.

With the exception of the staff at the Department of Arms Control and Disarmament at the MFA and a few specialists at the universities, the above-mentioned organizations have few experts dedicated to arms control research. Even fewer dedicate their attention to nuclear arms control issues; this expertise resides in the nuclear establishment. The remainder of this report will therefore concentrate on the arms control and nonproliferation community within the nuclear establishment.

Within the Nuclear Establishment

Arms control research within the nuclear establishment was led by COSTIND. The Arms Control Office coordinated all such research within COSTIND and the nuclear weapon laboratories. General Qian Shaojun, who was formerly the commander of the Lop Nur nuclear test site, was the director of this office.²⁶ He has a technical background in nuclear engineering and is an academician of the Chinese Academy of Engineering. Many arms control experts consider him one of the military's leading voices on arms control issues. COSTIND also contained a Foreign Affairs Department that conducted research on global and regional arms control issues.

Research on more specific nuclear arms control issues, such as deterrence, treaty provisions, and verification systems, was conducted at the nuclear weapons research laboratories. IAPCM blazed the trail when Hu Side founded the ISODARCO-Beijing Seminar on Arms Control in 1988 with the help of organizers from the Italian International School on Disarmament and Research on Conflicts (ISODARCO). IAPCM and the China Institute of Contemporary International Relations have since jointly hosted this seminar once every other year in China. IAPCM also formed the Program for Science and National Security Studies (PSNSS) in 1989, with the goal of promoting research on arms control issues and enhancing ties with domestic and foreign organizations. During the CTBT negotiations, several scientists from IAPCM provided technical support to the Chinese delegation. In January 1997, IAPCM created an Arms Control Physics Division with a research staff of eight.

After Hu Side was promoted to director of CAEP, he also helped to form the Program for Verification Technologies Studies (PVTS). This program was created in 1995 to investigate technical solutions to support arms control verification. Both Qian Shaojun and Hu Side visited the three DOE nuclear laboratories—Los Alamos National Laboratory, Lawrence Livermore National Laboratory, and Sandia National Laboratories—in 1994. The visit led to the initiation of the US-China Lab-to-Lab Technical Exchange Program in 1995.²⁷ The objective of the program was to establish technical interactions that would contribute to arms control and nonproliferation efforts. In its first two years, the program sponsored five major workshops, along with many smaller meetings.²⁸ The most important activity to date

has been the joint demonstration, together with CIAE, of Material Protection, Control, and Accounting (MPC&A) technologies for safeguarding and managing nuclear materials. That one-week event was held in Beijing in June 1998 to demonstrate to attending Chinese government and nuclear industry officials how technologies could be integrated in a comprehensive system for protecting nuclear materials.

Another group controlled by COSTIND was the China Defense Science and Technology Information Center (CDSTIC). Its role has been to gather, collate, and disseminate materials relevant to national security. Its Arms Control Department also provided support on arms control issues such as a possible fissile material production cutoff. The Northwest Institute of Nuclear Technology (NINT) has been the laboratory in charge of conducting and analyzing nuclear tests. Very little is known about them; currently, it has the lead role in handling on-site inspections for CTBT verification. The State Seismological Bureau (SSB), an agency under the State Council, but outside the military/defense system, has the lead role in seismic research for CTBT verification.

Although CAEP and IAPCM played important roles in the CTBT negotiations, they do not appear to have a major role in the eventual implementation of the treaty. This does not necessarily mean a lack of influence. On the contrary, key individuals continue to have important advisory roles, but the institutions were not specifically tasked.

As for the civilian side, CNNC did not appear to have a group on arms control research. As mentioned in the previous section, it created another name for itself, CAEA, to handle interactions with IAEA, and the Office of Nuclear Material Control (ONC) to fulfill its responsibilities on nuclear material control.

China promulgated "The PRC Regulations on Nuclear Materials Control" on June 15, 1987, and "Rules for the Implementation of Regulations on Nuclear Materials Control of the PRC" on September 25, 1990.²⁹ The Office of Nuclear Material Control was created within CAEA to carry out this task for the "whole country."³⁰ Underscoring the importance of ONC, these documents stated that the office has the authority to review and issue licenses for nuclear materials, while other involved organs, NNSA and COSTIND, have the role of approving licenses. Furthermore, although NNSA was

tasked with punishing violators, the punishment of revoking the licenses was subject to the approval of ONC.

Another government function exercised by CNNC was to regulate the export control of nuclear and dual-use items. In September 1997, China promulgated the "PRC Regulations on Nuclear Export Control." Subsequently, in June 1998 it issued the "PRC Regulations for Controlling the Export of Dual-Purpose Nuclear Goods and Relevant Technologies."³¹ CAEA was singled out in both regulations to play a central role in the export control approval process.

Among the civilian-oriented nuclear research organizations, CIAE appeared to be the most engaged in non-proliferation-related issues.³² Beginning in the late 1980s, CIAE sent several scientists to Los Alamos National Laboratory to be trained in the use of non-destructive analysis techniques for material accounting.³³ CIAE formed the Technical Research Laboratory for Nuclear Safeguards in 1995. This laboratory has been used to conduct research on nuclear safeguards techniques, provide training on material accounting to operators of other Chinese nuclear facilities, and support inspections for domestic nuclear material control. Over the past few years, CIAE has increased its interactions with the US DOE laboratories. It hosted the 1998 MPC&A demonstration mentioned above and invited US scientists for lectures on techniques for nuclear safeguards, material control, and waste management.³⁴

Although the regulatory measures mentioned above were specific about many things, they were rather vague on how the regulatory measures were to be enforced. For example, the two documents that regulate nuclear material control³⁵ specified the materials to be regulated, the responsibilities of the supervising authorities, the licensing process, how nuclear material accounting should be performed, and guidelines on the physical protection of nuclear materials. They did not specify how these measures were to be enforced, who would enforce them, or the criteria by which compliance would be measured.

Other official documents reveal the same pattern. The nuclear export control regulations³⁶ stated broad principles and identified regulating agencies, their relative roles, and the licensing process. While they state that violation of these provisions would constitute a crime, there were no details about enforcement.

It was reported in late 1995 that a Chinese firm engaged in the import and export of nuclear equipment and technologies had shipped 5,000 specialized ring magnets to a nuclear laboratory in Pakistan engaged in nuclear weapons development. There were concerns that these ring magnets could be used to construct high-speed gas centrifuges for unsafeguarded enrichment of uranium. There were rumors that the offending firm was the China Nuclear Energy Industry Corporation, a subsidiary of CNNC, although it was an official of CNNC who first revealed the sale. After being pressed by American officials, the Chinese government argued that they had been unaware of the sale, and therefore, Beijing should not be held accountable.³⁷ There was no evidence to indicate that there had been collusion between the regulatory and the business arms of CNNC, but the event clearly indicated that a system for comprehensive oversight was lacking.

In referring to the CNNC's attitude toward regulatory approaches, an official expressed the sentiment in the following manner: "The government trusts that its laws are obeyed; our safeguards approach is thus to assure us that everything is as it should be. Unlike us, in the United States you look for all possible ways that the law could be circumvented."³⁸

Besides taking a lax approach to enforcing regulatory measures, the arms control community also appeared disjointed and decentralized in approaching broad issues. Regarding a fissile material production cutoff treaty (FMCT), many arms control experts in the military sector were very interested in the issue but felt they had little access to production facilities and information controlled by CNNC. Key individuals might have better access through personal contacts, but there were no mechanisms for institutional interactions. On the other hand, while CNNC might have felt that material production matters were its jurisdiction, there was little indication it had a concerted effort on FMCT research.³⁹

After China promulgated the regulation on nuclear export control, one might have expected that the offices responsible for implementation would rely on technical organizations for support. Yet, none of the research laboratories mentioned in this paper have indicated knowledge of how the regulations would be implemented, the support structure, or even expressed any interest in playing that support role. Furthermore, the original announcement named COSTIND as one of the

principal responsible offices. But with the announced dissolution of COSTIND, there has not been official clarification on which organization will assume its role.

One last point to keep in mind is that while arms control and nonproliferation is a growing field of study in China, this does not mean the entities discussed above necessarily function as advocates for these goals. The best that could be said is that the interest in them is driven by a gradual toleration and willingness by the top leadership to consider arms control and nonproliferation options. Nevertheless, both issues are viewed as dominated by the United States. Even if certain arms control issues may be in China's interest but lack the support of the United States, the general perception is that China would not have the leverage to push it through on her own. Their arms control experts bring up the unsuccessful attempt to extract a no-first-use pledge from the United States as a case in point. The basic rationale for arms control research is therefore to make sure that China enters all negotiations with its eyes wide open.

CHANGES FOLLOWING THE NINTH NATIONAL PEOPLE'S CONGRESS

The restructuring plan was announced at the Ninth National People's Congress in March 1998 by the departing Premier Li Peng and clarified by Luo Gan, state councilor and secretary general of the State Council. The plan called for reducing the number of state ministries and commissions (or departments) from 40 to 29—fifteen departments disappeared while four new bodies were formed. About 16,000 government bureaucrats were to be idled. Luo reiterated several times that the reform was based on the principle that "the function of the government should be changed, and the function of the government should be separated from that of enterprises."⁴⁰ The departments that would undergo the most changes reflected this emphasis on the new relationship between the government and state enterprises.

The departments with state administrative functions remained basically unscathed; these included the Ministry of Foreign Affairs and the Ministry of Defense. The departments with roles in regulating the macroeconomic development of the country would be reorganized; these included the State Planning Commission, whose name was changed to the State Development and Planning Commission. The name change was meant to underscore a shift in emphasis from planning to fostering

Figure 1: Organization before Restructuring

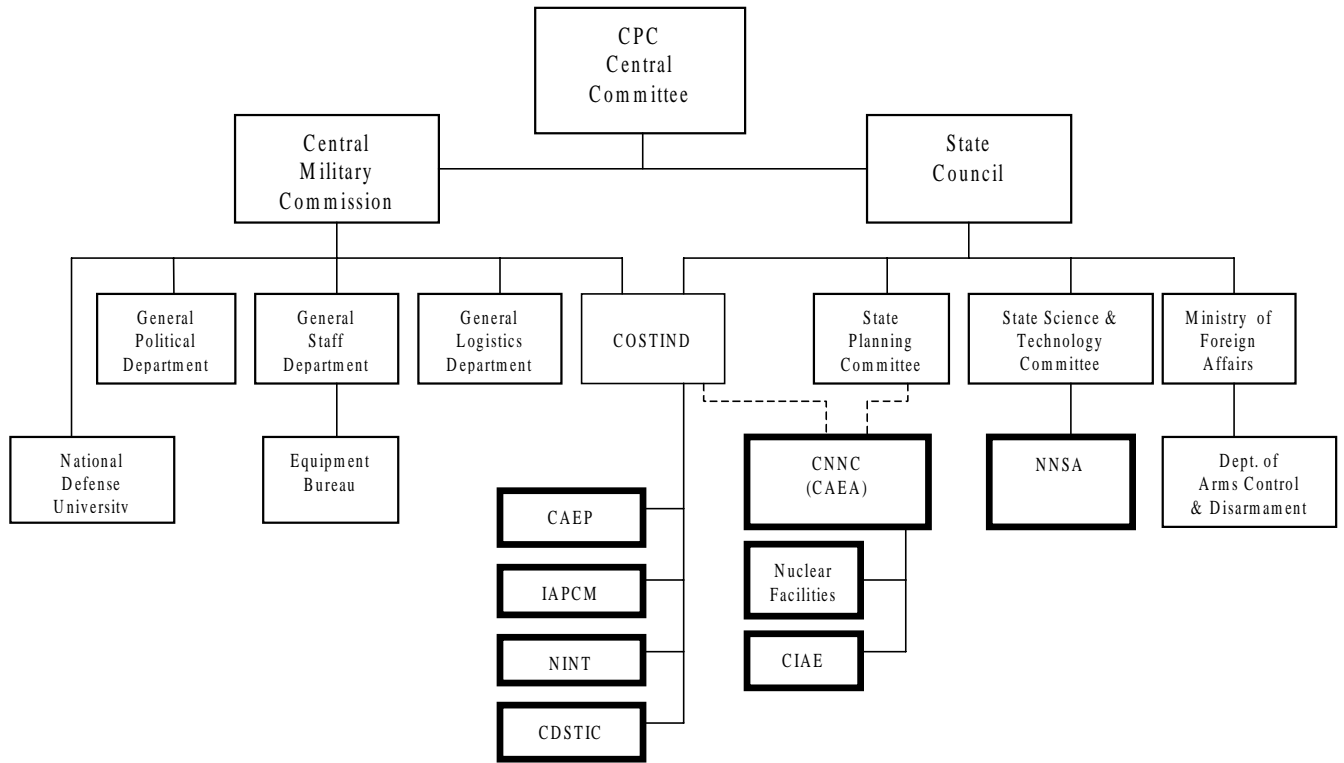
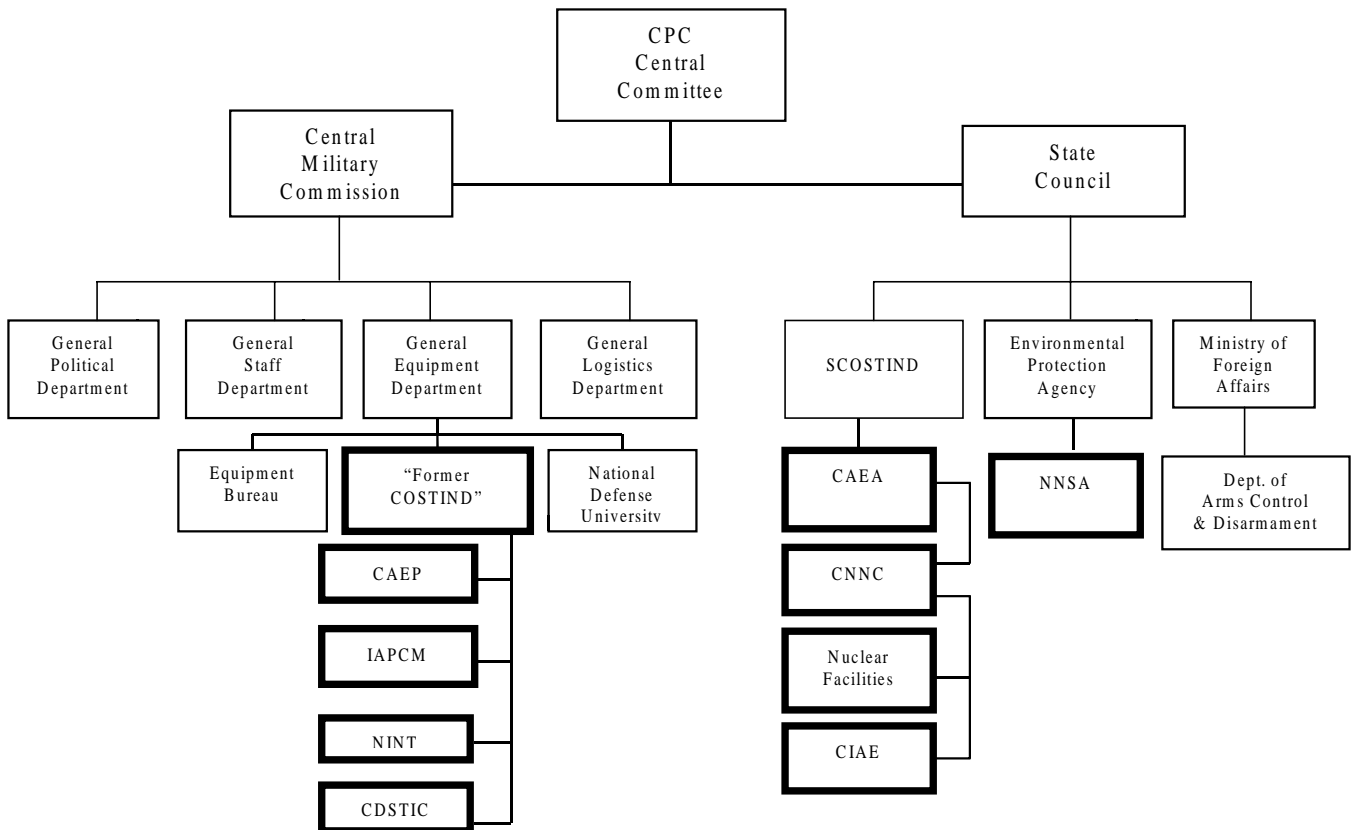


Figure 2: Organization after Restructuring



development. The departments with roles in managing enterprises would see the biggest changes. Many industrial ministries, such as those in charge of coal, metallurgy, and textiles would be reduced to the status of bureaus and placed under the management of the State Economic and Trade Commission.

The defense industries would be handled separately; COSTIND was dissolved and some of its responsibilities assigned, rather confusingly, to a new State COSTIND (SCOSTIND). The restructuring plan explained that the role of SCOSTIND was "to take over the management of the defense industries that had been assumed by COSTIND, the National Defense Department of the State Planning Commission, and the government functions that had been assumed by the military corporations."⁴¹

As more information was made available, it became clear that SCOSTIND bore little resemblance to COSTIND. Unlike COSTIND in the past, SCOSTIND would report only to the State Council and not the military. Liu Jibin, director of SCOSTIND, stated that his commission "is now under civilian, rather than military control." Liu was vice minister of the Ministry of Finance in 1988, and he was once vice minister of the Ministry of Aviation Industry.⁴² There has been no indication that he had a military background, or that any key personnel from COSTIND had transferred to SCOSTIND.

The new commission assumed only a portion of the role that was previously handled by COSTIND. Based on press reports of interviews given by Liu, SCOSTIND has the following tasks. First, it will act as liaison between the military and the defense industries. Once the military decides what weapons it needs, SCOSTIND will arrange for their production or importation. Second, SCOSTIND is supposed to regulate the defense industries. Entities that previously handled government functions will now be transferred to the new commission; these include the China Atomic Energy Authority and the China Aerospace Bureau. Third, SCOSTIND will assist in the reorganization of the defense industries, which include CNNC. Fourth, it is supposed to manage the distribution and utilization of resources for the defense industries. Fifth, it will set policies and guidelines for the future development of the defense industries.⁴³ Six vice-ministers were later named to help Liu carry out these tasks. These ministers were former high

officials of the five major defense industries and the State Planning Commission.⁴⁴

Although not formally reorganized, the China Atomic Energy Agency appears to be gaining a greater role. Zhang Huazhu, formerly a vice president of CNNC, was recently named chairman of CAEA. He will administer four bureaus responsible for nuclear power, the nuclear fuel cycle, nuclear safety, and international nuclear cooperation. In addition, Zhang said that CAEA would be "responsible for nuclear industrial policy guidelines and supervision."⁴⁵ Discussions with Chinese officials indicated that CAEA would not directly manage the military nuclear material production facilities. CNNC, or its successor enterprise, would act as contractor to the military and operate these facilities for a fee. Conversations with officials from the new CAEA indicated that the office currently has a staff of about 10, with limited carryover from the old CAEA.

The restructuring has yet to filter down to CNNC and the other defense industries. Apparently, bureaucratic resistance within the industries has been a big reason why change has been so slow. At this point, there are only speculations regarding the future of CNNC. Chinese contacts have indicated that CNNC would be broken up into several enterprise groups, possibly into ones that would manage nuclear power stations, nuclear fuel production facilities, and the import and export of nuclear technologies. These groups would be managed by yet another umbrella organization, the China Nuclear Industry Group.⁴⁶ The roles and relationships between these entities are not clear. In a recent report, the director of CNNC's restructuring office stated that CNNC would be split into two entities. The larger of the two entities would be in charge of businesses ranging from the mining of uranium to the production of nuclear fuel for both military and civilian reactor uses. It would also be responsible for nuclear waste treatment and nuclear safety. The other entity would be a construction group in charge of nuclear power plants.⁴⁷

Regardless, CNNC still exists as of this writing. It is interesting to note that there is a common aspect in all the speculations. They all suggest that CNNC would be broken up along functional lines, rather than into a few competitive but vertically integrated corporations. It appears the intent is to preserve the nuclear industry in a monopolistic environment.

The future of civilian nuclear research laboratories, such as CIAE, has not been decided. The impact of potential future changes on their associated nonproliferation research activities will be discussed in the following section.

The military reorganization was announced on April 5, 1998.⁴⁸ A new military department, the General Equipment Department,⁴⁹ has been created. It will be one of the four leading organs under the Central Military Commission, with the same bureaucratic rank as the General Staff Department, the General Political Department, and the General Logistics Department.

The GED apparently encompasses virtually all of the former functions of COSTIND and the Military Equipment Bureau that used to be under the General Staff Department.⁵⁰ It has much greater authority over weaponry management than COSTIND. For the first time, all aspects of weapons and equipment management became unified under one command. In a revealing interview on the role of the new department, an unidentified official from GED stated that:

[The reorganization] is expected to ensure centralized and unified leadership of army weaponry and equipment building, this being conducive to implementing an all-system and life-long weaponry and equipment management.... By the all-system and life-long weaponry and equipment management, we mean to ensure the planning, scientific research, test, purchase, distribution, use, storage, maintenance, retirement, and other aspects of the unified and scientific weaponry and equipment management.⁵¹

To bring unity to the new organization General Cao Gangchuan, who was director of COSTIND and also a former deputy director of the Military Equipment Bureau, was named director of GED. Cao was promoted to General during the transition from COSTIND to GED, a clear indication that the top leadership had been happy with his performance, and that the move to GED was a step up in responsibility.

There has not been an official announcement on the future of nuclear weapons research laboratories, such as CAEP, IAPCM, and NINT. The key question is which organization will retain control of the funds that provide the bulk of the support for these laboratories. According

to CAEP officials, approximately one-third of their funds goes to defense nuclear technology, one-third into applied science and high technology, and one-third into defense-conversion activities. It is likely that funds for the first two activities, or two-thirds of the total budget, came directly from COSTIND. It is unlikely that GED would surrender control of this fund to SCOSTIND. From past experience, it is also unlikely that the research laboratories will support the move back to the nuclear power industry. CAEP and IAPCM officials have been quite confident that their organizations will remain intact as one unit. They strongly believe that GED will administer them, and they behave as such. In the words of a high CAEP official, "The new COSTIND [SCOSTIND] does not have the ability to handle the tasks that CAEP is responsible for. We believe that we will continue to be administered by the people from the former COSTIND."⁵²

With regards to arms control, it appears that all key personnel associated with arms control in the former COSTIND have transferred to GED. This is the case with the Arms Control Office headed by Gen. Qian and the Foreign Affairs Department. In addition, the National Defense University and the "703" Arms Control Group, transplanted from the General Staff Department, are also part of the GED.⁵³ This makes up the largest concentration of arms control experts within the military.

IMPLICATIONS OF RESTRUCTURING

This section looks at the long-term impacts of the restructuring on the nuclear establishment and the several arms control and nonproliferation groups within it. The purpose is not to predict the future, but to present possible scenarios for how events might unfold. This may help US institutions identify new modes or opportunities to work with China to push forward the complex arms control and nonproliferation agenda.

Military Sector

The largest grouping of arms control experts in the military is now concentrated in the GED. It consists of the Arms Control Office and the Foreign Affairs Department from the former COSTIND, the research groups from CDSTIC and the nuclear weapons research laboratories, the National Defense University, and the little-known "703" Arms Control Group. In the short term these actors may face challenges establishing their

role in the new environment, but in the long term the new structure could have broad implications.

In the new environment, would there be shifting priorities between strategic and conventional weapons? Changing emphasis between R & D and procurement? Issues fought in the 1960s and 1970s could again resurface. If strategic systems, or nuclear weapon systems in particular, lose priority, then the associated arms control group would suffer. Another challenge they may face is that other powerful constituents within GED might have more conservative views toward arms control. Would the arms control group receive the necessary backing to survive attacks from their detractors? Would there be new priorities competing for funds needed to sustain arms control research? Despite these possible challenges, the new environment offers many advantages.

Perhaps the biggest potential benefit would be the consolidation of the arms control groups into a single unit that speaks for the whole military. The concentration of all the principal arms control groups within the GED could serve to create a critical mass and promote consensus-building within the military. The tighter integration of the arms control group with the rest of the PLA will also help. The historical development of COSTIND had created a gulf between that organization and the rest of the PLA; its dissolution will help bridge that gulf. The long-term health of the arms control group will also depend critically on the support they receive from the GED director. Director Cao spent most of his career in the General Staff and the Logistics Department. If he offers support, his ties to the PLA leadership could be an important factor in spreading the influence of the arms control group to the broader PLA community. In the long term, all these factors could help speed the development of a more formal and institutionalized arms control entity.

Another possible benefit of the new structure would be to allow the arms control groups a more open access to nuclear weapons management issues—issues that would be important in future multilateral arms reduction efforts. After China decided to sign the CTBT, many of its arms control experts admitted that the decision to join CTBT carried tremendous risks for China.⁵⁴ They had to examine many complex and intangible factors in deciding what China would gain in return for locking itself in a technically inferior position compared to other

nuclear weapon states. Nevertheless, China did decide to join, and it has continued to pronounce its support for arms control and nuclear disarmament.⁵⁵

If China is indeed serious about embracing arms reduction, then it must be prepared to face and deal with even tougher choices down the line. Further arms reduction efforts may eventually require China to agree to declare its excess fissile materials, to announce its total nuclear stockpile including warheads in storage, or to dismantle nuclear warheads. These issues are undoubtedly more complicated than those involved in CTBT, and verification of these agreements will be even more challenging. Recent press reports suggested that GED would have the responsibility of managing the full lifecycle of all weapons systems.⁵⁶ Taken literally, this responsibility would include management of nuclear weapons and material stockpiles, and their storage, maintenance, transport, and eventual retirement. A detailed knowledge of these activities and procedures would be essential to help China prepare for such an eventuality. An arms control group with broader knowledge of nuclear weapons management issues and procedures would help the military approach future arms reduction with a confidence based on thorough knowledge, rather than with skepticism based on fear.

The long-term prospects of the arms control group, however, will ultimately depend on whether they can maintain their expertise on the subject matter. While other think tanks or individuals may have keen insights on broad policies, no other group in China has a better grasp of the intricacies of nuclear arms control issues, provisions, and verification techniques than the arms control group in GED. Their extensive expertise has been steadily developed through years of research, participation in treaty negotiations, interactions with foreign experts, and exchanges with US laboratories. While there may be detractors of arms control in China, even they should still recognize the need to understand it. Thus, it is expected that the primary role of the GED arms control group will be in promoting a broader and more insightful debate on arms control issues within the military.

Civilian Sector

SCOSTIND is now the government's leading organ on defense science, technology, and industry matters, and its position on nuclear matters will be handled

through CAEA. A positive outcome of this restructuring is that those who now work for CAEA under SCOSTIND no longer work for CNNC. With the government and commercial functions now divorced, CAEA could begin to take a more comprehensive approach to regulating the nuclear power industry.

CAEA has inherited the responsibility of nuclear material control called for in the regulations on nuclear material control. It also has the task of administering the export control process outlined in the recently announced nuclear export control regulations.⁵⁷ An official from CAEA acknowledged that "implementing export control is an important task for this organization."⁵⁸

In August 1998, the Conference on Disarmament decided by consensus to establish an ad hoc committee to negotiate a Fissile Material Cutoff Treaty.⁵⁹ If negotiations were to start in the near future, the Ministry of Foreign Affairs, GED, and SCOSTIND are expected to be important players in this negotiation process. The MFA, with Ambassador Sha Zhukang heading the Department of Arms Control and Disarmament, will continue to lead the ensuing negotiations. GED, through its nuclear weapons research laboratories, will likely provide technical support during negotiation. SCOSTIND is expected to have a voice in the verification scope and approach for such a treaty to ensure that the needs and concerns of CNNC (or its successor enterprises) are met.

Another issue that in the future could require fuller participation from CAEA is nuclear waste management. CAEA could be expected to guide the debate on the selection of disposal approaches, repository sites, and the mode of transport of radioactive materials. On a more speculative side, it is conceivable that CAEA might some day lead the debate on long-term development plans for nuclear power. This policy-framing role would address such issues as how rapidly nuclear power should be developed, what reactor technologies should be adopted, and whether China should pursue plutonium reprocessing.

There is of course no guarantee that the new roles outlined above will be assigned. There is no indication that the government is willing to allocate additional budget to CAEA to pursue these activities. The current emphasis of Premier Zhu Rongji is to shrink the bureaucracy, not expand it. The profile of SCOSTIND is also decidedly administrative and finance oriented; it

does not yet have the credentials to stake out a role in policy framing. Nevertheless, a structure is in place that would allow CAEA to become a leading voice for the civilian sector of China's nuclear establishment.

The future of civilian nuclear research laboratories, in particular CIAE, could become rather complicated. Since the founding of China's civilian nuclear power industry in 1982, CIAE has been the centerpiece of that industry's research arm. Now that CNNC is becoming more like a commercial entity and CAEA is tasked to regulate the nuclear industry, the future sponsorship of CIAE is unclear. One prospect is for CIAE to be associated with the enterprise that CNNC will evolve into. This path is sure to be filled with pitfalls, however. The financial footing of a post-CNNC enterprise is uncertain and a research-oriented organization would find it difficult to obtain the necessary funding to sustain long-term research. The other choice is for CIAE to become associated with CAEA, but that could be equally risky. The new CAEA is part of an untested power structure. Its parent organization, SCOSTIND, is only a year and a half old and will likely suffer the disadvantage of being a "new kid on the block" compared to other established government departments. If the restructuring founders, which is a very real possibility, then SCOSTIND will find its position significantly weakened.

The research activities conducted at CIAE are similarly split between commercial technologies that interest CNNC and regulatory activities that interest CAEA. CIAE has extensive nuclear science and engineering expertise. It just broke ground in October 1998 for the construction of an experimental fast-breeder reactor. It has operated an experimental heavy-water reactor for several decades, and this expertise fits well with commercial nuclear power development. CIAE also operates the Nuclear Safeguards Laboratory that supports the inspection of nuclear facilities in China and has conducted training classes for operators in other nuclear facilities. These activities have been supported by research grants from CAEA. Not surprisingly, CIAE officials have admitted that they are worried that their organization might be split.⁶⁰

CONCLUSIONS

This report has focused on institutional relationships within the Chinese nuclear establishment. The role of institutional relationships in interactions between orga-

nizations is particularly important in China. The ease with which organizations can interact depends heavily on past history, how organizations are grouped, and who their patrons are. Even though the Chinese government has begun to break down these barriers, the government departments have continued to act as fiefdoms that jealously guard their prerogatives, to an extent that has discouraged interdepartmental exchanges. To a large degree, the underlying motive for all the restructuring initiatives has been to overcome institutional barriers. This report has sought to highlight this aspect of Chinese society and examine how restructuring might affect the future relationships among organizations in the nuclear establishment. Attention was paid specifically to the impact on the arms control and nonproliferation groups within the establishment.

On the military side, the new General Equipment Department has collected the largest concentration of arms control experts in the military. It consists of the Arms Control Office and the Foreign Affairs Department of the former COSTIND, the arms control groups in CDSTIC and the nuclear weapons research laboratories, the National Defense University, and the "703" Arms Control Group relocated from the General Staff Department. This centralization increases coordination, aids consensus-building, and promotes a more formal and institutionalized arms control entity that could speak for the whole military.

Furthermore, the GED, as one of the four general departments of the PLA, is a more powerful platform within the military, its director has close ties to the PLA leadership, and it has greater weapon-management authority than the former COSTIND. These factors could be opportunities for the arms control group to engage with a wider audience and gain access to nuclear weapons management issues that can serve to broaden the discussions within the military on arms control issues, practices, and verification challenges.

On the civilian side, the removal of government functions from the defense industries is also a positive step. CAEA, as one of the departments in the newly created SCOSTIND, is expected to give higher priority to regulating and supervising the nuclear power industry and to develop a more comprehensive approach toward implementation of regulatory and nonproliferation commitments.

SCOSTIND is a new entity and will remain a relatively weak power base for some time. In the long run, however, CAEA could be the platform for formulating a variety of policy issues relating to nuclear power, such as waste management, reprocessing, and nuclear power development.

In light of these changes, what should the US government do? Should it recognize that these nascent, but important, arms control and nonproliferation communities are in a critical juncture and thus encourage a continuation or expansion of US interactions? Or should it respond to recent security concerns at the DOE national laboratories and curtail further interactions? The US government should rightly be concerned about the loss of classified information. Arms control and nonproliferation, however, is about the tracking of movements of materials or items, and the assurance that certain procedures are implemented. The risk of divulging sensitive information is low and manageable.

The US government should also recognize that termination of interactions would diminish the expertise of the arms control and nonproliferation community in China and would likely lead to a loss of their influence. This should especially be a consideration for the arms control group in the GED. Their endurance will ultimately rely on maintaining their expertise in the subject matter. Furthermore, it is also in the interest of the United States to strengthen the civilian nuclear sector. A strong regulatory and administrative arm will be crucial to help China safeguard its nuclear materials, ensure that export control procedures are enforced, and make plans for the safe management of its nuclear wastes. Finally, expanded interactions could be focused on helping the Chinese civilian nuclear research organizations develop a core technical group with specific emphasis on addressing nonproliferation implementation. Some expertise currently exists, but its topical focus has been limited and lacking a clear mandate. In the final assessment, it is overwhelmingly in the interest of the United States to encourage continued interactions with the arms control and nonproliferation community in China. It is difficult to build, but easy to undo.

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² An excellent discussion of the changes instituted by current restructuring can be found in Harlan W. Jencks, "COSTIND is Dead, Long Live COSTIND! Restructuring China's Defense Scientific, Technical, and Industrial Sector," paper delivered to the Chinese Council of Advanced Policy Studies/RAND Conference on Software and the PLA, San Diego, CA, June 9-11, 1998.

³ John Frankenstein and Bates Gill, "Current and Future Challenges of the Chinese Defense Industrial Base," *China Quarterly* 146 (June 1996), pp. 394-427; Kenneth Lieberthal, *Governing China* (New York: W. W. Norton & Company, 1995), p. 122.

⁴ "Jiang Zemin Congress Report," Xinhua in English, September 21, 1997, in FBIS OW2109025397.

⁵ Jörn Brömmelhörster and John Frankenstein, eds., *Mixed Motives, Uncertain Outcomes: Defense Conversion in China* (London: Lynne Rienner Publishers, 1997), p. 23. Also see "Article on State-Owned Enterprise Reform," Xinhua Hong Kong Service in Chinese, January 7, 1998, in FBIS OW1401010198.

⁶ Frankenstein and Gill, "Current and Future Challenges."

⁷ "Jiang Zemin Congress Report."

⁸ John Wilson Lewis and Xue Litai, *China Builds the Bomb* (Stanford, CA: Stanford University Press, 1988).

⁹ Announced on May 4, 1982, at the 23rd Session of the Standing Committee of the 5th National People's Congress.

¹⁰ *China Today: Nuclear Industry, Part II* (Beijing: Chinese Social Science Publishing House, 1987), in FBIS JPRS-CST-88-008 (April 26, 1988).

¹¹ *Ibid.*, Chapter V.

¹² Interviews by author with knowledgeable sources.

¹³ Frankenstein and Gill, "Current and Future Challenges;" Kenneth W. Allen, Glenn Krumel, and Jonathan D. Pollack, *China's Air Force Enters the 21st Century* (Santa Monica, CA: Project Air Force RAND, 1995).

¹⁴ Benjamin C. Ostrov, *Conquering Resources: The Growth and Decline of the PLA's Science and Technology Commission for National Defense* (Armonk, NY: M. E. Sharpe, Inc., 1991), appendix.

¹⁵ The main themes of this paragraph were raised by Xue Litai, Stanford University, Center for International Security and Cooperation, private communication.

¹⁶ "NPC Appoints New Top Defense Science, Technology Officer," Xinhua in English, December 30, 1996, in FBIS OW3012104896.

¹⁷ Lewis and Xue, *China Builds the Bomb*.

¹⁸ China National Nuclear Corporation brochure, No. 1 Nansanxiang District, P. O. Box 2102, Beijing 100822 P. R. China.

¹⁹ National Nuclear Safety Administration brochure, No. 54 Hong Lian Nan Cun, Hai Dan District, P.O. Box 8088, Beijing, 100088 P. R. China.

²⁰ NNSA official, interview by author, July 1997.

²¹ China National Nuclear Corporation brochure.

²² Alastair Iain Johnston, "Learning Versus Adaptation: Explaining Change in Chinese Arms Control Policy in the 1980s and 1990s," *The China Journal* 35 (January 1996), pp. 27-61; Bates Gill and Evan S. Medeiros, "Domestic and Foreign Influences on Chinese Arms Control Policy," paper presented at the 1998 American Political Science Association Annual Meeting, Boston, MA, September 1998.

²³ See Bonnie S. Glaser and Banning N. Garrett, "Chinese Perspectives on the Strategic Defense Initiative," *Problems of Communism* 35 (March - April 1996), pp. 28-44.

²⁴ Information in this section is based on Wendy Frieman, "Chinese Arms Control Organizations: A Basic Primer," Science Applications International Corporation, McLean, VA, January 17, 1997. This work can also be found

on the CNS website at <<http://cns.mii.edu/db/china/sec6df.htm>>.

²⁵ Lu Ning, *The Dynamics of Foreign-Policy Decisionmaking in China* (Boulder, CO: Westview Press, 1997), p. 16.

²⁶ Private discussions with Chinese arms control expert.

²⁷ Nancy Prindle, "The US-China Lab-to-Lab Technical Exchange Program," *The Nonproliferation Review* 5 (Spring-Summer 1998), pp. 111-118.

²⁸ Comprehensive Test Ban Monitoring Technologies Workshop (January 1996), Workshop on Material Protection Control and Accounting Technologies (January 1996), Cooperative Monitoring Workshop (March 1996), Atmospheric Sciences and Nonproliferation Workshop (June 1997), Workshop on the Technical Expertise Applied to the Control of Nuclear Technologies for the Prevention of Nuclear Proliferation (August 1997).

²⁹ Willie S. T. Hsue of Los Alamos National Laboratory provided an English version of "The People's Republic of China Regulations on Nuclear Materials Control," promulgated on June 1, 1987 by the State Council. Kevin D. Burke of the Nuclear Regulatory Commission provided an English version of "Rules for the Implementation of Regulations on Nuclear Materials Control of the PRC," issued by the National Nuclear Safety Administration, the Ministry of Energy, and the Commission of Science, Technology, and Industry for National Defense on September 25, 1990.

³⁰ *Ibid.*

³¹ "PRC Regulations on Nuclear Exports," Xinhua Domestic Service in Chinese, September 11, 1997, in FBIS OW1309060397; "PRC Regulation for Controlling the Export of Dual-Purpose Nuclear Goods and Relevant Technologies," Xinhua Domestic Service in Chinese, June 17, 1998, in FBIS OW1906115998.

³² China Institute of Atomic Energy brochure (September 1990), Xing Zhen, Fang Shan District, P. O. Box 275, Beijing 102413 P. R. China.

³³ George W. Eccleston, "Summary of Safeguards Interactions Between Los Alamos and Chinese Scientists," Los Alamos National Laboratory Report LA-UR 94-1395, April 20, 1994.

³⁴ *The International Training Course on Physical Protection* was held in April 1998. A seminar on *Monitoring Systems and Technologies for Containment and Surveillance and Nuclear Material Control* was held in October 1998. A *Nuclear Waste Management Workshop* was held in January 1999.

³⁵ Hsue, "The People's Republic of China Regulations;" Burke, "Rules for the Implementation of Regulations."

³⁶ "PRC Regulations on Nuclear Exports."

³⁷ An excellent coverage of the event and related subjects can be found at the website "China's Nuclear Exports and Assistance to Pakistan: Statements and Developments," <<http://cns.mii.edu/db/china/index1fr.htm>>, Center for Nonproliferation Studies, Monterey Institute of International Studies, Monterey, CA.

³⁸ Chinese officials, interviews by author, November 1998.

³⁹ In October 1997, Chinese arms control experts did indicate that CNNC was considering allocating funds to form an arms control group in one of its research organizations. A fissile material production cutoff was to be one of its main topics of interest, but it is not clear if the group ever materialized.

⁴⁰ The author thanks Bates Gill of the Brookings Institution for providing a copy of the Chinese text of the restructuring plan and the speech by Luo Gan. Luo's speech was also summarized and reported in "Luo Gan Explains Restructuring Plan," Hong Kong Ta Kung Pao in Chinese, March 7, 1998, pp. B1-B2, in FBIS OW0903142298, and in "Luo Gan Announces Restructuring Plans," Xinhua in English, March 6, 1998, in FBIS OW0603083798.

⁴¹ *Ibid.*

⁴² John Pomfret, "Chinese Army Out of Business?," *The Washington Post*, November 23, 1998; "ZXS Introduces Minister Liu Jibin," *Zhongguo Xinwen She*, in FBIS OW1903152998 (March 18, 1998).

⁴³ "Interview with Minister of National Defense Science," *Beijing Central Television Program One Network in Mandarin*, April 21, 1998, in FBIS OW2204134098; Gao Jiquan, "Shoulder Heavy Responsibilities, Accept New Challenges - Interviewing Liu Jibin, New Appointed State Commission of Science, Technology, and Industry for National Defense Minister," *Jiefangjun Bao*, April 9, 1998, p. 5, in FBIS OW2904104898.

⁴⁴ "State Council Appoints, Removes Personnel," Xinhua Domestic Service in Chinese, April 17, 1998, in FBIS OW1804125198.

⁴⁵ Mark Hibbs, "With CNNC Breakup Well Underway, Zhang Says Enterprises are Next," *Nucleonics Week*, October 8, 1998, pp. 9-10.

⁴⁶ Ibid.

⁴⁷ Liu Weiling, "Nuclear Sector to Undergo Largest-Ever Restructure," *China Daily (Internet Version) in English*, February 5, 1999, in FBIS OW0502042999.

⁴⁸ "New PLA General Equipment Department," *Beijing Liaowang*, May 25, 1998, p. 30, in FBIS OW1206083298.

⁴⁹ There is still disagreement on the English name of this organization. In Chinese it is called *zong zhuangbei bu*. The official Chinese news agency Xinhua uses both terms: General Armament Department and General Equipment Department. There are others who call it the General Armament and Equipment Department. In a recent meeting, Chinese officials familiar with the organization claimed that the correct term is GED.

⁵⁰ Jencks, "COSTIND is Dead, Long Live COSTIND!"

⁵¹ "New PLA General Equipment Department."

⁵² Interviews by author, May 1998.

⁵³ Jencks, "COSTIND is Dead, Long Live COSTIND!"

⁵⁴ Johnston, "Learning Versus Adaptation."

⁵⁵ "China Arms Control and Disarmament," statement issued by the Information of the State Council of the People's Republic of China (Beijing, November 1995); "White Paper on China's National Defense," issued by the Information Office of the State Council of the People's Republic of China (Beijing, July 1998).

⁵⁶ "New PLA General Equipment Department."

⁵⁷ Hsue, "The People's Republic of China Regulations;" Burke, "Rules for the Implementation of Regulations."

⁵⁸ Interview by author, November 1998.

⁵⁹ Wade Boese, "CD Convenes Committee to Work on Fissile Cutoff," *Arms Control Today* 28 (August-September 1998), p. 30.

⁶⁰ Interviews by author, November 1998.

CPC	Communist Party of China
CTBT	Comprehensive Test Ban Treaty
DOE	Department of Energy
FMCT	Fissile Material Cutoff Treaty
GED	General Equipment Department
IAEA	International Atomic Energy Agency
IAPCM	Institute of Applied Physics and Computational Mathematics
ISODARCO	Italian International School on Disarmament and Research on Conflicts
MFA	Ministry of Foreign Affairs
MNI	Ministry of Nuclear Industry
MPC&A	Material Protection Control and Accounting
NINT	Northwest Institute of Nuclear Technology
NNSA	National Nuclear Safety Administration
NPC	National People's Congress
NPT	Treaty on the Non-Proliferation of Nuclear Weapons
ONC	Office of Nuclear Material Control
PLA	People's Liberation Army
PRC	People's Republic of China
PSNSS	Program for Science and National Security Studies
PVTS	Program for Verification Technologies Studies
SCOSTIND	State Commission on Science, Technology and Industry for National Defense (formed after March 1998)
SIIS	Shanghai Institute for International Studies
SOE	State-Owned Enterprise
SSB	State Seismological Bureau

Appendix: List of Acronyms

CAEA	China Atomic Energy Authority
CAEP	China Academy of Engineering Physics
CASS	China Academy of Social Sciences
CDSTIC	China Defense Science and Technology Information Center
CIAE	China Institute of Atomic Energy
CICIR	China Institute of Contemporary International Relations
CIIS	China Institute for International Studies
CIISS	China Institute of International Strategic Studies
CNNC	China National Nuclear Corporation
COSTIND	Commission on Science, Technology and Industry for National Defense (formed in August 1982 and dissolved in March 1998)