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# Global Nuclear Energy Partnership: Potential Regulatory Approaches for the Advanced Burner Reactor

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March 15, 2007

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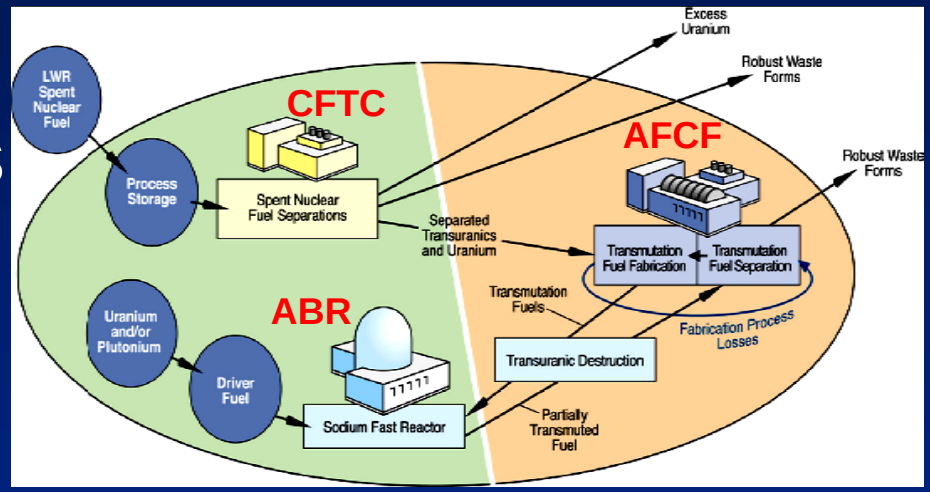
# GNEP Overview

- Global Initiative that proposes to close the fuel cycle
- Could involve several interconnected facilities
  - Consolidated Fuel Treatment Center (CFTC)
  - Advanced Burner Reactor (ABR)
  - Advanced Fuel Cycle Facility (AFCF)
- NRC likely to be the regulator for CFTC and ABR



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# Challenges

- NRC's role will depend on DOE/industry participation
- Interconnected facilities (each facility affects the safety, quality, effectiveness, and efficiency of the others):
  - Currently regulated under different 10 CFR Parts and NRC offices
- Ensuring regulations are in place and adequately integrated well before application is submitted
  - Provide guidance to applicants

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# ABR Regulatory Options

- Use existing Part 50 regulation
- Create new Part 5X regulation
- Develop new Part XX regulation specific to GNEP
- Commission Order

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# Use Existing Part 50 Regulations

- Part 50 regulation and guidance focused on LWRs
- Experience
  - Has been applied to 3 proposed fast reactors
    - Clinch River Breeder Reactor (CRBR) Construction License Application Safety Evaluation (NUREG-0968 issued March 1983)
    - Sodium Advance Fast Reactor (SAFR) – Pre-Application Safety Evaluation (NUREG-1369 issued December 1991)
    - Power Reactor Innovative Small Module (PRISM) – Pre-Application Safety Evaluation (NUREG-1368 Issued February 1994)
- Also applied to West Valley and Barnwell reprocessing facilities

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# Use Existing Part 50

- Review Part 50 to determine
  - What sections do/do not apply
  - Additional requirements for reprocessing facility and/or ABR
- Continue discussions with DOE on technical issues and acceptance criteria

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# Create A New Part 5X

- Create new regulation specific to sodium-cooled fast flux reactors (based on 50/52)
  - Require a PRA
  - Advanced reactor initiative

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# Create A New GNEP Regulation

- Develop a specific GNEP regulation applicable to both fuel reprocessing and recycle reactors (10 CFR Part XX)
  - Provides for greater efficiency and effectiveness in licensing review
  - Minimizes impact on existing Part 70 and Part 50 licensees and licensing actions.
  - Obviates the need for multiple rulemakings
  - Allows for integrated evaluation of risk for co-located facilities

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# Commission Order Actions

- Develop a licensing-basis document for each facility (CFTC and ABR), solicit public comment, and decide on either issuing an Order or directing a rulemaking.
  - Significant time savings if no rulemaking
  - Less opportunity for the public to participate
  - Doesn't support openness (NRC strategic goal)

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# Key Differences Between Potential ABR and Current Reactors (Potential Safety Issues)

- Liquid metal (Na) coolant
- Intermediate heat transfer loop
- Higher enrichment/fissile fuels
- Higher burnup spent nuclear fuel
- Larger actinide source term

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# Key Issues

- Accurate codes/modeling/validation
- Data analysis
- Advancing cross-section data
- Understanding of scale-up factors and cost
- TRU fuel performance – high burn and economics
- Modularity- scaling with regards to heat transfer and heat capacity
- Standardization
- PRA/integrated systems analysis- integrated facility
- Management of technical, process, and facilities interfaces
- Enhanced QA, MC&A, and other regulatory applications
- Closed fuel cycle/U supply economics
- Skilled people

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# Questions?