

What Nuclear Power's Revival Will Now Require: Tightening the Rules

Testimony of

Henry Sokolski
Executive Director
The Nonproliferation Policy Education Center
Washington, DC
www.npolicy.org

Submitted to

The House Committee on Foreign Affairs
“The Global Nuclear Revival and U.S. Nonproliferation Policy”

March 17, 2011
Room 2172
Rayburn House Office Building
Washington, DC

Madame Chairman, Ranking member, members of the committee, it is an honor to testify here today. Since the U.S.-Indian nuclear cooperative agreement was first proposed in 2005, the Nonproliferation Policy Education Center has advocated revising the U.S. Atomic Energy Act to assure closer Congressional oversight of negotiations of U.S. nuclear cooperative agreements and to set a higher international standard for nuclear nonproliferation. The Congressionally mandated Commission on the Prevention of WMD Proliferation and Terrorism, upon which I served, also made a number of specific recommendations in this regard that were unanimously adopted in the commission's final report. Most of these recommendations, including reassessing what civilian nuclear activities and materials the International Atomic Energy Agency (IAEA) can effectively safeguard against military diversions, already enjoy active Congressional support. These ten specific recommendations, which could be incorporated into the current U.S. Atomic Energy Act, are listed below.¹

1. Require majority approval in both Houses of any future U.S. nuclear cooperative agreement or alternatively, make such a vote necessary for any proposed U.S. nuclear cooperative agreement with any state that failed to meet the current requirements under the US Atomic Energy Act's for being "compliant" or that failed, in addition, to agree to:
 - a. Foreswear making nuclear fuel or engaging in heavy water reactor related activities
 - b. Bring the Additional Protocol into force for their country before receiving any controlled U.S. nuclear technologies or goods

1. For a point-by-point justification for each of these recommendations, which bear on the promotion of nuclear nonproliferation and safety, see my detailed testimony before this committee and the Subcommittee on Trade, Nonproliferation and Terrorism, "Nuclear Cooperation and the Atomic Energy Act," testimony given before a hearing of the House Committee on Foreign Affairs, "Nuclear Cooperation after Khan and Iran: Time for a New Paradigm," September 24, 2010 available at <http://www.npec-web.org/article.php?aid=70&rtid=8> and "Keeping U.S. International Nuclear Cooperation Peaceful," testimony given before a hearing of the Subcommittee on Terrorism, Nonproliferation and Trade, "The Future of U.S. International Nuclear Cooperation," May 5, 2010, available at http://www.npolicy.org/article_file/123_TESTIMONY_6_May_2010_FINAL_030211_0714.pdf.

- c. Bring the Convention on Supplementary Compensation for Nuclear Damage (CSC) into force for their country before finalization of the proposed 123 agreement.
2. Require that no United States Nuclear Regulatory license, U.S. federal contract, or U.S. loan guarantee be approved for any foreign nuclear entity unless the President of the United States has first certified that the government of that entity has explicitly endorsed adopting the key nonproliferation provisions (Articles 7 and 10) of the U.S.-UAE agreement on civilian nuclear cooperation in all future nuclear cooperative arrangements it might reach with any other non-nuclear weapons state.
3. Authorize the Government Accountability Office to create “Team-B” evaluations of the Nuclear Proliferation Assessment Statements (which the Executive Branch must currently complete under the U.S. Atomic Energy Act for any nuclear cooperative agreement it submits) upon the request of one chairman of either the foreign relations or intelligence committees in the House or Senate.
4. Adapt Section 416 of the House Foreign Relations Authorization Act for Fiscal Years 2010 and 2011 (H.R. 2410) to clarify what the IAEA can and cannot safeguard to provide a.) timely detection and b.) timely warning against possible military diversions.
5. Adapt legislation Congressman Fortenberry and Senator Akaka tabled last year (H.R. 3774 and S. 1675) for inclusion in the Atomic Energy Act to ensure proper implementation of Title V of the Nuclear Nonproliferation Act of 1978’s, which requires the U.S. to cooperate with developing nations in the assessment and deployment of nonnuclear forms of energy and in the conduct of country-specific energy surveys.
6. Clarify and amplify the key provisions of the Henry J. Hyde U.S. - India Peaceful Atomic Energy Cooperation Act of 2006 to assure that all U.S. civilian nuclear cooperation would cease, including intangible nuclear technology transfers and programmatic approvals for reprocessing if India chose to resume nuclear testing or violated IAEA safeguards. Reiterate and clarify the need to assure America’s compliance with the Nuclear Nonproliferation Treaty (NPT) and that of other key nuclear supplier states by incorporating the “Implementation and Compliance Report” requirements of the Hyde Act in the Atomic Energy Act itself.
7. Require that any changes to current U.S. policy to defer the commercial use of plutonium based fuels, the commercial recycling of spent fuel in the U.S., or the sharing of related technologies with other nonweapons states be approved by a joint resolution of Congress.
8. Require U.S. delegates to international or regional development banks to vote against extending subsidized loans for new nuclear construction overseas.
9. Clarify in law how the implementation of nuclear cooperation with Russia should be tied to Russian willingness to support President Obama’s objective of blending down more of the world’s surplus of weapons grade uranium and isolating proliferators, such as Iran.

10. Make it the policy of the U.S. to encourage the IAEA to monitor and keep account of every individual that visits any of the sites that the IAEA safeguards.

Japan's Nuclear Tragedy and Nuclear Power's Revival

Tighten the rules on nuclear exports always was needed and now is more salient than ever before. Just two weeks ago, the prevailing presumption underpinning of most assessments of nuclear power's future was that civilian nuclear power's massive, global expansion was an irresistible energy security and environmental imperative that our government and other nuclear supplier states had to support. Now, none of this seems so clear.

The key reason why, of course, has been the news of nuclear accidents following the earthquake in Japan. For years, the nuclear industry reassured us that the reactors they were building were safe because of all of the safety redundancies built into them. There would be no more Three Mile Islands. Now, after three hydrogen explosions, the continued venting of radioactive gas at several Japanese reactors, the possible breach of a containment vessel, and a massive spent fuel pond fire, this argument is no longer quite so credible.

Just the opposite: The worry now is that Japan's nuclear tragedy might repeat itself elsewhere. The Japanese reactors whose safety and cooling systems failed are roughly the same age of many of a good number of those operating in the U.S. Over twenty operating U.S. reactors are of nearly an identical design. Unlike Japan, which is retiring these machines after 40 years, though, the U.S. Nuclear Regulatory Commission has been extending their operating licenses for an additional 20. How sound is this practice? What, if anything, should our government and the reactor operators be doing to assure these reactors' run safely over their projected 60 year lifetime? Have we made any nuclear safety system assumptions that might prove to be as mistaken as those the Japanese made about the independent redundancy of their various primary and emergency nuclear cooling and hydrogen venting systems? These questions, now, should be issues of interest.

There also is likely to be pressures to review what U.S. agencies should be responsible at what time for dealing with a nuclear incident (the Department of Homeland Security, the Nuclear Regulatory Commission, the Energy Department, and the Defense Department). In addition, a case could be made for reviewing how much more or less electric utilities should pay for nuclear accident liability insurance as it bears directly on their financial stake in keeping their plants at the very highest levels of safety.² Finally, with the marked drop in the stock prices of most key

2. See, e.g., Jim Tankersley, "Taxpayer Meltdown: Taxpayers, Not the Utilities, Would Be Liable for Most of the Bill," *The National Journal*, March 15, 2011, available at

reactor vendors there is sure to be increased debate over how we should rate the financial risks of building new nuclear plants.³

These questions and more are likely to be reviewed, not just in Japan and the U.S., but in every state that either has nuclear power plants or is contemplating their construction. Thailand's prime minister, for example, just announced that his country would review its nuclear construction plans in light of the Japanese accidents. Senior officials from Switzerland, the European Union, India, and the Philippines have announced such decisions and German Prime Minister Merkel has called for a three-month review and the forced shut down of seven of Germany's older reactors.

Other Arresting Considerations

All of these new nuclear concerns, it should be noted, come on the heels of at least three other negative nuclear developments. The first of these is the political turmoil that has erupted in the Middle East. Up until the Tunisian and Egyptian political demonstrations, the Middle East was viewed by most nuclear supplier states as a key emerging market for new power reactor construction. Last fall and earlier this year, the U.S. government was reported to have been in negotiations on the possible conclusion of nuclear cooperative agreements with Jordan and Saudi Arabia – two countries that are coping with political turmoil of their own. Further work toward concluding such agreements, one would assume, is on hold.⁴

<http://www.nationaljournal.com/economy/a-japan-reactor-repeat-in-the-united-states-could-cost-the-government-dearly-20110315>.

3. Prices for the stocks of key nuclear reactor vendors have dropped significantly this week world-wide. See, e.g., Julie Cruz, "Stock in Europe Slide Most in Four Months on Japan Nuclear-Plant Concern," *Bloomberg*, March 15, 2011, available at <http://www.bloomberg.com/news/2011-03-15/european-stock-index-futures-tumble-on-radiation-concern-at-japanese-plant.html>; David Fogarty and Julie Gordon, "Nuclear Sector Takes a Beating But US Offers Support," *Reuters*, March 14, 2011, available at <http://mobile.reuters.com/article/idUSTRE72D3T620110315?ca=rdt>; and Louise Armitstead, "Nuclear Sector Faces Delay Amid Safety Fears," *The Telegraph*, March 15, 2011, available at <http://www.telegraph.co.uk/finance/markets/8381297/Nuclear-sector-faces-delays-amid-safety-fears.html>

4. See Elaine Grossman, "Obama Team Eyes Saudi Nuclear Trade Deal," *Global Security Newswire*, January 25, 2011, available at http://www.globalsecuritynewswire.org/gsn/nw_20110125_4190.php.

Second, and related, there has been a credit crunch that has hampered financing new nuclear projects both here and abroad. Domestically, the U.S. nuclear industry has made it clear that the costs of power reactor construction are high and rising and without generous federal loan guarantees, further reactor construction in the U.S. is in doubt.⁵ Unfortunately, according to a recent *Wall Street Journal* poll, one of the least popular forms of federal largesse during Washington's current budget crisis is spending on more nuclear loan guarantees.⁶

Meanwhile, overseas, South Korea -- one the most advanced and least expensive export reactor providers -- is discovering that it lacks the financial horsepower to competitively finance more, large, export reactor projects. Most recently, for this reason it was unable to compete successfully against Japan for reactor bids in Vietnam and Turkey.⁷ The French firm of AREVA, the world's leading nuclear contractor, also has had to pull out of a planned reactor construction project at Calvert Cliffs in Maryland. AREVA failed to secure a credit subsidy fee rating on a U.S. Department of Energy loan guarantee low enough for it to feel comfortable to proceed. Due to several other negative financial developments, Standard and Poor's reduced Areva's A-/A-1 credit rating last year to BBB+/A-2.⁸

5. For a review of the latest cost projections, see Henry D. Sokolski, "The High and Hidden Costs of Nuclear Power," *Policy Review*, September 2010, available at http://www.npec-web.org/article_file/20100805-

[The_High_And_Hiden_Costs_of_Nuclear_Power_290111_0356.pdf](http://www.npec-web.org/article_file/20100805-The_High_And_Hiden_Costs_of_Nuclear_Power_290111_0356.pdf).

6. See, Patrick O'Connor, "WSJ/NBC Poll: Hands Off Medicare, Social Security," *The Wall Street Journal*, March 2, 2011, available at <http://blogs.wsj.com/washwire/2011/03/02/wsijnbc-poll-hands-off-medicare-social-security/>. The raw polling data showing cuts to nuclear power plant subsidies to be the most popular budget cut is available at <http://texasvox.org/2011/03/04/wsji-poll-shows-americans-willing-to-cut-from-the-budget-for-nuclear-loan-guarantees/>.

7. See "South Korea to Bolster Support for Exports of Nuclear Plants," *The Korean Herald*, March 9, 2011, available at <http://www.koreaherald.com/business/Detail.jsp?newsMLId=20110309000846>.

8. See "France-Based AREVA Downgraded to BBB+ On Continued Weakened Profitability," Standard and Poor's, June 28, 2010, available at <http://www.alacrastore.com/research/s-and-p-credit-research->

[France_Based_AREVA_Downgraded_To_BBB_On_Continued_Weakened_Profitability_Outlook_Stable-806353](http://www.alacrastore.com/research/s-and-p-credit-research-France_Based_AREVA_Downgraded_To_BBB_On_Continued_Weakened_Profitability_Outlook_Stable-806353); Dan Yurman, "UK Depends on "France for the Nuclear Renaissance: But first EdF and Areva Have to Get Organized at Home," *The Energy Collective*, February 3, 2011, available at <http://theenergycollective.com/ansorg/50979/uk-dependes-france-nuclear-renaissance>; Francois de Beaupuy, "Areva's Overruns at Finnish Nuclear Plant Approach Initial Cost,"

Compounding these credit woes, the nuclear industry's prospects have been hobbled further by the global discovery of new, massive amounts of relatively clean burning, inexpensive, natural gas. Last week, just days before the Japanese earthquakes, John Rowe, CEO of Exelon, the world's largest merchant nuclear power utility, explained to an audience at the American Enterprise Institute that these gas discoveries give the U.S. and others much more room to let market forces pick energy winners and losers. He welcomed this and argued that the right energy choices were more likely to be made in such an environment. He said his firm had concluded it would not make sense for it to build a new nuclear power plant for the next decade or two. He also made clear that this decision consciously accounted for the need to reduce carbon emissions at the lowest cost in the quickest, most efficient fashion. Using these criteria, building new, expensive power reactors for the next one to two decades simply did not make sense.⁹

Nuclear Power and Proliferation: A Renaissance View

It could be argued that none of these developments have any direct relation to the security implications of spreading nuclear power plants abroad. Narrowly interpreted, Japan's nuclear woes merely highlights the potential hazards of operating nuclear reactors and of selling them to states that lack sufficient nuclear safety experience. More broadly viewed, however, nuclear power's current difficulties releases policy makers from the political pressures previously applied by lobbyists who have insisted that nuclear power's immediate, dramatic expansion demanded additional federal support.

Certainly, the most prevalent view until last week was that we simply had to learn to live with many, many more reactors being built internationally no matter what the security implications might be. Global warming, it was argued, would only worsen with the burning of more coal, and because relatively clean burning natural gas was presumed to be scarce and expensive, nuclear power was viewed as being the only immediate answer to reducing carbon emissions and

Bloomberg, June 24, 2010 available at <http://www.businessweek.com/news/2010-06-24/areva-s-overruns-at-finnish-nuclear-plant-approach-initial-cost.html>; "Team France in Disarray: Unhappy Attempts to Revive a National Industry, *The Economist*, December 2, 2010, available at http://www.economist.com/node/17627569?story_id=17627569&fsrc=rss; Guy Chazan, "Jinxed Plant Slows A Nuclear Rebirth, *The Wall Street Journal*, December 2, 2011, available at <http://online.wsj.com/article/SB10001424052748703865004575648662738551250.html>.

9. See John W. Rowe, Chairman CEO, Exelon Corporation "Energy Policy: Above All, Do No Harm," a presentation given before the American Enterprise Institute Washington, DC, March 8, 2011, available at http://www.exeloncorp.com/assets/newsroom/speeches/docs/spch_Rowe_AEI2011.pdf.

enhancing energy security. For some arms control proponents eager to eliminate nuclear weapons, it also has seemed critical for nuclear weapons states to share civilian nuclear technology liberally with nonnuclear weapons states. Such nuclear commerce, they have argued, was a necessary quid pro quo to get the world's nonnuclear weapons states to uphold their Nuclear Nonproliferation Treaty (NPT) pledges not to acquire nuclear weapons.¹⁰

Given all these concerns, emphasizing the need to restrict or control civilian nuclear energy in the name of nonproliferation has been viewed by some as a mistake. In this regard, three basic arguments have been made.¹¹

First among these is that worrying about the spread of nuclear power reactors is wrongheaded. Instead of reactors spreading, it has been argued, we should only worry about the proliferation of nuclear fuel making plants, which can bring states within weeks of acquiring the bomb fuel they need to make nuclear weapons. Certainly, the most popular power reactors, light water reactors, are not optimal for making the very highest weapons grade plutonium. Also, with more research even more proliferation resistant reactors may be possible. In the meantime, we can establish multinational nuclear fuel banks to service any demand states might have to make their own fuel.

Second, it has been argued that to the extent there might be a proliferation concern relating to power programs, we can simply scale up the IAEA's inspections to deal with the increasing number and enhance our own nuclear intelligence programs as well so we can counter-proliferate in clever ways like those Israel and the U.S. have used against Iran.

Finally, some argue, nuclear weapons proliferation might yet occur but since nuclear weapons are not all that useful in war, only a handful of states would bother to acquire them. Acquiring

10. See, e.g., Ambassador Libran N. Cabactulan, "Defining Success for the NPT Review Conference," NGO Committee on Disarmament, Peace and Security, available at http://disarm.igc.org/index.php?option=com_content&view=article&id=340:defining-success-for-the-npt-review-conference-spring-2010&catid=145:disarmament-times-spring-2010&Itemid=2 and "The Three Pillars in the Political Declaration," The Seven Nation Initiative on Nuclear Disarmament and Nonproliferation, available at http://www.7ni.mfa.no/NPT/3_pil_in_pol_decl/.

11. Although the following arguments have been generally made by policy makers in Washington and national security academics, the specific arguments here are drawn directly from a feature article in the World Nuclear Association's flagship magazine their top policy analyst, Steven Kidd, "Nuclear Proliferation Risk – Is It Vastly Overrated?" *Nuclear Engineering International*, July, 23, 2011, available at <http://www.neimagazine.com/story.asp?storyCode=2056931>.

the bomb would do them no good since their nuclear weapons could be deterred relatively easily by other states' conventional and nuclear weapons.

A Critique

Each of these arguments is popular. All are misleading. Each, properly assessed, helps clarify what this committee should do to tighten our current nonproliferation policies and to get other nuclear supplier states to do likewise.

Truly Proliferation Resistant Power Reactors? Not Yet

First, there is no bright clear line between boiling water with uranium and making nuclear fuel. Once a country begins a large nuclear power program, it must train hundreds of technicians to master nuclear engineering. This instruction is generally accomplished either by bringing foreign teachers in or sending one's students abroad. In either case, any country's best and brightest young students studying nuclear matters will be naturally interested in learning about the latest and most interesting nuclear topics. This, unavoidably, includes insights into how nuclear fuels perform and the latest techniques for producing them. The idea that one might try to block such learning at Western universities violates not only commonsense, but also most Western states' own domestic laws.

Second, the construction and operation of a large nuclear power plant makes it easier for states interested in making bombs to import illicit technologies and goods that have little or nothing to do with boiling water. This certainly was the case with Iran and its construction of a light water reactor at Bushehr. The U.S. State Department sanctioned at least one Indian nuclear technician who visited the site ostensibly for "safety" reasons. It turned out that he was the world's leading experts in extracting tritium – a fuel used to boost fission bomb yields significantly -- from heavy water production facilities, which Iran was bringing on line. A Russian nuclear implosion expert also visited Iran's peaceful nuclear program. Neither visit was discovered until after it occurred. This was one of the key reasons why the Congressional commission I just served on recommended having the IAEA keep track of who actually visits IAEA safeguarded sites.¹²

Of Course, beyond serving as a cover for illicit, intangible technology transfers, large civilian nuclear programs also make the illicit acquisition of dual use nuclear goods far easier to hide.

Third, large reactors are themselves useful to would be bomb makers. Even the most popular of proliferation resistant power systems -- the light water reactor -- uses fresh low enriched uranium and generates plutonium in its spent reactor fuel that can be seized or slowly stolen to help make

12. *World at Risk: The Report of the Commission on the Prevention of WMD Proliferation and Terrorism*, December 2, 2008, page 50, available at <http://www.absa.org/leg/WorldAtRisk.pdf>.

bombs. In a detailed study that my center completed several years ago, a detailed analysis was given on how fresh light water reactor fuel could be used to accelerate an illicit uranium enrichment program to make weapons-grade uranium. This could be accomplished with roughly one-fifth the effort that otherwise might be required using natural uranium. This study also detailed how spent fuel from the reactor could be chemically stripped out to produce enough near-weapons grade plutonium for 30 to 60 Hiroshima-sized bombs after only a year or so of reactor operation. The report also explained how would be bomb makers could divert these materials without the IAEA necessarily being alerted.¹³

This report's key findings were validated by nuclear safeguard scientists at our national weapons laboratories, officials at the U.S. State Department, and the House Select Permanent Committee on Intelligence.¹⁴ It was partly because of these findings that the second Bush Administration decided that North Korea could not be trusted with the two light water reactors that the Clinton Administration agreed to help build for Pyongyang.

Finally, the very operation of large reactors normally entails sensitive activities that might help states engage in illicit nuclear weapons related activities. One example is post irradiation experiments, in which spent reactor fuel is taken from the reactor, opened up, and the ceramic fuel pellets and cladding examined to help determine the reliability and performance of the fuel in the reactor. Allowing states to open up spent fuel for this legitimate diagnostic purpose could afford them an opportunity to divert spent fuel in order to separate out nuclear weapons usable plutonium. Post radiation examinations or PIEs, though, are normal for any power reactor operator and permitted even for states, like Taiwan, which have been previously caught trying to reprocess spent fuel illicitly to make bombs.

These problems have encouraged many nuclear researchers in the U.S. and other nuclear power states to call for the development of more proliferation resistant reactors. In theory, this maybe possible, but so far, little has changed. Certainly, what we have in the way of power reactors and

13. See Victor Gilinsky, et al., "A Fresh Examination of the Proliferation Dangers of Light Water Reactors," in Henry Sokolski, editor, *Taming the Next Set of Strategic Weapons Threats* (Carlisle, PA: US Army War College, Strategic Studies Institute, 2005), available at http://www.npec-web.org/article_file/20041022-GilinskyEtAl-LWR_310111_0241.pdf.

14. See House Permanent Select Committee on Intelligence, Subcommittee on Intelligence, *Recognizing Iran as a Strategic Threat: An Intelligence Challenge for the United States*, staff report, August 23, 2006, p. 11, at <http://intelligence.house.gov/Media/PDFS/IranReport082206v2.pdf>.

fuel making systems today are pretty much what we will be building and operating for the next two decades.¹⁵

Couldn't the U.S. and other nuclear supplier states convince nonnuclear weapons states not to make their own nuclear fuel by creating multilateral and international fuel banks? Again, the answer is unclear. The U.S. and other states tried to persuade Pakistan, Iran, Argentina, Brazil, Japan, and South Africa all to forgo making their own nuclear fuel and failed even though the economics of making nuclear fuel were far less favorable than they are today.

Construction of large power reactors can cost now anywhere between 4 and 10 billion dollars each – certainly no less and generally far more than what a small, crude uranium enrichment or plutonium reprocessing plant might cost. The U.S. and other nuclear supplier states, moreover, have been quite emphatic in arguing that all NPT-compliant member states have an “inalienable right” to make nuclear fuel so long as it is for peaceful purposes. None of this augers well for the proposition that giving nonnuclear weapons states power reactors and merely offering to make nuclear fuel accessible to them will suffice to persuade them to forswear their “right” to make nuclear fuel (and so develop a bomb option) of their own.¹⁶

More arguments could be made regarding the difficulty of keeping peaceful power programs from becoming launching pads for nuclear weapons work. What has been laid out here, though, more than suggests why it would be a mistake to share large reactors, even light water reactors, with any nonnuclear weapons state unless one was convinced it was clearly out of the bomb making business.

Nuclear Inspections and Intelligence: What Are the Limits?

This is where the idea of strengthening existing nuclear inspections and enhancing national intelligence are generally held up as nonproliferation solutions. In the case of IAEA inspections, much can be done to improve near-real time surveillance of inspected sites with remote sensors and secure communication links. Securing talented inspectors and retaining more of them would also be both possible and useful.

15. See Committee on Review of DOE's Nuclear Energy Research and Development Program, National Research Council, “Minority Opinion: Dissenting State of Gilinsky and Macfarlane,” in *Review of DOE's Nuclear Energy Research and Development Program* (Washington, DC: National Academies Press, 2008), available at http://armscontrolcenter.org/assets/pdfs/macfarlane_gilinsky.pdf and Frank Von Hippel, “Managing Spent Fuel in the United States: The Illogic of Reprocessing,” in Henry Sokolski editor, *Falling Behind: International Scrutiny of the Peaceful Atom* (Carlisle, PA: Strategic Studies Institute, 2008), pp. 159-221.

16. On the matter of the NPT and the right to peaceful nuclear energy,

Yet, simply sending money to the IAEA and increasing its authority ought not to be seen as a panacea. Most U.S. officials, for example, are extremely enthusiastic about increasing the number of state adherents to the IAEA's latest inspection understanding, The Additional Protocol, which authorizes the IAEA to conduct more intrusive inspections than under existing safeguards agreements. The increased inspection authority that the Additional Protocol affords, though, is most commonly occasioned by a reduction in the number of routine inspections. Once a country qualifies for Additional Protocol inspections, it is argued, it should be trusted more and inspected less. This lessens IAEA inspection loads but it also reduces IAEA safeguards presence on the ground.

There also are real limits on IAEA inspections. After Iran, Iraq, Libya, Syria, and Algeria, we learned that in the most dangerous cases, the IAEA cannot always meet its own timeliness nuclear detection goals. Safeguarding nuclear fuel making (e.g., enrichment, reprocessing, fuel fabrication, uranium hexafluoride production) and nuclear weapons usable fuels (highly enriched uranium, separated plutonium, mixed oxide fuel) anywhere; and large civilian nuclear facilities in hostile states (e.g., Iran and North Korea), are among these cases. In these instances, the inspected nuclear activities and materials are so close to bomb making that there is scant time even with discovery of a diversion to do much and a high likelihood that any discovery might come after the diversion if at all.¹⁷

Finally, recent research suggests that for large organizations with conflicting goals regarding the regulation of complex technologies, their mere expansion may not help and, in certain cases, could actually make matters worse. These research findings could easily apply to the IAEA, which is designed both to promote civilian nuclear applications and to restrain them to assure they stay peaceful. These two opposing IAEA functions make achieving the agency's

17. On these points see "In Pursuit of the Undoable, Troubling Flaws in the World's Nuclear Safeguards," *The Economist*, August, 23, 2007, available at http://www.economist.com/world/international/displaystory.cfm?story_id=9687869; Marvin M. Miller, "Are IAEA Safeguards on Plutonium Bulk-Handling Facilities Effective?" (Nuclear Control Institute, 1990), reprinted in Paul Leventhal et. al. (eds.), *Nuclear Power and the Spread of Nuclear Weapons* (Brassey's, 2002); Brian G. Chow and Kenneth A. Solomon, *Limiting the Spread of Weapon-Usable Fissile Materials* (The Rand Corporation, MR-346-USDP, 1993), pp. 1-15; Henry S. Rowen, "This 'Nuclear-Free' Plan Would Effect the Opposite," *The Wall Street Journal*, Edwin S. Lyman, "Can Nuclear Fuel Production in Iran and Elsewhere Be Safeguarded against Diversion?" in *Falling Behind*, pp. 101-20. January 17, 2008, available at <http://www.npec-web.org/OpEds/20080117-Rowen-WSJ-Letter.pdf>; David Kay, "Denial and Deception Practices of WMD Proliferators: Iraq and Beyond" in Brad Roberts, ed., *Weapons Proliferation in the 1990s*, (MIT Press, 1995); Gilinsky, "A Fresh Examination of the Proliferation Dangers of Light Water Reactors"; and Andrew Leask, Russell Leslie, and John Carlson, "Safeguards As a Design Criteria— Guidance for Regulators," (Australian Safeguards and Non-proliferation Office, September 2004), available at http://www.asno.dfat.gov.au/publications/safeguards_design_criteria.pdf.

safeguarding mission difficult. It also makes determining how much one is “strengthening” the IAEA inherently tricky.¹⁸

This, then, brings us to the utility of improving national intelligence capabilities. Since the late 1980s, much has been made of what the U.S. and other states might do to “counter” proliferation with trade interdictions, covert operations, passing off sensitive information to agencies like the IAEA and, if necessary, military strikes. All of these operations may be needed; all demand timely, actionable intelligence.

To argue that we can depend on such operations to prevent proliferation if we only could secure more “actionable” intelligence, though, would be a stretch. First, there are severe limits on how much actionable intelligence any country is comfortable sharing with allies, much less international organizations. Second, there are limits on how much information most governments, including our own, are likely to demand about states that are about to or may have already acquired nuclear weapons. In more than a few cases, getting or sharing such information becomes awkward since it can force officials to have to act in ways they may be disinclined to. This arguably was the case with Israel, Pakistan, and North Korea, where at various points, senior U.S. officials actually kept intelligence officers from inspecting or reporting more on what actually was occurring in each of these countries nuclear weapons programs. We subsequently have had to downplay the implications of nonproliferation failures in each of these cases. This suggests that our problem in preventing proliferation may not be the lack of actionable intelligence so much as a lack of demand for it in the hardest and, arguably, most important cases.¹⁹

18. See Charles Perrow, *Normal Accidents: Living with High-Risk Technologies* (Princeton NJ: Princeton University Press, 1984), pp. 9 ff. and Henry Sokolski, Building Support for the Agency’s Safeguards Mission: More Transparency, Funding, and Safeguards Candor,” A Presentation made before Panel 17 “Building Support for the Safeguards Mission” of the International Atomic Energy Agency Safeguards Symposium “Preparing for Future Verification Challenges,” November 3, 2010 IAEA Headquarters, Vienna, Austria, available at http://www.npec-web.org/article_file/Building_Support_for_the_Agencys_Safeguards_Mission_More_Transparency_Funding_and_Safeguards_Candor_260111_1818.pdf.

19. Consider Victor Gilinsky, “Casting a Blind Eye: Nixon and Kissinger Finesse Israel’s Bomb,” a presentation before the Carnegie Endowment for International Peace, January 24, 2011 available at http://www.npec-web.org/article_file/Casting_a_Blind_Eye-Kissinger_Nixon_Finesse_Israels_Bomb.pdf.

Downplaying Nuclear Proliferation's Security Risks

Government officials' natural aversion to conflict with other states (even proliferating ones) has fostered a school of proliferation optimists for whom the spread of nuclear weapons is hardly awful and may even be good. Their underlying operating assumption is that nuclear weapons are not useful militarily and that their use, in any case, can be deterred relatively easily.²⁰

To anyone who has studied the war scares between a nuclear-armed India and Pakistan, much of this optimism seems misplaced. The U.S. and others have had to intervene diplomatically more than once, partly to head off fears of nuclear weapons escalation. Also, the standard for what is thought to be worrisome – the actual use of nuclear weapons in anger -- is so low, it misses much of what matters.

Thus, the construction or operation of large nuclear reactors, in Syria, Iraq, and Iran has prompted at least nine major acts of war by the U.S., Israel, Iraq and Iran. Two of these strikes came with two major invasions of Iraq. Meanwhile, the latest historiography suggests that the 1967 Israeli War was actually prompted by Soviet desires to eliminate Israel's option to go nuclear. Similar historiography has detailed numerous plans advanced by India and Israel against Pakistani nuclear plants; by Pakistan against Indian nuclear plants; by Taiwan, Russia, and the U.S. against Chinese nuclear plants; and by the U.S. and Japan against North Korea.²¹ In more than a few of these cases, the nuclear facilities that were targeted were IAEA safeguarded. All of this history helps clarify just how “destabilizing” the spread of such facilities can be and why just a “little” proliferation can produce enormous security headaches even if nuclear weapons are never produced or used or the plants themselves are not fully completed.

What's to Be Done

Of course, nearly all U.S. officials understand just how great a security threat nuclear weapons proliferation is. More than a few understand that the link between nuclear power and nuclear weapons is significant and most privately concede that it will be more difficult to manage unless

20. See, e.g., John Mueller, *Atomic Obsession: Nuclear Alarmism from Hiroshima to Al-Qaeda* (New York, NY: Oxford University Press, 2010).

21. See, Matthew Fuhmann and Sarah F. Kreps, “Targeting Nuclear Programs in War and Peace: A Quantitative Empirical Analysis, 1942-200,” *Journal of Conflict Resolution* 2010 54:831 Originally published online 15 June 2010, appendix I, available at [http://www.npec-web.org/article/file/Appendices for Matthew Fuhmann and Susan E Kreps-Targeting Nuclear Programs 280211_1213.pdf](http://www.npec-web.org/article/file/Appendices%20for%20Matthew%20Fuhmann%20and%20Susan%20E%20Kreps-Targeting%20Nuclear%20Programs%20280211%201213.pdf).

tighter controls are put in place. The difficulty in doing so, they argue, however, is America's lack of leverage. The U.S. is no longer a lead manufacturer of controlled nuclear reactors or of major reactor components. The French, Russians, and Japanese now are easily America's equals. They not only can sell reactors at lower prices than the U.S., as government owned or protected entities, they are not hamstrung as US private reactor vendors are by having to get overseas customers to promise not to sue them in the case of a nuclear accident. As a result, it has been fashionable to argue that Washington must go along to get along – i.e., the U.S. must settle for whatever other nuclear suppliers will allow in the way of nuclear export control restraints.

This view, however, is mistaken on two grounds. First, what other key suppliers will voluntarily allow in the way of nuclear trade restraints is far shy of what is needed. China wants to sell reactors to Pakistan even though Pakistan has a very bad nonproliferation record. Russia, France, South Korea, and Japan, meanwhile, are happy to sell civilian nuclear power systems throughout the Middle East without demanding (as the U.S. did of the United Arab Emirates) that their customers forswear making nuclear fuel or ratify the IAEA's most stringent safeguards under the Additional Protocol.

As I have explained in previous testimony before this committee, all of these same nuclear suppliers, though, are eager to expand their nuclear businesses in America with U.S. Nuclear Regulatory licenses, Department of Energy contracts, and generous U.S. taxpayer-backed federal nuclear loan guarantees. Some of these firms, such as AREVA and EdF, are eager to secure exports to cover the costs they have incurred from their activities within France and Europe. All of this constitutes leverage.

The question is will we use it. The White House seems reluctant. Congress should not be. A key provision, this committee should insist on in revising the U.S. Atomic Energy Act is that no U.S. license, DoE contract or federal nuclear loan guarantee should be granted to any foreign nuclear vendor to expand their business here unless their host government explicitly adopts the key nonproliferation conditions of the U.S. – UAE nuclear cooperative agreement in their own nuclear cooperative activities with other non-nuclear weapons states. These conditions include getting the recipient to forswear making nuclear fuel or engaging in heavy water reactor related activities and ratifying the IAEA's additional protocol.

Promoting global adoption of this nonproliferation "Gold Standard," makes sense. It is something both Presidents Bush and Obama helped establish and is critical to prevent the further spread of nuclear fuel making, which is so dangerous and difficult to safeguard. It also is something that the U.S. needs to take the lead in promoting particularly since the Nuclear Suppliers Group is unlikely, initially to do so.

The key, as I have noted in testimony before, is to get the French to adopt this standard. Once the French do, Germany politically is certain to do so almost automatically. Since Russia is

seeking German nuclear technology through Siemens to help it upgrade Russia's domestic and export reactors, Moscow will indirectly be forced to adopt the standard as well: Legally no Russian reactor containing German technology could be exported from Russia without meeting German nonproliferation requirements and formal German consent. With France, Germany, Russia and the US all on the same sheet, it should be relatively easy to secure this standard's adoption by South Korea, Japan, and, perhaps even China.

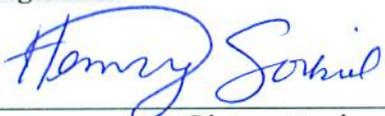
In any case, this committee should consider all of the recommendations listed in the front of this testimony and others as well to assure that the intent of the Nuclear Nonproliferation Act of 1978 is realized or, at least, not undermined. Right now, the economics of nuclear energy as compared to its alternatives allows us the time to get our nuclear policies in order.²² After Japan's tragic nuclear experience of the last week, we owe to ourselves, our friends, and the world to do so. This includes doing a better job of controlling this technology and to assure that it not only is safe, but that it never is diverted or misused to militarily threaten others.

22. See, Henry Sokolski, editor, *Nuclear Power's Global Expansion: Weighing Its Costs and Risks* (Carlisle, PA: Strategic Studies Institute, December 2010), available at <http://www.npec-web.org/thebook.php?bid=19>.

United States House of Representatives
Committee on Foreign Affairs

"TRUTH IN TESTIMONY" DISCLOSURE FORM

Clause 2(g) of rule XI of the Rules of the House of Representatives and the Rules of the Committee require the disclosure of the following information. A copy of this form should be attached to your written testimony and will be made publicly available in electronic format, per House Rules.

1. Name: Henry Sokolski	2. Organization or organizations you are representing: The Nonproliferation Policy Education Center
3. Date of Committee hearing: March 17, 2011	
4. Have <u>you</u> received any Federal grants or contracts (including any subgrants and subcontracts) since October 1, 2008 related to the subject on which you have been invited to testify? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Have any of the <u>organizations you are representing</u> received any Federal grants or contracts (including any subgrants and subcontracts) since October 1, 2008 related to the subject on which you have been invited to testify? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
6. If you answered yes to either item 4 or 5, please list the source and amount of each grant or contract, and indicate whether the recipient of such grant was you or the organization(s) you are representing. You may list additional grants or contracts on additional sheets. DSD \$99,999 Nonproliferation Policy Education Center DSD \$199,998 Nonproliferation Policy Education Center	
7. Signature: 	

Please attach a copy of this form to your written testimony.