

The Next Arms Race

By Henry Sokolski

November 11, 2008

To date, the conventional wisdom about reducing the threat of nuclear use has focused either on the advantages of the major powers making additional reductions in the number of nuclear weapons they have deployed operationally, or on trying to stem the further spread of nuclear weapons capabilities to additional states. The most popular manifestation of this view is the set of nuclear control proposals offered by George Shultz, Sam Nunn, Henry Kissinger, and Bill Perry. These proposals include having the U.S. take the lead to reduce U.S. and Russian nuclear weapons deployments and for spreading nuclear power technology in exchange for countries' pledges to forego making their own nuclear fuel—a step that would bring them to the brink of making bombs.¹

Although popular, this new nuclear control wisdom, if not properly conditioned, could actually *increase* the risks of nuclear proliferation and war. Certainly, spreading nuclear power technology in exchange for promises to forego nuclear fuel making could be quite risky. In fact, the U.S. and most other states currently claim that all states have an “inalienable” right to make nuclear fuel. So any state that promises to forego exercising their right to make nuclear fuel today might, once it has received all the nuclear technology it can, change its mind and take the last step to reprocess the spent fuel it has to make bomb material. What's worse is that there is no reliable way yet to detect covert nuclear fuel making plants early enough to intervene to prevent these plants from going on line and making a bomb's worth of material.²

Yet another set of concerns is the continuing growth in nuclear weapons making capacity of states like China, India, Pakistan and Israel. If, as some advocate, the U.S. reduces the number of its operationally deployed nuclear

1. See George Shultz, William Perry, Henry Kissinger and Sam Nunn, “A World Free of Nuclear Weapons,” *Wall Street Journal*, opinion, January 4, 2007, p. A15, at http://online.wsj.com/article/SB116787515251566636.html?mod=opinion_main_commentaries and “Toward a Nuclear-Free World,” *Wall Street Journal*, opinion, January 15, 2008, p. A13, at <http://online.wsj.com/article/SB120036422673589947.html>.

2. See Henry Sokolski, ed., *Falling Behind: International Scrutiny of the Peaceful Atom* (Carlisle, PA: Strategic Studies Institute, 2008), at <http://www.npec-web.org/Books/20080327-FallingBehind.pdf>.

weapons below 2,200 to numbers closer to 1,000, and if emerging nuclear weapons states continue to increase their capacity to make and deploy more nuclear weapons, the results in ten years time could be a set of nuclear arms rivalries that will be far more intense and tighter than any experienced since the outset of the Cold War. Instead of two nuclear players (the U.S. and Russia), there will be at least eight (*e.g.*, the U.S., Russia, China, France, Israel, the U.K., Pakistan and India). Instead, of the largest nuclear players (*e.g.*, Russia and the U.S.) having tens of thousands of warheads more than medium nuclear states like France, they would be separated by no more than several hundred. Also qualitatively, each of these players will more advanced than any country had at the outset of the Cold War: They all will have missile deliverable warheads, long-range ballistic missiles, and sea, land, and air-launched nuclear weapons systems.

Complicating this already vexing scenario, will be the possible emergence in 20 years or less of additional states with large reactor programs in the Middle and Far East (*e.g.*, Egypt, Turkey, Saudi Arabia, and Burma) and of a sizeable or growing set of nuclear weapons usable fuel stockpiles in the U.S., Russia, France, China, India, and Pakistan. Add to this, the growing civilian stockpiles of nuclear weapons usable fuels in Japan and of nuclear fuel making systems in Brazil, Argentina, South Africa, and Iran and the uncertainty that a resurgent Russia poses, and our nuclear future could easily be as grim as it was at the outset of the Cold War. Neither the proponents nor critics of the current conventional wisdom would consciously desire such a fate.

Background.

If current trends continue, in a decade or less, the United Kingdom could find its nuclear forces eclipsed not only by that of Pakistan, but of Israel, and possibly of India as well. Shortly thereafter, France could share the same fate. China, which has already amassed enough separated plutonium and highly enriched uranium easily to triple its current stockpile of roughly three hundred deployed nuclear warheads, also may increase its deployed numbers quietly during this period.³

3. See International Panel on Fissile Materials, *Global Fissile Materials Report 2008*, October 2008, pp. 11 and 16, at <http://www.ipfmlibrary.org/gfmr08.pdf>; and Andrei Cahng, "China's Nuclear Warhead Stockpile Rising," *UPIAsia.com*, April 5, 2008, at http://www.upiasia.com/Security/2008/04/05/chinas_nuclear_warhead_stockpile_rising/7074/.

As these states climb up in numbers, the U.S. and Russia, meanwhile, have agreed to reduce their strategic nuclear warhead deployments to as few as 1,700 each by 2012.⁴ Beyond this, prominent experts and advisors to President Elect Obama are recommending that the U.S. take the lead and reduce further to 1,000 warheads while arms control advocates insist we should go lower still.⁵ Whether or not Russia, a country that now touts its nuclear prowess, would be willing to join us in such reductions remains unclear. What's not, however, is that in the next decade, the U.S., if it continues to reduce its nuclear deployments, may have to contend with a world in which the quantitative differences between key nuclear armed contenders will be measured, not in thousands but in hundreds of weapons.

This is not a future that most Washington-based analysts have yet focused on. Instead, the U.S. nuclear reductions aspect of this future actually enjoys bipartisan support. In specific, such reductions are recommended in the most popular a set of proposals for eliminating nuclear weapons and reducing the risks of nuclear proliferation offered by George Shultz, William Perry, Henry Kissinger and Sam Nunn. Their vision, which both Presidential candidates endorsed, entails getting the U.S. and Russia to make significant additional nuclear weapons reductions; providing “reliable supplies of nuclear fuel, reserves of enriched uranium, infrastructure assistance, financing, and spent fuel management” to developing states; and ratifying a verifiable Fissile Material Cut-Off Treaty (FMCT) and a Comprehensive Test Ban Treaty (CTBT).⁶

These key elements of this proposal make a number of assumptions:

- (1) Russia is interested in making significant reductions (versus symbolic political ones) with the U.S.;
- (2) Reaching arms reduction agreements with Russia is central to reducing the prospects of nuclear arms races elsewhere (e.g., between Pakistan, India and China, Israel and Iran, etc.);

4. See *Treaty Between the United States of America and the Russian Federation On Strategic Offensive Reductions*, May 24, 2002, at <http://www.state.gov/t/ac/trt/18016.htm>.

5. See, e.g., Ivo Daalder and Jan Lodal, “The Logic of Zero: Toward a World Without Nuclear Weapons,” *Foreign Affairs*, November/December 2008, pp. 80-95; and Daryl Kimball, “We Cannot Afford to Delay Nuclear Disarmament,” *Atlantic Community.Org*, June 1, 2008 go to http://www.atlantic-community.org/index/Open_Think_Tank_Article/We_Can_Not_Afford_to_Delay_Nuclear_Disarmament.

6. See Shultz, Perry, Kissinger and Nunn, *op. cit.*

- (3) States can be bribed into suspending the exercise of what they claim is their right under the NPT to make nuclear fuel (and so come to the brink of making bombs);
- (4) We can reliably detect if they are covertly making fuel in sufficient time to take actions that could prevent them from acquiring a bomb; and
- (5) We can reach agreement to an FMCT and CTBT and such agreements are verifiable.

Each one of these assumptions is critical. Each is rebuttable.⁷ Indeed, some critics suggest that unless these nuclear threat reduction proposals are properly conditioned, each might actually *increase* the nuclear threats we face. Certainly, a key problem with most of them is whether and how their compliance can be confirmed. Such verification concerns have already prompted debate.⁸

A much larger problem, however, is the viability of two unspoken assumptions. First, are the U.S. and Russia likely to continue to reduce their nuclear weapons deployments? Second, need we only continue these reductions, secure existing nuclear weapons materials against theft, and prevent additional states from getting bombs to address the most pressing nuclear security threats? Most experts focusing on U.S.-Russian nuclear security issues and nuclear terrorism believe the answer to both questions is yes. For them, what is essential is for the U.S. to take the lead in reducing our nuclear weapons deployments down to 1,000 even if initially the Russians do not follow us step by step (*see chart below*).⁹

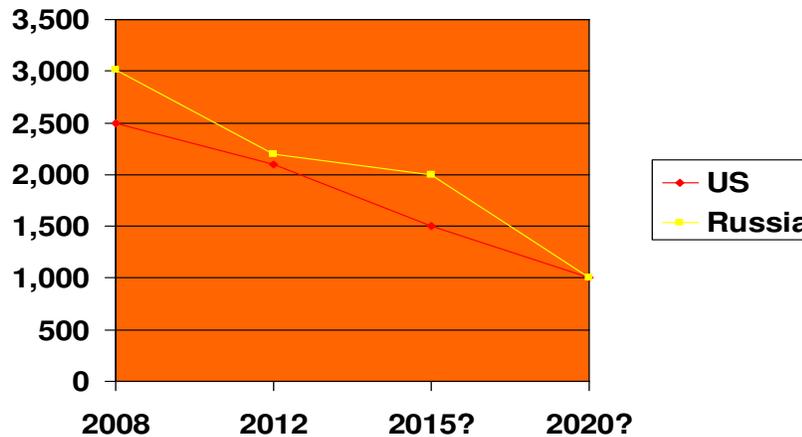
7. See, e.g., John Deutch and Harold Brown, "The Nuclear Disarmament Fantasy," *Wall Street Journal*, opinion, January 14, 2007, at <http://online.wsj.com/article/SB119542524645797257.html>; Henry S. Rowen, "This 'Nuclear Free' Plan Would Effect the Opposite," *Wall Street Journal*, letter to the editor, January 17, 2008, at <http://www.npec-web.org/Frameset.asp?PageType=Single&PDFFile=20080117-Rowen-WSJ-Letter&PDFFolder=OpEds>; Christopher A. Ford, United States Special Representative for Nuclear Nonproliferation, "The United States and the Fissile Material Cutoff Treaty," delivered at the Conference on "Preparing for 2010: Getting the Process Right," Annecy, France, March 17, 2007, at <http://www.state.gov/t/isn/rls/other/81950.htm>; and Jonathan Medalia, *Comprehensive Nuclear-Test-Ban Treaty: Issues and Arguments*, RL 34393, Congressional Research Service, March 12, 2008, at <http://www.fas.org/sgp/crs/nuke/RL34394.pdf>.

8. Cf. George Perkovich and James Acton, *Abolishing Nuclear Weapons*, (London: IISS, 2008); and Henry Sokolski and Gary Schmitt, "Advice to the Nuclear Abolitionists," *The Weekly Standard*, May 12, 2007, at <http://www.weeklystandard.com/Content/Public/Articles/000/000/015/068ekbiw.asp>.

9. See, e.g., Daalder and Lodol, "The Logic of Zero," *op. cit.*, and Graham Allison, *Nuclear Terrorism: The Ultimate Preventable Catastrophe* (New York, NY: Times Books, 2004).

Russia and the US: On the Road to Zero?

(Lodal/Daadler future with US taking the lead to move toward 1,000 operationally deployed strategic warheads)



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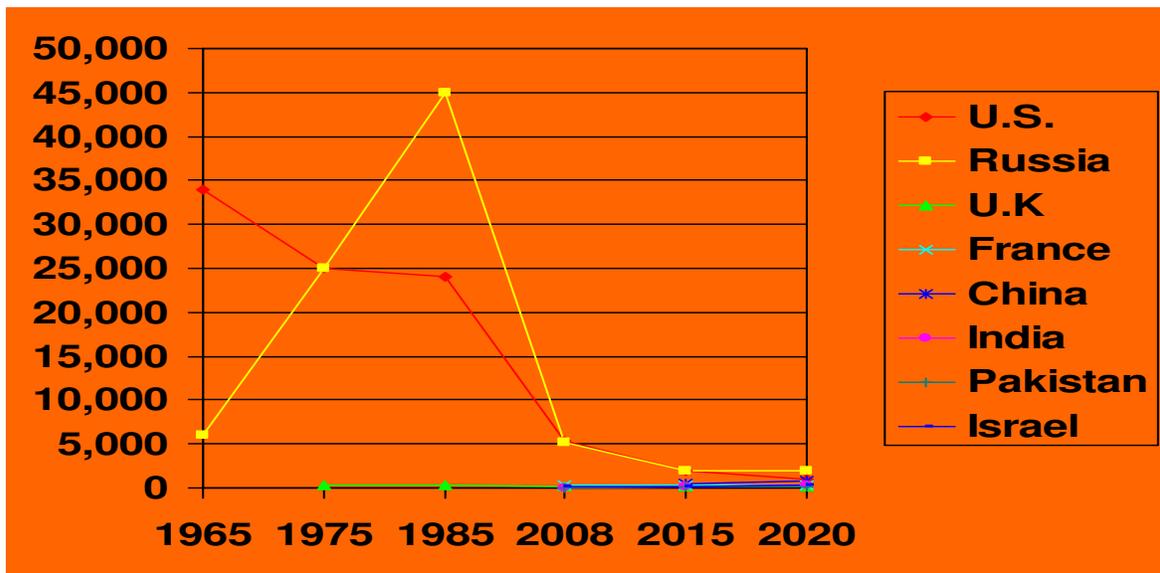
What has yet to be fully considered by those promoting this vision, though, is the nuclear weapons production capacities that continue to grow in Pakistan, India, China, and Israel and Russia's increasing reliance on nuclear weapons for its security. Nor has there been serious consideration of the military production ramp-up and break-out implications that large existing stockpiles of surplus U.S. and Russian military fissile material present, along with growing civilian and military stockpiles of nuclear weapons usable material in states like Japan, Pakistan, India, and China. With such nuclear weapons capabilities in play, the difficulties of monitoring and tracking nuclear weapons usable materials and expertise is only likely to increase. In 10 to 15 years, the expansion of Chinese, Indian, Pakistani, and Israeli nuclear capabilities could also make further U.S. and allied nuclear weapons reductions politically more difficult and could well encourage other countries to hedge their security bets by developing nuclear weapons options of their own.

The conventional wisdom, of course, is that all these dangers are best addressed by getting the U.S. and Russia mutually to reduce their nuclear weapons capabilities.¹⁰ Yet, at least as strong an argument can be made that, at some point,

10. See, e.g., Ellen O. Tauscher, "Achieving Nuclear Balance," *The Nonproliferation Review*, Vol. 14, No. 3 (November 2008).

the chances for strategic miscalculation (and war) would *increase* if China, Pakistan, India and Israel continued to augment their own nuclear capabilities and the U.S. and Russia reduced their own. Certainly, as the qualitative and quantitative differences between nuclear weapons states became smaller—when such differences are measured in hundreds of weapons rather than thousands of bombs—security alliance relations and rivalries are likely to become much more (and perhaps dangerously) sensitive to a variety of security developments (*see chart below*):

The Coming Strategic Crunch Among Current Nuclear Weapons States



What would compound this worrisome prospect are large amounts of weapons usable materials in military and growing civilian stockpiles that could be quickly militarized to create or expand existing nuclear bomb arsenals. In fact, these stockpiles exist and are growing (*see charts below*).

Nuclear Surpluses for Future Nuclear Ramp-ups and Breakouts

Frank Von Hippel, et. al., *Global Fissile Material Report 2008*

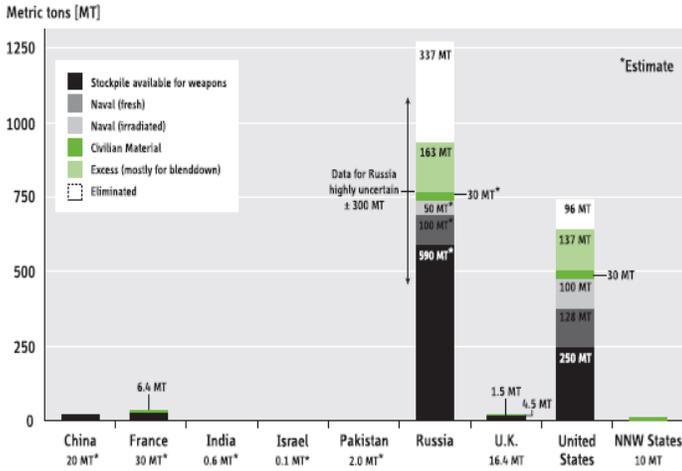


Figure 1.3. National stocks of highly enriched uranium as of mid-2008. The numbers for the United Kingdom and United States are based on official information. Numbers with asterisks are non-

governmental estimates, often with large uncertainties.¹⁸ Numbers for Russian and U.S. excess HEU are for June 2008. HEU in non-nuclear-weapon (NNW) states is under IAEA safeguards.

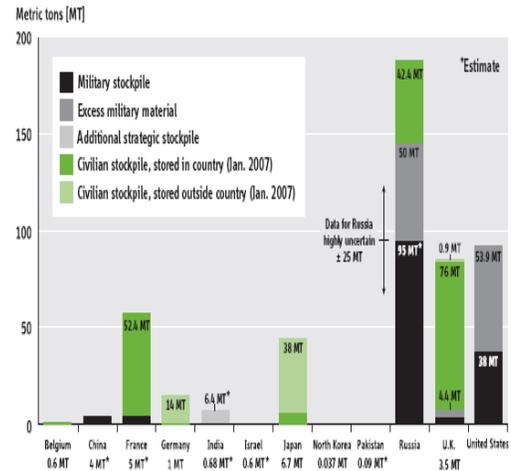


Figure 1.8. National stocks of separated plutonium. Civilian stocks are for January 2007 and based on the latest national INF/CIRC/549 declarations to the IAEA (with the exception of Germany).¹⁹ Civilian stocks are listed by ownership, not by current location. Weapon stocks are based on non-govern-

mental estimates except for the United Kingdom and the United States, whose governments have made declarations. India's plutonium separated from unsafeguarded spent PHWR fuel is categorized as an additional strategic stockpile.

Russia, for example, has at least 700 tons of weapons-grade uranium and over 100 tons of separated plutonium in excess of its military requirements, while the U.S. has roughly 50 tons of separated plutonium and roughly 160 tons of highly enriched uranium in excess of its military needs. China's surpluses of highly enriched uranium and separated plutonium are already significant: As noted before, analysts project Beijing can triple the number of weapons it currently has deployed at any time.

Finally, stockpiles of civilian materials that could be drawn upon to make additional bombs are large or growing. China, for example, is planning to complete two "commercial" reprocessing plants by 2025 that will be able to produce at least

1,000 crude nuclear weapons worth of material a year.¹¹ Meanwhile, Japan, a nonnuclear weapons state competitor of Beijing, already has roughly 45 tons of separated plutonium (much of which is stored in France), 6.7 tons of which is stockpiled on its soil—enough to make roughly 1,500 crude nuclear weapons. Japan also will soon be separating enough plutonium at its newest commercial reprocessing plant to make between 1,000 and 2,000 crude weapons worth of separated plutonium a year. Almost all of this newly separated plutonium will be in surplus of Japan’s civilian requirements and will be stored in Japan.¹²

As for India and Pakistan, they have no military “surpluses”. India, though, has already stockpiled roughly 11 tons of unsafeguarded “civilian” reactor-grade plutonium—enough to make well over 2,000 crude fission weapons—and can easily generate over 1,200 kilograms of unsafeguarded plutonium annually. Pakistan, has no such reserve but, like India, is planning to expand its “civilian” nuclear generating capacity roughly 20 fold in the next two decades and is stockpiling weapons grade uranium. Both countries are increasing their nuclear fuel making capacity (uranium enrichment and plutonium reprocessing) accordingly, which, in turn, will result in the generation of large, additional amounts of weapons usable materials that can quickly be turned into bombs.¹³

It is against this backdrop that U.S. and allied nuclear weapons states will have to plan. Again, quantitative and qualitative differences between these nuclear states will be much smaller than they have been at any time previously.

11. Areva Press Release, “Areva and CGNPC Sign Biggest Contract Ever,” November 26, 2007, at <http://www.areva-np.com/scripts/press/publigen/content/templates/show.asp?P=875&L=US>; and World Nuclear Association, “Nuclear Power in China,” October 2008, at <http://www.world-nuclear.org/info/inf63.html>.

China operates a pilot reprocessing plant capable of processing 50 tons of spent fuel annually. There are plans to expand this plant to process 100 tons. This would enable China to make up to 250 crude bombs worth of plutonium a year. China also is planning on completing a large commercial scale plant in 2020 based on indigenous technology located in far western China. Finally, China has contracted with AREVA to compete a plant by 2025 capable of processing 800 tons of spent fuel annually that is nearly identical in capacity and design to that AREVA help Japan complete at Rokkasho, i.e., large enough to make between 1,000 and 2,000 bombs per year assuming operation a full capacity and a bomb’s worth being defined as requiring 4 kilograms of plutonium.

12. See Masafumi Takuba, “Wake Up, Stop Dreaming: Reassessing Japan’s Reprocessing Program,” *Nonproliferation Review*, March 2008, p 71.

13. See, e.g., Zia Mian, A.H. Nayyar, R. Rajaraman and M.V. Ramana, “Plutonium Production in India and the U.S.-India Nuclear Deal,” in Henry Sokolski, ed., *Gauging U.S.-Indian Strategic Cooperation* (Carlisle, PA: Strategic Studies Institute, 2007), pp. 99-128, at <http://www.npec-web.org/Books/20070300-NPEC-GaugingUS-IndiaStratCoop.pdf>; and Zia Mian, A.H. Nayyar, R. Rajaraman and M.V. Ramana, “Fissile Materials in South Asia” in Henry Sokolski, *Pakistan’s Nuclear Future: Worries Beyond War* (Carlisle, PA: Strategic Studies Institute, 2008), pp. 129-67, at <http://www.npec-web.org/Books/20080116-PakistanNuclearFuture.pdf>.

Meanwhile, the capacity to increase deployed nuclear weapons arsenals beyond current numbers is either already significant or likely to grow due to planned expansion of the “civilian” nuclear sector. Both of these factors will place a premium on the ability of each nuclear state to weaponize their military and civilian surpluses quickly, to deploy forces that are survivable, and to have forces that can get to their targets and destroy them with highly levels of probability. It also will place increased pressures on advanced military states to deploy enhanced air and missile defenses and to develop preventative and preemptive war options.

More important, in such a setting, the military and nuclear rivalries between states could be much more intense than before. This means that relatively small developments—*e.g.*, Russian support for sympathetic near-abroad provinces, Pakistani-inspired terrorist events in India focused against India’s political leadership, Indian flanking activities in Iran near Pakistan, Chinese weapons developments or moves regarding Taiwan, state-sponsored assassination attempts of key figures in the Middle East or South West Asia, etc.—could easily prompt nuclear weapons deployments with “strategic” consequences (arms races, strategic miscues, and even nuclear war). As Herman Kahn once noted, in such a world “every quarrel or difference of opinion may lead to violence of a kind quite different from what is possible today.”¹⁴

This would put a premium on efforts to reduce nuclear rivalries and nuclear activities (both those that are explicitly of a military character and those relating to “civilian” nuclear fuel making) in China, Pakistan, India, and elsewhere (including the U.S. and Russia). It also would place a premium on reducing existing nuclear weapons usable material surpluses in the U.S. and Russia; repressing the further expansion of nuclear fuel making as much as possible; and being prepared to hedge militarily against our own worst nuclear security futures if such efforts fail.

Finally, if nuclear energy programs spread to states that might harbor a desire to hedge their security bets by developing a nuclear weapons option, you would have the perfect nuclear storm: Small differences between nuclear competitors that would put all actors on edge; an overhang of nuclear materials that could be called upon to break out or significantly ramp up existing nuclear deployments; and a variety of potential new nuclear actors developing weapons options in the wings.

Several new additional nuclear weapons contenders are also likely to emerge by 2030. These could include Japan, North Korea and South Korea, Taiwan, Iran, Algeria, Brazil (which is developing a nuclear submarine), Argentina and possibly Egypt, Syria, Turkey, and Saudi Arabia (courtesy of weapons leased to it by

14. Herman Kahn, *Thinking about the Unthinkable* (New York: Avon Books, 1964), p. 222.

Pakistan or China). All of these states have either voiced a desire to acquire nuclear weapons or tried to do so previously and have one or more of the following: A nuclear power program, a large research reactor, or plans to build a large power reactor by 2030.

With these programs inevitably comes all the training regarding fuel making to raise the prospect of overt or covert reprocessing or enrichment. Over the next two decades, then, these states might not acquire nuclear weapons, but might well become nuclear weapons-ready—*i.e.*, countries that would be no more than six to twelve months away from acquiring nuclear weapons if they chose to do so. A clear, additional knock-on effect of such internationally destabilizing developments is that there will be much more dangerous nuclear technology and materials that terrorists could conceivably gain access to. Neither the IAEA's nuclear inspection system (even under the most optimal conditions) nor technical trends in nuclear fuel making (*e.g.*, SILEX laser enrichment, centrifuges, new South African APS enrichment techniques, filtering technology, and crude radiochemistry plants, which are making successful, small, affordable, covert nuclear fuel making even more likely against our intelligence and inspection capabilities)¹⁵ afford cause for relief.

Certainly, such additional “peaceful” nuclear developments will complicate life. We will know who our closest friends and worst enemies might be, but be unclear on how willing our friends (if they have a bomb option) might be to back us up when a crisis arises. They might well choose to go it alone (*e.g.*, France in regard to Iraq in 2002). As for our enemies, we will have difficulty knowing just how lethal they might be. Keeping track of who is on first, then, will be far more difficult and tracking the possible alliance relations between or against other nuclear or near-nuclear states will be vastly more difficult than it has been yet. This risks straining

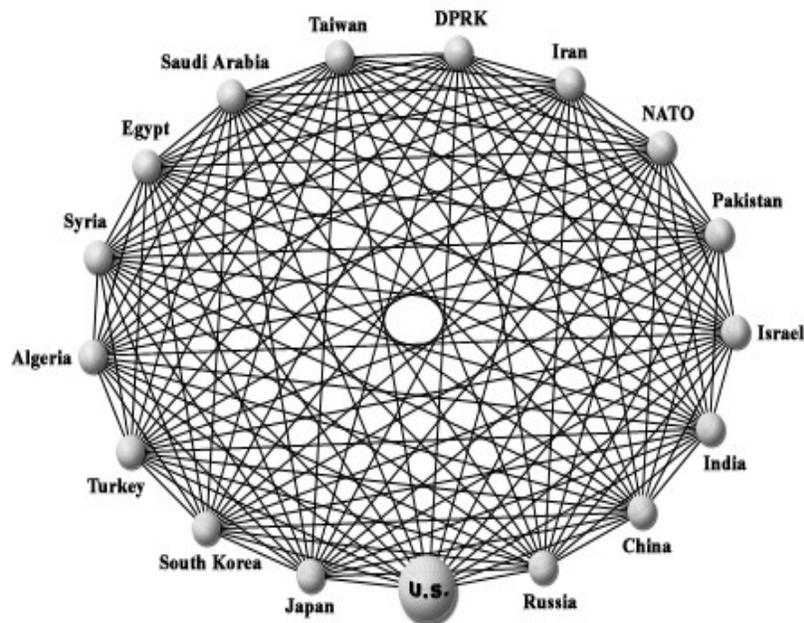
15. On these points see, David Kay, “Denial and Deception Practices of WMD Proliferators: Iraq and Beyond,” in Brad Roberts, ed., *Weapons Proliferation in the 1990s*, (Cambridge, MA: MIT Press, 1995); Victor Gilinsky, et al., *A Fresh Examination of the Proliferation Dangers of Light Water Reactors* (Washington, D.C.: NPEC, 2004), at <http://www.npec-web.org/Essays/20041022-GilinskyEtAl-LWR.pdf>; David Kay, “Iraqi Inspections: Lessons Learned,” Lecture for the Program of Nonproliferation Studies, Monterrey Institute of International Studies, February 10, 1993, p. 7, at <http://cns.miis.edu/research/iraq/kay.htm>; Henry Sokolski, ed., *Falling Behind: International Scrutiny of the Peaceful Atom* (Carlisle, PA: Strategic Studies Institute, 2008) at <http://www.npec-web.org/Books/20080327-FallingBehind.pdf>;

Mark Clayton, “Will Lasers Brighten Nuclear’s Future: New Process Could Replace Centrifuges But Renew Threat of Nuclear Proliferation,” *Christian Science Monitor*, August 27, 2008, at <http://features.csmonitor.com/innovation/2008/08/27/will-lasers-brighten-nuclears-future/>; and World Nuclear Association, “Nuclear Power in South Africa,” October 2008, at <http://www.world-nuclear.org/info/inf88.html>.

what diplomacy or military science might otherwise prevent well beyond the breaking point (*see graphic below*):

With More Nuclear-Ready States: Ramp Up to a Nuclear 1914?

Possible Proliferated Future



(136 chances for strategic miscalculation)

Today, plus

Iran DPRK Taiwan Saudi Arabia Egypt
Syria Algeria Turkey South Korea Japan

This future is one neither the proponents of nuclear abolition nor their critics would ever want, and why clarifying and hedging against these possibilities are important.

Unfortunately, few analysts have yet gone into much detail on these points. Regarding how vertical proliferation might proceed, official attention has focused on China.¹⁶ Excellent non-governmental analyses have also been done of how the current nuclear arms rivalry between India and Pakistan might unfold given the U.S.-Indian nuclear cooperative agreement.¹⁷ There is detailed work on the existing weapons stockpiles and the growing amounts of nuclear weapons usable materials in civilian stockpiles.¹⁸ Finally, there is a growing literature on the prospects for a new round of nuclear proliferation,¹⁹ and what might be done to mitigate this threat through the creation of new multilateral nuclear institutions.²⁰

What is missing is analysis of how these developments might relate to one another and what might be done to mitigate the security threats that might otherwise arise.

16. See, e.g., U.S. Department of Defense, *Military Power of the People's Republic of China, 2007*, (Washington, D.C.: U.S. Department of Defense, 2007), pp. 15-20, at <http://www.defenselink.mil/pubs/pdfs/070523-China-Military-Power-final.pdf>; Secretary of State's International Security Advisory Board, "China's Strategic Modernization," a draft report available at and reported on by Bill Gertz, "China Report Urges Missile Shield," *The Washington Times*, October 1, 2008 <http://www.washingtontimes.com/news/2008/oct/01/new-us-defenses-sought-to-counter-beijing-buildup>. For an extensive compendium of analyses on these issues go to "Chinese Military Power" available at <http://www.comw.org/cmp/fulltext/debate.html>.

17. See, e.g., Zia Mian, et.al, "Plutonium Production in India" and "Fissile Materials in South Asia," *op. cit.*.

18. International Panel on Fissile Materials, *Global Fissile Material Report 2008: Scope and Verification of a Fissile Material (Cutoff) Treaty* available at http://www.fissilematerials.org/ipfm/pages_us_en/about/about/about.php

19. See e.g., Kurt Campbell, Robert Einhorn, and Mitchell Reiss, eds., *The Nuclear Tipping Point* (New Delhi, India: Manas Publications, 2004); Mark Fitzpatrick, *Nuclear Programs in the Middle East: In the Shadows of Iran* (London, UK: IISS, 2008); and Henry Sokolski ed., *Taming the Next Set of Strategic Weapons Threats* (Carlisle, PA: Strategic Studies Institute, 2006), at <http://www.npec-web.org/Books/Taming.pdf>.

20. George Perkovich, et al., *Universal Compliance: A Strategic for Nuclear Security* (Washington, DC: Carnegie Endowment, 2005); William Luers, Thomas R. Pickering and Jim Walsh, "A Solution for the U.S.-Iran Nuclear Standoff," *The New York Review of Books*, March 20, 2008, at <http://www.nybooks.com/articles/21112>; Harald Muller, *Multilateral Nuclear Fuel-Cycle Arrangements*, Paper 35, Weapons of Mass Destruction Commission, 2006, available at <http://www.wmdcommission.org/files/No35.pdf>.

Questions.

All of this bears directly on what mix of strategic forces the U.S. must plan on deploying and raises a number of questions, including:

- (1) Will the U.S. hedge against other countries' possible nuclear break out or ramp ups either by continuing to keep large numbers of U.S. nuclear warheads and materials in reserve or by deploying more missile defenses to allow it to eliminate more of this surplus and yet have the strategic "cushion" or "margin" it needs to maintain "superiority"?
- (2) Should the U.S. continue to reduce its number of operationally deployed nuclear weapons even if other countries (*e.g.*, Russia or China) do not immediately reciprocate? If not, what should drive U.S. decision making in this regard?
- (3) Does the U.S. have a stake in keeping India and Pakistan (a strategic partner and a non-NATO ally respectively) from ramping up their nuclear weapons capabilities? What are the odds that China might use such an arms rivalry as a pretext to augment their own nuclear weapons capabilities?
- (4) At what level of Chinese nuclear operational deployments might the Japanese begin to demand countervailing military hedges to be made by its key ally, the U.S.? What might these strategic hedging steps consist of?
- (5) Should the U.S. care that Japan and China in a decade or less may both have "civilian" reprocessing plants producing upwards to 1,000 crude bombs worth of weapons usable plutonium a year? Would it reduce U.S. strategic nuclear requirements if facilities of these sorts were not operating in these states?
- (6) What sort of nuclear proliferation in the Middle East or North Korea, if any, would have an impact on U.S. nuclear requirements? When and how might such proliferation have an impact on U.S. missile defense requirements in the U.S. and overseas?
- (7) Is there any diplomatic effort or military preparation that could cope with the sort of proliferated world illustrated by the "Nuclear 1914" figure? If so, what might these efforts be?