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The Global Nuclear Energy Partnership – Realizing the Promise of a World Wide Expansion of Nuclear Power

Thank you, it is my pleasure to come before you to address the 2007 World Nuclear Association Annual Symposium. Every year, the WNA symposium gathers industry professionals and academics who continually devote their efforts to enabling and sustaining the success of nuclear energy and furthering its expansion throughout the world.

I had the privilege of addressing this gathering last year, when the symposium's theme was, "Building the Nuclear Future: Challenges and Opportunities." This year, the theme is "Our Nuclear Future: Converting Vision to Reality." I think the themes reflect our progress as we continue to focus on the future. In the United States, we have recognized the challenges confronting an expansion of nuclear energy, identified our opportunities, and we have set a vision, with international partners to make the expansion of nuclear energy a reality.

There is now worldwide momentum for a significant expansion of nuclear power. For economic reasons, for environmental reasons, and for energy security reasons, it is of paramount importance that we work to bring the vision of a renaissance of global nuclear energy development to fruition. Implementing this vision is the cornerstone of the Global Nuclear Energy Partnership, known as GNEP.

GNEP's mission is the global expansion of nuclear power in a safe and secure manner. Its promise as a comprehensive solution to facilitate the global expansion of nuclear power has fueled its progress over the past year, and will fuel its progress into the future. At its most fundamental core, GNEP seeks to overcome the barriers that have faced the global nuclear industry for decades.

The first barrier is disposition of nuclear waste. In many countries throughout the world, the build-up of spent nuclear fuel and nuclear waste presents not only an environmental concern, but also requires significant resources to maintain the necessary security and international safeguards. In the United States, significant amounts of spent nuclear fuel are stored in different locations around the country awaiting shipment to our planned geological repository at Yucca Mountain in Nevada.

The second barrier is the threat of proliferation of nuclear materials and the spread of sensitive nuclear technology for non-peaceful purposes. Nuclear power harnesses the potential energy stored in atoms, and harnessing this energy through fission has provided the world with some of its greatest opportunities, and some of its gravest challenges. The possibility of the spread of nuclear material and technology for the development of weapons of mass destruction is a major threat to global security. Safeguarding of the global nuclear enterprise is essential.

The third barrier is efficiency of the current nuclear fuel cycle. In the United States, the largest producer of nuclear power, we employ a "once through" fuel cycle. This "once through" practice only uses a part of the potential energy in the fuel, while effectively wasting substantial amounts of useable energy that could be tapped through recycling. The remaining fissionable material can be used to create additional power, rather than treating it as waste requiring long term storage. While several nations recycle some of the residual uranium and plutonium recovered from the spent fuel in light water reactors, no one has yet to employ a comprehensive technology that includes full actinide recycle.

The fourth and final barrier is the cost to develop and expand nuclear power in both developed and developing nations. For developing nations seeking to make use of nuclear power for electricity generation, costs for initial nuclear technology development, including high capital costs and inefficiencies in the fuel cycle, make it less attractive then more traditional technologies. Nuclear programs require a high degree of technical and industrial expertise. This is a serious obstacle for emerging countries attempting to develop nuclear power, although efforts are underway to increase the number of indigenously-trained nuclear experts through a variety of education and training initiatives. In the United States, uncertainties in the licensing process create an additional barrier to construction.

The Global Nuclear Energy Partnership is uniquely positioned to address each barrier: waste, non-proliferation, efficiency and cost. The founding partners of GNEP represent five of the largest producers of nuclear power in the world: China, France, Japan, Russia and the United States. This is an equal and voluntary partnership that stands to benefit greatly from the vast experience in nuclear energy each member nation contributes. The partnership will also benefit from an unprecedented industry component, with the commercial sector poised to bring new technologies to market in the areas of fuel enrichment and recycling, and advanced reactors that will mark the next generation of nuclear power. As the partnership expands, it also will enhance development of reactors appropriate for the smaller grids in developing nations.

Under any scenario, the United States and others will require waste repositories; however, recycling will

exponentially reduce the amount of waste destined for disposal. GNEP addresses both waste and fuel cycle efficiency through the development of advanced recycling technologies. Recycling spent nuclear fuel has the potential to decrease radiotoxicity, heat loads, and the ultimate volume of waste requiring disposal. This increased efficiency in the fuel supply would ensure that even with the expansion of nuclear energy, the pressure on nuclear waste repositories would be greatly reduced. Advanced fuel separation technologies can separate uranium at a very high level of purification for re-enrichment and use as fresh fuel. In addition, long-lived fission products and short-lived fission products can both be separated in preparation for storage or disposal. Further separation can isolate the transuranic elements such as plutonium, neptunium, americium and curium, which can then be fabricated into fuel or targets for use in an advanced recycling reactor. Consuming these transuranic elements will also increase the capacity of a repository by reducing overall volume and radiotoxicity.

One of the crucial concerns presented when reprocessing spent nuclear fuel is ensuring that elements separated not be used to create a weapon. Modern reprocessing technology using solvent extraction has been employed for over half a century. The predominant PUREX process has resulted in the accumulation of 240 metric tons of separated plutonium around the world. Compliance with international safeguards and security standards has helped control these materials. GNEP, however, seeks not only to reduce stocks of spent fuel, but also to eliminate excess stocks of plutonium, thereby strengthening nuclear security worldwide. Moreover, GNEP creates a framework where states that currently employ reprocessing technologies can collaborate to design and deploy advanced separations and fuel fabrication techniques that do not result in the accumulation of separated pure plutonium.

A prerequisite to global nuclear power expansion is the presence of competitive, reliable fuel services. The creation of such an enterprise is a cornerstone of GNEP and one of its near-term goals. Fundamentally, a reliable fuel service framework would create an assurance of supply for nations that do not possess fuel cycle capabilities, to hedge against any disruption that cannot be addressed through the market. Reliable fuel services would eliminate the need for countries to develop expensive domestic enrichment or reprocessing facilities, thereby creating economies of scale relative to the creation of indigenous facilities. The back end solutions of spent fuel take-back, interim storage, recycle and waste disposal are critical to the long-term viability of nuclear power. GNEP envisions the development of comprehensive fuel services, including such options as fuel leasing, to begin addressing these challenges while maximizing non-proliferation benefits. The establishment of these comprehensive and reliable fuel services, including spent fuel disposition options, will create an all-encompassing approach to nuclear power for nations seeking the benefits of nuclear power without the need to establish indigenous fuel cycle facilities. It is through enabling such a framework that GNEP makes its primary contribution to reducing proliferation risk.

To fully accomplish the GNEP vision requires significant technology development in the partner countries. The United States is pursuing policies and initiatives to spur domestic and international technological research and development—focused in the areas of the advanced separations process, transmutation fuels, and fast reactors to consume or destroy transuranic elements.

Recognizing the benefits of reprocessing, with special attention to the security concerns of separated spent fuel elements, the United States and other nations, over the last several years, have pursued research and development programs focused on separations processes that reduce the proliferation risk. These processes would not produce a pure plutonium product, but would combine plutonium with other materials. Recognizing that there is no solution to totally eliminate the proliferation risks associated with reprocessing, our goal is to transition to processes and design facilities that enhance their safeguardability and physical protection, producing materials that are less readily usable for a nuclear device than separated plutonium. Within the United States, this technology has been demonstrated to produce excellent product separation at the laboratory scale. Further technology development activities are now underway. The United States has initiated a larger scale end-to-end test of one of these advanced separations technologies using our national laboratories.

The ability to transmute, destroy, or burn transuranics in a fast reactor is key to the long-term waste management benefits of GNEP. We are aggressively developing transmutation fuels in cooperation with our partners, including tests currently underway using the French Phenix fast reactor.

The development of advanced separations processes and fuels catalyze further developments in advanced reactor technology. The areas of development for fast reactor technology center on the need for fast reactors to be cost competitive with current light-water reactors. Countries such as, France, Russia and Japan have experience in the design and operation of fast reactors, and we will continue working with these partners to accelerate the development of advanced fast reactors that are cost competitive, incorporate advanced safeguards features, and are efficient and reliable.

Novel policy and regulatory strategies will also play an important role in support of GNEP's vision. One key component is that of a global nuclear liability regime that will ensure the availability of cost-mitigation in the event of a nuclear incident and will provide the legal certainty

necessary to expand nuclear power. The Convention on Supplementary Compensation for Nuclear Damage (CSC) was developed under the auspices of the IAEA during the 1990's, and adopted at a diplomatic conference in 1997. The United States is completing the ratification process and looks to deposit its instrument of ratification with the IAEA in the near future.

In a further effort to build policy and regulatory foundations, multilateral and bilateral agreements within the partnership are being utilized. Multilateral agreements maximize opportunities for international contributions and are the most effective way to engage with a large number of partners. Bilateral agreements allow a secure avenue for engaging in preliminary discussions of sensitive fuel cycle cooperation and compliment the multilateral agreements. Both multilateral and bilateral agreements provide mechanisms for partners to provide technical assistance and support infrastructure development, especially for developing countries.

GNEP, as a conduit for nuclear expansion has seen measurable progress since I last addressed this gathering one year ago. This global partnership is an unprecedented alliance of nuclear energy leaders in both the East and the West. For the first time, both China and Japan have joined with Western governments to develop and deploy nuclear energy worldwide. The intent of a shared vision of the global nuclear energy community is reflected in the recent issuance of a Joint Statement by the GNEP partners. On May 21, U.S. Secretary of Energy Samuel Bodman hosted the first GNEP ministerial meeting in Washington, D.C. Ministers and atomic energy officials from China, France, Japan, Russia, and the United States gathered to engage in productive discussion and issued a Joint Statement of Support. The Joint Statement outlined areas to be developed in support of the partnership's expansion. These areas included: encouraging a closed fuel cycle to minimize waste volumes and radioactivity; developing and demonstrating advanced technologies for recycling spent nuclear fuel; incorporating the highest levels of safety, security and safeguards; developing and deploying fast reactors and grid appropriate reactors; and ensuring materials and technologies for the civilian fuel cycle will be used for only peaceful purposes.

In response to the progress and commitments made at the first GNEP ministerial meeting, today I am announcing that the a second ministerial meeting will be held on September 16th, just prior to the International Atomic Energy Agency's General Conference in Vienna, Austria. The main purpose of the up-coming ministerial is for the existing partners to agree to a common set of goals for GNEP's existence and implementation. As such, the partners will sign the GNEP Statement of Principles, recently agreed upon by the partner countries, as well as invite other countries to join GNEP by also signing the Statement of Principles, establish an operating framework for the partnership, and initiate further implementation.

The Statement of Principles is a seven point document that touches on each element of GNEP and establishes broad guidelines for participation. This document is the foundation and the archetype for all future involvement in the partnership.

To meet the objective of broadening the partnership, the five partners have invited candidate countries from around the globe, representing every geographical region and stage of economic development to be initial candidate countries.

Candidate countries have been invited for a variety of reasons including: specific expressions of interest for consideration in joining or observing GNEP; announcements of plans to initiate or expand civil nuclear energy programs; compliance with international safety, security and safeguards standards; and nomination by GNEP partner countries.

The second ministerial will work to establish a framework within which the partners will accomplish GNEP's goals. Currently, the partnership has in place a committee of ministerial officials from each partner country; this structure will be enhanced during the second ministerial. GNEP countries will establish a mechanism for further implementation in specific areas, such as: infrastructure development; reliable fuel services development; development of grid appropriate reactors; and nuclear safeguards and security.

As more countries consider nuclear power, it is important that they develop the infrastructure capabilities necessary for such an undertaking. In response, we are working with the IAEA to provide guidance for assessing countries' infrastructure needs and for helping to meet those needs. We stand ready to help countries interested in expanding the use of nuclear energy to assist in responsible implementation and management. For countries that have no existing nuclear power infrastructure, GNEP partners can share knowledge and experience to enable developing countries to make informed policy decisions on whether, when, and how to pursue nuclear power.

We are also positioned to begin work in the near future on two more important goals of GNEP, development of grid appropriate reactors, and extensive work on nuclear safeguards and security. Most of the world's developing countries and many smaller developed and emerging countries cannot accommodate currently available reactors. GNEP will facilitate the development, demonstration and deployment of grid-appropriate reactors that will include numerous features such as: fuel designs that could last the entire life of the reactor, effective and inexpensive safeguard techniques, standardized modular designs, and fully passive safety systems.

International nuclear safeguards are integral to implementing the GNEP vision. Safeguards are the building blocks of international nonproliferation. The United States will continue to work closely with the IAEA in developing the most advanced safeguards technologies including: monitoring and surveillance systems, advanced material tracking methodologies, control of the transfer of technology, transparency in the use of technology and materials, verification of peaceful uses, support for global best practices in security, and the ability to inspect and verify compliance with international agreements. One objective is safeguarding through design, the explicit inclusion of safeguards features from the beginning of new nuclear facility design and construction.

GNEP is intended to provide long-term and sustainable answers to growing energy needs, concerns about climate change, management of nuclear waste, and proliferation challenges. It blends international cooperation in policy, technical support, and framework and infrastructure development.

GNEP is positioned to contribute to addressing the global energy challenges we face. Today and into the future, the world requires nations to engage in broad, swift action to address those challenges, and there is no single solution. However, GNEP's unique, comprehensive approach exemplifies an international structure that can significantly impact the way in which the world produces energy, by safely and securely expanding civil nuclear power globally. GNEP's approach is durable, a long-term solution that requires near-term solidarity.

The prospects for nuclear energy are more promising today than at any time since its development.

I would like to recognize the WNA and its various efforts worldwide in all aspects of the commercial nuclear fuel cycle. You are making a difference for the betterment of nuclear energy. Thank you.