PRIF
Peace Research Institute Frankfurt
HSFK
Hessische Stiftung Friedens- und Konfliktforschung

PRIF-Report No. 97

Nuclear Transparency and Registers of Nuclear Weapons and Fissile Materials

Harald Müller/Annette Schaper

Member of Leibniz Association

Correspondence to:

PRIF · Baseler Straße 27-31 · 60329 Frankfurt am Main · Germany
Telephone: +49(0)69 95 91 04-0 · Fax: +49(0)69 55 84 81
E-Mail: mueller@hsfk.de · schaper@hsfk.de
Internet: www.prif.org

ISBN: 978-3-942532-13-6

Euro 10.-

Summary

International disarmament and non-proliferation activities have received new impetus from President Obama's promise to open up the pathway to a world free of nuclear weapons. The signing of a new disarmament treaty between the U.S. and Russia on strategic nuclear weapons is on the agenda, and negotiations on a more sweeping reduction of arsenals are to follow. The Geneva Conference on Disarmament is to work out a ban on production of weapons-grade fissile material (Fissile Material Cut-off Treaty, FMCT). Obama would like to start the ratification process for the test ban as soon as the imminent disarmament treaty with Moscow has been signed and ratified in each country. However, the immediately pending projects should not distort perception of the strategic necessity of disarmament: Disarmament is a long-term process that lasts for decades. The most important prerequisite for continuously achieving progress in the disarmament process is increasing trust among participants. The disarmament strategy must emphasize systematically building up this trust.

This requirement makes transparency an indispensable part of any successful disarmament process. Without transparency the participating parties will never be able to develop the trust to take bolder steps towards disarmament. Other states will not believe that participants in the disarmament process will really keep their promises. Measures to increase transparency are thus on the one hand a *component* and an *indicator* of progress in the disarmament process, and on the other a *prerequisite* for the non-nuclear states believing in the willingness of the nuclear states to disarm and therefore not developing the motivation to develop nuclear options themselves.

Despite its value, transparency encounters opposition. Some of this derives from special interests of the nuclear complexes and their employees, and is thus capable of being overcome with sufficient political will on the part of political leaders. It has to be taken seriously, but is, in the final analysis, of secondary significance. The situation is different with the second kind of hurdle, genuine fears for national security. These include the reluctance of nations with small nuclear arsenals to reveal details of their weapons inventories, because that could increase their vulnerability and limit their second strike capability. There are also justified concerns that certain information could contribute to wider distribution of nuclear weapons or even make it easier for non-state actors to gain access to fissile material or functioning nuclear weapons.

Sooner or later, registers of nuclear weapons and fissile material will be required in the disarmament process. These types of data collections help to dispel the suspicion that some partners could conceal important inventories. If those possessing nuclear weapons reveal their initial inventories of weapons and fissile material and regularly reveal any changes in these stocks, trust in the integrity of the reduction process develops. We are talking here of an ongoing procedure lasting decades, in which, step by step, more and more information about materials, technology, weapons, personnel, plants, practices, etc. of the nuclear weapons complexes in participating countries come to light through the voluntary cooperation of those possessing nuclear weapons. Mutual trust can only exist when one day the partners declare "zero holdings" of nuclear weapons. A huge effort is

required in order to perfect with the help of the International Atomic Energy Organization (IAEA) the methods of "nuclear archaeology", i.e., reconstructing earlier production of fissile material and warheads. Setting up a register of nuclear weapons has as its goal the systematical recording of relevant data.

The more comprehensive and detailed a register, the better it would be able to support the final steps towards a world free of nuclear weapons. It is just as clear, however, that such a perfect register is not capable of being introduced at present. For any such attempt would founder on the security fears already mentioned. For this reason it is advisable to follow the path to a register a single step at a time: start with what is possible today and advance to the degree that trust grows and some of the concerns that motivate resistance to transparency fade away: At this point advanced forms of the register can follow.

The negotiating forum that is involved in the construction of the register should be big enough to convince the non-nuclear states that the nuclear weapons states are working in earnest towards a common goal. At the same time, it has to be compact enough to permit goal directed negotiations and to avoid the dangerous distribution of sensitive data. Of the available alternatives, the Geneva Disarmament Conference seems to offer the most advantages. It is representative, because it brings together nuclear weapons and non-nuclear weapons states, but the instrument of the "friends of the chairperson" makes possible meetings of smaller negotiating committees in which those possessing nuclear weapons can meet separately in order to discuss confidential details.

If the negotiating forum were divided in this way into a technical working group of nuclear weapons possessors and a plenary group, to which the working group would report on its results and which would have to decide on the overall design of the register, this would solve the problem of the undesired wider distribution of sensitive information. The special security concerns of the smaller nuclear weapons possessors can be taken account of by dividing the obligation to make information public into phases and initially limiting it to storing data on initial stocks in a coded form in a "data safe". This data would only be made public in a later disarmament phase.

A step by step process is sensible because existing resistance must be overcome and this is only possible in "reasonable portions". At the same time, goal-directed establishment and increase in transparency is indispensable because otherwise the disarmament process would come to a halt after a short time because of lack of trust. An appropriate starting point would be negotiations on the FMCT, whose system of verification would have to be regarded strategically as a substantial step in the direction of transparency and promoting trust. The concept of an independent nuclear weapon register could be aired at the Nuclear Security Summit which will be held in April 2010.

The German Federal Government introduced the idea of a nuclear weapons register in 1994, when international conditions were not yet ready for it. In the perspective of a world free of nuclear weapons, an arena for creative disarmament ideas has developed in which the register concept too ought to find a place. Germany's Federal Government ought to make it a priority issue.

.

Contents

1. Background

1.1 Transparency and registers

The change of U.S. Government raises hopes for serious attempts at achieving substantial nuclear disarmament and progress in nuclear arms control. In his widely noted speech in Prague, U.S. President Barack Obama stressed that the goal must be a world without nuclear weapons (The White House 2009). He also declared the goal of ratifying the CTBT by spring 2010.[1] Other international politicians welcomed these goals.[2]

A key issue on the road to comprehensive nuclear disarmament is confidence in its feasibility and credible verification. This means all progress should be visible to the world. The more credible the verification, the more convincing the next steps in disarmament. Examples are: dismantling of nuclear weapons, withdrawal of fissile material from military use, and assurances that the number of weapons and the quantities of fissile materials can be reduced but not increased. But how can progress be observed? Much of the information on nuclear warheads and fissile materials that will be needed in verification is still shrouded in secrecy in several nuclear weapon states.

Today, the number of warheads in the possession of the nuclear weapon states is not precisely known. How many are in operation? How many in reserve? How many are undergoing maintenance? How many are dismantled, and how many are stationed in which countries? These numbers are rarely disclosed by governments. Instead, NGOs and individuals collect and publish public-domain information on nuclear weapons.[3] Often, this information is used not only in public but also by diplomats who lack access to more official information.

1 NTI Global Security Newswire, Obama Hopes to Win CTBT Ratification by May, August 10, 2009.

2 An example from Britain is: Douglas Hurd, Malcolm Rifkind, David Owen and George Robertson, Start worrying and learn to ditch the bomb, The Times, June 30, 2008; an example from Germany is: Helmut Schmidt, Richard von Weizsäcker, Egon Bahr und Hans-Dietrich Genscher Für eine atomwaffenfreie Welt, FAZ, January 8, 2009.

3 Examples of organizations that collect and publish public domain information on nuclear weapons are the Natural Resources Defense Council (NRDC), the Federation of American Scientists (FAS), the Center for Defense Information (CDI), or the Center for Arms Control, Energy and Environmental Studies at the Moscow Institute of Physics and Technology (MIPT). Examples of such documentations are: W. M. Arkin, R. S. Norris, J. Handler, Taking Stock – World-wide Nuclear Deployments 1998, NRDC, Washington, DC, 1998; NRDC Nuclear Notebook prepared by Robert S. Norris and William Arkin of the Natural Resources Defense Council, published in The Bulletin of the Atomic Scientists, www.thebulletin.org/issues/nukenotes/nukenote.html (21.1.2011); Chuck Hansen, Swords of Armageddon, Chukelea Publications, Sunnyvale, 1995; The High Energy Weapons Archive, http://nuclearweaponarchive.org/ (21.1.2011), until May 2002 also hosted by FAS; Center for Defense Information (CDI), www.cdi.org/issues/nukef&f/database/usnukes.html (21.1.2011); and Pavel Podvig (ed.), Russian Strategic Nuclear Forces, The MIT Press, 2002.

The same is the case with fissile materials. Transparency on warheads must be complemented by transparency on fissile material stocks and production facilities. Those in possession of nuclear weapons maintain reservoirs and pipelines of fissile materials and components for nuclear warheads, in addition to the warheads they have in deployment and in reserve. There is only sketchy knowledge about the quantities of fissile materials held by some nuclear weapon states. How much is still in reserve or is being used for remanufacturing? How much is considered excess to weapons needs? Which quantities exist in which isotopic and chemical composition, or in which location or facility? The U.S. and the UK have published information on their fissile materials, but others still keep their data shrouded in secrecy. Instead, numbers collected and assessed by NGOs are being used.

Why is the disclosure of information and transparency on warheads and fissile materials useful for progress in nuclear disarmament and arms control? This question will be discussed in the first chapter of this report. Examples of possible next steps that would be facilitated by more nuclear weapon-related transparency are: verification of nuclear weapon disarmament (including disarmament of tactical nuclear weapons); a fissile material cut-off treaty (FMCT); projects and treaties on the disposition of excess weapons plutonium – and safeguards, projects and treaties on assistance for improving the security of fissile materials; further reforms of international safeguards, especially in cases where these are implemented in nuclear weapon possessing states outside the NPT.

It is often argued that there are counter-productive side effects of transparency: Some information might be proliferation-relevant e.g. it has the potential to be useful in illegal nuclear weapon programs elsewhere. This is a major problem, because intrusive verification goes to the heart of sensitive nuclear weapons information and might inadvertently spread knowledge that is better kept secret. Nuclear transparency therefore must have a limit, but there is disagreement on where this limit should be placed: where an ideal demarcation between transparency and secrecy should lie.

"Knowing where the boundaries lie between classified and unclassified information can often be a key factor during the preparation for, and negotiation of, arms control and safeguards initiatives" (Comerford 2000). Currently, the demarcation lines that the different nuclear weapon possessors place between transparency and secrecy vary significantly. Not only will any judgment as to whether certain information poses a proliferation risk inevitably contain an element of subjectivity, but there are also additional motives for secrecy, none of which can be called truly objective. An example of such additional motives is "national security", foremost in which is the desire not to reveal strengths or weaknesses, in order to maintain "second-strike" deterrence capabilities. But secrecy can also serve as a cover for other motives, e.g. concealment of corruption, anti-democratic attitudes, or simply conservative inertia because it has always been the tradition to keep certain information secret.

The reasons why states keep much information secret and the problem of how to motivate them to more transparency is discussed in a separate chapter.

How can better progress be made toward achieving increased transparency? There is no generally agreed upon and comprehensive approach to transparency. A useful tool could be registers for nuclear weapons and fissile material not under international safeguards, in which the five de jure and the three de facto nuclear weapon states could participate. The register would be implemented in three stages. In the first phase, fairly general and unspecified information would suffice. In the second stage, information would be broken down into details of weapons and material holdings. In the third stage, precise data on location and parameters would be provided. This proposal is discussed in detail in another chapter.

In the view of the authors, registers are multi-objective transparency measures of great utility that would contribute considerably to international security, to more equitable relations among states with different nuclear statuses, and would be a highly useful, and perhaps even indispensable, precondition for future progress in nuclear disarmament.

1.2 The origin of the "Register Idea"

A tool for implementing transparency is registers, an idea that has been proposed several times. On December 16 1993, German Foreign Minster Klaus Kinkel pronounced a major "non-proliferation initiative" (Kinkel 1993). The initiative contained ten points, among them German support for the indefinite extension of the NPT and for a Comprehensive Test Ban Treaty. Point eight reads as follows:

> "Establishment of a nuclear weapons register: In this way we will implement the demand for transparency regarding stockpiles of nuclear weapons. This transparency is vital to international confidence-building in nuclear disarmament by the nuclear weapon states: only when stocks are known can the success of nuclear disarmament be measured. The idea of a nuclear weapons register is the logical continuation of our initiative to implement a register for conventional weapons in the UN context" (Author's translation).

Immediately after Kinkel's speech, German diplomats in the capitals of allied nuclear weapon states encountered some hostile responses. Part of the reason for this was a lack of consultation beforehand. No one likes surprises in an area that is seen as closely related to matters of national interest. The opposition was also grounded in the deep-rooted NWS reluctance to enter into any multilateral undertakings that endanger their complete freedom of action, and their deep instinctive fear of compromising either their privileged position or their national security by granting anything resembling transparency. This transparency-shy attitude is not absolute, and it varies considerably among the nuclear powers. A prominent example is the Openness Initiative of former Secretary of Energy Hazel O'Leary that led to the greatest efforts to be accountable for the whereabouts of U.S. fissile material both to the international community and to the American people themselves (U.S. Department of Energy 1994). And the register idea was proposed again by the UK's Robin Cook in 1995 when he was UK Shadow Foreign Affairs spokesperson (Gormley/Lewis/Pomper/Scheinman/Schwartz/Sokov/Spector 2009).

Nevertheless, highly unfriendly reactions were reported to Bonn from Washington, DC, London and Paris. The French reaction was so strong that the then German

ambassador in Paris threatened not to follow instructions in the future that would force him to take the issue up again. As a consequence, the German government decided to bury the issue for the time being.[4] While the idea still enjoys support within the foreign ministry and other parts of the German government, it has since not been seen as of sufficiently high priority to make it worthwhile risking the displeasure of Germany's three most important allies by making a renewed attempt.

At about the same time, Argentina proposed a discussion of the establishment of a nuclear arms register in the CD. As far as we understand the Argentinean approach, it would have been more appropriately depicted as a proposal for a nuclear disarmament register. The nuclear weapon states would register the nuclear weapons deactivated and dismantled as a consequence of nuclear disarmament agreements. Over time, the expectation went; such annual registrations would create enhanced transparency and thus contribute to the international climate in favor of disarmament. It can also be assumed that Argentina wanted to see the CD become more involved in the nuclear disarmament process, thereby improving the climate among nuclear and non-nuclear weapon states during the debate about the extension of the NPT – a treaty that the country had acceded to only recently, and that Buenos Aires turned out to be a staunch supporter of. The Argentinean initiative, however, did not lead to any action on the issue (Argentina Working Paper 1993).

A third approach was made by Egypt during the deliberations of the group of experts tasked with reviewing the experiences of the UN Register of Conventional Arms Transfers and developing suggestions for improvements. This group considered, inter alia, changing the parameters of arms to be reported, adding new types of weapons, including small arms, and requesting additional data – beyond arms exports and imports – on holdings and domestic production. Egypt, for its part, proposed adding weapons of mass destruction to the register.

This would have changed the character of the register considerably. At present it collects information about transfers of conventional weapons, not about production or holdings. In the nuclear field, however, transfers of weapons are illegal for all signatories to the nonproliferation treaty, including the five official nuclear weapon states.

The Egyptian motivation was and is most probably an attempt to exert additional pressure on Israel. Although Egypt is at peace with Israel, it is not willing to accept the difference in capabilities, and has taken several initiatives to force Israel to make concessions concerning nuclear transparency; Israel, however, while declaring in principle its intention of eventually becoming non-nuclear, has declared the consolidation of peace, including relations with the countries still hostile to its very existence, to be a precondition for nuclear disarmament. Israel staunchly refuses to discuss any nuclear matters as long as the peace process has not reached a much more advanced stage. The

4 Befehl verweigert, in: Der Spiegel, No. 15, 1994, p. 16.

nuclear weapons register was an additional Egyptian attempt to induce more nuclear transparency by Israel (Chalmers/Owen 1996: 31-32).

Within the CD's ad hoc group on Transparency in Arms (TIA), the non-aligned countries have persisted in linking their readiness to talk about enhanced conventional arms transparency with a fresh approach to creating transparency in weapons of mass destruction. This ball has bounced back and forth several times between the UN Conventional Weapons Transfer Register's Group of Experts, the UN General Assembly, and the CD's TIA group. Since there was no positive response from the nuclear weapon states, the TIA group could not register any progress in its work and, since 1994, has more or less ceased to function (Howard 1996: 77-86).

Thus the idea of a nuclear arms register has come from different quarters, has been fed by various motivations, and has taken several distinct shapes. No progress has been made in terms of preparing a legal instrument that would establish accountability of the nuclear weapon states to the world community.

In contrast, some transparency has been achieved not on warheads but on aspects of fissile materials. In 1997, the most important plutonium-using states agreed and drew up Guidelines for the Management of Plutonium (INFCIRC/549), in which they agreed to declare their civilian plutonium holdings annually. In February 1996, following a two-year study, the U.S. DoE published a comprehensive report detailing information about U.S. plutonium production and use from 1944 through 1994 (U.S. Department of Energy 1996). In 2001, they published a similar report on HEU (U.S. Department of Energy 2001a).

At the NPT PrepCom in 2002, Germany presented a working paper that called for "a reliable inventory of all nuclear weapons and stocks of fissile material usable for military purposes". Comprehensive and reliable data are prerequisites for the establishment of a nuclear weapon-free world (German Delegation 2002).

The objections of the nuclear weapon states have not disappeared. The "haves" are concerned that revealing information might compromise their national security. A part of the secrecy syndrome is obviously exaggerated and meant as a symbol of the privileges that nuclear weapons are supposed to confer upon their possessors. But other aspects deserve more serious consideration. Particularly the smaller nuclear weapon states may fear that revealing data about their nuclear weapon holdings may make them more vulnerable. It might even be that some of them wish to avoid embarrassment because their arsenals are smaller than the world presently believes, and they may fear that their weight as a deterrent might be devalued if their true size were to be exposed.

2. Issues

2.1 The rationale for transparency

2.1.1 Creating confidence by accountability

Secrecy and mistrust are twins. During the Cold War, the fear of a crippling first-strike attack informed much of the strategic debate during the U.S.-Soviet rivalry, and was a factor which drove the strategic arms race and fuelled the mutual suspicions of the superpowers. Of particular concern was the intrinsic secrecy of the Soviet system, a secrecy that was at its strictest in the highly sensitive nuclear military sector. The famous request by the U.S.SR's military participants in the SALT negotiations to their U.S. counterparts not to reveal data about the size and structure of Soviet strategic forces to Moscow's civilian negotiators can be recalled here. In addition, a number of strategic thinkers maintained that "uncertainty" about a nation's doctrine and posture added to deterrence; this philosophy had many adherents in France (Freedman 1989). Today, after the START agreements and bilateral U.S.-Russian transparency measures have shed more light on these countries' nuclear complexes, the total opacity of the Chinese strategic posture and of Beijing's future plans could become a major cause of U.S. and Russian "hedging" policy, and thus constitute a serious obstacle to radical cuts in nuclear arms. As China is certain to become a more and more important player in Asia and on the world scene, this could well result in the resumption of the arms race if no countermeasures are adopted.

The security dilemma can only be solved if states communicate to each other successfully that they have no intention – and possibly not even the capability – of starting a war of aggression. Since surprise is the condition for successful attack in most cases unless there are vast asymmetries in power, concealing one's own posture is easily taken as an indication that sinister intentions may exist. In contrast, offering one's neighbors unlimited insight into the parameters of one's own military strength and defense policies demonstrates that one has renounced the prerequisite for a concealed build-up intended for aggressive purposes. The use of transparency to address this problem should therefore involve making four particular features more transparent: intentions, capabilities, decision-making processes, and rearmament potential, especially regarding fissile materials (Walker 1997).

Transparency of stockpiles would give others a realistic image of capabilities, would avoid unnecessary ambiguities and would contribute to the prevention of potential new arms races and competitions. It should be complemented by transparency on fissile materials, especially on those from or for nuclear weapons. This would create international confidence that the nuclear disarmament process is taking place as declared. The larger the number of secrets abandoned and the more information disclosed, the more the overall picture becomes complete and convincing. In NNWS, the production and use of fissile materials is under IAEA safeguards. This has created confidence that no clandestine nuclear weapon program is under way, despite the existence in some of these states of large nuclear industries that technically could be misused for nuclear weapons purposes.

2.1.2 Arms control and disarmament

Future progress in nuclear arms control and further disarmament will only be possible if the participating states are willing to provide transparency in aspects that are necessary for verification, joint disarmament studies and confidence building. As verification procedures become more complex and sophisticated, more secrets will be touched upon during the verification process.

Transparency in nuclear warheads has been on the arms control agenda for several years: Since the end of the Cold War, the U.S. and Russia have engaged in a substantial nuclear arms reduction process, notably with the two START Treaties.[5] A special concern is warheads that are not yet covered by any control regime, either in the active stockpile or in a deposit, and that are ready for use, e.g. tactical nuclear weapons. As long as no information on these stockpiles is available, the potential for mistrust is high. Any success in nuclear weapons reductions will go along with doubts as to whether the reductions are really meaningful or whether they merely constitute a shift of warheads to other locations where they are not accounted for.

In any meaningful future nuclear disarmament, transparency of warhead dismantlement will play an important part. In the Joint Statement of Presidents Clinton and Yeltsin at the Helsinki Summit in March 1997, they stated that a START III Treaty should contain, among other things, "measures relating to the transparency of strategic nuclear warhead inventories and the destruction of strategic nuclear warheads […]".[6] So far, verification in nuclear arms control has covered mainly delivery systems, but has hardly affected warheads themselves.

Similarly, transparency in fissile materials facilitates the verification of future treaties such as a Fissile Material Cutoff Treaty (FMCT) that has been under consideration at the Conference on Disarmament (CD) for several years and which seeks to ban the production of fissile materials for nuclear explosives (Schaper 2001).[7] Whether such a treaty should also cover material produced prior to its entry into force is disputed. Nevertheless, even if it does only cover future production, its verification will have to include monitoring of production facilities. A prerequisite is a certain degree of transparency regarding these facilities. The verification will also need access to certain

5 Treaty text: www.fas.org/nuke/control/start1/text/. A summary is: A START Briefing Book, The Bulletin of the Atomic Scientists, November 1991, p. 24.

6 President Clinton and President Yeltsin, Joint Statement on Parameters on Future Reductions in Nuclear Forces, White House Fact Sheet, Helsinki, 21 March 1997, printed in: Disarmament Diplomacy, April 1997, p. 32.

7 On the situation and the events in the CD see Rebecca Johnson, Fissile Material talks (Fissban), www.acronym.org.uk/fissban/index.htm and reports published in the journal Disarmament Diplomacy, online at www.acronym.org.uk (21.1.2011).

data on already existing materials in order to produce reliable results on materials produced after entry into force of an FMCT.

Furthermore, transparency in fissile materials would facilitate technical disarmament measures, for example, in disposing of plutonium and HEU from dismantled weapons. For several years, the problem of how to dispose of excess weapons plutonium in a way that minimizes proliferation dangers and maximizes the technical hurdles for rearmament has been studied, nationally and internationally.[8] Studies dealing with Russian material always have to cope with the problem that the material is still tainted with so many secrets. In the studies on the disposition option of fabrication mixed oxide fuel (MOX) from excess weapons plutonium, the isotopic composition of the plutonium is still secret and must therefore be replaced by fictitious assumptions.[9] But this information is necessary for the design of a MOX facility so that its criticality can be calculated and the facility's elements designed accordingly. In future verification scenarios aimed at comprehensive verification of nuclear disarmament, the output of the verified dismantlement process – the fissile materials – would also be subject to monitoring and accounting. Should some technical aspects still be secret, this would create a gap or the need for additional complicated procedures. More declassification of information on fissile materials would facilitate processes like this one, making them less costly, more effective and more convincing.

8 Prominent examples for of studies are include: U.S. National Academy of Sciences: National Academy of Sciences (NAS), Committee on International Security and Arms Control (CISAC), Management and Disposition of Excess Weapons Plutonium, Washington 1994; NAS, CISAC, Management and Disposition of Excess Weapons Plutonium: Reactor Related Options, Washington 1995. A German- – French- – Russian project for the building of a MOX pilot plant for Russian disarmament plutonium and an American- – Russian agreement on the non-military use of Russian disarmament uranium had been among the most advanced plans until the German Government cancelled its support because for domestic political reasons. See Gesellschaft für Anlagen- und Reaktorsicherheit (GRS)mbH, Siemens Aktiengesellschaft und Ministerium für Atomenergie der Russischen Föderation (MINATOM): Basisauslegung für eine Pilotanlage zur Produktion von Uran-Plutonium-Brennstoff aus waffengrädigem Plutonium und zum Einsatz dieses Brennstoffs in Kernreaktoren (Principal basic design of a pilot plant for the production of uranium plutonium fuel from weapon grade plutonium and for the use of this fuel in nuclear reactors), Final Report, February 28, 1997. See also N.N. Yegorov et al. The AIDA-MOX 1 Program: Results of the French-Russian Study on Peaceful Use of plutonium from Dismantled Russian Nuclear Weapons, in IAEA: Nuclear fuel cycle and reactor strategies: Adjusting to new realities, Proceedings of an International Symposium held in Vienna, June 3-6, 1997, p. 93; Joint United States / Russian Plutonium Disposition Study, Prepared by the Joint U.S.-Russian Plutonium Disposition Steering Committee. U.S. Department of Energy, Washington, DC, September 1996.

9 Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) mbH, Siemens Aktiengesellschaft und Ministerium für Atomenergie der Russischen Föderation (MINATOM): Basisauslegung für eine Pilotanlage zur Produktion von Uran-Plutonium-Brennstoff aus waffengrädigem Plutonium und zum Einsatz dieses Brennstoffs in Kernreaktoren (Principal basic design of a pilot plant for the production of uranium plutonium fuel from weapon grade plutonium and for the use of this fuel in nuclear reactors), Final Report, February 28.

Without transparency, problems arising from secrecy of information could make states more reluctant to engage in arms control negotiations, or could result in a much more modest outcome. Any declassification of information that touches upon fissile materials for nuclear weapons and their production will be beneficial for future verification and nuclear arms control.

Finally, confidence that security is possible without nuclear weapons requires confidence that nobody is cheating and hiding any warhead or fissile materials. A prerequisite is transparency and verification (Schaper 2009).

2.1.3 Nonproliferation and physical security

It is generally assumed that the security of warheads is high and that there is hardly any risk of abuse or diversion. However, there may be exceptions, and only little is known on standards in some states possessing warheads. An example is Pakistan. The security of its nuclear complex is said to be a concern. The Pakistani government would not support terrorists. But the Taliban and fundamentalists have many sympathizers in the population. It is not clear whether even insiders would support them, and political turmoil could make its nuclear weapons and stocks of nuclear explosive material vulnerable to theft (Albright 2001). It is believed that the physical security of Pakistan's nuclear weapons is below standard (Albright/O'Neill/Hinderstein 2001). It is not known where the nuclear weapons are hidden, because it is likely that the storage sites might not withstand an attack. They are not equipped with so-called *permissive actions links*, which would prevent any unauthorized use. Another example are rumors some years ago on lost Russian so-called "rucksack bombs" that might have fallen into terrorists' hands. Although the rumors were probably incorrect, it would have been beneficial if all existing warheads had been accounted for internationally, and if standards of physical protection were an issue of international collaboration.

Similarly, too little is known about explosive materials, e.g. their quantities, physical properties, physical security and diversion risks. As an example, the risks are high in Russia, which is in the process of transforming its nuclear control system. The security of the Russian nuclear production complex is estimated to be far below Western standards. Incomplete accounting records from the Soviet period make it difficult to determine whether fissile materials could already have been illicitly removed.[10] Even less is known

10 There are numerous publications on the situation and the security of the Russian nuclear complex and the international response to it. See for example Matthew Bunn, The Next Wave: Urgently needed new steps to control warheads and fissile material, Report Carnegie Endowment for International Peace and Harvard University, March 2000, available at www.ksg.harvard.edu/bcsia/atom; Kevin O'Neill, The Risk of Theft: Protecting Fissile Materials in the Former Soviet Union, in: David Albright and Kevin O'Neill (eds.), the Challenges of Fissile Material Control, Washington, DC, 1999, p. 41, downloadable at: www.isis-online.org; Vladimir A. Orlov, "Accounting, Control, and Physical Protection of Fissile Materials and Nuclear Weapons in The Russian Federation: Current Situation and Main Concerns",

about the security of warheads and fissile materials in other states with nuclear weapons and nuclear complexes. Furthermore, large quantities of weapon materials are becoming surplus to requirements, and the processes of warhead dismantlement, material transport, storage, and disposition create additional risks of diversion.

Why would transparency on fissile materials be beneficial for efforts to halt nuclear proliferation? A variety of co-operation projects between states, notably the U.S. and Russia, are aimed at enhancing the security of fissile materials and warheads. Transparency in fissile materials would facilitate international cooperation aimed at improving the situation, for example, regarding international collaboration in material protection, control and accountancy (MPC&A) and measures for storage and transportation. Controls aimed at ensuring that funds are being spent properly sometimes conflict with secrecy on fissile materials and facilities. For example, an achievement of U.S.-Russian CTR cooperation is the construction of a storage facility for excess weapons materials and warhead components. However, the U.S. wants to ensure that the materials stored at the facility in fact originated in weapons. But the Russian side refuses to grant sufficient transparency, not only because of its own secrecy requirements but also because the U.S. refuses to offer reciprocal transparency at corresponding sites of its own. The larger the number of secrets revealed, the easier it will become to incorporate excess nuclear weapon materials into international CTR activities.

2.1.4 Attitude change by reporting practice

Major sources of proliferation-relevant materials and technologies can be found in states that control them through solely national means, without any obligation to adhere to international standards or to have the security of their nuclear materials checked by an international agency. The owners regard accounting for and ensuring the security of their warheads, nuclear complexes and fissile materials as a solely national matter. In contrast, in non-nuclear weapon states (NNWS) as defined in the NPT, the culture is different: Fissile materials are a matter of international responsibility and reporting obligations are self-evident and uncontested by either decision-makers, the public or the industry. The longer the nuclear industry has been accustomed to safeguards, the more a similar culture will develop. During the long history of safeguards, methods of accounting and verification have been developed and refined, and there is a large international community of safeguards experts. The international safeguards in the NNWS have greatly reduced the danger of

Paper presented at the International Seminar on MPC&A in Russia and NIS, Bonn, sponsored by the Deutsche Gesellschaft für Auswärtige Politik, April 7-8, 1997. For European activities see Kathrin Höhl, Harald Müller and Annette Schaper, Edited by Burkard Schmitt, EU cooperative threat reduction activities in Russia, Chaillot Paper 61, June 2003, www.iss.europa.eu/uploads/media/cp061e.pdf (24.2.2011).

nuclear proliferation. They have led to discipline and high standards of physical protection, materials accountancy and control of nuclear materials and installations.

A paradigm shift in states possessing nuclear weapons is overdue: Similarly to NNWS, the NWS should start regarding their nuclear weapons and fabrication complexes and civilian and military fissile materials as a matter of international responsibility that entails duties. A first step would be creating more transparency through binding commitments to transparency and reporting. A later goal could be universal international safeguards which would promote a security culture and similarly high standards everywhere.

2.2 Motives for secrecy

It would be easier to implement transparency and registers, if the owners of the nuclear materials were willing to declassify some related information. In some cases, it is not clear why certain information must still be kept secret, in others, it is obvious. In this chapter, motives for secrecy and rationales for declassification are discussed. In reviewing the secrecy of nuclear weapons information, stark differences become apparent between the nuclear weapons-states concerning this issue. The most transparent state in this regard are the U.S., even though the Bush-Administration sought to reverse the course of increased openness pursued by the government under Clinton.[11] Israel, on the other hand, can be found at the other end of this spectrum, as it continues to deny even possessing nuclear weapons. However, all the nuclear weapons-states share certain motives for secrecy:

2.2.1 Secrecy as non-proliferation measure

Revealing specific technical details can entail proliferation risks: they could be used to advance the nuclear weapons program of another proliferator. Therefore, sensitive information such as the specifics of nuclear weapons construction and the production of particular materials and tools used in the process should not be disclosed. However, there is some information on nuclear weapons which, though formerly kept secret by the nuclear weapons-states, has become publicly available. It includes mostly general principles concerning the construction and functionality of nuclear weapons, rather than specific technical information. Most of this general data can even be accessed on the internet.[12] There is no need to classify information that is already available.

11 Documents on U.S. Secrecy and Openness Policy are being compiled by Steven Aftergood and made available at: www.fas.org/sgp/ (21.1.2011).

12 Examples are: Carey Sublette, Nuclear Weapons Frequently Asked Questions, Version 2.25: 9/8/2001, http://nuclearweaponarchive.org/Nwfaq/Nfaq0.html (21.1.2011); and Gerhardt Locke, Aufbau und Funktionsweise von Kernspaltungswaffen, Bericht INT 25, Euskirchen 1982 (not available on the

Compared to the basic information and nuclear science, specific engineering and technical information, the specific engineering and technical information bears the capacity to considerably accelerate the program of another proliferator and lower the investment in time and money, also making it less probable that the program is detected prior to completion. Such specifics should therefore be safeguarded. Even though a determined potential proliferator might have the capacity to develop the capability to produce nuclear weapons on his own, extended classification can impede this process or at least make it more expensive and less likely to be completed. Furthermore, it makes it more likely that the program is detected and there is more time to counteract it.[13]

Registers of nuclear weapons and fissile materials as discussed in this analysis would not conflict with the goal of non-proliferation, because such registers would not provide any technical detail for proliferators. A few exceptions might arise in cases of information on insecure facilities containing fissile materials, the publication of which could potentially facilitate illegal diversion. Cases like this should trigger international collaboration aimed at improving the physical security of such facilities.

2.2.2 Secrecy for national security

The classification of information related to nuclear weapons is usually justified with the term "national security", even though the exact definition of the term remains illusive. Below, three variations of "national security" are analyzed: deterrence, uncertainty as strategy, and secrecy on the level of technological development.

(a) Deterrence: Deterrence lay and lies at the centre of nuclear strategies aiming at preventing both a nuclear and a major conventional war. The survivability of nuclear forces is crucial to maintain a functioning deterrence posture. Survivability, in turn, is dependent upon several aspects of secrecy. Precisely, keeping the location of nuclear weapons can be crucial in preventing successful pre-emptive attacks.

It is contested to which extent nuclear deterrence strategies are still judicious after the end of the Cold War, as some argue that conventional deterrence would suffice in most conflict situations. But states will insist on the need for secrecy as long as such deterrence strategies persist. However, deterrence is often merely a pretext for information currently kept secret and it is doubtful whether it can be a legitimate justification. There might not be the need for the present level of secrecy for all nuclear weapons systems.

A nuclear weapon register that gives numbers of warheads on submarines would not conflict with the goal of a second-strike capability as long as the location of the

Internet). Another site that offers many resources and links is: The Nuclear Weapon Archive – A Guide to Nuclear Weapons, http://nuclearweaponarchive.org/ (21.1.2011).

13 The function of classification in delaying proliferation can be compared to that of export controls.

submarines is not known. Some smaller nuclear weapon states, however, use uncertainty about numbers for reasons of deterrence. They argue that uncertainty makes it more difficult for an adversary to plan a first strike. On the other hand, this uncertainty is an incentive for the adversary to build up a larger arsenal of its own. Furthermore, it is questionable whether uncertainty despite some unofficial numbers really makes a difference. A similar discussion applies to transparency on quantities of fissile materials, because some states argue that such information would enable conclusions about the size of their arsenals.

(b) Uncertainty as strategy: the uncertainties concerning capabilities as well as the pursuit of a strategic advantage were part of the American as well as the Soviet nuclear strategy during the Cold War and this legacy endures to this day. However, a certain degree of transparency was reached through arms control measures in cases where uncertainty put the stability of strategic relations in jeopardy (Walker 1997). The classified material included capabilities and technical details; as such data could have revealed information on military planning. But history has shown that transparency due to arms control during the Cold War has contributed to stabilizing the situation. This important lesson applies today to smaller nuclear weapon possessing states such as India and Pakistan.

(c) Secrecy regarding the level of technological development: States might want to cover technological shortcomings, effectively bluffing about capabilities, or try to maintain their technological advantage, so as to prevent an adversary from preparing countermeasures, such as anti-ballistic missile systems and to be able to turn an adversary's weakness into an advantage. Therefore, the level of technological achievement is mostly not disclosed. This reasoning, however, applies only to very detailed technical aspects, but not to general information such as numbers, types, yields, ranges, or operational status of nuclear weapons or quantities and properties of fissile materials, that could become part of registers.

Nevertheless, smaller nuclear weapon states might want to impress by capabilities and could be tempted to exaggerate their holdings. For instance, after its test in 1998, India claimed that it was a successful thermonuclear explosion, which later turned out as an exaggeration. Similarly, the North Korean nuclear test in 1996 was far less successful than claimed. While nuclear tests are an indicator for capabilities, they are dealt with by the CTBT. Nuclear registers deal with different information.

Nevertheless, smaller nuclear weapon states might want to impress with their capabilities and could be tempted to exaggerate these. As an example, after its test in 1998, India claimed that it was a successful thermonuclear explosion, which later turned out as an exaggeration. Similarly, the North Korean nuclear test in 1996 was far less successful than claimed. While nuclear tests are an indicator of capabilities, they are covered by the CTBT. Nuclear registers deal with different information. China is another example of a state that does not publish warhead numbers, citing deterrence as the reason.

2.2.3 Secrecy as status

As access to classified information is often affiliated with the select status the nuclear complexes of nuclear weapons-states have within the state bureaucracy, some decision makers and politicians view the disclosure of technical data as the relinquishment of this status or even as a defeat. This mindset often leads to even more excessive secrecy. Scientists, who are normally interested in open communication within the scientific community and wish to gain a reputation by publishing their findings, are unable to do so, when working on nuclear programs (Gusterson 1999). However, since this is balanced by the acknowledgement they receive within the closed circle of the nuclear scientist community, even they come to view secrecy as a privileged status and therefore something to be appreciated.

Most politicians, who depend on the advice of experts, often prefer to be safe than sorry when faced with the decision of whether to declassify nuclear information or not. Conservative administrations tend to prefer to keep such information secret anyhow.

Nobody officially admits this reason for secrecy. Indeed, while excessive secrecy is known as a problem in international arms control endeavors, it is hardly ever made a subject of international discussion or even negotiations. In cases where the topic of secrecy and transparency is discussed in domestic politics, and even in the rare moments when it touches on nuclear weapons, the motive of "secrecy as status" is not mentioned. Instead, the motives of non-proliferation and national security discussed above are discussed. However, the question must be explore as to whether these only serve as a convenient and accepted pretext, concealing status or other motives lie.

2.2.4 Secrecy because of democratic deficiencies

Another reason – democratic deficits – plays a crucial role in some states in sustaining extreme secrecy, even though it is hardly admitted to. The greater the democratic deficits in a state, the easier it is to use secrecy as a shield against troublesome criticism. It can also be used to cover up mismanagement, criminal activity or corruption. In addition, secrecy can also be used by certain groups to promote special interests, e.g. preserving their independence in decision-making, increase their monopoly on specific knowledge and therefore their power as well as to avoid oversight by competitors or the public (Walker 1997). The smaller the community that sets the agenda, the more power its members accumulate. In democratically constituted states, the legal precautions to prevent the abuse of secrecy are greater. If bureaucracies have traditionally been granted the right to be in charge of national security issues with limited oversight, they will have little motivation to cede this "right". The leverage the outside world has to promote greater transparency in these states is limited. Even democracies in which traditionally parliamentary control over military activities has been feeble or limited, such as France, it is hard to create a basis for outside transparency (Grand 2003).

The U.S. provide one of the best-known examples for the way democracies may seek to limit the possibility of abuse. In 1966, the Freedom of Information Act (FOIA) entered

into effect, which grants any person the statutory right of access to government information. "The basic principle of the FOIA is to ensure an informed citizenry, vital to the functioning of a democratic society, needed to check against corruption and to hold the governors accountable to the governed."[14]

Secrecy because of democratic deficiencies is a matter of fact. But the democratic stance of states is not the subject of debate over nuclear arms control, transparency and registers of warhead and fissile materials. There are only a few scenarios in which democracy and secrecy might affect each other: one is a long nuclear production history whose documentation is incomplete and sloppy and which is likely to exist in several states. Those responsible for the situation have no interest in transparency. Therefore, it is most important that any attempt at arms control, international collaboration and transparency offer a face-saving way out of this scenario. In particular, a newly established register must not expect the same precision as the nuclear material accountancy in non-nuclear weapon states that are subject to IAEA safeguards. Instead, with great patience, a transition period must be allowed, during which the level of precision is advanced, preferably within international material accounting projects.

2.2.5 Secrecy because of historic traditions and conservative inertia

This is a simple motive which is found everywhere. Historically, all nuclear weapon programs began in complete secrecy, without direct democratic control. If there is no established structure or motivation for change, one can hardly expect shifts in policy or declassification. Citizens or individuals working within the system who would welcome greater transparency might not see a way of initiating a reform process or be afraid of the possible repercussions of doing so and prefer to not take action. Non-action bears no immediate consequences, whereas declassification requires a specific measure and always involves the risk of revealing too much. Furthermore, maintaining the status-quo has become the routine approach of conservative bureaucracies, which is seldom questioned. There is no mechanism on declassification contained within the classification system. This may reflect the attitude of the state possessing nuclear weapons or just be restricted to the mindset of the nuclear complex. Israel is the most prominent example of a nuclear program that has never moved beyond the level of extreme secrecy (Cohen 1998).[15]

States that wish to promote international transparency should start by implementing bureaucratic mechanisms that enable declassification. At the same time, they should examine their own interests in international transparency and national security and

14 United States Supreme Court in NLRB v. Robbins Tire Co., 437 U.S. 214, 242 (1978), quoted on http://wikifoia.pbworks.com/Sunshine+Quotes (21.1.2011).

15 Cohen and Graham criticize that the Israeli nuclear complex escapes any democratic control and develop suggestions of how to end the extreme secrecy, cf. Avner Cohen and Thomas Graham Jr., An NPT for Non-Members, Bulletin of the Atomic Scientists, May/June 2004.

identify the true motives behind the status quo. A historic example that has the potential to deliver lessons is the U.S. "Openness Initiative", announced on December 7, 1993 by the U.S. Department of Energy (DoE).

Nuclear arms control was just one of its many rationales. It had a two-pronged approach concerning non-proliferation objectives by identifying and increasing security measures for truly sensitive information and by supporting global "transparency" for non-sensitive elements of nuclear programs (U.S. Department of Energy 1994). This led to the reform of the DoE´s nuclear classification and declassification system in 1998 (U.S. Department of Energy 1998). The initiative also called for clear and justifiable criteria for judgment on classification and declassification. It also emphasized that the only reason for classification should be national security. The revised U.S. legislation states that

> "in no case shall information be classified [...] in order to
>
> 1. conceal violations of law, inefficiency, or administrative error;
> 2. prevent embarrassment to a person, organization, or Agency;
> 3. restrain competition;
> 4. prevent or delay the release of information that does not require protection for national security or non-proliferation reasons;
> 5. unduly restrict dissemination by assigning an improper classification level; or
> 6. prevent or delay the release of information bearing solely on the physical environment or public or worker health and safety."

The reasons listed above clearly belong in the category of "secrecy because of democratic deficiencies", described in the preceding section. In an analysis, these motives are the most difficult to pinpoint and even more difficult to eradicate through changes. A definition of "national security" and non-proliferation is also provided, even though it is not very specific. Officers in charge of classification are obliged to assess:

> "The extent to which the information would assist in the development of a nuclear weapon capability in a non-nuclear weapon state or in improvements to the weapons in a NWPS.
>
> The costs in terms of time and money in acquiring the information.
>
> Any national security impact; particularly the extent to which the information would assist an adversary nation to assess or counter U.S. capabilities and limitations" (U.S. Department of Energy 1998).

As a result of the Openness Initiative, a range of information such as more data on warhead numbers, technical information on warheads, plutonium production and stocks and basic science related to nuclear weapons was declassified. It is compiled and made available on the DoE's "Restricted Data Declassification" (RDD) lists whose seventh version consists of over a hundred pages of technical details that are now declassified (U.S. Department of Energy 2001b).

3. Options

3.1 Scope of registers

3.1.1 Nuclear weapons and deployments

Making information on nuclear warheads available can hardly be considered a proliferation risk. In a case where the location of nuclear arsenals is not sufficiently secured and therefore might be vulnerable to a terrorist attack or theft of warheads, the assessment might be different. One example of this kind are the Pakistanis arsenals, which are rumored to be susceptible to this danger (Albright 2001). However, the most prominent reason a state might choose to maintain secrecy concerning the deployment of warheads and arsenals is that if this knowledge became available, it could undermine the state´s security as well as that of its allies by providing a greater incentive for a disarming first strike and consequently weaken deterrence. But the question remains if the classification must cover all locations of nuclear weapons, as a credible retaliatory force based, for example, exclusively on nuclear-armed submarines might still suffice.

An alternative for smaller nuclear powers might be to remain ambiguous concerning the exact numbers of their arsenals to maintain their deterrence capacity until a nuclear retaliatory capability has been built, that enables survivability (Li Bin 2003: 24) But not only ambiguity on sheer numbers, but also on geographical localization, yields, ranges, or operational status could help maintain nuclear deterrence in their view.

While large nuclear powers do not suffer from these concerns, the idea that uncertainty reinforces deterrence remains prevalent, even decades after the end of the Cold War, as a U.S. report on accidental releases of classified data shows (U.S. Department of Energy 2003): "The inadvertently released nuclear weapons utilization information [...] detailed in this report could assist potential adversaries in assessing the strengths of the U.S. nuclear arsenal." It may not be unjustified to see this level of secrecy as exaggerated.

Until now, no nuclear-weapons state has made all of the information concerning its warheads available, even though most of them have either made statements or published documents containing related information. Within the framework of the nuclear arms-control treaties, mainly START and INF, there has also been an exchange of data on strategic nuclear warhead delivery systems between the U.S. and Russia. Nonetheless, the main focus of the important agreements between the two great powers has been on delivery vehicles and launchers. The number of warheads was estimated indirectly through counting rules, through which a certain number of deployed warheads is associated with a specific delivery vehicle.

Transparency in tactical nuclear weapons – an entire category of nuclear weapons – is still lacking. They are only subject to an informal regime created by unilateral declarations by George Bush and Mikhail Gorbachev in the autumn of 1991. Since then, both sides have substantially reduced their tactical arsenals, but information exchange has been limited to periodic updates on progress. There were no monitoring or any other meaningful transparency measures. Neither side has given a comprehensive overview of

its tactical arsenal (Potter/Sokov/Müller/Schaper 2000). In addition, weapons in various reserve categories are completely omitted from official accounts. Some tactical nuclear weapons are stationed outside the territory of the owners, a prominent example being Germany, which serves as a deployment site for U.S. nuclear weapons. Meanwhile, calls for withdrawal of these weapons are intensifying, including Foreign Minister Frank-Walter Steinmeier who on April 27, 2009 spoke in favor of a withdrawal of all nuclear weapons from Germany. The exact number of warheads has not been released; instead public discussions refer to estimates by NGOs that are based on previous reports, official statements, declassified documents and leaks.[16] It has become apparent that the number of nuclear weapons outside the U.S. has been reduced during the last years, but this has been done in secret without official declarations. Similarly, there is no official explanation of the reasons for this deployment. The lack of numbers and justification is an obstacle to progress on nuclear disarmament.

Even though they officially do not provide deployment locations or the numbers of warheads, the U.S. have been the most forthcoming in providing detailed information about their nuclear weapons. As a result of the Openness Initiative, they have, however, published an official account of the sum total of nuclear warheads in their stockpile until 1961, , the number of warheads retired or dismantled up to 1994, the number assembled each year, and some additional data (Department of Energy 2003). Stockpile numbers of the past years, which in part contain weapon systems still in the stockpile, remain classified; just as any information outside the scope of this document, as revealing it would be seen as a potential national security-threat.

Although Russia is far more open than the Soviet Union was, it is much more secretive than the U.S. and has not released warhead information on a comparable level. Organizations collecting this type of information (e.g. the NRDC) can draw from U.S. intelligence reports, Foreign Broadcast Information Service (FBIS) publications, information flows and publications of independent Russian researchers, who have begun to compile and publish information on strategic nuclear weapons.[17] In contrast to the information originating from the U.S. government, there are very few official Russian government sources.[18] As a result, the information that is published by NGOs is, as they

16 Notably NRDC Nuclear Notebook prepared by Robert S. Norris and William Arkin of the Natural Resources Defense Council, published in The Bulletin of the Atomic Scientists, www.thebulletin.org/issues/nukenotes/nukenote.html. See also W. M. Arkin, R. S. Norris, J. Handler, Taking Stock – World-wide Nuclear Deployments 1998, NRDC, Washington, DC, 1998. Another example is information provided by the Center for Defense Information (CDI), www.cdi.org/issues/nukef&f/database/usnukes.html (21.1.2011).

17 See website of the Center for Arms Control, Energy and Environmental Studies at the Moscow Institute of Physics and Technology (MIPT): Current Status and Future of Russian Strategic Forces, www.arms-control.ru/start/rsf_now.htm (21.1.2011), Pavel Podvig (ed.), Russian Strategic Nuclear Forces, The MIT Press, 2002.

18 Most of them are quotes and articles in the Russian press or articles by government members. An example is 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 DC:

caution, much less exact that the U.S. numbers, the least precise being the information on non-strategic nuclear forces.

The British Defense Ministry has published some information on warhead numbers and their operational status (British Ministry of Defense 2003). In France the release of numbers has been more indirect, e.g. via presidential speeches and legal documents attached to procurement laws and defense budgets (Grand 2003).[19] The NGOs that publish this information do so by compiling bits of information on the nuclear forces from various official publications as well as the data they receive from peace organizations monitoring nuclear storage sites. While these locations are well-known in countries like Britain and France and the number of related official publications is quite high, China releases almost no official information (Li Bin 2003) and the only sources of independent research groups are U.S. government intelligence reports and the Taiwanese press.

The NWS that are not party to the NPT still remain obscure. Though India and Pakistan have demonstrated impressively through their nuclear tests that they possess the nuclear warheads in question, they hardly reveal any other information. India has not published the number of its warheads, only officially announced yields and it is unknown, whether these warheads can be placed on the Indian delivery systems.[20] There has not been any statement confirming or denying the existence of nuclear weapons by Israel.

By now, more details have become public than many countries are willing to reveal. One source is the national intelligence agencies or "national technical means" (NTM), as paraphrased in arms control. This "involuntary transparency", through which the activities and goals of an opponent come to light, was, as Walker points out, a source of permanent strife between the two superpowers during the Cold War, while simultaneously creating confidence between the them (Walker 1997: 15). There have been instances when governments have revealed information intentionally without drawing too much attention, e.g. in attachments to military procurement funding requests, in public comments of low ranking governmental officials, or even leaked it to the press or researchers without the source being discernable. This is a very inconspicuous way of making information available to the public.

Brookings Institution, 1999, p. 320: "Whereas in 1991 the U.S.SR had about 22,000 tactical nuclear weapons, at present Russia retains around 3,00, including 200 atomic demolition munitions, 600 air defense missile warheads, 1,000 gravity bombs and short-range air-to-surface missiles, and 2,000 naval anti-ship, antisubmarine, and land-attack weapons." Arbatov was a member of the State Duma of the Russian Federation Defense Committee. Other authors have published somewhat differing numbers, quoted in Potter et al. (2000: 60).

19 An independent group that publishes data is the Centre de Documentation et de Recherche sur la Paix et les Conflicts (CDRPC) that has published data on the French arsenal on its web site: Observatoire des armes nucléaires françaises, www.obsarm.org/main/obsnuc_cdrpc.htm (21.1.2011).

20 There are open sources on these countries' potential delivery systems, e.g. see the Center for Defense Information's website www.dci.org (21.1.2011).

3.1.2 More detailed technical information on nuclear warheads

As verification procedures become more complex and sophisticated, the more secrets are touched upon during the verification process, especially technical details of individual warheads. Future verification measures will seek to distinguish between a real and a fake warhead and its identification. This is what is being planned for the continuation of the START-process. To be able to reach a certain level of assurance, verification has to use invasive examinations of technical properties. However, most of these technical details are kept secret. It is not necessary to be informed about all technical properties of a warhead; a subset of this data would suffice for verification. The less information is available, the more difficult verification becomes, while on the other hand, the more information becomes available, the greater the danger of proliferation might become. Examples of such more detailed technical information on warheads are: their mass and shape, their isotopic and chemical composition, the size of a pit and its reflector, the types and shapes of conventional explosives and other components, the mass, shape and design of secondaries, or information on other components such as ignition electronics or the outer casing.

In contrast to the information on general warhead properties described in the preceding section, this kind of information is much more sensitive, and unsuitable for any official register and regular information release. Nevertheless, if certainty can be created that a sealed container holds a specific warhead type, all other verification measures will need only to confirm that the declared items and their seals have not been changed during transportation and that the items have reached their declared destination, e.g. an intermediate storage site or a dismantlement facility.

The U.S. and Russia have been investigating means of how to identify warheads for the purpose of verification of dismantlement without revealing sensitive data since the mid-1990s. The significance of these methods has increased, as both states are apparently unwilling to exchange classified technical information (Bukharin 2003: 165). These technical measures seek to protect as much sensitive information as possible while simultaneously ensuring to the greatest extent possible that a certain object can be classified correctly as containing a nuclear warhead or a decoy. At the heart of these measures is radiation measurement in combination with information protection techniques and automated processes that finally give a reliable and simple “yes” or “no” to the question of whether a specific warhead is enclosed in a container. The more information fed into these technical processes, the more reliable the verification becomes. The prerequisite is confidence between the parties that none of this information will be leaked for purposes other than the desired verification. In order to avoid problems, they could share this information between themselves alone.

In sum, sensitive classified information is less suited for international publication and for inclusion in a register of nuclear weapons, but some of it plays an important role in future verification scenarios. Therefore, it is crucial to explore methods of making use of such information without increasing proliferation dangers.

3.1.3 Fissile materials

Transparency on warheads would be incomplete if it were not supplemented by transparency on stocks of fissile materials. The dismantlement of nuclear warheads generates nuclear and non-nuclear warhead components and fissile materials. The dismantlement of warheads does not only occur in the course of nuclear disarmament put also as part of the maintenance process of an arsenal. Therefore, those possessing nuclear weapon maintain reservoirs and pipelines of fissile materials and components for nuclear warheads in addition to their warheads in deployment and reserve. These materials amount to hundreds of tons and represent an additional reserve for potential rearmament. They can be grouped into various categories, namely "reserve material for potential rearmament", "remanufacturing pipelines", or "still in military jurisdiction but considered excess to weapons needs." Some HEU is also reserved as fuel for nuclear-powered submarines.

It is desirable to establish a fissile material register with numbers officially declared by the owners. The different categories, namely whether material is considered necessary for nuclear weapons or whether it is considered excess should be declared. Other information that could be helpful, especially for international disarmament projects, are technical properties such as isotopic or chemical composition, physical shape, e.g. pits, recast metal objects, oxide powder, or scraps and residues. Finally, locations too should be declared, e.g. at storage and manufacturing sites or in various disposition processes; additionally, information on civilian stocks and HEU for naval propulsion, an overview of all production capabilities, e.g. reprocessing and enrichment, also reactors, fuel fabrication facilities and other elements of the nuclear fuel cycle should be declared. Documentation of production history might add to a clearer picture.

Finally, in this context the weapons usability of special and other materials is also interesting, along with the technical explanations why. Examples are the weapons usability of reactor-grade plutonium, special HEU fuels for civilian research reactors, or other isotopes formed in civilian nuclear fuel cycles and posing potential proliferation dangers, especially neptunium-237 (Np-237) and americium-241 (Am-241).

The data on the quantities and locations of military plutonium and HEU stocks is mostly kept secret. An estimated 450 tons of military and civil plutonium and over 1,700 tons of HEU are believed to exist.[21] Monitoring only covers a small amount of this material, as most of it remains restricted due to classification. Some NWS still refuse to make the figures on the isotopic and chemical composition of their HEU and plutonium beyond their weapons needs available. Independent scientists were able to compile an overview of stocks by methods such as literature searches, interviewing officials, or estimating reactor production from power and operating times. The margin of error in

21 Website of the Institute of Science and International Security (ISIS): www.isis-online.org (21.1.2011).

these calculations can vary, depending on the type of material and its condition. With some NWS, these margins can be quite large.[22]

After a two-year study, in 1996 the U.S. DoE published an in-depth report containing information on the country´s plutonium production and use 1944 through 1994 (U.S. Department of Energy 1996). In 2006, the U.S. also published a history of its HEU production and use from 1945 to 1996 (U.S. Department of Energy 2001a).

The British government also published a study in early 2000 containing data on British stockpiles of nuclear materials with the purpose of making the plutonium from disarmament accessible to IAEA inspections (United Kingdom's Defense Nuclear Programme 2000). However, the data relating to British HEU was not published, possibly because it is used exclusively for nuclear submarines. Nonetheless, the British and American publications on plutonium should be commended as a step in the right direction. Similar initiative on the part of the other NWS is still lacking. Concerning greater transparency towards the international community, the difficulties of many NWS are reflected in their commitments to the Additional Protocol (adopted in May 1997 by the IAEA member states). It provides new mechanisms to strengthen the effectiveness and improve the efficiency of the safeguards system.[23] But the information the NWS provide concerning their civilian nuclear activities still does not equal the transparency of the NNWS.

Concerning greater transparency towards the international community, the difficulties of many NWS are reflected in their commitments to the Additional Protocol (adopted in May 1997 by the IAEA member states). It provides new mechanisms to strengthen the effectiveness and improve the efficiency of the safeguards system.[24] But the information the NWS provide concerning their civilian nuclear activities still does not equal the transparency of the NNWS.

There have been several declarations of intent to place excess nuclear material from dismantled warheads under international verification:

A statement issued at the G8 summit in Moscow in 1996 stated that:[25]

> "We pledge our support for efforts to ensure that all sensitive nuclear material (separated plutonium and highly enriched uranium) designated as not intended for use for meeting

22 See FN 21.

23 IAEA, Model Protocol Additional to the Agreement(s) between State(s) and the International Atomic Energy Agency for the Application of Safeguards, IAEA document INFCIRC/540, Sep. 1997. INF/CIRC/540 was corrected twice in 1998: in INFCIRC/540/Corr. 1 (12 Oct.) and INFCIRC/540 (Corrected) (Dec.), available at URL www.iaea.org/Publications/Documents/Infcircs/1997/infcirc540.pdf 21.1.2011). For a detailed description and analysis see Häckel, Erwin/Stein, Gotthard (eds.), Tightening the Reins: Towards a Strengthened International Nuclear Safeguards System, Berlin/Heidelberg/New York, Springer-Verlag, 2000.

24 See FN 23.

25 Moscow Nuclear Safety and Security Summit Declaration, April 20, 1996, paragraph 25.

> defense requirements is safely stored, protected and placed under IAEA safeguards as soon as is practicable to do so."

In the Guidelines for the Management of Plutonium, which were agreed in 1997 between the most important states using plutonium, it is stated that "these guidelines apply to the management of all plutonium in all peaceful nuclear activities, and to other plutonium after it has been designated by the Government concerned as no longer required for defense purposes".[26] A major purpose of these guidelines is to create maximum transparency.

Transparency on excess fissile material was also promised by the NWS at the NPT Review Conference in May 2000:[27]

> "We are committed to placing as soon as practicable fissile materials designated by each of us as no longer required for defense purposes under the International Atomic Energy Agency (IAEA) or other relevant international verification."

The international community is advocating greater transparency. The same has been requested by the EU Council at the NPT Review Conference:[28]

> "[...] calling on nuclear weapon States, as agreed at the Moscow G7/P8 Summit on Nuclear Safety on 19 and 20 April 1996 to place fissile material designated as no longer required for defense purposes under appropriate international safeguards and physical protection."

The call has also been repeated in several UNGA resolutions, the latest in November 2001.[29] It must be noted that these declarations contain the rather vague phrasing "as soon as practicable", which could delay success indefinitely.

The negotiations between the IAEA, the U.S. and Russia, also referred to as the "*trilateral initiative*", have been a step in the right direction concerning the mechanisms of verifying excess nuclear materials resulting from disarmament. Its goal is to work out an arrangement, under which information on the origin of a weapon and other fissile materials exempted from defense requirements in Russia and the U.S., be it classified or unclassified, could be submitted to IAEA verification (Shea 1999, 2003: 229ff.).[30] In the case of classified forms, the material would be submitted in sealed containers, and only a few, not very specific attributes would be verified, e.g. whether the amount of plutonium

26 IAEA, INFCIRC/549.

27 Letter dated 1 May 2000 from the representatives of France, China, Russia, the UK and the U.S. addressed to the President of the 2000 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, NPT/Conf.2000/21, http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N00/411/96/PDF/N0041196.pdf?OpenElement (24.2.2011).

28 Council Common Position of 13 April 2000 relating to the 2000 Review Conference of the Parties to the Treaty on the Non-proliferation of Nuclear Weapons Official Journal L 097, 19/04/2000 p. 0001 (Document 400X0297)), Article 2 (2 i).

29 Resolution 56/24N of the UN General Assembly, 29 November 2001, A path to the total elimination of nuclear weapons.

30 Press Statement on the Trilateral Initiative, IAEA Press Release, PR 97/26, September 30, 1997.

present in a container exceeds a specified minimum mass value. The verification techniques used here take advantage of information barriers (Shea 2003; Whiteson/MacArthur 1998). The IAEA would not be able to verify that the materials submitted actually came from dismantled nuclear warheads. However, an important benefit would be the irreversibility of disarmament, since, once the material is subject to safeguards, it can never again be used in the manufacturing of nuclear weapons. It also helps to determine quantitatively just how much fissile material has been removed from defense programmes. The trilateral initiative has the potential to be a starting point for verification of future nuclear disarmament agreements, and for incorporating other NWPS.

In September 2000, the U.S. and Russia concluded an agreement on the disposition of excess weapons plutonium, the "*Plutonium Management and Disposition Agreement*" (PMDA).[31] It devotes large sections to the protection of sensitive material, mentions the use of information barriers during inspections, and defines categories of information classification. In order to circumvent the declassification of the plutonium isotopes, the agreement regulates how this plutonium may be diluted by up to 12 percent with so-called "blend stock" plutonium which is of different isotopic composition and from a non-weapon origin. This procedure ensures that no conclusions can be drawn on the original isotopes, and means that a larger quantity of plutonium must be disposed of. Furthermore, international verification of the disposition process will be more difficult, as the feedstock blurs accurate material accountancy, and the verification process only starts after the blending has taken place. If the isotopes of the plutonium were published, these disadvantages would be obsolete, and the disposition process would be simpler.

In future verification scenarios that aim at comprehensive verification of nuclear disarmament, the output of the verified dismantlement process – the fissile materials – would also undergo monitoring and accounting. Should the isotopes still be masked, this would create a gap or the need for additional complicated procedures. More declassification of information on fissile materials would facilitate processes like this one and make them less costly, more effective and more convincing.[32]

In discussions on the scope of future FMCT negotiations, none of the nuclear weapon owners except Pakistan is willing to consider the inclusion of those fissile materials produced prior to the agreement's entry into force – something demanded by a large number of NNWS.

31 Agreement Between The Government Of The United States Of America And The Government Of The Russian Federation Concerning The Management And Disposition Of Plutonium Designated As No Longer Required For Defense Purposes And Related Co-operation, September 1, 2000, text available at: www.state.gov/documents/organization/18557.pdf (24.2.2011).

32 It must be noted that it is doubtful whether the agreement on Pu disposition will be implemented, because of its very high costs and because it is unclear whether the international community will contribute enough funds.

3.2 Negotiating transparency and registers

The first step towards transparency is unilateral declarations. The next would be institutionalization and regular updates, e.g. registers of information. They would pave the way for future steps that include verification.

Where could or should a register be negotiated? Several possibilities exist that will be assessed in the next sections.

3.2.1 Using the Conventional Arms Trade Register Process

The suggestion has been made to amend the Conventional Arms Trade Register in such a way as to make it applicable to weapons of mass destruction as well. There would be advantages to using an already available instrument with an established administration procedure. In the long run, such a register would develop into a world inventory of arms. In addition, concessions by the nuclear weapon states might induce other countries to be more forthcoming with respect to the inclusion of data they still regard as endangering their national security, should they become transparent.

However, the UN Conventional Arms Register may not be the best place to start. First, the qualitative distinction between conventional arms and weapons of mass destruction, particularly nuclear weapons, should not be blurred. This speaks for a separate rather than an integrated solution. Secondly, it might be preferable to keep register undertakings equal for all participants. Since only a few countries are supposed to report under the nuclear weapons register, such equality could not be maintained. Thirdly and more importantly, the Conventional Arms Trade Register is concerned with exports and imports and may remain so for an extended period. In contrast, the export of nuclear weapons is categorically prohibited under the NPT, to which all nuclear weapon states belong. The export of fissile materials that could be used for weapons purposes to non-nuclear weapon states (as defined by the NPT, that is, including the three de facto nuclear weapon states) is already registered through the IAEA, as this falls under the safeguards obligation of Art. III of the NPT and the related Safeguards Agreement INFCIRC/153. Fourth, while the UN Conventional Arms Register is based on voluntary participation, it is likely that participants would wish to have some guarantee of the participation of at least the other nuclear weapon states, if not the de facto nuclear weapon states as well, in the form of a legally binding undertaking. Finally, it is not clear whether the group of experts – experts mainly for conventional weapons – is an ideal body to prepare the details of a nuclear arms register.

For much the same reasons, while the UNGA should certainly endorse a register agreement if and when it comes along in the form of a draft resolution, it appears not to be the ideal body to negotiate the details; nor is its first committee in a good position to do so. Either body should consider and discuss whatever concept emerges from other negotiation forums, but if these do not come up with a useful and well-worked out proposal, the UNGA would not be capable of stepping into the breach.

3.2.2 The Conference on Disarmament

Using the CD for this purpose looks a better option. However, the CD had been deadlocked for many years. At the present time, there is hope that the deadlock will be overcome and the CD will start to negotiate an FMCT. In the context of an FMCT, the question of whether existing fissile material should be covered will be highly contested. Some delegations will insist that the scope of the FMCT only deal with material produced after the treaty comes into force, which will probably be opposed by some other delegations. A way out could be to take the question of existing fissile materials out and deal with them in an additional committee on nuclear weapon and fissile materials registers. However, care must be taken that this will not be perceived as a trick in the FMCT context to create a backdoor for getting unwanted elements back in. Care must also be taken not to overburden the CD whose litmus test on starting FMCT negotiations still lies ahead. In the event that FMCT negotiations do indeed start, they will fully occupy the delegations. Negotiations at the same time could be a counterproductive overload. Instead, engaging in negotiations on registers immediately after the FMCT could be envisaged.

It could be useful to deal with them under the heading of "transparency in armaments", which is also on the CD agenda. This item has been largely idle for most of the lifetime of the CD, partly because of the reluctance of the non-aligned countries to grant more insight into matters they view as pertaining closely to their own security unless there is movement on the nuclear disarmament side. Taking up the nuclear arms register in this context might thus be viewed as an adequate quid pro quo.

A third option would be not to negotiate the register in the CD at all, but to establish an ad-hoc committee on nuclear disarmament without a negotiation mandate, to which the countries participating in the register would report on the negotiation process, present its results, and submit the register data annually once it is established. These data could present a solid information base which deliberations by the committee on nuclear disarmament could build on.

3.3 Negotiations among the P-5 or the P-5 plus 3

It could be claimed that the expertise necessary to work out the details of a register lies exclusively in the hands of those countries that possess nuclear weapons, because only they know about both the possibilities and risks of revealing specific information about the arsenals and the materials they consist of. Similarly, the argument could be made that they would feel fewer inhibitions about discussing this matter frankly among themselves, not least because Art. I of the NPT would not apply (this, however, would not be valid for a forum in which the three de facto nuclear weapon states participated, as they are non-nuclear weapon states under the definition of the NPT). Because of these advantages, a small forum consisting only of the "haves" might be able to solve the issues in connection with establishing a register more quickly than a multilateral forum with wider membership.

While it should not be denied that this is a possibility, there are nevertheless reasons why a multilateral forum with strong participation by non-nuclear weapon states is preferable. First, a register is meant, inter alia, to work as an instrument ensuring accountability of the nuclear weapon states to the world community. Consequently, it would be appropriate to have this community present when the details of the register are decided. Secondly, a certain pressure on the nuclear weapon states might help to give the register a more open and informative shape than if the nuclear weapon states, which have a shared interest in keeping accountability limited, were to decide everything among themselves. Third, the value of the register as an instrument of security and its role in the disarmament process might be better understood by a broader range of actors if these actors had a say in bringing it about. Fourth, a multilateral forum – notably the CD – would automatically ensure the presence of the three de facto nuclear weapon states. Finally, it is not clear whether the "haves" would not stumble over disagreements. For a while during the CTBT negotiations, the P5 negotiated among themselves on a testing threshold, but were unable to reach agreement. An outcome, namely a "zero-yield" test ban, was agreed quickly after the topic was taken back to the CD and the international community.

However, the CD is a difficult body because it operates under the unanimity rule. It had already been deadlocked for years. For this reason, it may happen that the attempt to extract a negotiation mandate from this body might fail. Certain non-nuclear weapon states might be dissatisfied with a more limited definition of the subject of negotiations, and could object. One or a few of the nuclear weapon states or the de facto nuclear weapon states might not be willing to let negotiations start. In either case, it might be better to restrict the talks to a smaller circle. If the political will existed, this could be done through a parallel to the Ottawa process, that is, within a group of like-minded countries. It goes without saying that this would have little meaning unless a majority of the eight most important countries participated. If they preferred to discuss matters among themselves outside a formal multilateral body, such a process would be preferable to no register at all if it yielded meaningful results. Similarly, a system initiated by the P-5 without a role for the three de facto nuclear weapon states would be preferable to the present lack of transparency, particularly if it were set up in such a way as to admit and facilitate later accession by the three. Again, something would be better than nothing, but we recognize that countries in regions adjacent to the de facto nuclear weapon states may have different priorities.

3.3.1 Using the Enhanced NPT Review Process

It has been suggested that the Enhanced Review Process that was agreed to in the context of the indefinite extension of the NPT, and which started in April 1997 with the first session of its preparatory commission, should be more extensively used as a negotiating body for nuclear disarmament issues. This suggestion has gained some strength through the long-lasting stalemate in Geneva. However, there are principle reasons why this suggestion should be treated with considerable caution and why, in our particular

context, its implementation might quickly prove counterproductive. First, the review process is not a negotiation process. It would be artificial to transform it from its primary task of scrutinizing the implementation of a specific treaty and proposing steps to enhance this implementation into a forum where other international instruments would be worked out. Secondly, such a practice would detract from the CD's standing as the authoritative multilateral negotiation body – without a tangible advantage, as the rules of the Review Conferences would presumably also contain the consensus clause. While past rules of procedure permitted voting in extreme circumstances and as the consequence of an elaborate sequence of procedural steps, this rule has never been used. Since negotiating would be an innovative mission for the Review, it is likely that new, specific rules would be set up for this purpose, and there is no prospect that the nuclear weapon states would accept any negotiation on a nuclear weapons issue that would not allow them a veto. Thirdly, the past history of the NPT Review Process is not very promising. The Review Conference in 2005 ended in disaster and dismay (Müller 2005). Finally, and perhaps most importantly, the three de facto nuclear weapon states are not parties to the NPT and its review process. They would be excluded from the beginning, and the prospects of their ever accepting an instrument in whose negotiations they would not have had a say are extremely slim.

3.3.2 Some other options

There are several international endeavors that could be regarded as first steps or that could eventually serve as motivator, accelerator or even forum for negotiations on registers:

- The bilateral U.S.-Russian negotiations on a reduction of strategic arms and replacement of the expiring START treaty could cover transparency measures on warhead numbers.
- As explained above, negotiations on the FMCT could motivate transparency on fissile materials.
- Those nuclear weapon states willing to do so could offer voluntary reports in the CD, First Committee, or Enhanced Review Process context, pending negotiation of a more formally based register.
- International cooperation projects on enhancing the security of fissile material create additional motivation for transparency.
- The Management of Plutonium creates transparency on civilian plutonium stocks.
- The Convention on the Physical Protection of Nuclear Materials (INFCIRC/274/Rev.1) makes it legally binding for states to protect nuclear facilities and material in peaceful domestic use, storage as well as transport.

Summarizing the considerations of this chapter, it appears that using the CD for straightforward negotiations to establish a nuclear weapons register would be the preferable option. An Ottawa type process or the Conventional Arms Register review

process could be used as substitutes, although it is hard to see how the latter could succeed where the CD had failed. An agreement between the P-5 plus three or at least the P-5 that was submitted to the UNGA would be better than nothing. Other measures would produce a puzzle from which informed observers could draw conclusions close to those a register would reveal, but they would lack the symbolic force and practical manageability of a consolidated register. However, if nothing else were available, this would be better than nothing.

3.4 Institutionalization of registers

A register must be drawn up, maintained, collected, kept, and circulated, and someone has to take responsibility for performing these tasks. There are various options:

- The IAEA could be tasked with administering the register. This has the major advantage that the expertise and an adequate international structure are available. It is likely that the IAEA will also be tasked with the verification of an FMCT, which would create synergies. It would also increase the chance that the IAEA will be well prepared for when verification of nuclear disarmament is laid upon its shoulders. However, the distinction between administering declared information and actually verifying treaties must be clear; otherwise objections will be likely, especially by the nuclear weapon states.
- If the NWR were attached to the UN Conventional Arms Register it would fall on the UN Secretariat to administer it in the context of its UNCAR activities, of which it would be just a part. However, as attaching the nuclear to the conventional register is not a very good idea, it is not likely that this will be the option chosen.
- The alternative would be to use the same type of mechanism as for the Conventional Arms Register, but to deal with the NWR separately. In this way the UN Secretariat would be charged with this task under a different heading.
- If the register were an exclusive P-5 initiative, a standing commission would probably be established. This body would meet annually and would be staffed by experts and high-ranking officials from the foreign and defense ministries and atomic energy agencies or ministries of the five nuclear weapon states. The register would be maintained by this commission. The five could use the CD – its nuclear disarmament or transparency groups, the First Committee of the UN General Assembly, or the Information Circulars of the IAEA – to communicate register data.

3.5 Dealing with secrecy concerns: Phased-in transparency for the preparation of verification

We can debate long about the justifications for secrecy. Fact is that some of the nuclear weapon states see a degree of secrecy a necessary condition to preserve vital national security interests. It can be hoped that these concerns will soften up in the course of the disarmament process, but this will take time. Meanwhile, it is desirable to move forward with transparency measures, at best in the form of some register.

One initial possibility would be for the smaller nuclear weapon states to reveal not their actual nuclear weapon holdings, but the upper level of holdings that they deem desirable to maintain the viability of their deterrents and beyond which they commit not to enhance their arsenals. This transparency measure would ensure potential rivals that they would not be confronted with unexpectedly superior nuclear forces and thus reduce their motivations to press ahead with ever more warheads and delivery vehicles of their own. While this step would be very useful to bring the smaller nuclear weapons states into the disarmament process, it would lay too little ground for the more demanding requirements of verification of disarmament process in later stages, when numbers would be lower than today and sensitivities commensurately higher.

The history of arms control in Europe gives a hint how that circle might be squared and how verification might be prepared. Until 1987, the Arms Control Agency of the Western European Union was tasked with checking the conventional armaments of the member states. Members had to inform the Agency about the size and deployment sites of their armed forces. But they were reluctant to do so in a completely comprehensive way. Instead, they delivered, year by year, sealed envelopes containing the parameters of troops and equipment which were deployed at a specific site. The Agency would draw from the package a few envelopes, open them, and then visit the sites and compare what they found there with the numbers and items announced in the envelope. In principle, the whole holdings of a state were in escrow at the ACA, so the state indicated its readiness to offer complete transparency. Through the practice of random selection, however, overall holdings were never fully revealed (Jacob 1989: 167-171).

What can we learn from this interesting precedence? The smaller nuclear weapon states which are so much concerned about their security can supply information about their warhead holdings or their fissile material stocks in a sealed envelope to the IAEA. This could be deposed in a tamper-proof safe that could be opened only through the collaboration of IAEA and the state concerned. Once these basis data would be delivered, the state would then openly declare changes in stocks. Once political conditions and the progress in nuclear disarmament and verification would make it possible to move towards complete transparency, the envelopes concerning data on the original holdings would be opened, and the IAEA could start with inventory verification, using the original data plus or (hopefully) minus the changes that had meanwhile been reported. States, facing the expectation of this higher degree of transparency compared to the one in early stages, would have no good incentives to cheat right now if that would mean being caught in the

act later on. A prerequisite is that they accept the transparency measures as preparatory steps for future verification.

There is one caveat: Some of the countries presently insisting on opaqueness might have practiced rather sloppy material accountancy. There is the risk, then, that they would be caught with inconsistencies, and that this would create embarrassment of the country and – possibly unjustified – distrust on part of the other participants. It is therefore essential to accept initial large error margins of numbers in order to have a face-saving procedure of clarification. Otherwise, a country with former sloppy material accountancy would never accept transparency and verification of its stocks. There are various methods for future verification (Schaper 2009): The most prominent is material accountancy comparable to that of current safeguards in NNWS. Other important tools are managed access procedures that aim at protecting certain information and revealing others, and not the least societal verification. A promising method how to clarify discrepancies between measured inventories and numbers in book-keeping is "nuclear archaeology", in which special isotopes in permanent components of reactors, reprocessing plants or tails of enrichment can be used to reconstruct past production records (Fetter 1993: 237-259). This however, is only possible if a country is willing to allow such intrusive and thorough methods. Lessons can also be learnt from the case of South Africa, in which discrepancies had been clarified by thorough material accountancy that examined also tails of enrichment processes and by making use of some of the methods of nuclear archaeology von Baeckmann/Dillon/Perricos 2002). Those nuclear weapon states such as the United States or Britain which have made a considerable effort to inquire into their own past production could insert additional helpful information.

4. Conclusion

A nuclear weapons register is an idea whose time has come. It would enhance international security, corroborate the principles of transparency and accountability of the nuclear weapon states vis-à-vis the world community, and would be a stepping stone towards, and eventually an indispensable precondition for nuclear disarmament, as it would serve as a precursor for verification in a nuclear weapon free world. By the same token, if conceptualized appropriately and with due respect for the present concerns and sensitivities of those countries possessing nuclear weapons or unsafeguarded fissile material, such a register could be introduced without any loss of security for these countries, and it could evolve as confidence is built, allaying these concerns and sensitivities to levels lower than those now prevailing.

For reasons of acceptability for the countries concerned and the integrity of the legal construction of the nuclear non-proliferation regime, it would be wise to limit the commitment of the three de-facto nuclear weapon states to reporting their fissile material holdings outside safeguards. Some differentiation in these reports would be possible if the reporting form were shaped appropriately – i.e., the "other uses" category – so that these

states would not be required to specify precisely their (supposed) nuclear weapon holdings. The register should start without a verification obligation in order to respect the sensitivities of the eight countries concerned. Verification measures could be added, by agreement, as the register evolves, although this should be negotiated as an option, however, since it is likely that there will be initial opposition to verification. It can also be expected that aspects covered by the register would be subject to bilateral, multilateral or international verification as a consequence of other nuclear arms control and disarmament measures. In a later stage of further disarmament, verification would come into play and could be linked to the registers.

For reasons of practicability, the register should be established as a separate body. The CD route appears most appropriate. Other forums have disadvantages. Limiting the forum to the eight or five countries immediately concerned might facilitate its creation in some respects, but would not be optimal in terms of confidence and accountability, and would thus endanger some of the improvements that could otherwise be expected in relations between nuclear and non-nuclear weapon states.

As in all policy areas related to nuclear disarmament, here again the best is certainly the enemy of the good. An ideal register would be bolstered by verification and complete information about all eight countries. This is much too much to ask for in the present situation. Instead, the register should be regarded as an element in a set of many measures that synergize to form a process. As mentioned at the outset, in nuclear disarmament incrementalism is the name of the game; this principle applies to the nuclear arms register as well.

Enhanced transparency in nuclear armaments has become a real possibility since the end of the Cold War. It is part and parcel of a once "utopian" order of international security in which states, the major powers in particular, strive for security by means of cooperation rather than by power competition, and where arms control, transparency and disarmament are becoming guiding principles for both international security and also national security policies, in preference to unfettered unilateral arms build-ups, secrecy and deception.

Biography

Albright, David/O'Neill, Kevin/Hinderstein, Corey 2001: Securing Pakistan's Nuclear Arsenal: Principles for Assistance, ISIS Issue Brief, October 4; www.isis-online.org/publications/terrorism/pakassist.html (15.2.2011).

Albright, David 2001: Securing Pakistan's Nuclear Weapons Complex, Paper for the 42nd Strategy for Peace Conference, Warrenton, Virginia, October 25-27, 2001, www.isis-online.org/publications/terrorism/stanleypaper.html; 68 Pakistan's Nuclear Dilemma, Carnegie Endowment for International Peace, Non-Proliferation Project Roundtable, October 2, 2001. Transcript: ww.state.gov/documents/organization/18557.pdf (24.2.2011).

Arbatov, Alexei 1999: Deep Cuts and De-alerting: A Russian Perspective, in: Feiveson, H. A. (ed.), The Nuclear Turning Point – A Blueprint for Deep Cuts and De-Alerting of Nuclear Weapons, Washington, DC.

Argentina Working Paper 1993: Conference on Disarmament, Ad hoc Committee on Transparency, in: Armaments (CD/TIA/WP.14), August 3, 1993.

British Ministry of Defense 2003: What do you know about...? Nuclear Deterrence, www.mod.uk/aboutus/keyfacts/factfiles/nuclear.htm (12.2.2003), 7th January 2003: "We'll maintain fewer than 200 operationally available nuclear warheads."

Bukharin, Oleg 2003: Appendix 8A. Russian and U.S. Technology Development in Support of Nuclear Warhead and Material Transparency Initiatives, in: Zarimpas, Nicholas (ed.), Transparency in Nuclear Warheads and Materials, Oxford.

Bunn, Matthew 2000: The Next Wave: Urgently Needed New Steps to Control Warheads and Fissile Material, Report Carnegie Endowment for International Peace and Harvard University, March, http://belfercenter.ksg.harvard.edu/publication/1753/next_wave.html (21.1.2010).

Chalmers, Malcolm/Greene, Owen 1996: The UN Register in its Fourth Year, Working Paper 2, Bradford, November, pp. 31-32.

Cohen, Avner 1998: Israel and the Bomb, New York, NY.

Cohen, Avner/Graham, Thomas Jr. 2004: An NPT for Non-Members, Bulletin of the Atomic Scientists, May/June.

Comerford, Richard 2000: The Role of Security and Classification in Arms Control and Nonproliferation, Proceedings of the 41st Annual INMM Conference, New Orleans, LA, July; on CD-ROM, available from INMM, inmm@inmm.org.

D'Alema, Massimo/Fini, Gianfranco/La Malfa, Giorgio/Parisi, Arturo/Calogero, Francesco 2008: Per un mondo senza armi nucleari, in: Corriere della Sera, July 24.

Fetter, Steve 1993: Nuclear Archaeology: Verifying Declarations of Fissile Material Production, Science & Global Security, no. 3, pp. 237-259.

Freedman, Lawrence 1989: The Evolution of Nuclear Strategy, 2. ed., Basingstoke, 1989.

German Delegation 2002: Attaining a Nuclear-Weapon-Free World, 2002 NPT Preparatory Committee (PrepCom), New York, April 11, 2002.

Gormley, Dennis M./Lewis, Patricia M./Pomper, Miles A./Scheinman, Lawrence/Schwartz, Stephen/Sokov, Nikolai/Spector, Leonard S. 2009: Four Emerging Issues in Arms Control, Disarmament, and Nonproliferation: Opportunities for German Leadership, The James Martin Center for Nonproliferation Studies, July 2009.

Grand, Camille 2003: Nuclear Weapon States and the Security Dilemma, in: Zarimpas, Nicholas (ed.): Transparency in Nuclear Warheads and Materials, Oxford.

Gusterson, Hugh 1999: Secrecy, Authorship and Nuclear Weapons Scientists, in: Reppy, Judith (ed.), Secrecy and Knowledge Production, Cornell University, Peace Studies Program, Occasional Paper, pp. 23, 57.

Hugh Gusterson 1999: Secrecy, Authorship And Nuclear Weapons Scientists, in: Judith Reppy (ed.), Secrecy and Knowledge Production, Cornell University, Peace Studies Program, Occasional Paper #23, p. 57, October 1999, www.einaudi.cornell.edu/PeaceProgram/publications/occasional_papers/occasional-paper23.pdf (15.2.2011).

Hansen, Chuck 1995: Swords of Armageddon, Chukelea Publications, Sunnyvale, CA.

Höhl, Kathrin/Müller Harald/Schaper, Annette 2003: EU Cooperative Threat Reduction Activities in Russia, in: Burkard Schmitt (ed.) Chaillot Paper no. 61, 2003, www.iss.europa.eu/uploads/media/cp061e.pdf (21.10.2010).

Howard, Sean 1996: Post-NPT Extension Confidence-Building Measures: Proposals for a Nuclear Weapons Register, in: Poole, John/Guthrie, Richard (eds.), Verification 1996: Arms Control, Peacekeeping and Environment, Oxford, pp. 77-86.

Hurd, Douglas/Rifkind, Malcolm/Owen, David/Robertson, George 2008: Start Worrying and Learn to Ditch the Bomb, The Times, June 30.

IAEA Press Release 1997: Press Statement on the Trilateral Initiative, PR 97/26, September 30.

Jacob, Klaus 1989: Aspects of the Verification of Conventional Arms Control Measures in Europe, in: Altmann/Jürgen/Rotblat, Joseph (eds.), Verification of Arms Control Reductions. Nuclear, Conventional and Chemical, Berlin, pp. 167-171.

Juppé, Alain/Norlain, Bernard/Richard, Alain/Rocard, Michel 2009: Pour un Désarmement Nucléaire Mondial, Seule Réponse à la Proliferation Anarchique, Le Monde, October 15.

Kerr, Paul K./Nikitin, Mary Beth 2009: Pakistan's Nuclear Weapons: Proliferation and Security Issues, Congressional Research Service, July 30.

Kinkel, Klaus 1993: "10 Punkte Initiative zur Nichtverbreitungspolitik", in: Bericht zur Rüstungskontrolle und Abrüstung 1993, Bonn, pp. 199-202.

Li Bin 2003*:* Transparency and Security in Russian–U.S. Nuclear Relations, in: Zarimpas, Nicholas (ed.): Transparency in Nuclear Warheads and Materials, Oxford, p. 24.

Locke, Gerhard 1982: Aufbau und Funktionsweise von Kernspaltungswaffen, Bericht INT 25, Euskirchen (im Internet nicht erhältlich).

McGrath, Kaegan/Savvidis, Vasileios 2009: UNSC Resolution 1887: Packaging Nonproliferation and Disarmament at the United Nations, NTI Issue Brief, December.

Müller, Harald 2005: A Treaty in Troubled Waters. Reflections on the Failed NPT Review Conference, in: International Spectator, vol. 40, no. 3, pp. 33-44.

O'Neill, Kevin 1999: The Risk of Theft: Protecting Fissile Materials in the Former Soviet Union, in: Albright/David/O'Neill, Kevin (eds.), The Challenges of Fissile Material Control, Washington, DC, 41, http://isis-online.org/books/detail/challenges-of-fissile-material-control/19 (21.1.2010).

Orlov, Vladimir A. 1997: Accounting, Control, and Physical Protection of Fissile Materials and Nuclear Weapons in The Russian Federation: Current Situation and Main Concerns, Paper presented at the International Seminar on MPC&A in Russia and NIS, Bonn, sponsored by the Deutsche Gesellschaft für Auswärtige Politik, April 7-8.

Podvig, Pavel (ed.) 2002: Russian Strategic Nuclear Forces, Moscow.

Pomper, Miles A./Potter, William/Sokov, Nikolai 2009: Reducing and Regulating Tactical (Substrategic) Nuclear Weapons in Europe, Prepared for Unit for Policy Planning and Research, Finnish Ministry of Foreign Affairs, December, http://cns.miis.edu/opapers/pdfs/tnw_europe.pdf (17.2.2011).

Potter, William/Sokov, Nicolai/Müller, Harald/Schaper, Annette 2000: Tactical Nuclear Weapons – Options for Control, UNIDIR Research Report, Geneva.

Savvidis, Vasileios/Seiler, Jessica 2009: Nuclear Disarmament Proposals from 1995 to 2009: A Comparative Chart, CNS Feature Stories, 3. December, http://cns.miis.edu/stories/091203_disarmament_proposals.htm (21.1.2010).

Schaper, Annette 2009: Verifying the Non-Production and Elimination of Fissile Material for Weapons, in: Corey Hinderstein (ed.), Cultivating Confidence published by NTI, pp. 67-122.

Schaper, Annette 2001: Principles of the Verification for a Future Fissile Material Cut-off Treaty (FMCT), PRIF Reports No. 58, Frankfurt 2001, www.hsfk.de/fileadmin/downloads/prif58.pdf (13.2.2011).

Schmidt, Helmut/von Weizsäcker, Richard/Bahr, Egon/Genscher, Hans-Dietrich 2009: Für eine atomwaffenfreie Welt, FAZ, January 8.

Shea, Thomas E. 1999: Verification Of Weapon-Origin Fissile Material In The Russian Federation &United States, IAEA Bulletin, vol. 41, no. 4, p. 36.

Shea, Thomas E. 2003: Potential Roles for the IAEA in a Warhead Dismantlement and Fissile Materials Transparency Regime, in: Zarimpas, Nicolas (ed.), Transparency in Nuclear Warheads and Materials, Oxford, pp. 229.

Sublette, Carey 2001: Nuclear Weapons Frequently Asked Questions, Version 2.25: 9/8, http://nuclearweaponarchive.org/Nwfaq/Nfaq0.html (21.1.2010).

The Bulletin of the Atomic Scientists 1991: A START Briefing Book, The Bulletin of the Atomic Scientists, November 24.

The White House 2009: Office of the Press Secretary, Remarks by President Barack Obama, April 5, 2009, www.whitehouse.gov/the_press_office/Remarks-By-President-Barack-Obama-In-Prague-As-Delivered/ (2.7.2009)

United Kingdom's Defense Nuclear Programme 2000: Plutonium and Aldermaston – An Historical Account, in the internet at www.mod.uk (21.1.2010).

U.S. Department of Energy 2003a: Office of Classified and Controlled Information Review, Eleventh Report on Inadvertent Releases of Restricted Data and Formerly Restricted Data under Executive Order 12958 (Deleted Version)(U), May 2003, www.fas.org/sgp/othergov/doe/inadvertent11.html (15.1.2011).

U.S. Department of Energy 2003b: Declassification of Certain Characteristics of the United States Nuclear Weapon Stockpile, www.osti.gov/html/osti/opennet/document/press/pc26.html (21.12.2010), as of December 2003.

U.S. Department of Energy 2001a: National Nuclear Security Administration, Highly Enriched Uranium: Striking a Balance – A Historical Report on the United States Highly Enriched Uranium Production, Acquisition, and Utilization Activities from 1945 through September 30, 1996, January.

U.S. Department of Energy 2001b: Office of Declassification, Restricted Data Declassification Policy 1946 to the Present (RDD-7), January 1, www.fas.org/sgp/othergov/ doe/rdd-7.html (21.1.2010).

U.S. Department of Energy 1998: Office of the Secretary, 10 CFR Part 1045, Nuclear Classification and Declassification – Action_Final Rule; www.osti.gov/opennet/forms.jsp?formurl=reports/finreg.html (21.1.2010).

U.S. Department of Energy 1996: Plutonium: The First 50 Years: United States Plutonium Production, Acquisition, and Utilization from 1944 through 1994, DOE/DP-0137, February, www.osti.gov/html/osti/opennet/document/pu50yrs/pu50y.html (21.1.2010).

U.S. Department of Energy, 1994: Office of Declassification 5, Draft Public Guidelines to Department of Energy Classification of Information, Washington DC 2054, June 27.

von Baeckmann, Adolf/Dillon, Gary/Perricos, Demetrius 2002: Nuclear verification in South Africa, IAEA Bulletin.

Walker, William 1997: Reflections on Nuclear Transparency and Irreversibility: The Re-regulation of Partially Disarmed States, Background Paper for Session Five of the Conference on the Fissile Material Cutoff, Schlangenbad, June.

Walker, William 2000: Plutonium and Aldermaston – An Historical Account, Trust & Verify, no. 92, July.

White House Fact Sheet 1997: Joint Statement on Parameters on Future Reductions in Nuclear Forces, Helsinki, March 21, 1997, in: Disarmament Diplomacy, April, p. 32.

Whiteson, R. 1998: Information Barriers in the Trilateral Initiative: Conceptual Description D.W. MacArthur, Report LAUR-98-2137, Los Alamos, NM.