
Appendix 3A. China and nuclear transparency

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I. Introduction

One approach to making nuclear weapons less threatening is to promote nuclear transparency, meaning that the nuclear weapon states (NWS) would provide the public with information about the status of their nuclear weapons. It is believed that nuclear transparency, if handled appropriately, could reduce the suspicions, fear and miscalculations among the states and people of the world about the use of nuclear weapons. At the same time, some information about nuclear weapons is considered as highly sensitive in the NWS because of the mass destruction capabilities of these weapons. The NWS have to be very careful in drawing the line between transparency and secrecy in the nuclear weapon area. China in general supports the concept of transparency in armaments and insists that different transparency measures should be examined and treated differently according to their implications for China's security. As stated by the Chinese Ministry of Foreign Affairs:

China supports appropriate and feasible transparency measures in armaments in a bid to promote mutual trust between states and regions and to enhance world peace, security and stability. It should be emphasized that transparency in armaments is [a] means rather than [an end]. Under the current international situation, no country can support or achieve absolute transparency in armaments. When and at what stage a certain country can and should undertake what transparency measures must be guided by the basic principle of assured security for all states. Countries can define specific transparency measures consistent with their national or regional situation and requirements on the basis of voluntary choice or through consultations according to their specific surroundings and political, military and security conditions.¹

In the area of nuclear weapons, the Chinese position on transparency follows the principles stated above. This appendix explores the security considerations and other factors that shape China's policy on different approaches to nuclear transparency.

Five kinds of nuclear weapon transparency can be discerned: transparency in nuclear strategy, qualitative transparency, quantitative transparency, clarification of nuclear activities and acceptance of site visits. Transparency in nuclear strategy means that a state provides information about its nuclear strategy. Qualitative transparency means that a state provides information

¹ This statement on one of the key Chinese positions on arms control can be found at the official Internet site of the Chinese Ministry of Foreign Affairs, URL <<http://www.fmprc.gov.cn/eng/5382.html>>.

about the quality of its nuclear weapons, for example on its possession of nuclear or thermonuclear warheads and on the major delivery systems in place for them. Quantitative transparency implies that a state provides data on the number of nuclear weapons in its possession or data from which such information could be derived. Some nuclear or nuclear-relevant activities could be misinterpreted by other states and therefore cause dangerous reactions. Clarification of nuclear activities removes suspicions by explaining the purpose and the nature of these activities and/or by providing evidence. The NWS occasionally allow foreign visitors to enter some of their nuclear sites, including their testing, production, research and launch sites. The acceptance of site visits could help other states understand correctly the nuclear status of a state and therefore avoid overestimation. Based on different security implications, China takes different attitudes towards these five kinds of transparency.

II. Chinese attitudes towards nuclear transparency

China takes a very positive position on transparency in nuclear strategy. It clearly defined the principles of its nuclear strategy in 1964, when it conducted its first nuclear test explosion: 'The Chinese Government hereby solemnly declares that China will never at any time or under any circumstances be the first to use nuclear weapons'.² This no-first-use commitment is much more than just a diplomatic gesture. It is also a statement of domestic defence policy that has regularized the development and evolution of China's nuclear arsenal since the beginning of its nuclear programme. The declaration of China's nuclear strategy based on its no-first-use commitment has helped the rest of the world to understand the nature of China's nuclear force. China has also declared some characteristics of its nuclear force required by its no-first-use policy. These include keeping the nuclear force at a small size and maintaining its sole function as deterrence.³ The first characteristic indicates that China will not develop a first strike capability relying on a large number of nuclear weapons. The second characteristic limits the categories of nuclear weapons in deployment, meaning that China does not deploy certain nuclear weapons that would be suitable for fighting a war but not for deterrence. Estimates provided by other states about the quantity and categories of China's nuclear weapons are consistent with the above statements.⁴ In the infancy period of nuclear

² See 'Chinese government statement on the complete prohibition and total destruction of nuclear weapons', available at the official Internet site of the Chinese Ministry of Foreign Affairs, URL <<http://www.fmprc.gov.cn/eng/5741.html>>.

³ 'China's National Defence, 2000', White Cover Paper, Information Office of the State Council of the People's Republic of China, Oct. 2000, Beijing, p.11.

⁴ See, e.g., the 'Nuclear Notebook' in the *Bulletin of the Atomic Scientists*. The part about the Chinese nuclear arsenal is updated about once a year. The 'Nuclear Notebook' is prepared by Robert Norris and William Arkin of the US Natural Resources Defense Council and is also available at URL <<http://www.bullatomsci.org/issues/nukenotes/nukenote.html>>. SIPRI yearbooks also report such statistics.

development in China, the no-first-use declaration increased China's security by reducing the incentives of the former Soviet Union and the USA to make a pre-emptive strike against it. The firm commitment of no-first-use still plays an important role in maintaining nuclear stability.

In addition to its mission and size, China's nuclear force has some other characteristics consistent with the no-first-use policy. A recent Chinese news article described a military exercise, in which the Chinese Second Artillery began to launch a simulated retaliatory strike several days after China had received a simulated nuclear attack.⁵ This indicates that China does not put its nuclear weapons on high alert, in contrast to normal Russian and US practice. A delayed nuclear response makes an accidental launch of China's nuclear weapons impossible.

China has not yet made public the requirements of its nuclear strategy in the form of explicit figures because Chinese nuclear deterrence relies on quantitative ambiguity, as discussed below.

China also tends to declare and make public information relevant to the quality of its nuclear weapons. China has declared almost all of its major progress in qualitative nuclear development, for example, the first explosive test of a nuclear device, the first test flight of a missile tipped with a nuclear warhead, the first explosive test of a thermonuclear device and the first test flight of an intercontinental ballistic missile (ICBM). These declarations have updated the knowledge available about the quality of China's nuclear weapons in a timely manner. China has also exhibited its nuclear delivery systems in some of the country's important parades, for example, on the 35th and 50th anniversaries of the People's Republic of China, thus demonstrating proof of its declared capabilities. Qualitative transparency provides the outside world with an assessment of Chinese nuclear weapons and helps to avoid miscalculations in this regard.

China has never declared the number of its nuclear weapons, the amount of its stockpiled fissile materials or the production rate of new nuclear warheads. When another state makes estimates pertaining to China, China neither confirms nor denies these figures. China will most probably maintain the policy of quantitative ambiguity as a way of protecting its nuclear deterrence until it has built a survivable nuclear retaliatory force that relies on geographical ambiguity instead.

China is ambivalent about clarifying its nuclear activities. On the one hand, it understands that if it provides information on nuclear weapon-related activities, such as missile test flights, it can contribute to removing suspicions and false alerts in other states. On the other hand, China is concerned that the declaration of such activities could give away too much sensitive information to the military intelligence agencies of other states. During the conference for

⁵ Dong, J. and special correspondent Wu, X.: 'True story: China's mysterious strategic missile forces on rise', *Guangzhou Ribao* (Internet edn) in Chinese, 1 July 2001, Foreign Broadcast Information Service, FBIS Translated Text, 'PRC Strategic missile forces mature into "strong shield"', CPP20010703000044.

review of the 1968 Treaty on the Non-proliferation of Nuclear Weapons (Non-Proliferation Treaty, NPT) in 2000 (NPT Review Conference), China initially opposed the commitment to increased transparency by the NWS with regard to nuclear weapon capabilities and as a voluntary confidence-building measure. China wished to relate it to commitments on a no-first-use of nuclear weapons as well as to limit it to being operative only in the context of negotiated arms limitations agreements.⁶ Based on these considerations, China does not refuse the clarification of most nuclear weapon-related activities after they have taken place. It might be objected that some activities could be misinterpreted if a state does not inform about them beforehand. This is true of missile test flights, for example, and in this case China tries to minimize the negative effects by other approaches. China keeps its nuclear weapons off alert and has signed non-targeting agreements with Russia in 1994 and with the USA in 1998.⁷ China is an active participant in crisis and suspicion reduction activities. It maintains hotline links with Russia and the USA that can help clarify misunderstandings and misinterpretations during and after intricate nuclear weapon-related events.

China has a two-sided attitude towards site visits to its nuclear facilities and favours adopting strict rules to regularize site visits in order to avoid possible abuses. For example, in the negotiations on the 1996 Comprehensive Nuclear Test-Ban Treaty (CTBT), China and a number of other concerned states insisted on the need for a large majority of votes to trigger on-site inspections.⁸ However, in practice China is quite generous about hosting site visits on a voluntary basis. As revealed recently, scientists from US nuclear weapon laboratories have 'recorded detailed histories of the Chinese program from top scientists, inspected nuclear weapons labs and bomb testing sites, interviewed Chinese weapons designers, photographed nuclear facilities' in the last 10 or more years.⁹ The US scientists even witnessed closely as preparations were made for a Chinese underground nuclear test.¹⁰ Also, the Chinese nuclear complex hosts arms control conferences, which sometimes have included site visits by foreign civilian experts. For example, during the International School on Disarmament and Research on Conflicts (ISODARCO)–Beijing Seminar on Arms Control in 1996, the participants of the conference were taken on a tour to 'Science City' in Mianyang, which is a part of a Chinese defence research institute, the China Academy of Engineering Physics. The acceptance of site

⁶ See, e.g., Simpson, J., 'The 2000 NPT Review Conference', *SIPRI Yearbook 2001: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2001), p. 495.

⁷ See United Nations, 'Implementation of the comprehensive nuclear-test-ban treaty: general and complete disarmament', URL <<http://www.un.org/documents/ga/docs/51/plenary/a51-127.htm>>; and The Acronym Institute, 'China-US summit', URL <<http://www.acronym.org.uk/dd/dd27/27china.htm>>.

⁸ Johnson, R., *A Comprehensive Test Ban Treaty: Signed But Not Sealed*, ACRONYM Report no. 10 May 1997. The compromise that was reached is seen in paragraph 46 and calls for at least 30 affirmative votes by members of the Executive Council in order to make a decision to approve on-site inspections.

⁹ Coll, S., 'The man inside China's bomb labs, US blocks memoir of scientist who gathered trove of information', *Washington Post*, 16 May 2001, p. 1.

¹⁰ Coll, S. (note 9).

visits by foreign experts promotes transparency in Chinese nuclear development.

III. Reasons for transparency

There are various reasons for providing transparency in the area of nuclear weapons. The first is to reduce nuclear suspicions, the most serious of which are overestimations of a state's nuclear capability, misinterpretation of some activities of a state and uncertainties in predicting the future of the nuclear forces of a state. All such suspicions have been a concern for China. If the nuclear capability of China is overestimated by other states, this would increase the perceptions of China as a threat. China does not want such overestimations as would disturb its economic development.

There are two kinds of nuclear activity in China which could be misinterpreted by other states. A treaty-compliant activity could be suspected of being a violation, which could damage China's international reputation. Also, a routine or a civilian activity in China could be wrongly regarded by other states as a hostile military action, which could trigger overreactions against China. As China maintains its nuclear forces at a very low level of alert, the latter kind of misinterpretation is made very rarely. The uncertainties in predicting the future of Chinese nuclear forces have been used in some quarters as arguments to attack China. For example, some of the advocates of the US National Missile Defense (NMD) argue that the USA should not care about China's reactions to NMD development and deployment because China will modernize its nuclear force in any case.¹¹ This argument takes advantage of such uncertainties and does not take into account the effect that NMD deployment might have on Chinese nuclear development.¹²

The second reason for nuclear transparency is to reduce concerns over nuclear proliferation. On many occasions, China has had to deal with accusations about transferring sensitive nuclear technologies and components to other states. This has put a burden on its diplomatic resources. China now practises a much more transparent policy by putting all bilateral nuclear cooperation with other states under the safeguards of the International Atomic Energy Agency (IAEA). Transparency in this area should help reduce suspicions about Chinese nuclear transfers.

The need to make nuclear deterrence credible constitutes a third reason for nuclear transparency. The nuclear deterrence of a state relies on the adversary's perception of the state's nuclear retaliatory capability. It is therefore important for China to be able to prove its nuclear capability by demonstrating that it can explode nuclear devices, by having the means to

¹¹Perlez, J., 'China likely to modernize nuclear arms, US believes', *New York Times*, 12 May 2000.

¹²The differences in Chinese nuclear development made by NMD deployment are discussed in Li, B., 'The effects of NMD on the Chinese strategy', *Jane's Intelligence Review*, vol. 13, no. 3 (Mar. 2001), pp. 49-52.

deliver them to a certain range and by showing that its nuclear weapons have some possibility of surviving a first strike. If an NMD system is deployed, China would also need to demonstrate that its nuclear weapons can penetrate such defences.

Finally, the fourth reason for nuclear transparency is to promote arms control. Chinese experts have suggested that Russia and the USA should put the fissile materials which have resulted from the dismantling and reduction of warheads under international monitoring to prevent them from reversing these nuclear reductions.¹³ As a response, China may be requested to provide evidence to show that it is not producing new fissile materials at the same time as Russia and the USA are reducing their nuclear arsenals to a very low level. Such exchanges form an integral part of compromises in global arms control negotiations.

IV. Concerns over transparency

There are two major concerns regarding nuclear transparency. The first concern is that certain facets of nuclear transparency may help hostile intelligence aiming to find the weakness of a nuclear weapon system in a state and thereby to facilitate the design of countermeasures against such weakness. This is a genuine concern for all NWS. For example, the survivability of a mobile nuclear weapon system, a land-based ICBM or a submarine-launched ballistic missile (SLBM), relies on the geographical ambiguity of the system. If the manoeuvring strategy of the system is known, the attacker could increase the kill probability by narrowing the targeting area. China has yet to acquire operational long-range mobile nuclear weapons; the survivability of its current ICBMs therefore relies on the ambiguity in the quantity. As China never confirms or denies reports on the number of its ICBMs, other states cannot build very high confidence in this area. An attacker who considers launching a first strike against China will have to face uncertainty as to China's retaliatory capacity. The attacker will have an estimate of ICBMs but will inevitably have missed a few. This is how China's nuclear deterrent works today.¹⁴ For this reason, China refuses to clarify any information that could help narrow the margin of error in estimates of Chinese ICBMs by potential adversaries.

The second major concern is that some transparency measures could leak information on nuclear weapon designs, which may lead to nuclear proliferation. Nuclear facilities in all of the NWS are regarded as highly sensitive objects and their nuclear weapon complexes are strictly protected

¹³ Chen, X. and Tian, D., 'The key is to verify and control nuclear explosive materials', *Arms Control Collected Works* (Program for Science and National Security Studies, Institute of Applied Physics and Computational Mathematics: Beijing, 1995), pp. 53–56.

¹⁴ For a more detailed discussion about the quantitative ambiguity of the Chinese nuclear arsenal, see Li, B., 'China's nuclear disarmament policy', ed. H. A. Feiveson, *The Nuclear Turning Point—A Blueprint for Deep Cuts and De-Alerting of Nuclear Weapons* (Brookings Institution Press: Washington, DC, 1999), pp. 325–32.

from intrusion. Approaches to protecting sensitive nuclear weapon technologies are always in opposition to approaches to nuclear transparency. If there is no way to find a compatible solution, transparency has to be sacrificed because nuclear proliferation is regarded as a serious threat by all of the NWS. China has the same concern about the effect that nuclear transparency may have on nuclear proliferation. It has developed a system which includes regulations to protect sensitive information and as well as the hardware to prevent illegal access to its facilities.¹⁵

V. Changing factors in shaping the Chinese transparency policy

Some of the factors shaping China's policy on nuclear transparency are changing. The first factor is that China is acquiring more survivable nuclear weapons. After China deploys a mobile nuclear force, it will be much less concerned about the problem of survivability. It will then be able to rely for its retaliatory capacity on geographical ambiguity instead of quantitative ambiguity and this would constitute a major change in the nature of Chinese nuclear deterrence. This change will provide China some leeway for allowing greater quantitative transparency in the area of nuclear weapons because it will feel much less reluctant to declare information on the number of its nuclear weapons.

The second changing factor is that China is involved in the process of globalization, which requires more transparency in the commercial area. This challenge extends to the nuclear area as well, where the transformation of routines tied to the old secrecy system is accelerating. For example, in the past, most Chinese defence-related institutes used box numbers for mail for the sake of secrecy. In the past two decades, however, they have begun to provide street addresses to the public. At the same time, they started replacing the ordinal numbers which previously stood for their departments and institutes with names denoting the activities of these units.

Some defence institutes are increasing their transparency in the process of conversion to civilian purposes. For example, the China Academy of Launch Technology (CALT) is a company engaged in missile production and civilian space-launch services. To join the global information network, CALT provides detailed technical parameters of its launch vehicles on its Internet site.¹⁶ This could help people outside China understand the technical characteristics of some of its missile products from a quantitative standpoint. Additionally, many new transparency arrangements can be expected after China joins the World Trade Organization (WTO).

¹⁵ Yu, J., 'A brief introduction to the National Bureau of Nuclear Safety', *Letter of Radiation Protection* [in Chinese: *Fushe Fanghu Tongxun*], vol. 15, no. 2 (1995), pp. 59–62.

¹⁶The Internet site of the China Academy of Launch Technology is URL <<http://www.calt.com>>.

New technologies promoting more transparency make up the third changing factor. The development of the Internet has provided a quick and easy way of sharing information. This could provide transparency in the nuclear area and help build trust. The Chinese–US laboratory-to-laboratory cooperation project, for instance, demonstrated a technology of remote monitoring of fissile materials through the Internet.¹⁷ This joint effort would have enhanced mutual trust in the physical protection of these materials and thus would have contributed to non-proliferation. Unfortunately, this project was terminated in the wake of the Cox Report.¹⁸

Another significant factor is commercial satellite imaging which now has very high resolution power and can provide almost global coverage. Old secrecy approaches, such as hiding some sensitive areas on the map, are no longer meaningful. Chinese defence institutes and industries no longer conceal their addresses. In fact, some of China's defence institutes are using the Internet to explain their work.¹⁹

VI. Conclusions

The Chinese policy on and practice in nuclear transparency are mainly based on its security considerations, including maintaining the effectiveness of its nuclear deterrence and avoiding nuclear suspicions. China is currently increasing the survivability of its nuclear weapons and continuing its efforts towards reform and openness. These factors will increase China's confidence in providing greater transparency.

¹⁷ Prindle, N., 'The US-China lab-to-lab technical exchange program', *Nonproliferation Review*, vol. 5, no. 3 (1998), pp. 111–18.

¹⁸ Select Committee on US National Security and Military/Commercial Concerns with the People's Republic of China, *Final Report* (US Government Printing Office: Washington, DC, 25 May 1999); and May, M. (ed.), *The Cox Committee Report: An Assessment* (Center for International Security and Cooperation: Stanford, 1999).

¹⁹ The brief introduction on the Internet site of the China Academy of Engineering Physics says, 'The China Academy of Engineering Physics, founded in 1958, an independent account in the national planning, is a complex of theoretical, experimental, designing, and production work for developing advanced defence science and technology'. The Internet site is at URL <<http://www.caep.ac.cn/>>. The China Academy of Engineering Physics has a map of its 'science city' at this site. See URL <<http://www.caep.ac.cn/jj/weizhi.htm>>.