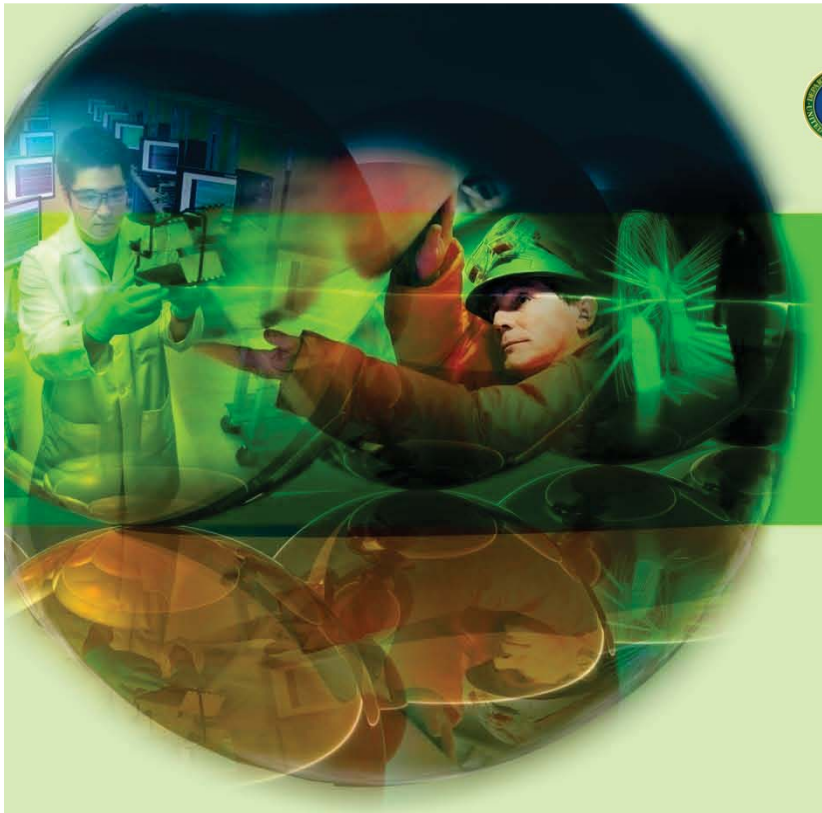


U.S. DEPARTMENT OF ENERGY | Office of Nuclear Energy

Fuel Cycle Technologies Annual Review Meeting

Dr. Monica Regalbuto

Deputy Assistant Secretary for Fuel Cycle Technologies

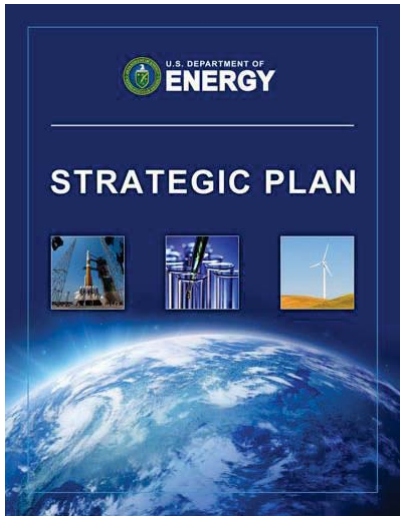
U.S. Department of Energy

Argonne National Laboratory

November 8, 2011

FCRD Overall 2012 Goals

- Realigning FCRD Mission and Program Objectives with DOE Strategic Plan
- Working Toward an Integrated Approach (Cradle to Grave)
- Redefining the Role of the TIO
- Understanding FCRD Technical Impact in Lieu of Fukushima and BRC
- Path Forward
- Recognitions



Mission and Program Objectives

Office of Nuclear Energy

Mission

DOE

Ensure America's security and prosperity by addressing its energy, environmental, and nuclear challenges through transformative science and technology solutions.

Goal 3: Secure Our Nation

- Enhance nuclear security through defense, nonproliferation, and environmental efforts.

NE

Advance nuclear power as a resource capable of making major contributions in meeting the Nation's energy supply, environmental, and energy security needs by resolving technical, cost, safety, security and regulatory issues through research, development, and demonstration.

FCR&D

Develop Used Fuel waste management strategies and sustainable fuel cycles that improve resource utilization, minimize waste generation, improve safety and limit proliferation risk.

Program Objectives

Near Term

- Address BRC recommendations for Used Fuel Disposition.
- Increase focus on accident tolerant fuels.
- Down select fuel cycle options for further development.

Medium Term

- Conduct science based, engineering driven research for selected fuel cycle options.
- Complete implementation plan for developing a Test and Validation Complex for extended storage of used nuclear fuel.
- Evaluate benefits of various geologic media for disposal.

Long Term

- Demonstrate the selected fuel cycle options at engineering scale.
- Execute Test and Validation Complex for extended storage of Used Fuel.
- Conduct engineering analysis of disposal site(s) for selected geologic media.

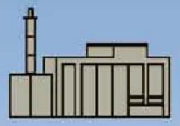
Working Toward an Integrated Approach

Front End

Back End

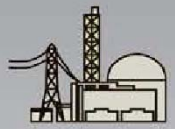
Uranium Resources

- Conventional production
- Innovative approaches
  - U Seawater

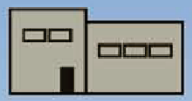


Fuel Fabrication

- Safety enhanced LWR fuel
  - Accident tolerance
- Higher performance
  - Improved burnup

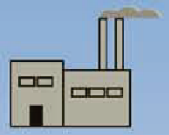


Reactors



Interim Storage

- Evaluating extended time frames
- Transport after storage



Recycle

- Separations
- Recycled fuel
- Secondary waste treatment

Disposal

- Alternative geologies
- Alternative waste forms

Optimize through systems analysis and engineering

Redefining the Role of the TIO

Substantial financial barriers remain related to the large scale construction of new nuclear power plants

Recognition that there is the need for a waste management strategy

Energy Policy Act of 2005

Fukushima

The Blue Ribbon Commission on America's Nuclear Future - Jan 2012

Outlook & Challenges

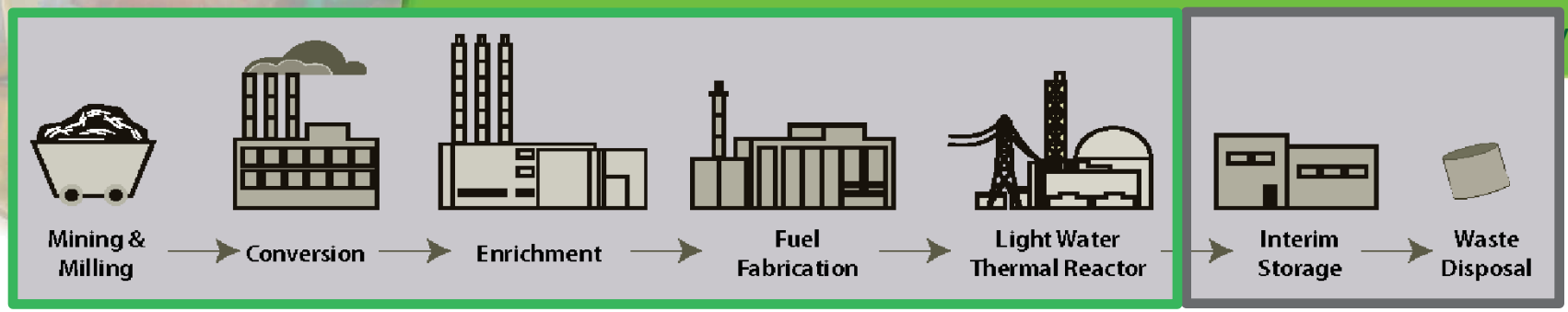
Blue Ribbon Commission

- The BRC will complete its work end of January 2012
- The current direction of NE's fuel cycle R&D is consistent with the recommendations of the BRC, but areas of emphasis may change

Fukushima Event

- May lead to shifting program priorities such as severe accident tolerant fuel & nuclear fuel storage

BRC Draft Report – 7 Key Recommendations



Advanced Fuel Cycles

BRC affirms the need for R&D on advanced fuel cycles that represent advantages over today's technologies

- **BRC-6** Create stable, long-term support for research, development, and demonstration (RD&D)
- **BRC-7** Need international leadership that addresses global non-proliferation concerns and improve the safety and security

Used Fuel Management

BRC provides policy and planning framework that will help guide management of used nuclear fuel

- **BRC-1** A new approach to siting and development
- **BRC-2** A new, single-purpose organization focused on nuclear waste in the United States
- **BRC-4** Develop permanent deep geological disposal site(s) for spent fuel and high-level nuclear waste
- **BRC-5** Develop one or more consolidated interim storage facilities as part of managing back end of nuclear fuel cycle

Uncertain Congressional Direction

Office of Nuclear Energy

dollars in thousands

Activity/Sub-Activity	FY 2011 Current	FY 2012 Request	FY 2012 House	FY 2012 Senate
Separations and Waste Forms	37,133	36,893	-	-
Advanced Fuels	50,648	40,443	-	59,000 (b)
Transmutation R & D	5,721	3,109	-	-
Modeling and Simulation	22,350	0	-	10,000 (c)
Systems Analysis and Integration	23,775	20,466	-	-
MPACT	6,674	7,864	-	-
Used Nuclear Fuel Disposition	32,535	37,249	36,000 (a)	60,000 (d)
Fuel Resources	3,592	4,646	-	-
SBIR/STTR		4,340	-	-
Total	**182,428**	**155,010**	**132,000**	**187,917**

a. All documentation relating to Yucca Mountain should be preserved.
b. Priority on enhanced fuels and cladding for LWRs, 90-day report on plans to develop meltdown-resistant fuel leading to reactor testing and utilization by 2020.
c. Assess issues related to the aging and safety of storing spent nuclear fuel in fuel pools and dry storage casks.
d. $10M for development and licensing of standardized casks,
$3M for developing models for potential partnerships to manage waste,
$7M for characterizing potential geologic repository media,
90-day report on revisiting the 2006 NAS report: “Going the Distance: the Safe Transport of [SNF] and [HLW] in the [US],”
$2.5M in carryover for BRC if Secretary extends mission to develop legislation.

Path Forward: Need to Deal with Uncertainty

- **Need for stronger integration between FCRD and NE program components in order to:**
  - Develop and propose integrated solutions in the near-term
  - Understand integrated options in the long-term
- **Modify program structure and technical scope to address changing needs**
  - Relevance reviews scheduled for 2011 in Fuels, Separations/Waste Forms, and MPACT
- **Establish new priorities**
  - We need to act, and act fast in order to demonstrate relevance and credibility

Recognitions

- Secretary's Honor Awards Ceremony October 27, 2011 – Fukushima Team

- Separation Workshop – Thirteen University Faculty and National Laboratory Staff Recognized

  Present at the meeting:

  - Gordon Jarvinen
  - Robert Jubin
  - Bruce Moyer
  - Terry Todd
  - Al Sattelberger