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Testimony before the House Committee on Foreign Affairs,
Subcommittee on Terrorism, Nonproliferation, and Trade

July 24, 2008

Rayburn House Office Building, Room 2172

Chairman Sherman, Congressman Royce, and Members of the Committee:

My name is Jack Spencer and I am the Research Fellow for Nuclear Energy Policy for The Heritage Foundation.

Thank you for inviting me to testify today before the Subcommittee on Terrorism, Nonproliferation, and Trade.

As we sit here today there are approximately 440 commercial nuclear reactors operating around the world. One hundred and four of them are operating in this country alone. With the exception of a few highly publicized and, I might add, mostly misunderstood, accidents, these reactors have operated safely, cleanly, and to the benefit of society for most of their lifetimes.

This is not to suggest that no problems have ever arisen. It is merely to acknowledge the relatively good track record of nuclear power.

And it is this track record that essentially brings us here today to discuss ways to save the Nonproliferation Treaty and the nonproliferation regime in an era of nuclear renaissance.

Is a Nuclear Renaissance Under Way?

Answering such a question is difficult. Certainly the world is preparing for an expansion of nuclear power. But the size and scope of that expansion remains unknown. It is clear that many countries, including the United States, are beginning to look at nuclear power as a viable alternative for meeting future energy demand.

Indeed, approximately 39 nuclear power reactors are under construction around the world. More important to the question before us today is the large number of reactors that could come online in the next few decades. Nations across the world have voiced an interest in building nuclear power plants. Literally hundreds of reactors are in the planning stages. But even that could be a fraction of what is about to come if there is truly a nuclear renaissance.

The likelihood of a massive expansion of nuclear power depends on the factors behind the growth. If it is a question of energy independence and economics, then the expansion of nuclear power in the United States, while potentially significant, will likely remain moderate. However, a mandate to reduce CO₂ emissions could bring about a much more comprehensive expansion.

Recent analysis by the United States Department of Energy's Energy Information Agency suggests that the United States will need to add approximately 268 gigawatts of new nuclear power by 2030 to meet the CO₂ emissions objectives mandated by the Lieberman–Warner climate change bill (S.3036).¹ In terms of reactors, assuming an average of 1.3 gigawatts per reactor, the U.S. would need to construct approximately 200 reactors over the next 25 years.

If the rest of the world were held to similar emissions levels, 268 gigawatts in the U.S. would extrapolate to roughly 1000 new reactors for the rest of the world. This would meet anyone's definition of a nuclear renaissance.

Whether such an outcome is likely—or even possible for that matter—is certainly up for question. However, what is clear is that the path towards drastic CO₂ reduction will lead to an accelerated expansion of nuclear power.

But even aside from being CO₂ free, nuclear energy has many attributes that make it attractive. For that reason, I believe that even absent CO₂ restrictions, nuclear power in one form or another will play a larger role in energy production around the world in coming years. China and India provide good examples. Neither of these countries are necessarily concerned about CO₂ emissions, yet both are planning a significant nuclear expansion to meet their skyrocketing energy demands.

The question then becomes, what can the U.S. and the international community do to manage this potential growth so that states can enjoy the benefits of nuclear power without increasing the risk of proliferation.

The Nonproliferation Regime

While the nonproliferation regime is under stress, it is not broken. Indeed, it is largely working. The treaties, agreements, organizations, and initiatives in place today provide peaceful nations with numerous tools to control the spread of dangerous technologies and the authority to act when dangerous behavior is identified. The question is whether supplier states follow the established rules and to what extent peaceful nations are willing to compel proliferators to discontinue risky behavior.

North Korea, for example, did not surprise anyone where its so-called peaceful nuclear activities were revealed as a cover for a nuclear program. To the extent there

¹ United States Department of Energy, Office of Integrated Analysis and Forecasting, *Energy Market and Economic Impacts of S.2191, the Lieberman–Warner Climate Security Act of 2007*, April 2008, at [http://www.eia.doe.gov/oiaf/servicerpt/s2191/pdf/sroiaf\(2008\)01.pdf](http://www.eia.doe.gov/oiaf/servicerpt/s2191/pdf/sroiaf(2008)01.pdf) (May 22, 2008).

were any surprises in the early 1990s, the international community had ample time to respond. Whether changes in policy toward North Korea altered its behavior can be debated, but certainly the nonproliferation regime worked insofar as it gave the world ample warning of North Korea's intentions.

The same is true today with Iran. The world is not unaware of Iran's programs. The problem is with states that enable Iran's actions and the difficulty of developing a cohesive policy to compel a change in its behavior.

One could argue that the Iran and North Korea problems are examples of nonproliferation regime failure. Perhaps they are to the extent that the purpose of nonproliferation policy is to prevent any spread of nuclear technology for the purposes of weaponization. But the reality is that as long as the basic building block of the international system is the sovereign nation-state, no international treaty or regime can stop a state from pursuing dangerous programs. It is not a problem of nonproliferation policy, but a problem of hostile, dangerous regimes.

That is not to suggest that current nonproliferation policy could not be modified. Any set of rules used to manage something as dynamic as nuclear technology will always require adjustments to accommodate for tactical changes by would-be proliferators. That is why there are regularly held NPT conferences, Nuclear Suppliers Group meetings, and so forth.

In essence, the fundamental bargain of the Nuclear Nonproliferation Treaty is sound. However, a global nuclear renaissance would present certain new and unique challenges. Yet I believe that a global nuclear renaissance is not incompatible with national and international nonproliferation objectives.

Reestablishing America's Credibility as a Commercial Nuclear Power Leader

Even if a nuclear renaissance were to come at the expense of nonproliferation objectives, it is unclear whether the United States is in a position today to do much about it. Like us, other nations are facing serious challenges with their energy policy. The fact is that notwithstanding optimistic predictions about renewable energy sources, nuclear power helps solve many nations' energy problems.

The U.S. is no longer dominates the commercial nuclear technology field. Its industry has atrophied over the past three decades. During that time other nations—most notably France, Russia, and Japan—have continued to build their commercial nuclear capacities. Now they are prepared to supply the world with commercial nuclear technology, and there is little that the U.S. can do about it.

That is not to suggest that the U.S. has nothing to offer or has no leverage. It does. While other countries were developing strong nuclear industrial bases and commercial business models, the United States was engaged in significant research and development

and perfecting nuclear power plant operations. Furthermore, despite its lack of domestic nuclear industry, the United States remains the most influential nation in the world.

These three things (R&D, expertise in operations and maintenance, and prestige) are precisely what is needed to ensure that a global nuclear renaissance moves forward without unduly jeopardizing the nation's nonproliferation objectives. America's research and development in nuclear technology will be critical to the future of safe, global nuclear energy. These technologies will bring about safer reactors, proliferation-resistant fuels, and new methods for managing nuclear waste. While other nations also engage in R&D, the U.S. and its system of national labs and universities are the best. Exporting these technologies would help to advance nonproliferation goals.

America's nuclear plants operate at over 90 percent capacity, which is an extremely efficient level. This allows the U.S. to produce much more power per reactor than anywhere else in the world. Thus, by exporting our operations and maintenance expertise, other nations would need fewer reactors. America's reactors are safe, efficient, and secure. If every reactor in the world operated like those in the U.S., there would be no proliferation risk.

The challenge for the United States will be to integrate its concerns, principles, and values into global norms without isolating itself from the process. This means not attempting to stop progress on commercial nuclear power, but instead taking the lead in creating new rules for global nuclear commerce.

Nuclear Fuel Supply and Used Fuel Management

Nations such as Iran and North Korea have insisted that they need a domestic fuel services industry to ensure fuel supplies. Although most observers recognize these justifications as a sham, they are technically legitimate insofar as nothing exists to guarantee those supplies. Therefore, a credible fuel supply guarantee must be at the center of any strategy that sets out to save the nonproliferation agenda while allowing for a nuclear renaissance.

Fuel supplies, however, can never be unconditionally guaranteed. Instead, a system should be implemented that assures fuel access as long as certain nonproliferation guidelines are followed. This system could be built around a statement of principles such as those stated in the President's Global Nuclear Energy Partnership. As long as a country complies with the statement of principles, they can have access to fuel services.

Of course this puts a premium on the statement of principles. While the President's GNEP program may serve as a useful guide, it is not adequately comprehensive.

One of the ideas for guaranteeing fuel supplies has been to establish an international fuel bank. An international fuel bank has some merit, but it should not be the primary mechanism for controlling nuclear fuel supplies. Instead, it should merely be

an insurance policy against any coordinated effort to deny a compliant participant country access to fuel.

A central tenet of any future fuel services regime must be that fuel suppliers maintain title of that fuel throughout the fuel cycle, as long as it is in a form that could be potentially dangerous. This means that any nation that engages in the fuel supply market must also have a workable spent fuel management strategy. The elements of the strategy would be developed by each individual fuel supplier state.

There should also be a concerted effort to ensure that the fuel supplier and fuel management markets are as free, open, and transparent as possible. Indeed, the idea of promoting free markets should be embedded in any potential statement of principles. This means that fuel supplier states should open their markets to international competition. Supplier companies (including state-owned companies) should operate as private, for-profit firms, and every effort should be made to eliminate tariffs and quotas that artificially protect domestic fuel and fuel services markets.

The international community should not be responsible for managing nuclear waste. Instead, each nation would operate under its specific rules and regulations as they pertain to nuclear waste issues. Reprocessing, permanent geologic storage, and other used fuel processing technologies would be brought to bear as each nation deems appropriate.

The U.S. can simultaneously advance its nonproliferation and commercial objectives by:

- **Developing an international nuclear fuel services program.** The United States and other fuel service supplier nations should develop a program to guarantee nuclear fuel services (fuel supply and used fuel disposition) to any nation that agrees to the nonproliferation guidelines set forth by the program. The international component of the President's GNEP program could serve as the foundation of such a system, but it must be developed further.
- **Taking a more active role in safeguards and verification.** The International Atomic Energy Agency has a monopoly over the safeguards and verification process. While the IAEA has a critical role in promoting safety, security, and cooperation in the nuclear field, safeguards and verification need additional oversight. A more active U.S. role, especially in activities involving fuel services, would have multiple benefits. First, it would allow the IAEA to focus its efforts on those countries that are not part of the fuel services program and are often the sources of legitimate national security concerns, as opposed to spreading its resources across the entire nuclear industry. The reality is that most of the world presents little or no proliferation threat and requires only minimal related oversight. Second, it would provide a second opinion and another level of scrutiny for potential proliferation concerns. The U.S. and other fuel service suppliers should make their provision of fuel services contingent on verification of compliance.

- **Leading the world in developing new rules to govern commercial nuclear activities.** The United States should use the resurgence of nuclear power to reestablish itself as a player in the industry. The best way to position itself to compete is to ensure that the rules and norms of the global nuclear industry are consistent with America's strengths. This means ensuring that the system is based on free-market principles, openness, and transparency. However, doing this requires the U.S. to be fully engaged in the international commercial nuclear market. The rules that it creates in governing the commercial transactions between it and others could become the basis for all international nuclear trade as long as these agreements are practical, fair, and relevant. This means ensuring that agreements, such as 123 agreements, move forward in ways that respect proliferation concerns, but do not sacrifice commercial activity. If these agreements do not strike this balance, the U.S. will be denied access to the global nuclear market while others step in to take its place.
- **Recognizing the enduring role of Article IV of the Nuclear Nonproliferation Treaty.** The reality is that any country can pursue whatever technologies that it chooses. As the article states, countries' rights to pursue peaceful nuclear technologies are "inalienable." This inalienability, however, is not absolute. It is contingent on states party to the NPT fulfilling their obligations and responsibilities under the pact. Any nonproliferation regime that does not respect the rights of individual states will not be successful. The key is not to deny others the right to develop technology, but to devise a system that promotes buy-in from both providers and consumers of nuclear fuel services. If the system is economically rational, credible, and reliable, then all peaceful nuclear countries would find participation beneficial. Only those that would seek to use nuclear technology for nefarious purposes would find benefits in operating outside of the system.

Conclusion

In conclusion, the current nonproliferation regime provides the international community with numerous tools to control the spread of dangerous nuclear materials. However, none of these tools can magically prevent a dedicated nation (or other international actor) from seeking dangerous capabilities. Such prevention requires the political will to use the available tools effectively. Furthermore, there will always be a struggle to keep technology of all sorts out of the hands of those who would use it for nefarious purposes. However, the existence of this struggle is not justification to deny society the benefit of critical technologies such as nuclear power.

That concludes my testimony today. Thank you for this opportunity. I look forward to your questions.