

Institute for Nuclear Energy Science and Technology

INEST Fuel Cycle CORE 2012 Outreach Meeting February 21, 2012

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INEST Mission/Vision

- Create a laboratory component that stimulates discovery at technology and time scales beyond the constraints of current DOE missions while establishing strong partnerships with the university research community
- Grow technology leadership reputation while building long-term capabilities, tools and techniques to advance nuclear technology
- Establish linkages with NUC universities which will stimulate innovation and technical excellence, and a source of high quality future employees

National labs focus on the near term 0–2 year timeframe. The NE University program focuses on the 2–4 year timeframe. What the Institute should focus on is the long term,> 4 year timeframe.

INEST Organization Chart



FY2011 INEST LDRD Portfolio

\$3.2 M Investment

- Research projects are distributed between 4 CORE's (New Hybrid Nuclear Energy Systems CORE not yet included-mid year 2012 call planned)
- Require university participation
- CORE meetings and workshops are used to hone topical areas and generate university interests





Fuel Cycle CORE Organization



Fuel Cycle CORE Recent Activities

- Established Steering Committee in 2010
- 1st Workshop was held at CAES in July 2010 on Backend strategies for dealing with spent TRISO fuel
 - Over 40 participants from universities, INL and other national labs
- Outreach and information workshop March 2011, UNLV, Las Vegas
 - 14 universities invited

- 50 professors, researchers, students participated
- Fuel Cycle lectures at ISU, UNM, UNLV
- 2nd Workshop held in Charlotte, NC, January 10-11, 2012
- Outreach workshop at OSU February 21, 2012

2nd Fuel Cycle CORE Workshop

Defining a National User Facility Concept for Enhancing the University, Laboratory, Industry Base for Separation, Waste Form and Actinide Sciences

Selected Observations

- The working groups gravitated toward a user network concept with some similarities to the ATR NSUF; however the separations and waste forms community has a much broader range of technical activities and is more diffuse. Also a central "anchor" facility such as the ATR does not exist instead facilities exist at several DOE laboratories.
- Much pertinent research and training can be done in "cold" environments using surrogate materials or in "warm" (radiological) facilities. Such environments could operate with lower security/access requirements and expense vis a vis Cat I or II facilities.
- A key national US "mission need" will exist in waste forms, separations, safeguards, and nuclear forensics areas for the next 50 or more years. Emphasis areas will naturally change but the expertise needs will remain constant
- An integrated capability for testing US specific flowsheets to down select US R&D based separation schemes is missing. A graded approach with the involvement of industry would be beneficial in terms of targeting development of used fuel technology and applications based on end user needs.
- A NSUF could consist of a (new) laboratory for radiologically cold and warm operating environments (to allow significant flexibility in research and user access) coupled to an existing (upgraded) facility at a national laboratory for larger-scale radiologically "hot" environment demonstrations requiring kilogram materials handling in hot cells or other shielded facilities.

Current FC CORE LDRD Portfolio

No.	1 st year (of 3)	TITLE	PI	Co- Investigators	University Involvement	CORE
12-056	FY-12	Recovery of Precious Metals from Used Nuclear Fuel and Electronic Waste Using Sulfur-Impregnated Nano-scaffolds	Peter Zalupski	Linda Nazar	University of Waterloo, Canada	Fuel Cycle
12-059	FY-12	Chemistry and Flowsheet Development for Lanthanide Separations	R. Scott Herbst	Peter Zalupski, Mikael Nilsson	University of California - Irvine	Fuel Cycle
10-032	FY-10	Investigation of Molten Bromide Salts Systems for Separation and Recovery of Actinides from Fission Products	Lister, Ted	Shelly Li, Steven Herrmann		Fuel Cycle
11-006	FY-11	Supercritical Fluid Extraction of Actinides from TRISO Reactor Fuels	Mincher, Bruce	Chien Wai	University of Idaho	Fuel Cycle

Space Power CORE has 2 active LDRD projects Safety Licensing CORE has 2 active LDRD projects Fuels and Materials CORE has 7 active LDRD projects