

Global Nuclear Energy Partnership

Paul Lisowski

**Deputy Assistant Secretary for Fuel
Cycle Management**

**Office of Nuclear Energy
U.S. Department of Energy**

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Conference**



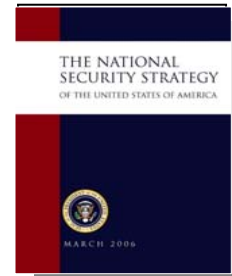


GNEP is a Strategy to Support Safe Secure Civilian Nuclear Power Expansion Worldwide

- Expand use of nuclear power
- Establish reliable fuel services
- Support grid-appropriate exportable reactors
- Enhance nuclear safeguards technology
- Develop and deploy recycle technology
- Develop and deploy advanced recycle reactors
- Minimize nuclear waste

GNEP

GNEP



The goal of the Global Nuclear Energy Partnership (GNEP) is the expansion of nuclear energy for peaceful purposes worldwide in a safe and secure manner that supports clean development without air pollution or greenhouse gases, while reducing the risk of nuclear proliferation. - GNEP Statement of Principles





GNEP is part of the President's Advanced Energy Initiative, launched in February 2006

- GNEP proposed to establish the foundation for safe and secure expansion of nuclear energy in the U.S. and worldwide
- FY 2007 funding of \$167.5M
- FY 2008 budget proposes \$405M, including \$10M for safeguards technologies



"...my Administration has announced a bold new proposal called the Global Nuclear Energy Partnership...we will develop and deploy innovative, advanced reactors and new methods to recycle spent nuclear fuel."





GNEP international engagement and partnership development activities

- **GNEP has engaged with advanced fuel cycle countries, reactor and candidate reactor countries since the February 2006 announcement, among those are:**
 - Russia, China, France, UK, Japan, South Korea, Canada, Australia, Germany, Argentina, Brazil, Indonesia, Philippines, Ukraine, Nigeria, Ghana, South Africa, Vietnam, Malaysia, Poland, Bahrain, Jordan, and Mexico.
- **Co-Sponsored IAEA Workshop on Infrastructure Needs for Developing Countries in December 2006**
- **Bi-Lateral Civil Nuclear Cooperation Agreements in place with Russia and Japan**
- **Japan, France, Russia, and China, with UK and IAEA observers held a Ministerial meeting with the U.S. Secretary of Energy on May 21, 2007 in Washington, DC to state support for GNEP**





GNEP international engagement and partnership development activities (cont.)

■ A second Ministerial meeting held in Vienna on Sep. 16, 2007 had 35 countries participating

- Added 11 countries to the original 5 Partner countries, more than tripling the Partnership.
- All 16 publicly signed the GNEP Statement of Principles.
- Nineteen additional Countries attended as Observers and most are seriously considering GNEP membership

GLOBAL NUCLEAR ENERGY PARTNERSHIP Structure





GNEP Ministerial Vienna Austria, September 17, 2007



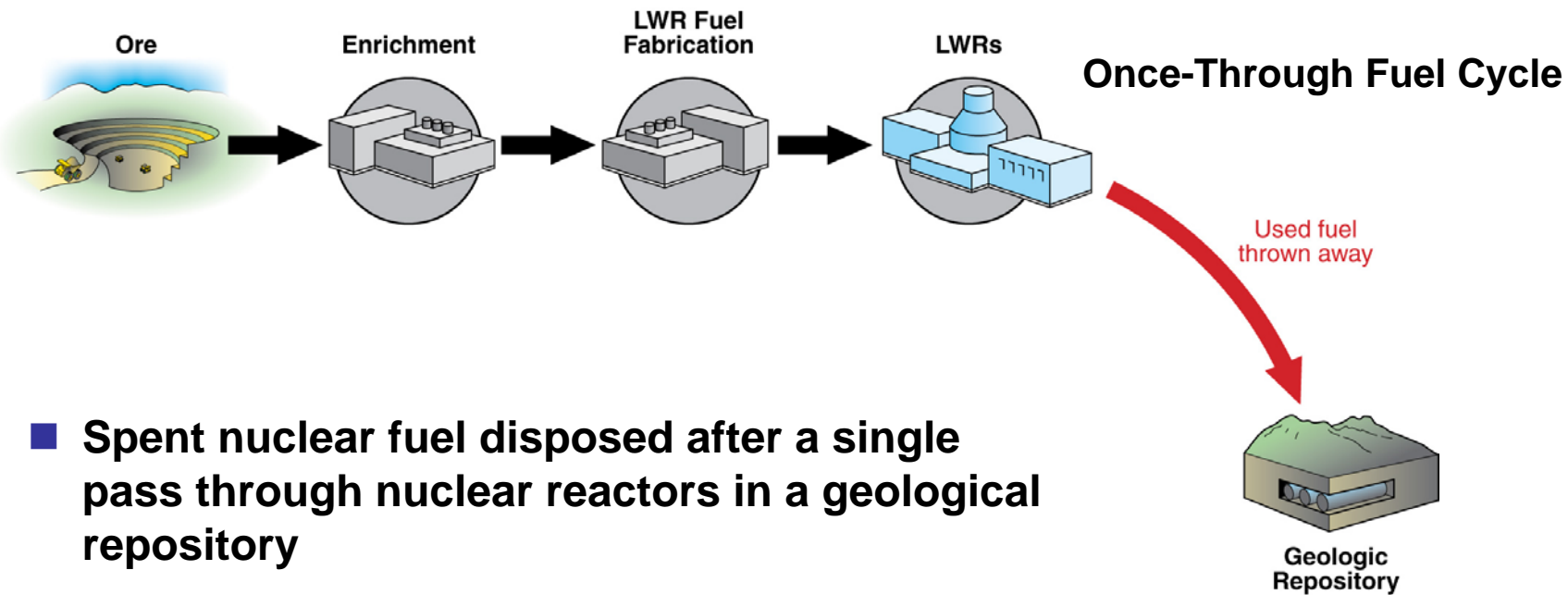
February 22, 2008

2008 ECA Annual Meeting





At present the U.S. has a once-through fuel cycle



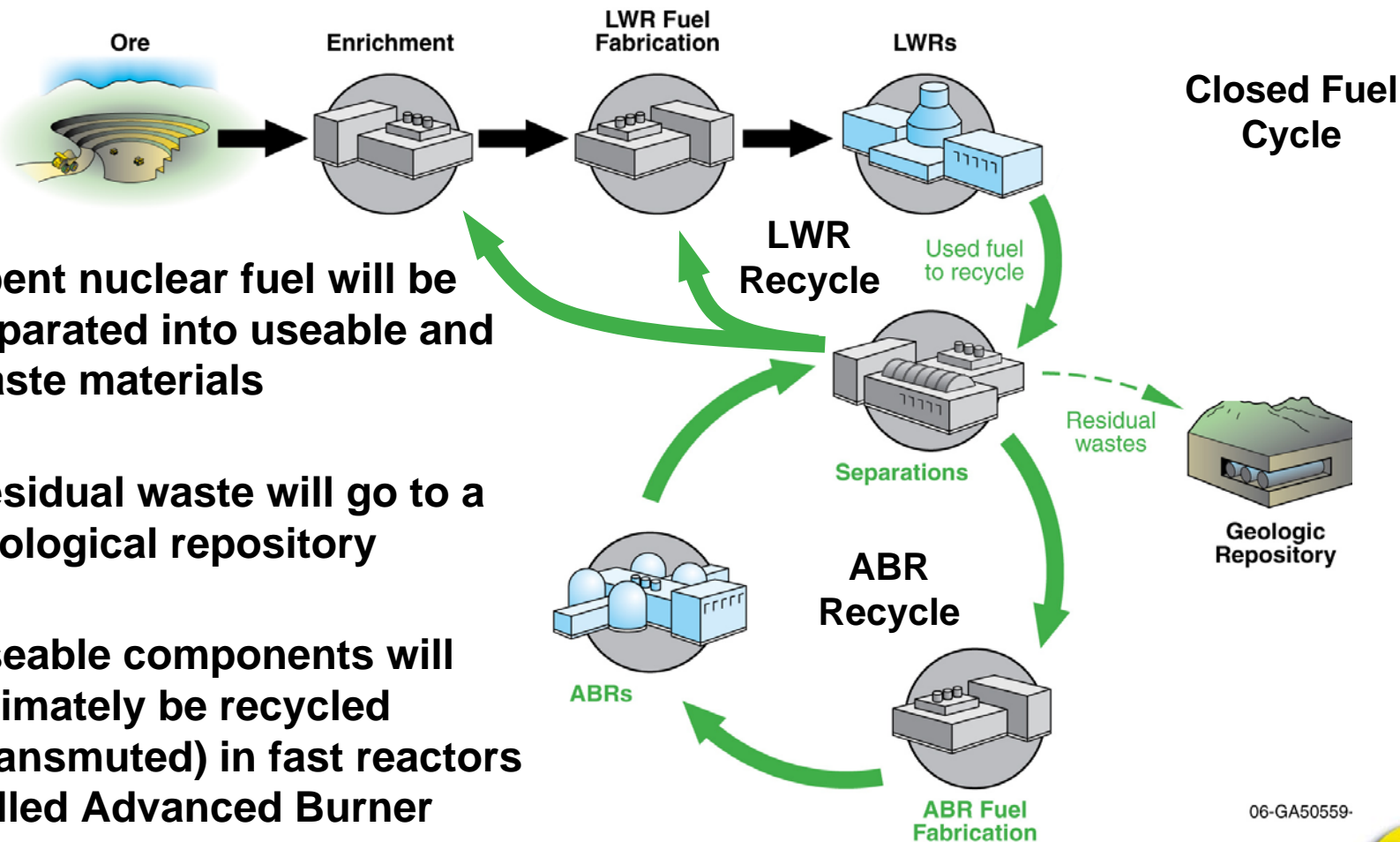
- Spent nuclear fuel disposed after a single pass through nuclear reactors in a geological repository
- If nuclear power increases as predicted, the U.S. will need multiple repositories by the end of the century with the once-through fuel cycle

06-GA50559-02





GNEP will move the U.S. from a once through to a closed or recycling fuel cycle



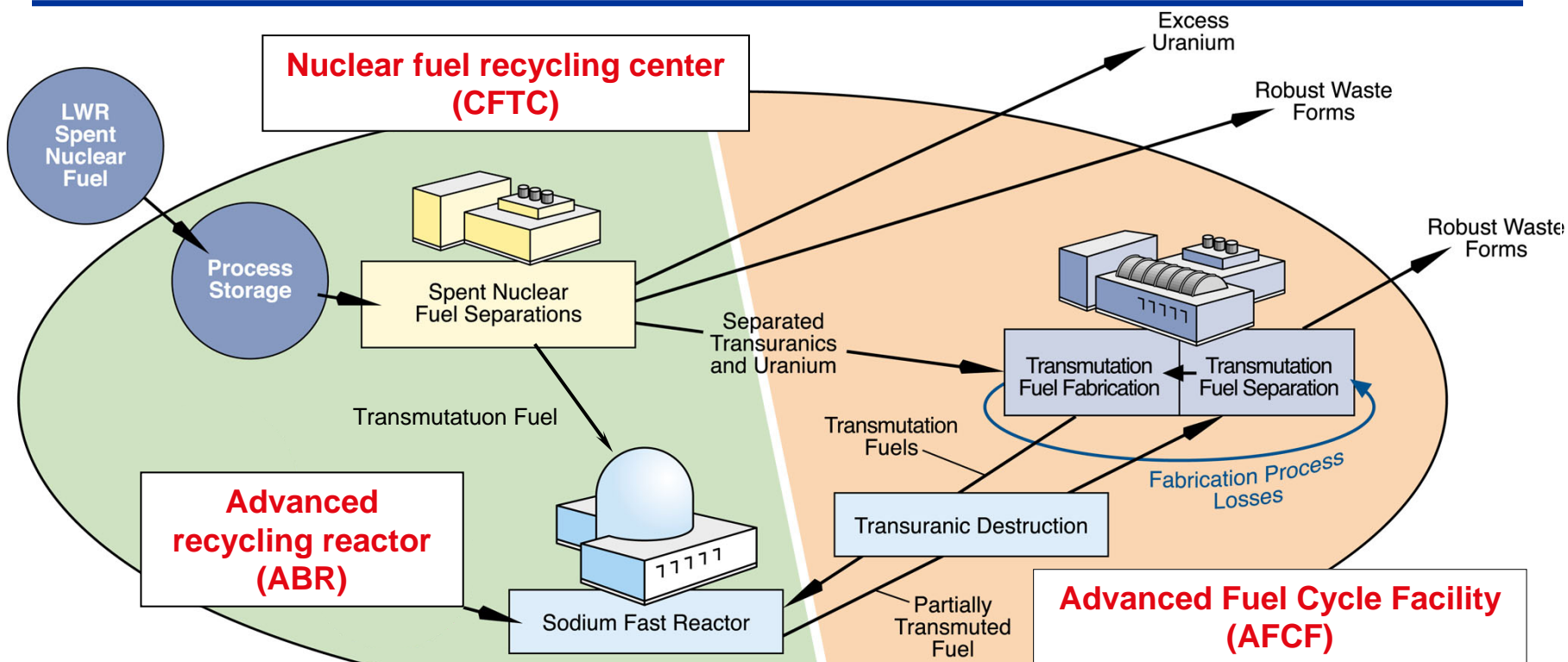
- Spent nuclear fuel will be separated into useable and waste materials
- Residual waste will go to a geological repository
- Useable components will ultimately be recycled (transmuted) in fast reactors called Advanced Burner Reactors

06-GA50559-





GNEP envisions three domestic facilities supported by research and development activities, initially



Industry led with national laboratory, university and international participation

National laboratory led with NRC, industry, university and international participation

Advanced Fuel Cycle R & D

National laboratory led with NRC, industry, university and international participation





GNEP R&D and Technology Development Objectives

- **Conduct research and development in support of the overall GNEP mission**
 - bringing about a significant, wide-scale use of nuclear energy and taking actions now that will allow that vision to be achieved while reducing weapons proliferation risk and effectively addressing the challenge of nuclear waste disposal.
- **Provide critical long-term R&D and near-term technology development components required to meet these objectives.**
- **These two elements allow GNEP to address core research needs to provide *flexibility* to accommodate the developing baseline strategy while simultaneously supporting industry's near-term technology needs**





Initial Industry engagement for ABR and CFTC projects will be through Cooperative Agreements

- **Awards to 4 Industry Teams were made September 29, 2007**
- **Deliverables Include**
 - Business Plan
 - Conceptual Design Studies
 - Technology Development Roadmap
 - Communications Plan
- **Three separate Project Performance Periods**
 - From initial award (FY2007) through FY2009
 - Phase 2 and 3 awards based on industry performance
- **Anticipated Funding (~ \$60M)**
 - FY2007 ~\$16M
 - FY2008 ~\$20M (subject to appropriations)
 - FY2009 ~\$24M (subject to appropriations)





Initial Deliverables for industry engagement awards

■ Business Plan

- Details how the marketplace will facilitate DOE in developing and commercializing the needed advanced fuel cycle technologies and facilities to meet GNEP goals

■ Conceptual Design Studies

- Contains engineering design concepts and their associated scope, cost and schedule information for the initial nuclear fuel recycling center and initial advanced recycling reactor

■ Technology Development Roadmap

- Describes the state of readiness of the proposed technology and describes methods and plans to acquire needed technologies to support GNEP deployment

■ Communications Plan

- Contains scientific, technical and practical information relating to nuclear energy and the closing of the nuclear fuel cycle packaged in such a manner that costs and benefits can be easily understood by the public and other key stakeholders





Key Conclusions from review of Industry Input

- **Meaningful incremental steps can be taken in the near-term to fully close the fuel cycle in the United States**

- **Fast Reactors**
 - Additional technology development is needed to demonstrate safety, reliability and economics
 - Government-funded demo reactor could be deployed within 20 years

- **Separations**
 - Technologies exist that do not separate pure plutonium that can be deployed in the 2020-2025 timeframe producing fuel for existing light water reactors (LWRs)

- **Business Case**
 - Integrated recycling and waste management approaches suggested
 - Utility waste fund pays, requiring minimal U.S. government investment
 - Requires substantial legislative and regulatory changes





A National Environmental Policy Act analysis is underway for GNEP

■ GNEP Programmatic Environmental Impact Statement (PEIS)

- assess reasonable alternatives
- analyze potential environmental impacts
- assist DOE decision-making

■ GNEP Siting Studies

- Stakeholder interest in hosting one or both commercial-scale facilities
- 11 grant applications funded
- 9 states (ID, IL, KY, NM, OH, SC, TN, UT, WA)
- Both DOE and non-DOE sites proposed

Advance Notice of Intent
(ANOI)
3/2006

Notice of Intent
(NOI)
1/2007

Public
Scoping Process
1/2007-6/2007

Draft PEIS
Summer 2007

Public Comment on
Draft PEIS
Fall/Winter 2007-08

Final PEIS
Spring 2008

Record of Decision
(ROD)
Summer 2008





Change in Approach to the GNEP PEIS

- **The Department received more than 14,000 comment documents during the scoping period for the GNEP PEIS**
- **Consideration of these comments resulted in the addition of several programmatic alternatives (i.e., alternative fuel cycles and technologies)**
- **DOE reconsidered its proposals regarding specific facilities in light of scoping comments and other considerations**
- **DOE has eliminated the project-specific proposals for the siting, construction, and operation of a nuclear fuel recycling center and an advanced recycling reactor from the GNEP PEIS**





Change in Approach to the GNEP PEIS

- **DOE will not make any decision based on this PEIS regarding sites for these facilities**
- **The only project-specific proposal analyzed in the GNEP PEIS is for an advanced fuel cycle facility to be located on a DOE site**
- **The GNEP PEIS will include the option to move forward with this facility**





GNEP PEIS Discussion of SNF Storage

■ PEIS acknowledges the following SNF storage:

- Potential for SNF storage associated with reactor facilities as part of those facility license (as is currently done)
- Potential for SNF process storage associated with any recycle facilities for programmatic alternatives (approximately 2 years of process inventory)
- Potential for SNF process storage associated with the AFCF (approximately 1 year of process inventory)





GNEP PEIS Discussion of SNF Storage (continued)

■ Consideration of Interim Storage

- DOE does not presently have the authority to accept commercial spent nuclear fuel for interim storage under the Nuclear Waste Policy Act. This is because of the linkages in the NWPA that do not allow interim storage until a repository construction authorization is granted and that limit the amount of SNF that can be placed in storage until a repository is operational
- Based on these limits, DOE is pursuing the development of a repository, with the intent of moving SNF to it when available
- If a consolidated interim storage site were to be pursued, there would be additional costs, needs and associated risks to transport the SNF to the new site. This would be then be followed by additional transportation to a repository for disposal or a recycling facility for processing





GNEP PEIS Discussion of SNF Storage (continued)

- **PEIS includes Interim Storage as an alternative considered but not further evaluated for the following reasons:**
 - Even though DOE does not have the authority to accept commercial SNF for interim storage under the NWPA
 - Interim Storage does not meet the purpose and need for action
 - *Consolidating SNF does not reduce the SNF volume*
 - *Interim storage would have a limited effect from the standpoint of thermal output, since the longer-term thermal output is driven by the decay of long-lived actinides, not the short-lived fission products. Similarly, the short-term thermal decay benefit can be achieved by continued on-site storage at commercial sites, without incurring the impacts associated with construction of an interim storage facility and transportation of that SNF to that site*
 - *Interim storage does not address the long-term radiotoxicity of the spent fuel requiring geologic disposal)*





GNEP PEIS Discussion of SNF Storage (continued)

■ Conclusions on Interim Storage under GNEP PEIS

- The physical act of moving SNF from multiple locations to fewer locations for interim storage (even for periods of 100 – 300 years) does not satisfy DOE's need for action (does not reduce volume, thermal output or radiotoxicity of SNF requiring geologic disposal)
- As such, as a standalone alternative, interim storage is not considered to be a reasonable alternative





GNEP/AFCI Budget History

Fiscal Year (\$K)							
Appropriations from beginning of program	2003	2004	2005	2006	2007	2008	2009 Request
	\$57,292	\$64,644	\$67,462	\$78,408	\$167,484	\$179,353	\$301,500

