

Future Prospects of the Global Nuclear Partnership

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May 18, 2006

I would like to thank Japan Atomic Energy Agency President, Mr. Tonozuka for this opportunity to represent the United States Department of Energy and the National Nuclear Security Administration at JAEA's first international forum. It is an honor to address this forum and a personal pleasure to once again to visit Japan and to see more of this beautiful country.

I would also like to extend my congratulations to the formation of the Japan Atomic Energy Agency (JAEA). Merging two strong and important research and development organizations like the Japan Nuclear Fuel Development Institute (JNC) and the Japan Atomic Energy Research Institute (JAERI) could not have been a simple task. Looking out into the audience today at so many of my distinguished colleagues in the international community here for this occasion, it is clear that the transition has been handled well and is most successful. I wish JAEA a very bright and prosperous future. The United States Department of Energy (DOE) looks forward to continuing our history of mutually beneficial cooperation in nuclear nonproliferation, especially given the dramatic changes that I foresee in the nuclear industry and, indeed, in the way in which the world makes use of nuclear energy.

As you are all aware, the international demand for energy is rising rapidly as many of the world's societies and economies develop. We estimate global energy demands may increase by as much as 50 percent by 2025. The demand for electricity may grow by 75 percent.

To meet the growing demand for electricity many emerging industrial economies, particularly India and China, are constructing new reactors. There are approximately 130 new reactors under construction or under consideration around the world. The world has already determined that nuclear power is going to play a significant role in meeting future energy needs.

The international community is therefore presented with a dilemma – how to encourage the development and use of nuclear power, to share the benefits of clean, safe, and reliable energy, while at the same time minimizing the risk of proliferating nuclear weapons technology and materials? This has always been the grand challenge put forward in the Nuclear Non-Proliferation Treaty (NPT).

The NPT is fundamental to the growth and sustainability of nuclear energy. But we all know that in violation of their obligations under the NPT, a nation can use their civilian nuclear programs to hide nuclear weapons development activities. Therefore, the major

nuclear nations must adapt their approach to address the future global growth of nuclear power – we must find ways to strengthen the NPT.

To address this challenge, President Bush has proposed creation of a Global Nuclear Energy Partnership, or “G-NEP” for short, to increase global energy security, encourage development of emissions free electricity around the world, improve the environment, and reduce the risk of nuclear proliferation.

GNEP will provide energy with security. Through it, we are working to encourage a consensus among the leading nuclear supplier countries on a set of goals to develop technologies and institutional arrangements to offer nuclear reactors and fuel services to users in a way that serves their interests while substantially reducing proliferation risks. The long-term goals include agreement that the world needs to:

- Expand nuclear power in an appropriate manner to supply growing global energy demand while reducing carbon emissions.
- Restrict the spread of enrichment and reprocessing technologies.
- Reduce accumulated stocks of separated plutonium.
- Develop recycling technology for spent fuel that groups plutonium with other actinides and blends them with uranium in preparation for use as new fuel.
- Develop reactor technology that burns this mixture of plutonium and actinides, which can reduce dramatically the long-term waste management challenges.
- Develop fuel-leasing arrangements among fuel service suppliers to give developing nations assured sources of supply and provide incentives to forego the development of indigenous enrichment and reprocessing facilities.
- Ensure recycle facilities and reactors employ advanced safeguards for robust proliferation resistance, physical protection, and use only for civil purposes.

We believe that nuclear energy could expand significantly within such guidelines while meeting global nonproliferation objectives. Under this framework, over the next fifty years, we could safely and securely double the number of nuclear power plants both in the U.S. and globally.

But this will require a fundamental change in how we manage the fuel cycle. We must develop a new approach to spent fuel management. We need to optimize our management of used nuclear fuel and make more efficient use of our uranium resources. To meet the goals of GNEP, the DOE has developed a broad implementation strategy comprised of seven elements.

First, we intend to show leadership by expanding the use of nuclear power in the U.S. We will build on advances made by our President and Congress to stimulate new nuclear plant construction. In 2002, the Administration announced the Nuclear Power 2010 program, a cost-shared initiative with industry aimed at demonstrating the streamlined regulatory procedures for siting and constructing new nuclear plants. Much progress has been made since this program was first announced and today we are sponsoring two demonstrations aimed at submitting and obtaining approval of the first combined Construction and Operating

License (COL) applications. We are confident we will see new plants under construction within the next ten years.

Second, we must address the nuclear waste issue. A geologic repository in the United States will be necessary under all fuel management scenarios. Direct disposal will be the only option for a portion of older commercial spent fuel and certain specialized fuels for which separations processes have not been developed.

Under GNEP, commercial spent nuclear fuel would be recycled so that transuranic elements (Neptunium, Americium, Curium, etc.) would be consumed, not disposed of as waste. Residual waste fission products would be reconfigured for disposal at a single geologic repository. GNEP would provide three improvements to spent fuel disposal at a repository by: (a) significantly reducing the volume of nuclear waste, (b) enhancing thermal management by reducing the waste form heat load, and (c) reducing the amount of long-lived radionuclides requiring disposal.

Third, we propose to demonstrate proliferation-resistant recycling technology. To accomplish this, the Department would accelerate the development, demonstration, and deployment of new technologies to recycle nuclear spent fuel that do not result in separated plutonium – a key proliferation risk of existing recycling technologies. Moreover, this technology would only be deployed in partnership with supplier nations.

The Advanced Fuel Cycle Initiative (AFCI) program has over the years identified promising nuclear technology options that have been successfully demonstrated at laboratory scale and are now mature enough for larger scale demonstration programs. By starting now we allow sufficient time to thoughtfully address any issues that arise during pilot and engineering scale demonstration phases.

The U.S. and its international partners would propose to conduct an Engineering-Scale Demonstration of advanced recycling technologies – a process called “Uranium Extraction Plus” (UREX+) that would separate the usable components in used commercial fuel from its waste components, without separating pure plutonium. Under GNEP, we encourage all recycling nations to implement processes that will not separate pure plutonium products. I understand that both Japan and France have already taken steps to incorporate uranium into their final product mixture to enhance proliferation resistance. These steps will move us all forward in meeting this important nonproliferation objective and will enable us to help shape the global fuel cycle.

Fourth, the U.S. and its GNEP international partners would develop and demonstrate Advanced Burner Reactors, or “ABRs”, that consume transuranic elements in used fuel from nuclear power plants, avoiding the requirement for a geologic repository to accommodate this radioactive, radiotoxic, and heat-producing material for hundreds of thousands of years while it decays. We would also work to develop, test and qualify the fuels for the advanced burner reactor made from the transuranic feedstock from the UREX+ process.

Fifth, GNEP would build and strengthen a reliable international fuel services consortium of nations with advanced nuclear technologies to enable developing nations to acquire nuclear energy economically while minimizing nuclear proliferation risk. Under a cradle-to-grave fuel leasing approach, fuel supplier nations would provide fresh fuel to conventional nuclear power plants located in user nations. Used fuel would then be returned to the fuel supplier nations and recycled using a process that does not result in separated plutonium. The recycled fuel would then be used in an ABR in fuel supplier nations. The ultimate waste, likely in stable glass logs and of no proliferation concern, could be returned to the initial user country, or more likely, to an approved repository in another country offering a commercial service. Such an approach would allow many user nations to receive the benefit of having a reliable supply of reactor fuel without having to make the significant infrastructure investments required for enriching, recycling and disposal facilities. By providing this strong economic incentive, we can help to stem the spread of enrichment and reprocessing technologies and address a major non-proliferation concern.

Sixth, the U.S. and its international partners will pursue deployment of existing small-scale reactors that are cost-effective, secure and well suited to conditions in developing nations. Moreover, the U.S. would also encourage designing, developing and deploying a small-scale reactor that utilizes the same nuclear fuel for the lifetime of the reactor, eliminating the need for refueling.

Finally, and perhaps most importantly for this audience, under GNEP, international safeguards will be an integral part of the global expansion of nuclear energy and the development of future proliferation-resistant fuel cycle technologies. In order for the International Atomic Energy Agency to effectively and efficiently monitor and verify nuclear materials, the U.S. and its GNEP partners must design advanced safeguards approaches directly into the planning and building of new, advanced nuclear facilities. We must also look to enhancing safeguards and security arrangements in all aspects of the fuel cycle including transportation, storage, and disposal.

In closing, I want to emphasize that GNEP is an inclusive, not exclusive opportunity for all nations to come together behind this important international effort. GNEP provides the opportunity for us to reshape the fuel cycle and create new arrangements that constrain proliferation. We need to demonstrate that GNEP will be a bargain for supplier- and user-states alike. In exchange for giving up the potential to make weapons, user-states will have nuclear energy systems available while avoiding the need to invest in enrichment or spent fuel repositories.

This is a great challenge for a great cause. As President Eisenhower said in 1953 in his “Atoms for Peace” speech before the United Nations that we “...allow all peoples of all nations to see that, in this enlightened age, the great powers of the earth, both of the East and of the West, are interested in human aspirations first, rather than in building up the armaments of war.” The Global Nuclear Energy Partnership embodies this spirit and we seek your partnership in meeting the essential tasks before us.