Testimony for the Record

Marvin S. Fertel
President and Chief Executive Officer
Nuclear Energy Institute
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Chairman Menendez and Ranking Member Corker, thank you for the opportunity to testify today on this important issue. I am Marvin Fertel, President and Chief Executive Officer of the Nuclear Energy Institute[1] (NEI). Our 350 members represent all aspects of peaceful nuclear technology, from nuclear power plant operators and reactor vendors, to major architect/engineering firms, to fuel suppliers and component manufacturers, to educational and research organizations. On behalf of our members, we appreciate the opportunity to provide testimony on U.S. peaceful nuclear energy cooperation to the Senate Foreign Relations Committee.

Industry view on Section 123 agreements

U.S. nuclear cooperation and commercial engagement in other countries' new and expanding nuclear power programs advance global nuclear safety, security and nonproliferation. U.S. commercial involvement ensures the highest possible levels of nuclear power plant safety and reliability, maintains U.S. leadership in nuclear energy technology and maintains U.S. influence over global nuclear nonproliferation policy and practices. Noted national security experts agree that "one of our nation's most powerful tools for guaranteeing that countries acquiring this [nuclear] technology continue to use it exclusively for peaceful purposes is to ensure that the U.S. commercial nuclear industry continues to play a leading role in the international civil nuclear marketplace."[2]

In order to create American jobs and support critical U.S. foreign policy interests, the United States must be fully engaged in the global expansion of nuclear energy already underway. The U.S. nuclear energy industry:

- Supports efforts to limit the spread of uranium enrichment and used fuel reprocessing (E&R) technologies consistent with current U.S. policy. The United States has a broad portfolio of bilateral and multilateral policy instruments that can be used to advance this policy, including: Nuclear Suppliers Group guidelines, assurances of fuel supply, multilateral guarantees of fuel supply and used fuel disposition, bilateral commitments, and other assurances required by the Atomic Energy Act.

[1] The Nuclear Energy Institute is responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry, including regulatory, financial, technical and legislative issues. NEI members include all companies licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel cycle facilities, materials licensees, and other organizations and individuals involved in the nuclear energy industry.

[2] April 25, 2013, letter to President Obama from Senator William S. Cohen, Dr. James Schlesinger, Admiral Michael Mullen, Dr. John Hamre, General Brent Scowcroft, General James Jones, Senator Pete Domenici and Ms. Susan Eisenhower (attached).

- Opposes initiatives to condition U.S. nuclear cooperation on new terms that our potential partners will not accept and other supplier nations will not require. Each bilateral relationship is unique and complex. Whether and how E&R provisions should be included in a Section 123 agreement, beyond what is already in practice and in statute, should reflect the unique circumstances of each bilateral relationship. Pragmatism should continue to guide the United States as it negotiates Section 123 agreements. NEI supports the flexibility in the Atomic Energy Act that allows the Executive Branch to negotiate agreements based on the concerns and imperatives specific to each nation or region.

- Supports prompt negotiation of new and renewal bilateral agreements for peaceful nuclear energy cooperation. These agreements are essential for substantial U.S. nuclear exports. We are concerned that the Republic of Korea agreement has required a temporary extension to avoid a lapse and that the renewal Taiwan agreement was submitted for Congressional review so late that it may lapse as well. We also note that three agreements were allowed to expire in the past 21 months[3] and that two others will almost certainly expire by July of this year.[4]

  Prompt negotiation of 123 agreements will allow Congress the necessary time to conduct deliberative and effective oversight. It will also avoid the uncertainly created by the "just in time" nature of new and renewal agreements that, according to foreign customers, casts doubt on the U.S. as a reliable supplier nation.

- Supports a proactive approach for the negotiation of Section 123 agreements with nations with new or expanding peaceful nuclear energy programs. It is in the U.S. national security, nuclear safety and economic interest to secure agreements early and with a broad set of partners rather than to sit idly by as these nations partner with other nuclear suppliers. Without agreements in force, we forfeit exports, jobs and commercial benefits, and we will fail to influence these programs in terms of their nuclear safety, security and nonproliferation norms.

The global nuclear market and U.S. market share

Beginning with President Eisenhower's "Atoms for Peace" vision 60 years ago, American expertise established the world's largest nuclear energy program and fostered the use of this technology around the world. Our dedication to excellence maintains 100 U.S. reactors at world-class levels of safety and reliability. More than 60 percent of the world's 437 operating reactors are based on technology developed in the United States. Our nuclear industry has the knowledge, experience and infrastructure to support nuclear facility construction, operation and maintenance around the world. In addition, U.S. firms are making major investments in technology development to continue their tradition of innovation. These investments include development of small modular reactors, advanced technologies for uranium enrichment, more advanced large reactors with improved safety features and advanced manufacturing techniques to improve quality and reduce costs.

[3] Bangladesh (June 2012), Peru (April 2012) and Columbia (September 2013).
[4] Thailand (June 2014) and Norway (July 2014).

Today, there are 71 new nuclear power stations under construction worldwide, of which five are under construction in the United States. An additional 172 are in the licensing and advanced planning stages and virtually all of these plants will be built abroad where the demand for reliable, affordable and clean baseload electricity is growing. Electricity from nuclear energy will help economies expand and lift hundreds of millions from poverty while having a minimal impact on the environment. But with this growing nuclear market comes growing competition from other nuclear supplier nations, which can now provide a full range of products and services.

Over the past two decades, new supplier nations have entered the growing global nuclear market and multi-national partnerships and consortia have been formed to develop nuclear energy facilities. According to a 2010 GAO report, "while the value of U.S. exports of nuclear reactors, major components and minor components have increased, the U.S. share of global exports declined slightly" from 1994 to 2008.[5] Over the same period, the U.S. share in the fuel market declined sharply from one-third to one-tenth of the market.

The declining U.S. share of the global reactor, major component and minor component market is largely attributable to the growth of international competitors who began as suppliers to their domestic markets and over time expanded their offerings to the global market. For example, France's AREVA and Russia's Rosatom have steadily increased their presence in the global market. Although 11 of the reactors under construction today are U.S. designs, four are French and 16 are Russian.[6] One of the newest entrants in the global nuclear market is the Republic of Korea. In December 2009, Emirates Nuclear Energy Corporation awarded a multi-billion dollar tender to a Korea Electric Power Corporation-led consortium to build the first nuclear power plant in the United Arab Emirates (UAE). In addition, there has been an expansion of indigenous technologies developed for domestic markets. For example, 20 of the 71 nuclear plants under construction globally are Chinese reactors being built in China.[7]

As additional reactors are brought into service, a growing portion of the global nuclear market is nuclear fuel: uranium, conversion, enrichment and fuel fabrication. Over the past 20 years, economically attractive supplies of nuclear fuel have become available from an increasing number of supplier nations. Australia holds the most extensive identified resources, at 31 percent of the world's total. In recent years, Kazakhstan has emerged at the world's largest uranium producer, producing over 36 percent of global primary production in 2012. Conversion, enrichment and fabrication of fuel also operate as a wide-ranging international commercial market.

State of the U.S. commercial nuclear energy industry

Although major components such as ultra-large forgings and reactor pressure vessels are no longer manufactured in the United States, the U.S. nuclear industry continues to manufacture a wide range of equipment, components and fuel for nuclear power plants around the world. U.S.

[5] "Global Nuclear Commerce: Governmentwide Strategy Could Help Increase Commercial Benefits From U.S. Nuclear Cooperation Agreements with Other Countries", United States Government Accountability Office Report to the Committee on Foreign Affairs, House of Representatives, November 2010.
[6] International Atomic Energy Agency, 2014.
[7] Ibid.

firms also supply the global market with high-value services, including site evaluation, engineering and construction, fuel supply and transport, expertise in plant operation, decommissioning and more. After a nuclear power plant is constructed, U.S. firms can remain engaged throughout its life, which can last half a century or more, thus having a physical presence at nuclear facilities and influence over safe operational practice.

For example, Westinghouse Electric Company, headquartered near Pittsburgh, Pa. employs nearly 13,000 people, including engineers, technicians and other professionals (8,000 in the United States) who support its global business to provide fuel, services, technology, plant design and equipment to electric utility and industrial customers in the worldwide commercial nuclear electric power industry. Four Westinghouse AP1000® nuclear power reactors are currently under construction in China. Westinghouse is in discussions to contract support for an additional eight plants, with more expected. Support of these follow-on projects employs significant quantities of U.S. content from high-end precision manufacturing to instrumentation and control systems.

GE Hitachi Nuclear Energy, headquartered in Wilmington, N.C., employs more than 1,500 skilled professionals in its U.S. operations. GE Hitachi designs, services and manufactures nuclear components and fuel for the U.S. and global markets, including Taiwan and Mexico. Nearly one fifth of nuclear reactors in operation around the world are based on GE's boiling water technology and GE Hitachi has made significant investments in advanced reactor designs and innovative uranium enrichment technology.

The U.S. nuclear industry does not just supply technology. For example, Curtiss-Wright, an American company that traces its roots back to the Wright Brothers' first flight, employs 10,000 skilled professionals with facilities in some 30 states, is a manufacturer of precision nuclear components such as reactor coolant pumps, advanced valves, and electrical components. These safety-critical components are produced to the highest quality and safety standards for customers in the United States and abroad. As with many nuclear suppliers, Curtiss-Wright's business is increasingly abroad where it supplies components to nuclear facilities around the world including China, Korea, Taiwan, Mexico, UAE and the UK. Roughly a quarter of Curtiss-Wright's nuclear energy business comes from international markets and this is expected to grow significantly in the coming years as nuclear construction outside of the United States accelerates.

In addition to large companies, small businesses also benefit from nuclear exports. For example, Precision Custom Components of York, Pa., employs 270 Americans to manufacture high-end specialized components such as reactor vessel internals and integrated head packages for the U.S. and international markets including China. Nuclear exports support manufacturing jobs in more than 30 states.

Section 123 agreements of current interest

NEI and our members are grateful that this Committee recently approved an extension of the current Section 123 agreement with the Republic of Korea (ROK), and will soon consider renewal agreements with Taiwan and the International Atomic Energy Agency (IAEA), and a new agreement with Vietnam. Each of these agreements has significant potential benefits for

U.S. exports and U.S. jobs. For every $1 billion in exports, between 5,000 and 10,000 U.S. jobs are created or sustained.

- ***Republic of Korea.*** South Korea is the world's fourth-largest generator of nuclear energy and a major global supplier in its own right. Nineteen of South Korea's 23 operating plants – and all of South Korea's power plants under construction, on order or planned – are based on U.S. technology.[8] South Korea's licensing of U.S. technologies and export of U.S. components, fuel and services have earned billions for U.S. suppliers. Significant U.S. content in the Korean APR-1400 power plant and other U.S.-South Korea supply relationships earned U.S. suppliers more than $2 billion in the U.A.E. tender. That project alone is supporting thousands of jobs across 17 states.[9]
- ***Taiwan.*** Two General Electric nuclear energy facilities are under construction in Taiwan at Lungmen, and other U.S. companies provide equipment, services and fuel to Taiwan's six operating nuclear power plants. Fuel exports to Taiwan's reactors from AREVA North America in Richland, Washington, help support the more than 650 jobs at this facility. Renewal of the bilateral cooperation agreement will result in up to $10 billion of U.S. exports.
- ***IAEA.*** The IAEA does not operate nuclear power plants, but the IAEA agreement is commercially significant because, in combination with other agreements, it enables U.S. nuclear energy trade with Mexico. Currently, Mexico operates two General Electric-supplied Boiling Water Reactors at Laguna Verde. In 2012, the Mexican government announced plans to explore expansion of its nuclear program with additional units at the Laguna Verde site.
- ***Vietnam.*** Vietnam is implementing an ambitious national plan to develop up to 10,000 megawatts of nuclear generating capacity by 2030 with the first reactors coming on line in 2020. Russia and Japan have already secured agreements to develop nuclear energy projects in Vietnam, while U.S. firms have been sidelined absent this important agreement. Conclusion of a Section 123 agreement with Vietnam has the potential to result in $10-20 billion in U.S. nuclear exports.

Section 123 agreements ensure U.S. nonproliferation aims

Section 123 agreements provide critical nonproliferation benefits. These include significant commitments to safeguard materials, to prevent material diversion for non-peaceful purposes, and to provide adequate security for materials. The agreements provide for U.S. consent rights over the enrichment, reprocessing and retransfer of U.S. materials. This means that obligations are attached to these materials, which include stringent nonproliferation assurances that these materials will not contribute to weapons programs.

Within this framework, Section 123 agreements ensure that U.S. partners agree to rigorous nonproliferation and nuclear security requirements as a prerequisite to nuclear cooperation with the United States. The nine U.S. requirements include prior U.S. consent for any enrichment or reprocessing of U.S. materials and, in post-Nuclear Non-Proliferation Act agreements, consent

[8] "Nuclear Power in South Korea," World Nuclear Association, December 2012.
[9] Ex-Im Bank News Release, September 7, 2012.

for reprocessing of nuclear fuel that has been used in a U.S.-supplied reactor. The U.S. nuclear energy industry has always supported this approach.

U.S. nuclear energy cooperation is an essential element of the Nuclear Nonproliferation Treaty, which forms the basis of the global nonproliferation regime. Countries commit not to pursue nuclear weapons and, in exchange, are guaranteed support for their right to develop civil nuclear power and other peaceful uses of nuclear energy, subject to international supervision. The United States has relied on this framework for decades to advance its global nuclear nonproliferation agenda.

Limiting enrichment and reprocessing (E&R)

The nuclear industry supports efforts to limit the spread of E&R consistent with current U.S. policy. The United States currently has in force 23 nuclear cooperation agreements covering 50 countries, Taiwan and the IAEA. All agreements negotiated since the Nuclear Non-Proliferation Act of 1978 provide for U.S. consent rights for enrichment or reprocessing of U.S.-flagged materials.

A unilateral and inflexible requirement that potential trading partner countries forswear their rights to E&R as a condition for a Section 123 agreement would have the perverse effect of undermining U.S. nonproliferation interests by significantly reducing the number of countries willing to engage in civil nuclear commerce with the United States.

Other nuclear suppliers – like Russia, France, Japan and South Korea – stand ready to engage in nuclear commerce with other countries, whether or not those countries have concluded a 123 agreement with the United States. As a result, the net effect of refusing to conclude 123 agreements with countries that are unwilling to renounce E&R would be to encourage them to do business with other suppliers, thereby foregoing the economic and national security benefits of commercial nuclear engagement.

When a country like the UAE is willing, in the context of a Section 123 agreement with the United States, to renounce E&R, the United States should include that commitment in the Section 123 agreement. But when a country, which otherwise demonstrates its intent to develop an exclusively peaceful commercial nuclear energy program, makes clear that it is unwilling to renounce these rights in a bilateral agreement with the United States, it would be self-defeating to forego the nonproliferation and other benefits to the United States of concluding a Section 123 agreement with that country.

Industry is pleased that Taiwan and UAE have committed not to develop E&R, but we believe they are special cases. Taiwan, for example, has minimal need for E&R because its fleet of nuclear power plants is small and will eventually be phased out under the current national energy policy. The United States had unusual leverage in negotiation of the renewal agreement because Taiwan relies on it to enable its nuclear trade with other supplier countries, and because of the important U.S.-Taiwan security partnership. For all of these reasons, we believe the Section 123 with Taiwan is not a realistic model for other countries.

Conclusion

NEI believes that the global expansion of nuclear energy infrastructure provides the United States a unique opportunity to meet several national imperatives at the same time: (1) increasing U.S. influence over nuclear nonproliferation policy and practices around the world; (2) ensuring the highest possible levels of nuclear power plant safety and reliability around the world, by exporting U.S. advanced reactor designs and America's world-class operational expertise; (3) maintaining U.S. leadership in nuclear energy technology; and, (4) creating tens of thousands of jobs and maintaining a healthy manufacturing base for nuclear energy technology and services.

If U.S. exporters were able to capture 25 percent of the global market – estimated at $500 billion to $750 billion over the next 10 years – this would create (or sustain) up to 185,000 high-paying American jobs.

To maintain U.S. influence over global nonproliferation policy and international nuclear safety, the U.S. commercial nuclear energy sector must participate in the rapidly expanding global market for nuclear energy technologies (437 commercial nuclear reactors in operation around the world, 71 under construction, 172 planned or on order).

The U.S. nuclear industry is competitive, but we must be allowed to compete. This requires Section 123 agreements in place. The industry:

- Supports efforts to limit the spread of uranium enrichment and used fuel reprocessing (E&R) technologies consistent with current U.S. policy.
- Opposes initiatives to require new conditions for U.S. nuclear cooperation unilaterally that our potential partners will not accept and that other supplier nations do not impose. Pragmatism should continue to guide the United States as it negotiates Section 123 agreements.
- Supports prompt negotiation of new and renewal bilateral agreements for peaceful nuclear energy cooperation. These agreements are essential for meaningful U.S. nuclear exports.
- Supports a proactive approach for the negotiation of Section 123 agreements with nations with new or expanding peaceful nuclear energy programs, including the ROK, Taiwan and Vietnam. It is in the U.S. national security, nuclear safety and economic interest to secure agreements early and with a broad set of partners rather than to sit idly by as these nations partner with other nuclear suppliers. Without agreements in force, we forfeit exports, jobs and commercial benefits, and we will fail to influence these programs in terms of their nuclear safety, security and nonproliferation norms.

Engaging in nuclear energy markets allows the United States to promote several of its interests at the same time; disengagement is a net loss for safety, security and the U.S. economy. Without U.S. commercial engagement, the United States would have substantially diminished influence over other nations' nonproliferation policies and practices. U.S. technology and U.S. industry form a critical engine that drives U.S. nonproliferation policies.

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April 25, 2013

President Barack Obama
The White House
1600 Pennsylvania Avenue, NW
Washington, D.C. 20500

Dear Mr. President:

We write to underscore the importance of preventing nuclear weapons proliferation, and to caution against the adoption of policies that could inadvertently weaken the ability of the United States to continue to provide international leadership on this critically important issue.

For more than half a century, the cornerstone of global efforts to prevent nuclear weapons proliferation has been the "atoms for peace" formula. With very few exceptions, the countries of the world have accepted this formula. Countries that enter into it commit not to pursue nuclear weapons, and in exchange are guaranteed support for their right to develop civil nuclear power and other peaceful uses of atomic energy, and submit to international supervision.

The Atoms for Peace formula has been very successful. Access to commercial nuclear technology was not seen as a threat to the nuclear nonproliferation regime, but rather as a sign of the health of that regime and an essential means for implementing it. One of our nation's most powerful tools for guaranteeing that the countries acquiring this technology continue to use it exclusively for peaceful purposes is to ensure that the U.S. commercial nuclear industry continues to play a leading role in the international civil nuclear marketplace. Here the news is not encouraging.

While the United States and one or two other countries had a near-monopoly on civil nuclear technology in the 1950s, today the list of countries actively competing in the international civil nuclear marketplace includes Russia, France, Canada, Great Britain, Germany, the Netherlands, Japan and South Korea. And it is likely soon that China and India will become active participants in the international nuclear marketplace. According to a November 2010 Government Accountability Office (GAO) report on nuclear commerce, the U.S. share of global exports of "nuclear reactors, major components and equipment, and minor reactor parts" fell from 11 percent to just 7 percent between 1994 and 2008. The U.S. share of global exports of nuclear fuel fell from 29 percent to just 10 percent over that same period of time.

This decline in U.S. market share translates to substantially diminished U.S. influence in such areas as nuclear nonproliferation and nuclear safety. As a result, the United States is in an increasingly weak position to unilaterally impose onerous requirements on potential buyers of civil nuclear technology, simply because buyers have so many alternatives to U.S. sources of supply. It follows that, in order to restore its nonproliferation influence around the globe, the United States Government must find ways to strengthen the competitiveness of the U.S. nuclear industry, and avoid policies that threaten to further weaken it.

We therefore urge that, as part of your export control reform initiative, streamlining of the process for licensing civil nuclear exports be made a top priority. We know that there are experts who

argue that we should make access to American nuclear technology even more restrictive in the future. This would have the unintended effect of further diminishing America's competitiveness in the global nuclear marketplace. America's ability to lead the global nuclear nonproliferation regime will diminish steadily as America abandons the field.

Consistent with the Atoms for Peace policy framework, America restricts the right of other countries to buy from American nuclear suppliers unless those countries agreed to stringent security procedures and conditions (the so-called 123 process). Historically we have managed this process on a sensible case-by-case basis. If we adopt a much more restrictive approach, we will not prevent countries from acquiring nuclear technology, but instead will encourage nations to turn to suppliers that do not impose difficult standards. The non-proliferation regime is weakened in that circumstance.

We share your Administration's concern about the risks associated with the potential spread of sensitive nuclear fuel cycle technologies such as enrichment and reprocessing. But as our nation seeks to reduce these risks, we must be careful not to diminish America's influence in the international civil nuclear marketplace. America's nuclear industry exports are shrinking, and this is bad for non-proliferation policy.

The U.S. Government must recognize that the U.S. civil nuclear industry is one of its most powerful tools for advancing its nuclear nonproliferation agenda. It is critical to adopt policies that will strengthen that tool. Weakening it will merely cede foreign markets to other suppliers less concerned about nonproliferation than the United States.

Sincerely,

Senator William S. Cohen
Former Secretary of Defense

General Brent Scowcroft
Former National Security Adviser

Dr. James Schlesinger
Former Secretary of Energy, Secretary of Defense and Director, CIA

General James Jones
Former National Security Adviser

Admiral Michael Mullen
Former Chairman, Joint Chiefs of Staff

Senator Pete Domenici
Former Chairman Senate Budget Committee

Dr. John Hamre
Former Deputy Secretary of Defense

Ms. Susan Eisenhower
Chairman Emeritus, Eisenhower Institute