

## CHAPTER 2

### **Non-Strategic Nuclear Weapons: Problems of Definition**

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Non-strategic nuclear weapons, though reduced in number from the massive Cold War arsenals of the United States and Soviet Union, continue to pose a significant problem for arms control. Though only about one thousand NSNW remain in the U.S. arsenal, many thousands still exist throughout Russia.<sup>1</sup> These weapons are not yet covered under any of the formal arms control treaties and may pose a problem for future arms control efforts. In addition to the political problems associated with the reduction of these weapons, the difficulty in defining which weapons should be characterized as NSNW has caused problems for arms control in the past and is likely to continue to impede future attempts at arms control. This chapter focuses on the difficulty of defining these weapons and why a definition is necessary for further progress in arms control.

#### **Anatomy of the NSNW Problem**

The first motivation to control these weapons is U.S. concern over the remaining NSNW in the Russian arsenal. Three main problems highlight the perceived need to target and reduce Russian NSNW. First, the collapse of the Soviet Union and consequent crash of the Russian economy has led to concern over the command and control of the former Soviet nuclear arsenal. Although virtually all Russian strategic nuclear weapons are equipped with locking mechanisms, many of the older NSNW are not equipped with these safety measures or are safeguarded by permissive action links (PALs) of questionable quality.<sup>2</sup> Therefore, those locks might not prevent these weapons from being used by unauthorized persons if they could be obtained. Additionally, the high number of Russian NSNW and different storage sites – as well as the poor accounting system for these weapons – makes it more likely that weapons could be

diverted from storage, a leading proliferation risk. Given the financial hardship of the military officers that are guarding these weapons, questions have been raised about the long-term security of Russia's NSNW forces. Furthermore, Russian moves to consolidate its storage sites (under U.S. encouragement) rely upon transporting nuclear weapons over long distances, making them more vulnerable to theft.

The second reason that it is important to target Russian NSNW in the short-term concerns arms control. If NSNW are not addressed soon, the possibility exists that the Russians may backslide from the status quo or even defect from past agreements, both formal and informal.<sup>3</sup> Because of the disintegration of Russia's conventional forces, Moscow has looked for an alternate way to match the conventional capabilities of NATO. When faced with a conventionally superior force in 1999 military exercises, for example, Russia found that it needed to use nuclear weapons in order to stop the invading forces. Given that NATO relied on NSNW when it felt that it was conventionally inferior to the Soviet Union during the Cold War, it should be no surprise that a weakened Russia has adopted the same tactic.<sup>4</sup>

Furthermore, Russia currently has little incentive to pursue reductions in NSNW. In addition to Moscow's perception that it needs NSNW to make up for its conventional inferiority to NATO, discussions of further NATO expansion have exacerbated Russia's feelings of conventional inferiority. NATO poses a real military threat to Russia despite its proclaimed peaceful intentions, especially since future expansions of NATO would bring the alliance closer to the Russian border, perhaps even incorporating some of the former Soviet republics. Moreover, the United States continues to pursue a national missile defense system (NMD) that would mean scrapping the ABM treaty and potentially decreasing the effectiveness of Russia's strategic deterrent. Not only does NMD threaten Russian security, but it lays the precedent for breaking old agreements or treaties that no longer benefit the security of one of the signatories. This would lay the groundwork for Moscow to re-deploy NSNW into Europe in violation of the Intermediate-

Range Nuclear Forces (INF) Treaty or to rebuild nuclear forces that it supposedly gave up through the 1991 Bush-Gorbachev Presidential Nuclear Initiatives (PNIs).

There continue to be significant discrepancies in reports of the remaining number of NSNW in the Russian arsenal. Although estimates by the NRDC and two Russian experts, Diakov and Arbatov, all agree that Russia has approximately 4,000 NSNW left, the numbers of different types of weapons vary significantly (see Figure 1). The variance in these numbers makes it especially difficult to predict how many NSNW actually exist in Russia and cast doubt on whether the Russians themselves actually have an accurate count of their arsenal. If no exact inventory exists, it would be impossible to know whether and when any NSNW have been stolen or sold. Other estimates of Russia's NSNW stockpile range from 4,000 to 20,000 weapons. The higher numbers take into account the large numbers of weapons that still exist given that Russia has apparently not fulfilled its promise to destroy the NSNW withdrawn under the PNIs.<sup>5</sup>

	NRDC <sup>6</sup>	Arbatov <sup>7</sup>	Diakov <sup>8</sup>
Air defense missiles	1,100	600	1,250
Land mines (ADMs)	0	200	0
Tactical Aviation	1,600	1,000	2,060
Naval Weapons	1,200	2,000	2,400
Total	3,900	3,800	5,710

**Figure 1 – Estimates of Russia's NSNW Arsenal**

The third motivation to control NSNW is the U.S. desire to pursue further arms control measures with Russia. Although strategic nuclear weapons have been limited under the START treaties, there is currently no formalized arms control regime for non-strategic nuclear weapons. Little attention has been paid to

NSNW since the 1991 PNIs.

Furthermore, NSNW threaten the progress of strategic arms control. The United States has hopes of moving forward from START II, which institutes limits of 3,500 strategic nuclear warheads, to START III, which would reduce that number to a maximum of 2,500 or less for both the United States and Russia.<sup>9</sup> Because the arsenals of both the United States and Russia contain high-yield NSNW, the value and meaning of further strategic reductions is diluted if non-strategic weapons are not addressed. U.S. NSNW have yields as high as 170 kilotons (KT), higher than many of its strategic weapons, while Russia has NSNW with yields up to 1 megaton (MT).<sup>10</sup> Furthermore, at least five other countries have nuclear weapons which are not encompassed under the START regime.

	Max Range (km)	Maximum Yield
U.S. NSNW	Intercontinental (B-2/B-52)	170 KT (B-61) <sup>11</sup>
Russian NSNW	Intercontinental (Bear)	1 MT (AS-4 ASM) <sup>12</sup>
China*	3,100 (H-6)	4-5 MT (DF-5A) <sup>13</sup>
India*	2,600 (Jaguar)	50 KT <sup>14</sup>
Pakistan*	1,500 (Ghauri)	35 KT <sup>15</sup>
France*	6,000 (SLBM)	300 KT (Mirage 2000/Super Etendard) <sup>16</sup>
Britain*	7,400 (Trident SLBM)	100 KT <sup>17</sup>

*\*not considered NSNW by possessing state*

**Figure 2 – Nuclear Arsenals Unaffected By START**

Finally, even if the United States develops a strong interest in pursuing arms control for NSNW, Washington may have little to offer Russia in order to encourage Russian reductions. Given that the United States has placed all of its nuclear SLCMs in storage, the only weapons that remain deployed are B-61 bombs located throughout Europe. However, these weapons serve what the Europeans see as a very valuable political purpose, which limits

America's ability – and the desirability – of removing these weapons from Europe. Therefore, the most valuable nuclear carrot that may be available to persuade Russia to pursue reductions in NSNW is likely to be politically untenable for Washington.

### **Why a Definition Is Necessary**

There are four main reasons why the arms control community needs to develop a workable definition for non-strategic nuclear weapons. First, in order to move towards a solution of the NSNW problem, a definition is necessary to form a basis for further discussion. Second, whether arms control is seen as a measure to reduce costs, prevent accidents, or to reduce the threat of weapons of mass destruction, it is necessary to include all nuclear weapons into arms control treaties in order to meet these goals. Without a workable definition, NSNW cannot be incorporated in future arms control efforts. Third, a definition of NSNW would allow the United States and Russia to meet the intent of the START regime and make reductions more meaningful. As Moscow and Washington meet their obligations under START II, including reductions to 3,500 warheads, and then move forward to the proposed START III reductions to 2,500 warheads, NSNW become an increasingly large proportion of the U.S. and Russian arsenals. Agreement to START III obligations would leave the United States with over 50 percent more nuclear weapons than allowed by the treaty and would leave Russia (by even the lowest count) with over 150 percent more nuclear weapons than counted under START.<sup>18</sup>

Finally, if the United States and Russia ever intend to include third party states in an arms control regime, a definition of strategic and non-strategic weapons is critical. Reductions to low numbers increase the importance of incorporating third states. If the United States and Russia find it necessary for either security or cost considerations to reduce the level of their own arsenals, it will be important for third party arsenals to remain as small or smaller than the arsenals of the United States or Russia. A failure to include third states might allow the perceived strategic nuclear advantage to favor a state not incorporated into the arms control

regime. For instance, Russia is especially concerned about the Sino-Russian nuclear dyad. Without international limits, either Russia or the United States might find it in their own interests to rebuild part of their arsenal in response to a third-party threat, potentially leading to arms racing or other negative spiral effects. Placing limits on the arsenals of all states also shows progress toward the obligations that Russia, the United States, and China have as signatories of the Nuclear Non-Proliferation Treaty (NPT).

### **Categories for Definition**<sup>19</sup>

There are seven possible ways to define non-strategic nuclear weapons. Each has potential downfalls for nuclear weapons reductions or the incorporation of third states into an arms control framework. Both the utility and the potential problems of each of the definitions are discussed below. The costs and benefits of using any of these definitions should be considered in any attempts to define NSNW for the purposes of reductions.

#### *Range.*

Range-based definitions have been useful in the past because it is easy to differentiate between intercontinental weapons and shorter-range or battlefield weapons. Any weapon that could hit the territory of the Soviet Union or the United States when launched from the other could be considered strategic, defining the remainder of the two superpower arsenals as non-strategic. The main problem with a range-based approach is that there is a significant gray area between strategic and non-strategic weapons and their associated delivery vehicles. For instance, aerial refueling allows tactical aircraft to carry nuclear weapons across ranges that would be considered strategic under a range-based definition. Furthermore, some classes of weapons classically thought of as non-strategic have characteristics similar to strategic weapons. Long-range non-strategic SLCMs have weapons characteristics that approximate those of strategic ALCMs, for example. Thus, a range-based approach is not sufficient for a clear differentiation of strategic and non-strategic nuclear weapons. Additionally, range-based definitions have significant implications for third state arsenals. The arsenals of

France and Britain could be defined as NSNW based on their ranges, as would the entire arsenals of India and Pakistan. The nuclear weapons of all four of these countries are designed for intra-continental range even though each country sees its nuclear weapons as having strategic roles. Much of China's nuclear arsenal would also be defined as non-strategic using this approach.

*Yield.*

A second potential definition for NSNW is by yield. As strategic and non-strategic weapons were being built, this type of definition seemed to have much practicality. Initially, NSNW had much smaller yields than strategic weapons. However, considerable overlap currently exists in the yields of strategic and non-strategic nuclear weapons. In the U.S. arsenal, the highest yields of weapons considered to be NSNW are a variant of the B-61 bomb at 170 KT and the nuclear SLCM with a yield of 150 KT. By contrast, U.S. strategic weapons have yields as low as 5 KT for air-launched cruise missiles (ALCMs) and 100 KT for ballistic missiles. U.S. gravity bombs exist with yields lower than 1 KT. Illustrative of this overlap is the fact that both the non-strategic B-61 gravity bomb and the strategic Minuteman III warheads have 170 KT yields.<sup>20</sup>

*Target.*

Third, NSNW could be characterized by the target against which the weapon is intended to be used. This definition has two advantages. First, target-based definitions fit the earlier characteristics of nuclear weapons. At least in the U.S. case, strategic weapons were typically designed to cause damage to the adversary's homeland, including the destruction of nuclear missile sites, industrial nodes, and political targets. Most strategic targets were predetermined and listed as geographic points in the nuclear Single Integrated Operational Plan. By contrast, NSNW were usually designed to hit short-range targets of tactical value, most often on the battlefield or theater of war. These targets would be determined during the course of a campaign, and were usually of immediate or short-term military value. A target-based definition also fits the classic nomenclature for the weapons. Strategic weapons are those that are designed to

be used against strategic targets while non-strategic (also known as tactical) weapons are deployed for tactical purposes. However, most of the unambiguously non-strategic weapons that once existed in the U.S. and Russian arsenals have been retired. For instance, the United States no longer has short-range nuclear ammunition which could only be employed on the battlefield. Thus, NSNW increasingly look like strategic weapons. Furthermore, during wartime, the same targets might become both strategic and tactical, thus blurring the distinction even further. A submarine base or airfield could be targeted to eliminate the threat of strategic retaliation and to eliminate the conventional threat that assets deployed at these sites might create.

*National Ownership.*

Nuclear weapons may be designated as either strategic or non-strategic based on national ownership. While the arsenals of China, India, and Pakistan are clearly designed for strategic purposes, these arsenals would be considered non-strategic in the U.S.-Russia context (see Figures 3, 4, and 5). The geographic proximity of the nuclear weapons state to its likely adversary is an important consideration when determining whether the state's arsenal is strategic or non-strategic. Definitions based on national ownership would circumvent the problem of using a definition that does not translate well from negotiations between the United States and Russia to third party states. This would allow third states to be brought into arms negotiations while avoiding characterizing their entire arsenals as non-strategic. However, definitions based on national ownership might also create a double standard, allowing some states to expand their "strategic" arsenals while other states were eliminating or reducing weapons with similar characteristics under limitations imposed on NSNW.

	Range (km)	Yield	Number of Warheads in Arsenal
Short-range missiles (M-9/M-11)	300	Low KT	120
Aircraft (Q-5/H-6)	400/3,100	5-20 KT/varying yield	30/120
MRBMs (DF-21A)	1,800	200-300 KT	48
SLBMs	1,700	200-300 KT	12

**Figure 3 – Estimated Chinese NSNW Arsenal<sup>21</sup>**

	Range (km)	Yield	Number in Arsenal
Short-range missiles (Privthi)	150/250/350	Low	
Aircraft (Jaguar)	2,600	Up to 50 KT (est.)	
MRBMs	1,500/2,500	15-20 KT (est.)	
SLBMs (Sagarika) (in development)	330 (est.)		
			Total: 50

**Figure 4 – Estimated Indian Arsenal<sup>22</sup>**

	Range (km)	Yield	Number in Arsenal
Short-range missiles (Hatf)	60/280	Low	
Aircraft (F-16)	850	Short-term potential, up to 25 KT	
MRBMs	800/1,500	Short-term potential, 15 KT	
			Total: ~12

**Figure 5 – Estimated Pakistani Arsenal<sup>23</sup>**

*Delivery Vehicle.*

NSNW could be defined by delivery vehicle. Classifications based on delivery vehicle are useful because prior strategic arms treaties between the United States and the Soviet Union counted delivery vehicles to reach the limits mandated under the treaties. Therefore, using delivery vehicles to define NSNW would appear to more easily allow NSNW to be incorporated into the START regime. Since the original intent for START III was to include NSNW, it would be useful to have a definition that maintained the provision to limit NSNW under this regime. However, under a definition based on delivery system, it would likely be difficult to find agreement on some weapons classifications. For instance, both strategic and non-strategic bombs can be launched from the same aircraft. Russian strategic missile submarines can carry non-strategic weapons. Finally, what the United States considers theater defense might constitute national defense for smaller third party states.

*Capability.*

Weapons could be categorized according to their capability.<sup>24</sup> Under this definition, all weapons, conventional or nuclear, which could take out strategic targets would be considered strategic. By contrast, weapons of either low-enough accuracy or small-enough yield would be considered non-strategic. This definition would allay some of Russia's concerns for its security in the post-Cold War world. Moscow has declared that limits on nuclear weapons alone are not sufficient to provide for Russian security since the United States and its NATO allies are so superior conventionally that even Russia's strategic targets are at risk. However, this definition still falls prey to the problems of defining some targets as strategic and others as non-strategic, not to mention the difficulty in getting both the United States and Russia to agree to those definitions.

*By Exclusion.*

Finally, given the problems that arise from each of the above definitions, NSNW could be defined "by exclusion." In other words, for the purposes of arms control, NSNW would be defined as all of the nuclear weapons not yet counted under

strategic arms control treaties. This type of definition is useful because it avoids the problem of classifying weapons that overlap according to yield, range, potential target, or delivery vehicle. Additionally, this definition would allow a more seamless transition to incorporating NSNW into START III or other treaties based on the strategic framework. However, defining NSNW according to prior arms control treaties between the United States and Soviet Union would have little applicability to third party states.

### **Consequences for Arms Control**

The definition that is chosen for NSNW might have significant consequences for arms control, given that any definition will impact third party states in two main ways. First, it is important to consider nuclear states other than the United States and Russia when designing future nuclear reductions. Third party states must be taken into account in order for deep cuts in the U.S. and Russian arsenals to occur. The most critical state to consider in the short-term is China. Given both the size and the proximity of China to Russia, Moscow is understandably concerned about the Chinese conventional and nuclear arsenals. Russia has used China to justify the deployment of tactical nuclear weapons closer to its border with China to deter an attack.<sup>25</sup> Moscow fears that because of its current conventional weakness, it must use nuclear threats to deter even conventional attack. If the Chinese arsenal will affect Russian nuclear decision making, then it is important to consider the threats for which China maintains its own arsenal. China faces a second nuclear threat in its neighbor, India, and Pakistan looks to the Indian arsenal to decide on its own nuclear policies and production. Thus, when dealing with NSNW, it would be useful to consider third party states which might affect the nuclear dialogue between the United States and Russia if any progress is to be made.

The second potential negative consequence of creating a definition without considering third party states is that some definitions may define the entire arsenals of states as non-strategic despite their clearly strategic purposes. For instance, although China does not claim to have any weapons or delivery

systems that are designated as non-strategic,<sup>26</sup> under a definition based on range or yield, much of their nuclear arsenal might be delineated as such. The current arsenals of India and Pakistan would be designated almost completely as NSNW by these measures of classification. This could give India incentive to increase its nuclear arsenal, given that one of the main reasons for India to test nuclear weapons in 1998 was for purposes of prestige. New Delhi felt that nuclear weapons were a necessary “currency of power,” and that, therefore, they needed nuclear weapons in order to be seen as both a world power and a state of technical prowess.<sup>27</sup> In order to maintain parity with the major states, India might find it necessary to build weapons that would be considered strategic (according to U.S. and Russian standards) in order to get the international prestige that they feel they deserve. This would mean an expansion of the Indian arsenal and perhaps the manufacture of weapons that could, for the first time, threaten the United States. This would be an unfortunate and regionally destabilizing consequence of some definitions for NSNW.

Additionally, under yield-based definitions, the much-reduced nuclear arsenals of France (max 300 KT) and Britain (max 100 KT)<sup>28</sup> would likely be seen as non-strategic despite their long range and their ability to hit strategic targets in Russia (see Figure 6).

	Range (km)	Yield	Number in Arsenal
Carrier-based aircraft (Super Etendard)	650	300 KT	20
Long-range aircraft (Mirage 2000)	2,750	300 KT	60
SLBMs	6,000	6x150/100 KT	384
			Total: 464

**Figure 6 – French Arsenal<sup>29</sup>**

When considering potential definitions for NSNW, definitions that are based on yield, range, or target might eliminate third party states from the arms control dialogue or encourage the expansion of existing arsenals. Therefore, even though yield-, range-, and target-based definitions may have some utility in the U.S.-Russia context, they might cause problems when trying to incorporate third party states. Furthermore, if third party states, most critically China, are not considered, Russia is likely to remain unwilling to take significant steps to reduce NSNW.

### **Conclusion**

Despite many obstacles, NSNW reductions are an important goal. Most importantly, reductions would decrease the threat of loose nuclear weapons or unauthorized use from Russia where NSNW still do not seem to be accounted for in a reliable way. In order to proceed with any nuclear reductions – either strategic or non-strategic – it is likely that NSNW will have to be incorporated in the disarmament regime, given the increasingly high proportion of the U.S. and Russian arsenals that they make up. To deal with NSNW, they must be defined in a way that accomplishes as many U.S. goals as possible. These goals include Russian reductions, which will be in part dictated by perceptions of Chinese strength, and the maintenance of the nonproliferation regime, thus limiting the expansion of already existing arsenals in third party states. However, the most useful definition for NSNW in the U.S.-Russia context – a definition based on those weapons which have thus far been excluded from strategic treaties – is likely to ignore critical third party states, upon which Russian reductions are partially based. In a worst case scenario, a poorly-chosen definition could even encourage third party states to build more nuclear weapons. Therefore, defining NSNW in a way that allows all-encompassing arms reductions may be difficult. Nevertheless, reductions in NSNW are a worthwhile goal, and efforts should be made to define these weapons in such a way that eliminating NSNW arsenals is possible.

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**Endnotes**

<sup>1</sup> See “U.S. Nuclear Forces, 2001,” *The Bulletin of the Atomic Scientists*, March/April 2001, pp. 77-79.

<sup>2</sup> See, for instance, Amy F. Woolf, “Nuclear Weapons in the Former Soviet Union: Location, Command, and Control,” *CRS Issue Brief*, 27 November 1996; and Stephen P. Lambert and David A. Miller, “Russia’s Crumbling Tactical Nuclear Weapons Complex: An Opportunity for Arms Control,” INSS Occasional Paper 12, (Colorado Springs: USAF Institute for National Security Studies, April 1997).

<sup>3</sup> Russia has already decided to store rather than eliminate 20,000 tactical nuclear weapons that it withdrew from deployment in accordance with the 1991 PNIs. There has been some discussion in the Kremlin Security Council about improving and perhaps redeploying these weapons. See Walter Pincus, “U.S. Nuclear Stockpile Plans Draw Scrutiny; Navy Upgrading Warheads as Talks With Russia Seek Further Arms Reduction,” *The Washington Post*, 24 April 1999; and David Hoffman, “Kremlin to Bolster Nuclear Stockpile; NATO’s Airstrikes Are Making Russia Worried, Sources Say,” *The Washington Post*, 30 April 1999.

<sup>4</sup> Michael R. Gordon, “Nuke Arsenal Takes Center Stage; Russia’s Recent Military Exercise Reflects Expanding Role of Arms,” *New York Times*, 10 July 1999.

<sup>5</sup> Pincus; also William M. Arkin, Robert S. Norris, and Joshua Handler, *Taking Stock: Worldwide Nuclear Deployments, 1998* (Washington: Natural Resources Defense Council, March 1998), p. 27.

<sup>6</sup> “Russian Nuclear Forces, 2000,” *The Bulletin of the Atomic Scientists*, July/August 2000, p. 70.

<sup>7</sup> Alexei Arbatov, “Deep Cuts and De-Alerting: A Russian Perspective” in H.A. Feiveson, ed., *The Nuclear Turning Point – A Blueprint for Deep Cuts and De-Alerting of Nuclear Weapons* (Washington, D.C.: Brookings Institution, 1999), p. 320.

<sup>8</sup> Anatoli Diakov, quoted in Nikolai Sokov, “Estimate of Total Russian (non-deployed) Sub-Strategic Nuclear Weapons,” appendix to William C. Potter, “Update on Developments Regarding Tactical Nuclear Weapons Disarmament,” presented to the United Nations Secretary-General’s Advisory Board on Disarmament Matters, New York, 28-30 June 1999.

<sup>9</sup> President George W. Bush has indicated that he would like START III to institute limits lower than the commonly discussed number of 2,500.

<sup>10</sup> “U.S. Nuclear Forces, 2001.”

<sup>11</sup> *Ibid.*

<sup>12</sup> See Arkin, Norris, and Handler, *Taking Stock: Worldwide Nuclear Deployments, 1998*, p. 27. On the yield characteristics of the AS-4, see Thomas B. Cochran, *et al*, *Nuclear Weapons Databook, Volume IV: Soviet Nuclear Weapons* (New York: Harper and Row, 1989), p. 165.

<sup>13</sup> “Chinese Nuclear Forces, 2000,” *Bulletin of the Atomic Scientists*, November/December 2000, pp 78-79

<sup>14</sup> 50 KT is the highest-yield weapon that India claimed to explode in its 1998 tests. Seismic data, however, suggest that the test yields were closer to 25-30 KT. See David Albright, “The Shots Heard ‘Round the World,” *The Bulletin of the Atomic Scientists*, July/August 1998.

<sup>15</sup> Pakistani uranium weapons are based on a Chinese design that has a reported yield of 20-25 kilotons. See Andrew Koch, “Subcontinental Missiles,” *The Bulletin of the Atomic Scientists*, July/August 1998, pp. 44-49. The higher estimate of 35 KT comes from Robert S. Norris and William M. Arkin, “After the Tests: India and Pakistan Update,” *The Bulletin of the Atomic Scientists*, September/October 1998, pp. 69-71.

<sup>16</sup> See “French and British Nuclear Forces,” *The Bulletin of the Atomic Scientists*, September/October 2000, pp. 69-71.

<sup>17</sup> *Ibid.*

<sup>18</sup> Russian NSNW are summarized in Figure 1. U.S. NSNW currently include 320 SLCMs in storage in the United States and 1,350 B-61 variants deployed in Europe and the United States. “U.S. Nuclear Forces, 2000,” *The Bulletin of the Atomic Scientists*, May/June 2000, p. 69.

<sup>19</sup> Much of the information in this section on definitions of NSNW was first published in George Lewis and Andrea Gabbitas, “What Should Be Done About Tactical Nuclear Weapons?” (Washington, D.C.: The Atlantic Council of the United States, 1999), pp. 2-4.

<sup>20</sup> See “U.S. Nuclear Forces, 2000.”

<sup>21</sup> “Chinese Nuclear Forces, 2000,” pp 78-79. This type of analysis of the Chinese arsenal was suggested by William C. Potter and Nikolai Sokov, “Tactical Nuclear Weapons: The Nature of the Problem,” draft, United Nations Institute for Disarmament Research, available at <http://www.unog.ch/unidir/e-tnw1.htm>.

<sup>22</sup> “After the Tests: India and Pakistan Update,” and Albright, “The Shots Heard ‘Round the World,” *The Bulletin of the Atomic Scientists*, July/August 1998, pp. 20-25.

<sup>23</sup> Koch, “Subcontinental Missiles,” and Norris and Arkin, “After the Tests: India and Pakistan Update.”

<sup>24</sup> Thanks to Lt. Col. Neil Couch, USAF, for bringing this potential definition to my attention.

<sup>25</sup> See, for instance, Walter Pincus, "Russia Considering Increased Nuclear Dependence," *Washington Post*, 7 December 1997.

<sup>26</sup> In 1982, a Chinese military exercise resulted in the use of nuclear weapons for "tactical" purposes, showing some potential interest in NSNW. Additionally, Chinese nuclear policy has been responsive to relations with Russia. Therefore, it would not be wholly unlikely that China might pursue the development of NSNW if Russia were to use non-strategic weapons as a deterrent along the Sino-Russian border. See "China's Mixed Signals on Nuclear Weapons," *The Bulletin of the Atomic Scientists*, Vol. 47, No. 1 (May 1991); and Kenneth Allen, Chapter 10, "Chinese Perceptions of NSNW"

<sup>27</sup> See, for instance, Leo E. Rose, "India's Regional Policy: Nonmilitary Dimensions" in Stephen Philip Cohen, ed., *The Security of South Asia: American and Asian Perspectives* (Urbana, IL: University of Illinois Press, 1987), p. 4; and K. Subrahmanyam, "Nuclear Force Design and Minimum Deterrence Strategy for India" in Bharat Karnad, ed., *Future Security Imperilled: India's Security in the 1990s and Beyond* (New Delhi: Viking, 1994), p. 178.

<sup>28</sup> Britain has 48 Trident-III SLBMs and 185 warheads in its stockpile. See "French and British Nuclear Forces," *The Bulletin of the Atomic Scientists*, September/October 2000, pp. 69-71.

<sup>29</sup> See "French and British Nuclear Forces;" also Robert Norris, Andrew Burrows, and Richard Fieldhouse, *Nuclear Weapons Databook, Volume V: British, French, and Chinese Nuclear Weapons* (Boulder: Westview Press, 1994).