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"Suitcase Nukes:" A Reassessment



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Attention to portable nuclear devices (often referred to as "suitcase nukes") peaked in 1997-early 1998 following well-publicized allegations by the late governor of Krasnoyarsk Krai and former Russian Security Council Secretary, General (Ret.) Alexander Lebed, that an unknown number of these weapons (possibly as many as several dozen) could not be accounted for. These devices represent probably the greatest threat if they end up in the hands of terrorists due to the combination of small size and full-scale nuclear explosion effects. Interception of "suitcase bombs" is difficult along land borders and practically impossible along maritime borders. At the same time, the political, psychological, and economic effects of a blast from a portable nuclear weapon would be far greater than, for example, those of a "dirty bomb."

The first and only reliable line of defense against the acquisition or use of "suitcase nuclear weapons" by terrorists lies in the countries that possess such devices or have the capability to produce them. Lebed's 1997 statements are particularly unnerving because the early 1990s (when, according to him, a number of portable nuclear devices were lost) represented the time of greatest risk with regard to nuclear weapons security in Russia. Governmental institutions were radically weakened, and a dramatic drop in the standard of living made individuals with access to these weapons extremely vulnerable to the temptation of easy illegal profit. Official denials, including the denials that such weapons even existed, are not a sufficient reason for complacency.

This paper revisits open-source information about suitcase nukes to assess the level of threat stemming from the possibility that a number of them could have ended in the hands of terrorists or states that support them.

It seeks to achieve that task by concentrating on the following objectives:

- reassess information from publicly available sources about portable nuclear devices and try to determine, in particular, whether these weapons actually existed;
- analyze the scenarios of their loss that were offered by the special commission charged with the accounting for portable nuclear devices in the mid-1990s; and
- based on these scenarios, assess the probability that portable nuclear devices could have fallen into the hands of international terrorist organizations or states that support them, as well as the probability that such devices could be used for terrorist purposes.

The paper reaches two main conclusions:

- First, the probability that any portable nuclear devices were lost prior to or after the breakup of the Soviet Union appears low; the scenarios of loss offered by the special commission in 1996 are actually the least plausible among other possible scenarios. This does not mean that the threat does not exist, but rather that at this moment, it is probably

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not the most immediate threat to the home security of the United States or to US armed forces abroad.

- Second, even if any devices were lost, their effectiveness should be very low or maybe even non-existent, especially if the loss occurred during the period of the greatest risk, in the early 1990s. Without scheduled maintenance, these devices apparently can produce only minimal yield and eventually possibly no yield at all, and can only serve as a source of small amounts of weapons-grade fissile materials.

That being said, open-source information has limited usefulness and can only yield probabilistic analysis instead of definitive answers. Consequently, it is necessary to continue efforts aimed at acquiring better and more reliable information about the status of Soviet/Russian portable nuclear devices, as well as about the parameters of threat they might pose in the hands of terrorists.

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Information on Portable Nuclear Devices from Russian Open Sources

In a recent interview, the deputy chairman of the Duma Defense Committee, Alexei Arbatov, noted that complete silence had surrounded the subject of portable nuclear devices since the debate of the mid-1990s.[1] Indeed, suitcase nukes often seem a matter of fiction rather than that of fact.

The "mythological" qualities of suitcase nukes derive not only from limited information—this is a common feature in almost everything concerning Russian nuclear weapons—but primarily from the fact that almost all available information dates to a very brief period (the second half of 1997 and early 1998) and is not very reliable. Comments about suitcase nukes are conspicuously absent in open sources prior to 1997. For example, one of the most authoritative Russian treatises on nonstrategic nuclear weapons published by the Institute of World Economy and International Relations does not mention them.[2]

There are only two stories in which references to them could be suspected, and then only in hindsight. The first is a statement in 1995 by the director of the Ministry of Defense Ecological Center, Col. Boris Alexeev, about nuclear devices that weighed 90 kilograms (kg). [3] The other was made by Anton Surikov, an outspoken nationalist expert on defense issues and son of a leading figure in the Soviet military-industrial establishment, who said in an interview with the Estonian newspaper *Postimees* in 1996 that in a scenario of NATO landing on the Russian Baltic Sea shores, Russia would resort to "miniature" nuclear weapons. [4] Both statements are not conclusive proof; however, as it is not entirely clear whether the authors meant portable nuclear weapons or some other types of weapons.

Silence continued in the post-1998 period. It is hardly surprising that official sources remained mute, but non-governmental organizations did as well. For example, in the manuscript of a major study of Russian tactical nuclear weapons, an expert from the Moscow-based PIR Center, Ivan Safranchuk, referred to them as "so-called" and ultimately dropped the reference in the final version of the study published in 2000.[5] A subsequent study of these weapons written by the deputy director of the PIR Center, Yuri Fedorov, did not mention them either.[6] Alexei Arbatov, who earlier was cited complaining about the absence of information about portable nuclear devices, did not mention them in his 1999 study, which treated the subject of Russian nonstrategic nuclear weapons in considerable detail.[7]

Scarcity of information notwithstanding, hindsight has its advantages, and a reassessment of available data can yield tangible results, especially utilizing new information about the state of the Russian nuclear weapons complex that has become available in the last five years.

The "suitcase nukes saga" began in the fall of 1997, when General (Ret.) Alexander Lebed made several statements to the effect that during his short tenure as the Secretary of the Security Council in 1996, he received information that the separatist government in Chechnya possessed small nuclear devices.[8] In an attempt to clarify the situation, he created a special commission under the chairmanship of his assistant, Vladimir Denisov. According to Lebed, the commission was only able to locate 48 such munitions of a total of 132, an indication that 84 were lost (subsequently Lebed changed the total number of suitcase nukes several times, stating in the end that the number was between 100 and 500, but probably closer to 100).[9]

It should be noted that almost nothing is known about the methods of the commission's work: for example, whether it checked only records or was able to compare the actual inventory to records as well (if only records were checked, it cannot be said with certainty whether more warheads were missing or whether any warheads were missing at all). Since the commission was disbanded before it was able to complete its work, it has remained unclear whether it was able to confirm the alleged loss of warheads (i.e., it looked everywhere

and failed) or simply did not have time to clarify the situation (Denisov's statement seems to imply the latter). It is not even known who the members of the commission were.

A well-known leader of the Russian ecological movement, academician Alexei Yablokov, immediately confirmed and expanded on Lebed's statements. He announced that 700 such devices, which he called "nuclear mines," had existed in the Soviet Union. Responding to statements from Ministry of Defense (MOD) officials that there were no portable nuclear devices in the records, Yablokov announced that these devices had been in the hands of the KGB, and thus, by definition, MOD records could not include them.[10]

Official and semi-official Russian sources immediately denied Lebed's and Yablokov's stories, but their testimonies gradually revealed bits and pieces of information, raising suspicion that small nuclear devices did exist and even providing a glimpse of their properties. For example, the press secretary of Minatom, Georgi Kaurov, stated that, like the United States, the Soviet Union produced "very small nuclear weapons," and that "the ability to manufacture miniature nuclear weapons demonstrates a state's high level of technology and its ability to create multipurpose and even aesthetically attractive nuclear weapons." [11] Another official said that these devices did not exist, but that if they *had* existed, their production and maintenance would have been very expensive.[12] The chief of the 12th GUMO, Igor Valynkin, recently disclosed that the serial number of one of the "suitcases" that Lebed made public, RA-115, represented a "production index" (i.e., the type of munitions) and that the whole type had already been eliminated.[13]

The difficulty of assessing the situation stems, first and foremost, from the fact that many, if not all, participants to the 1997-98 scandal could have had ulterior motives. At that time, Lebed was running for the governor of Krasnoyarsk Krai, with an option of running for President again in 2000. Yablokov, a perennial fighter against Minatom, was (still is) prepared to support anything that would help his cause; from a technical point of view, his testimony is particularly questionable. Russian MOD and Minatom officials could be expected to deny anything, regardless of whether allegations were completely or even partially correct. Several remarks about suitcase nukes from Arab sources in the late 1990s-early 2000s could have been prompted by a desire to promote or expose Usama bin Laden's terrorist organization. In the end, not a single source can be considered entirely reliable.

The Portrait of a Mini-Nuke

In hindsight, it is clear that statements made by both sides in the 1997-98 debate could have referred to different classes of nuclear devices. One class mentioned was nuclear mines, while another was the portable nuclear devices for Special Forces, which were the subject of Lebed's statement. Even if portable devices did not exist, one can suspect that some types of nuclear mines were sufficiently small to generate "suspicious" statements by officials. Indeed, statements by MOD and Minatom representatives were worded very carefully and denied the existence of "nuclear suitcases," but not necessarily the existence of other small nuclear devices. They could thus claim that they were telling the truth even if they knew all along that other small nuclear devices could be portable. The uncertainty about classification could also explain the silence of non-governmental experts.

Nuclear mines are a well-known class of nuclear weapons. They were used by the Engineering troops and deployed along Soviet borders, primarily along the border with China. Nuclear mines were intended to create obstacles in the path of advancing enemy troops by altering the landscape and creating areas with high levels of radioactive contamination. The total stockpile was 700[14]—incidentally, the number Yablokov claimed represented the stockpile of suitcase nukes (and, potentially, evidence that Yablokov did not have adequate knowledge of the subject). Russian official sources reported that, in accordance with the 1991 Presidential Nuclear Initiatives (PNIs), all nuclear mines had been withdrawn to central storage facilities, and their elimination was "almost complete." [15] Judging from the available information, including from official and semi-official Russian sources, some of these devices were relatively small and could be portable. The often-cited weight was 90 kilograms (kg), [16] and they could have low yield (0.02 to 1 kt).[17]

On the other hand, the existence of smaller devices custom-designed for Special Forces, probably analogous to American small atomic demolition munitions (SADM), should not be ruled out either. Lebed apparently referred to such munitions in his statements (some sources, including himself, mentioned the weight of 30 kg). Several broad considerations suggest that the story about portable nuclear devices should be taken seriously, with a caveat that their existence cannot be viewed as an established fact.

First and foremost, the very fact that the United States possessed such munitions makes it feasible that the Soviet Union produced them as well, if only to replicate the American experience (the habit of Soviet designers to duplicate American weapons systems or use them to justify their own research is well known from other major projects, such as development of solid-fueled missiles or MIRVed ICBMs). Furthermore, Soviet scientists are

known for their propensity to explore every possible avenue, including the most powerful nuclear device; it is only logical to assume that they tried miniaturization as well. An artillery shell for 152-mm howitzers (which, in the Chelyabinsk-70 museum, is advertised as the smallest nuclear munition in the world) testifies to the ability to create a reasonably small and light nuclear explosive device. According to one Russian expert, the size of these shells (15 cm in diameter and 50 cm in length) apparently represents the smallest size of the nuclear device Russian designers were able to achieve (the 130-mm naval guns did not have nuclear shells).[18]

Sifting through available evidence, one can conclude that if such devices existed, they likely had the following characteristics:

- Small size (60x40x20 cm) and relatively light weight (probably upward of 30 kg). These parameters are generally consistent with available information about Soviet 152-mm artillery shells, as well as with the US ADM.[19]
- Low yield (less than 1 kt, maybe as low as 0.1 kt).
- Remained under control of the 12th GUMO (the Main Department at MOD in charge of handling all nuclear devices), were kept at or near MOD Special Forces (Spetsnaz) bases, as well as at central storage facilities, and were intended for transfer to Spetsnaz at short notice.
- Short life span between scheduled maintenance. According to the chief of the 12th GUMO, Igor Valynkin, small munitions required replacement of components every several months (other sources mentioned six months).[20] Valynkin's statement is the most direct corroboration of the allegations about the existence of portable nuclear devices. Stationary nuclear mines with such a short warranty period simply did not make sense, while portable devices for use behind enemy lines could still be acceptable.
- Were likely equipped with reasonably sophisticated permissive action links (PALs), which should preclude unauthorized use. Also, there is unconfirmed information that some small nuclear devices (munitions for 152-mm howitzers) were kept during peacetime in "half-assembled" state, i.e., parts were kept separately, although quick assembly in the case of war was possible.

Several of these statements require an in-depth discussion.

Control of portable nuclear devices is a highly contentious issue, and there has been little data except the claim of the 12th GUMO that it controlled all nuclear weapons and Yablokov's claim that nuclear suitcases were controlled by the KGB. The latter claim appears insufficiently credible for two reasons.

First, the mission of portable nuclear devices should have been explosions in the enemy's rear position during or just prior to the outbreak of war for the purpose of disrupting the infrastructure as well as sabotaging the enemy's command and communications. This directly points to the MOD Spetsnaz as the likely custodian of these weapons since this use of the devices closely matches its type of missions. Spetsnaz representatives flatly denied possession of nuclear weapons,[21] but their statements might refer to the fact that in peacetime, nuclear weapons remained in the custody of the 12th GUMO and were released to troops at a special command.

In contrast, the first KGB Spetsnaz group, *Alpha*, was created in 1974,[22] whereas miniature nuclear devices were probably created in the 1960s, as in the United States or, at the latest, in the early 1970s. Until the end of the 1970s, KGB Spetsnaz was small and consisted of just one group. Furthermore, its mission was, from the very beginning, antiterrorist operations, in particular, rescue of hostages (the group was established immediately following the terrorist acts during the Olympic Games in Munich). The first combat mission of KGB Spetsnaz was in 1979 in Kabul, where they participated in the capture of Amin's palace. Thus, possession of nuclear weapons was simply not in line with its mission.

One should be sensitive to the possibility that GRU Spetsnaz, as well as KGB Spetsnaz, if necessary, could have used the smaller versions of nuclear mines, which were technically within the purview of the Engineering Troops. Valynkin's statement that one type of nuclear device mentioned by Lebed had been completely eliminated is an indirect corroboration of that hypothesis since all or almost all nuclear mines were eliminated during the 1990s. In that case, however, it cannot be doubted that during peacetime, portable nuclear mines remained in the custody of the 12th GUMO.

A short maintenance schedule is an intriguing feature of portable nuclear devices, which is particularly important from the counterterrorism perspective: If that information is correct, such devices would be useless or have limited utility after only a few years, begging the question of whether terrorists would envision the same purpose for such devices as the

Soviet Union. The period between routine maintenance—only six months—might seem very short, but short maintenance periods appear to be a typical feature of all Soviet warheads.

Without detailed knowledge of the design of Soviet warheads, it would be impossible to know which components needed replacement at what time intervals. Two potential candidates are tritium and the neutron generator, which may use radioactive materials that decay over time. It seems possible, for example, that Soviet designers balanced on the threshold, using only just enough plutonium to achieve critical mass and relied on tritium to generate required yield. In that case, even modest degradation of tritium could have resulted in a significant drop of yield. Thus, it would be safe to assume that without proper maintenance, portable nuclear devices might still produce chain reaction, but yield would be minimal, and with time, possibly non-existent.

PALs were apparently introduced no later than in the mid- to late 1970s. Consequently, portable nuclear devices produced before that time probably did not have sophisticated means of preventing unauthorized use. Regardless, there is reason to believe that most of them eventually were equipped with such devices: Due to their short service life, they had to return to production facilities for a major overhaul (reportedly, service life of Soviet strategic warheads was about 15 years). During the disassembly-assembly process, the devices could have been fitted with better protection devices. Warheads produced in the late 1960s or in the 1970s should have undergone major maintenance at least once by the time of the breakup of the Soviet Union.

Assessment of the Scenarios of Loss

It is, of course, impossible to reliably verify Lebed's claim that nearly a hundred of these miniature nuclear devices could not be accounted for in 1996. According to Vladimir Denisov, the chair of the special commission established by Lebed in 1996 to account for suitcase nukes, the commission was able to account for the portable nuclear devices that had been present in the territory of Russia prior to 1990 or 1991, but could not vouch for the ones that could have remained in the territories of other former Soviet republics.[23] This leaves three possible scenarios of loss of such devices: (1) some of them remained outside Russia when nuclear weapons were consolidated in the early 1990s; (2) a handful of such devices were assembled outside Russia using components that could have been produced or stolen; or (3) they were lost inside Russia, most likely in the early 1990s. The first two scenarios were implied by Denisov, while the third simply appears logical and requires attention. The following section assesses the probability of loss under each of these three scenarios.

Loss of Suitcase Nukes Outside Russia

The loss of nuclear explosive devices might have occurred in the early 1990s, just prior to or during the transfer of all nuclear weapons to the Russian territory. Tactical nuclear weapons were stored in the territories of all 15 republics that made up the Soviet Union. According to Lebed, portable devices were kept in republics around the perimeter of Soviet territory, which makes the Baltic states, Belarus, Ukraine, and South Caucasus particularly suspicious from the point of view of control of portable nuclear devices (since the Soviet Union was geared for a war with NATO, it is likely that nuclear weapons intended for use by Spetsnaz forces would be kept close to borders with NATO).

The period of 1990-91 was marked with increasing chaos, the emergence of nationalist and/or pro-independence movements in some republics, in particular in Ukraine, the Baltics, and South Caucasus. Many servicemen joined these organizations, whether openly or secretly, and thus opportunities for unauthorized access to nuclear warheads could not be ruled out.

Several stories published in Russian newspapers in the mid-1990s concentrated on this scenario. One such story, which fit Lebed's allegation about Chechnya, described the purchase of two 30 kg "rucksack" nuclear devices by Chechen representatives in Lithuania in November 1991-January 1992. Another report about a "Chechen bomb" appeared in the fall of 1999, when Russian troops were starting a new war in Chechnya.[24] The devices were reportedly stolen prior to the transfer of nuclear weapons to Russia and hidden there until sold to Chechnya. It should be noted, however, that Russian newspapers, which published stories about the sale of nuclear weapons to the Chechens, are among the least reliable sources of information in Russia, so their evidence should be taken with a grain of salt. Lebed himself stated that the story about the diversion of portable nuclear devices to Chechnya, which prompted his investigation in the first place, was eventually found to be false. [25] Incidentally, according to former Deputy Secretary of State, Strobe Talbott, Chechen President Jokhar Dudaev approached the US government in 1993 claiming he possessed Soviet nuclear weapons, but could not support his claim.[26]

The assessment of the validity of that scenario should take into account two considerations:

- First, accounting and control of nuclear weapons in the Soviet Union was reasonably reliable, if primitive by today's standards. The troops of the 12th GUMO, which controlled all nuclear devices, were privileged and passed through, by Soviet standards, a very rigorous selection process. In the general chaos of the late 1980s-early 1990s, troops charged with the control of nuclear weapons (the 12th GUMO, the SRF, parts of the Navy and the Air Force) were the last to see the weakening of morale and loyalty. In addition to other selection criteria, these troops were comprised, with few exceptions, of officers, sergeants, and privates of Slavic and, on rare occasions, Baltic origin. Representatives from the Caucasus (especially North Caucasus) or Central Asia, as well as non-Slavic people of Russia, were usually avoided. In this regard, the Baltic republics were, indeed, a likely candidate for the location of possible diversion of nuclear weapons, especially given the intensity of anti-Soviet and anti-Russian sentiment in the late 1980s-early 1990s. Still, the probability of an "insider job" should be judged as remote. Chances are, in 1990-91, the loss of one or several nuclear devices would have been noticed.
- Second, all nuclear weapons were withdrawn from the Soviet republics, with the exception of Belarus, Kazakhstan, and Ukraine, to Russia as early as 1990 and definitely no later than the beginning of 1991. The early removal was usually conducted in secret and, in many cases apparently avoided the attention of US intelligence services (Presidential Nuclear Statements in September-October 1991 were reportedly motivated in part by the desire to facilitate the removal of tactical nuclear weapons to Russia from other Soviet republics). This action was motivated by the increasing risk that nuclear weapons might fall into the hands of various political movements that were rapidly developing at that time.

In at least one case, in Azerbaijan, the local pro-independence Popular Front attempted to prevent the removal; the Soviet military had to fire warning shots to disperse the crowd that was blocking the runway at the Air Force base from which bombers with nuclear weapons were taking off. Troops were authorized to use deadly force if necessary, but luckily warning shots were sufficient. This case demonstrated the length to which the Soviet MOD was prepared to go to prevent the seizure of nuclear weapons. Consequently, the possibility that nuclear weapons could have been intercepted and captured by a local group seems low: Information about such an event could not have been concealed within the MOD and, furthermore, we would have known about the use of force to defend or recapture nuclear weapons.

This leaves Belarus, Kazakhstan, and Ukraine as possible candidates for diversion. Tactical nuclear weapons were withdrawn from their territories in 1992, already after the dissolution of the Soviet Union. According to Arab sources, Usama bin Laden attempted to acquire (bought, some newspapers claimed) nuclear weapons in Ukraine (the Ukrainian government denied this[27]) and Kazakhstan, among other countries (including Russia). One uncorroborated report in December 2000 claimed that the intelligence agency of an unnamed European country intercepted a shipment of approximately 20 nuclear warheads—originating from Kazakhstan, Russia, Turkmenistan, and Ukraine—intended for bin Laden and the Taliban regime of Afghanistan.[28] An attempt to acquire "suitcase" weapons was specifically mentioned in relation to Kazakhstan. An Israeli military intelligence report, which was supposedly leaked, claimed that bin Laden paid over £ 2 million to a middleman in Kazakhstan for a "suitcase" bomb. This claim, however, was also uncorroborated by other sources or physical evidence.[29]

Among these three scenarios, the presence of portable devices in Kazakhstan is the least likely, since it was not a border republic. The removal of tactical nuclear weapons from Belarus and Kazakhstan proceeded smoothly, following the same procedure as the removal from other republics in 1990-1991 (i.e., the 12th GUMO remained part of an integrated command and was formally under the authority of the CIS Strategic Deterrence Forces, but in practice answered to the Russian MOD and the President of Russia). In other words, chances of diversion in these two republics should be assessed as about the same as with regard to other republics, except that the situation in 1992 was more chaotic and difficult to control.

Ukraine represented a different case. In 1991, the government announced a decision to become non-nuclear, but in early 1992 began to explore the possibility of keeping nuclear weapons. Of particular concern was the fact that in May 1992, the personnel of "Facilities S"—nuclear storage facilities controlled by the 12th GUMO—began to take the oath of allegiance to Ukraine, effectively meaning that the chain of custody and accounting began to break down. It is impossible to say with any certainty when erosion began—probably not earlier than February, when the transfer of tactical nuclear weapons to Russia was stopped for the first time. Air Force bases, including those with aircraft equipped for nuclear weapons (and with nuclear weapons stored inside the bases) began to take the Ukrainian oath in March 1992.

On the other hand, the removal of tactical nuclear weapons from Ukraine was conducted under a special procedure codified in a Russian-Ukrainian agreement signed in March 1992.

This procedure included thorough authentication of each warhead delivered from Ukraine by representatives of both sides, including the checking of serial numbers against the logs kept at the 12th GUMO in Moscow. In effect, the tense Russian-Ukrainian relationship generated a more reliable accounting and verification procedure than was the case with other republics. Consequently, the chance that any weapon entered in central logs remained in Ukraine is very low.

Based on this information, it seems unlikely that any nuclear devices, including portable ones, were lost or stolen outside Russia prior to their removal to the Russian territory. It is practically certain that, contrary to recent (1999-2001) reports, no nuclear warheads could have been bought in Ukraine or Kazakhstan simply because there have been no reports about the presence of non-strategic nuclear weapons in their territories after 1992.

This conclusion, however, rests on two assumptions: first, that original records were complete and accurate and, second, that all withdrawn warheads were checked against these records. These assumptions need further exploration in light of the above-quoted statement by Denisov—that his commission was unable to verify whether any portable nuclear devices remained outside Russia—since that statement implicitly questions the status of the records.

The following hypotheses are possible:

- Records are full and complete, as Igor Valynkin announced. No warheads are missing, and Denisov's commission was simply unable to complete its job (Denisov admitted that the commission was, indeed, disbanded prematurely).
- As Yablokov speculated, portable nuclear devices were not entered into logs of the 12th GUMO, since they were under control of the KGB. This explanation does not seem very plausible, the special status of the KGB notwithstanding. Yablokov's assertion contradicts all available information about the chain of custody of nuclear weapons, which were supposedly the sole responsibility of the 12th GUMO. In addition, it should be possible to check MOD records against logs of production facilities, and then any "unaccounted" devices would be revealed. This means that, in theory, the 12th GUMO or the Denisov commission had the opportunity to ascertain the existence or the absence of unaccounted warheads.
- A small number of nuclear weapons could have been moved to republics other than Russia in 1990-91, when Soviet institutions were weakened. This theory does not seem plausible either, simply because it would be illogical to send nuclear weapons to republics from which other weapons were being hastily withdrawn (again, possible exceptions are Belarus, Kazakhstan, and Ukraine, where substrategic nuclear weapons remained until mid-1992).
- There is (or was) no single, complete, readily accessible repository of records, and comprehensive checks were not conducted before the creation of the Denisov commission in 1996. For example, records could be divided between the 12th GUMO and four production (dismantlement) facilities in Russia. In that case, the whereabouts of warheads withdrawn from outside Russia and subsequently eliminated or stored would be particularly vague. This appears a plausible explanation for Denisov's statement about the inability to locate warheads that had been kept outside Russia prior to the collapse of the Soviet Union. One hopes such a check has been conducted since 1996.

Thus, the hypothesis that a number of portable nuclear devices remained outside Russia or were stolen during the transfer to Russia does not appear convincing. Both the circumstances of that transfer and the likelihood that reasonably complete records exist (even though they might be divided among several holders) lead to a conclusion that former republics of the Soviet Union are an unlikely source of unaccounted for suitcase nukes.

Clandestine Production Outside Russia

The possibility that a handful of warheads could be produced outside Russia using components left, purchased, or stolen after the transfer of warheads to Russia was raised during the debate in 1997-98. However, this does not seem plausible: Design and production of nuclear weapons were concentrated solely in Russia, and, in all probability, nuclear research centers in other republics simply lacked specialized knowledge. However, it is possible that such information exists outside Russia, perhaps procured by officials contemplating the possibility of retention of Soviet nuclear weapons. Official and unofficial sources in 1997-98 asserted that the design of miniature nuclear devices was more complex than that of common warheads and could not be performed "at home" (thereby indirectly confirming that small devices did exist in the Soviet Union). In any event, the probability of assembly of a portable nuclear device is much smaller than the probability that a crude nuclear weapon could be assembled in a non-nuclear state or by terrorists.

Loss of Suitcase Nukes Inside Russia

Like all nuclear weapons that are not permanently deployed on delivery vehicles, portable nuclear devices should be kept at storage facilities, controlled by the personnel of the 12th GUMO. Consequently, they should be subject to the same risks as other weapons, exacerbated by their small size. Another potential weak link in the chain of custody is dismantlement facilities, where these devices are kept for some time prior to elimination. According to reports in late 1998, including a detailed one in the London-based, Arab daily, *Al-Watan Al-Arabi*, Chechens acquired approximately 20 "tactical" nuclear weapons from Russian facilities, to be subsequently transferred to bin Laden for a sum of \$30 million in cash plus two tons of opium. These claims, too, were not corroborated by other sources or physical evidence.[30] In the end, the feasibility of this scenario depends on the level of security provided by facilities, some of which in the last decade have benefited from American assistance.

Security risks at storage facilities have been well researched. It is sufficient here to briefly list the most relevant factors for the case of portable nuclear devices:

- There is an uncomfortably high probability of "insider threats" from personnel that work or previously worked at storage facilities. Although their salaries and living conditions are usually somewhat better than that of ordinary officers and sergeants, the standard of living is still low by today's standards. Many officers are forced to take additional jobs "on the side" and could be easily co-opted by criminal organizations or foreign intelligence.
- All, or at least the majority, of key personnel live inside the outer security perimeter of storage facilities and often do not leave upon retirement unless provided housing by the government, as required by law. In the mid-1990s, for example, nearly 3,500 retired officers continued to live within the closed compounds of the 12th GUMO facilities.[31] Close personal relations among active-duty officers, and between them and retired officers, can facilitate access to inner security perimeters. In at least one case, a retired officer who was still living at a nuclear weapons storage facility was able to arrange access for local criminals to the inner (most secure) zone to steal small arms intended for guards.
- Security systems at many storage facilities are old and often inadequate; only 47 percent of these facilities so far have been equipped with new fences and other equipment purchased through US funding under the Cooperative Threat Reduction (CTR) program. The power supply is often unreliable. The accounting systems at many of the facilities are antiquated. All these problems continue to haunt nuclear weapons storage sites even today, but conditions were considerably worse in the early 1990s. It is difficult to be confident that any thefts that might have occurred a decade ago would have been noticed.

The situation is similar at production and dismantlement facilities, where components of warheads could be stolen by employees. Workers and engineers were and are plagued by the same woes, and the challenges are further exacerbated by the absence of military discipline (or what remains of it in post-Soviet conditions), as well as greater numbers of facilities and their location in large cities (the "closed" status of these cities offers only limited enhancement of security).

The early 1990s was a period of particularly high risk both due to socioeconomic conditions and also because the massive removal of nuclear weapons to Russia from outside the Soviet Union and from other former Soviet republics put an unusual stress on the system. At that time, storage facilities were literally overflowing, and many of them contained more warheads than allowed by safety regulations.

Conclusion

The open-source data on suitcase nukes is sketchy and incomplete. Still, even using this data, one can assess the nature of these weapons, the probability of an unknown number of them having been stolen, and the level of associated threat.

In spite of official denials, there are sufficient grounds to believe that the Soviet Union had one or more types of portable nuclear devices. Most likely, these were devices designed for the use by Special Forces (Spetsnaz), analogous to the American SADM, or using the physics package similar to that contained in artillery shells. The widely used word "suitcase" is misleading since these devices were quite heavy (no less than 60 lb, probably considerably more), but they could have been moved by one, but more likely, two people.

Without additional data, it is impossible to say with an acceptable level of certainty whether any number of these weapons was stolen during and following the breakup of the Soviet Union, as Alexander Lebed and a few other Russians claimed. Available evidence suggests that these stories were most probably not true, and that they were generated by incomplete information or ulterior motives. The probability that such weapons could be used by terrorists (assuming some were stolen) appears even lower.

The reasons for that conclusion are the following:

- Probably the most convincing evidence is the fact that no terrorist group has used such a device or even credibly threatened its use. There have been many instances, especially during the first and the second, ongoing wars in Chechnya. Yet, the worse case so far was limited to the burying of a container with radioactive isotopes in a Moscow park. Since the majority of feasible scenarios involve Chechens, and since the period of greatest risk was in the early 1990s, the inactivity of Chechens in this matter is significant.
- The scenario offered by Denisov, namely, that a number of portable nuclear devices were left outside Russia when nuclear weapons were withdrawn to its territory, appears unlikely. In most cases, the removal took place more than a year before the breakup of the Soviet Union, when the Soviet military, in particular troops charged with custody of nuclear weapons, were in relative order. In the only case in which an attempt to "conceal" a limited number of nuclear weapons could be suspected—in Ukraine—the removal was subject to enhanced accounting procedures.
- The risk of loss of nuclear weapons was the greatest in the early 1990s within the territory of Russia itself. At that time, large numbers of nuclear weapons were transported across the country, often by trains ill-suited for that purpose; accounting could be relatively lax, and personnel was undergoing the period of deepest uncertainty, depression, and precipitous drop in the standard of living. With time, the probability of the loss of portable nuclear devices decreased with gradual increase of stability and, even more important in terms of immediate effect, American assistance, which helped to improve accounting, transportation, and security of nuclear weapons.
- Yet another scenario offered by Denisov—assembly of portable nuclear devices from parts "forgotten" outside Russia—is the least believable. There was no nuclear weapons production outside Russia; consequently, the probability that parts of nuclear weapons could be found outside its territory is very unlikely. In addition, there was very little specialized expertise and know-how outside Russia, whereas portable nuclear devices were apparently very complicated in design and required highly skilled professionals to oversee their production and assembly.

Even assuming that some portable nuclear devices were lost, it would be very difficult to use them, and it is almost certain that the features that make portable nuclear devices so dangerous (small size and full-scale nuclear explosion effects) will not be taken advantage of.

- Information about unusually short maintenance periods for these weapons is probably true, although the extent and the pace of deterioration of nuclear weapons' features cannot be determined from open sources. Since, as it was noted above, the period of greatest risk was in the early 1990s, the stolen devices, if any, have already missed as many as 20 routine component replacement procedures and are probably nearing the end of their service life. Consequently, it is nearly certain that they will be unable to produce the design yield and maybe will not be able to produce any yield at all.
- Most, if not all, portable nuclear warheads are equipped with some protection devices (e.g., PALs), making their unauthorized use difficult, though not completely impossible.

In effect, portable nuclear devices, if stolen, will hardly be usable, at least not in the fashion that they were originally designed for. They could be, of course, dismantled to extract weapons-grade plutonium, which could then be used in a cruder nuclear device or for a "dirty bomb"; but in this case, the problem of suitcase nukes is virtually indistinguishable from the broader problem of safety and security of all Russian nuclear weapons and weapons-grade fissile materials.

That being said, low probability is not a sufficient reason for comfort or lower vigilance. Until the situation is sufficiently clarified, it will be necessary to guard against the infiltration of a portable nuclear device into US territory and, probably of even greater importance, to keep in mind the possibility that nuclear mines might be used against US troops abroad in more or less the same way the Soviet Union planned to use them against advancing NATO or Chinese troops.

Above all, it is necessary to strengthen the effort to obtain additional information about suitcase nukes, including the types of small (portable) weapons and their status (eliminated or stored; whether any were lost; and the safety and security procedures applied to the ones that are still kept), as well as the possible performance of the ones that could have been stolen and remained hidden for long periods of time.

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