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The Global Nuclear Energy Partnership (GNEP)

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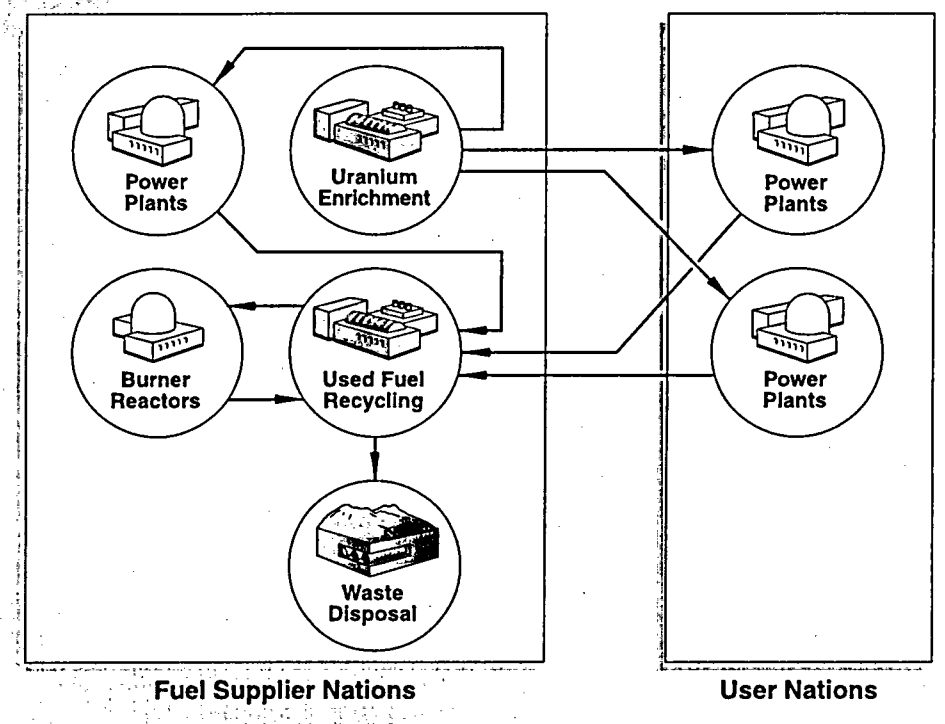

A possible reliable fuel services arrangement

United States Department of Energy

GNEP Element: Establish Reliable Fuel Services

GNEP would build and strengthen a reliable international fuel services consortium under which "fuel supplier nations" would choose to operate both nuclear power plants and fuel production and handling facilities, providing reliable fuel services to "user nations" that choose to only operate nuclear power plants. This international consortium is a critical component of the GNEP initiative to build an improved, more proliferation-resistant nuclear fuel cycle that recycles used fuel, while increasing energy security for all participating nations.

Reliable supply reduces the incentive to spread uranium enrichment or reprocessing technology

The challenge stems from the fact that certain technologies used to produce nuclear fuel, or separate out plutonium from used fuel, could be used to produce material for a nuclear weapon. For example, highly enriched uranium can be created by enriching uranium beyond the level required for nuclear power plant fuel. (Fresh uranium fuel for power reactors is not

Continued next page

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The Global Nuclear Energy Partnership (GNEP)

Continued from previous page

enriched enough to be weapons-usable.) Another potential source of weapons-usable material stems from the extraction of plutonium from used fuel inventories.

The current international nonproliferation approach could be improved by reducing the motivation for countries seeking nuclear power to develop either uranium enrichment or fuel recycling capabilities. These countries could receive the benefit of having a reliable supply of reactor fuel without having to make the significant infrastructure investments required for enrichment, recycling, and disposal facilities.

Besides avoiding the capital investment of building a fuel handling infrastructure, a comprehensive package of fuel service benefits could include "cradle-to-grave" fuel leasing that incorporates "used fuel take-back" once the advanced recycle technologies are demonstrated and deployed. This package of benefits could be offered to user nations under appropriate conditions, including appropriate safeguards and forgoing uranium enrichment and reprocessing activities.

How the system would work

Under a cradle-to-grave fuel leasing approach, fuel supplier nations would provide fresh fuel to conventional nuclear power plants located in user nations, typically by enriching uranium. These conventional nuclear power plants could be either existing or next generation power reactors or the new, small-scale reactors to be developed under GNEP. Used fuel would be returned to a fuel cycle nation and recycled using a process that does not result in separated plutonium. The recycled fuel would then be used in *advanced burner reactors* in fuel supplier nations.

Such a fuel leasing approach would provide an incentive for nations to forgo enrichment and reprocessing technology. The new fuel assurances approach would seek to provide:

- The political certainty that an approach to provide reliable supply of fresh fuel is in place.
- The resource certainty that fresh fuel would be available when needed.
- The financial certainty that the price for fresh fuel supplies would be competitive.
- And when recycling is proven, the certainty that used fuel would be taken back under agreed and reasonable terms.

To succeed as an incentive for nations to forgo the development of indigenous enrichment and reprocessing capabilities, the supply of reactor fuel must be reliable and available at competitive market prices. Agreement to take-back spent fuel, once recycle technology is fully proven, will also provide a significant economic incentive because it will allow reactor nations to avoid many cost, safety and safeguards burdens.

As a result, this approach would permit increased access to the benefits of nuclear energy while enhancing global security.

Steps Underway

The U.S. has already committed 17.4 tons of highly enriched uranium that will be blended down to low enriched uranium and used to establish a fuel reserve to backup supply assurances. Other countries have expressed interest in contributing to a "fuel bank." Because it will take time to develop the necessary technologies to support the "cradle-to-grave" fuel leasing approach envisioned under GNEP, the U.S. is reaching out to International partners to establish an interim reliable fuel services approach consistent with GNEP's objectives.

United States Department of Energy