U.S. DEPARTMENT OF ENERGY

Nuclear Energy

NUCLEAR ENERGY UNIVERSITY PROGRAMS

NEUP
Funding Opportunity Announcement Overview

JC de la Garza
NE-53 NEUP
Federal Point of Contact

June 2016

U.S. DEPARTMENT OF ENERGY

Nuclear Energy

NEUP Funding Opportunity Announcement Overview

FINANCIAL ASSISTANCE
FUNDING OPPORTUNITY ANNOUNCEMENT

U. S. Department of Energy

Idaho Operations Office

Fiscal Year 2016 Consolidated Innovative Nuclear Research

Funding Opportunity Announcement:
DE-FOA-0001281

Announcement Type: Initial 8/7/2015 Draft
AMENDMENT 000001 (8/13/2015)

CFDA Number: 81.121

Informational Webinar: August 10–12, 2015
(Video links and presentations will be made available at www.neup.gov)

Issue Date: August 13, 2015

Letter of Intent (Mandatory only for NSUF Applications)
Due Date: August 27, 2015 at 8:00 p.m. ET

Pre-Application (Mandatory except for IRPs and MS-EM-1)
Due Date: September 17, 2015 at 8:00 p.m. ET

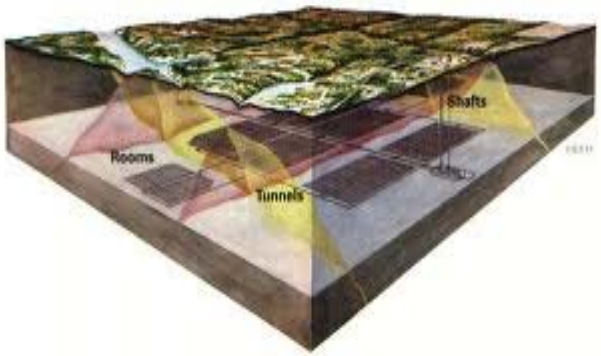
IRP Application
Due Date: December 3, 2015 at 8:00 p.m. ET

Full Application
Due Date: February 18, 2016 at 8:00 p.m. ET

- The Fiscal Year 2016 Consolidated Innovative Nuclear Research (CINR) – Funding Opportunity Announcement (FOA) is available online at https://neup.inl.gov/SitePages/Home.aspx
- The DOE - Office of Nuclear Energy conducts crosscutting nuclear energy research and development (R&D) and associated infrastructure support activities to develop innovative technologies that offer the promise of dramatically improved performance for advanced reactors and fuel cycle concepts while maximizing the impact of DOE resources
- This FOA addresses the competitive portion of NE's R&D portfolio as executed through the Nuclear Energy University Programs (NEUP), Nuclear Energy Enabling Technologies (NEET), Crosscutting Technology Development (CTD), and the Nuclear Science User Facilities (NSUF)
- Our focus today is on NEUP funding in the FOA

NEUP Funding Opportunity Announcement Overview

- DOE NE created NEUP in 2009 to consolidate university support under one program (Universities in the United States of America)
- NE-53 (Used Fuel Disposition (UFD) campaign) is now tasked with monitoring and assuring the health of the Spent Nuclear Fuel storage and transportation system with ultimate disposal under a consent-based siting approach
- NE-53 focus areas are Storage, Transportation, Disposal



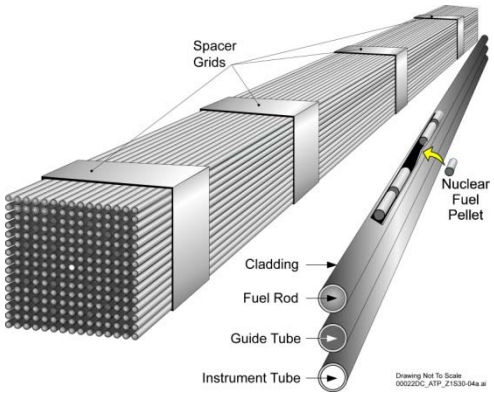
ARTIST'S VIEW OF A DISPOSAL VAULT IN RELATION TO THE ROCK STRUCTURE

NEUP Funding Opportunity Announcement Overview

Storage System Components

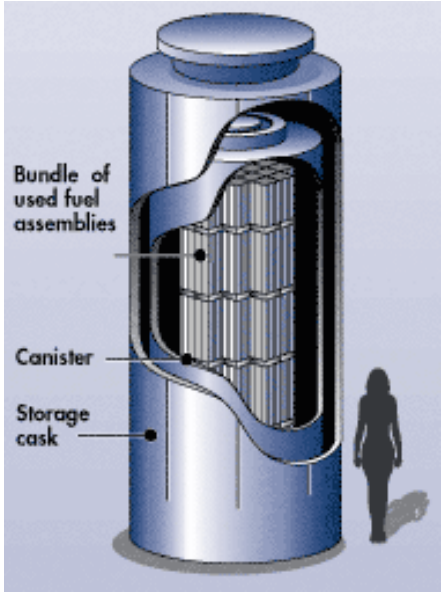
I. Fuel

I. Fuel/Pellet
II. Cladding
III. Assembly hardware



II. Casks

I. Internals (baskets, neutron poisons)
II. Container (canister, welds, seals, bolts)
III. Overpack/Storage module



III. ISFSI

I. Pad
II. Rebar
III. Physical Protection

IV. Monitoring Systems

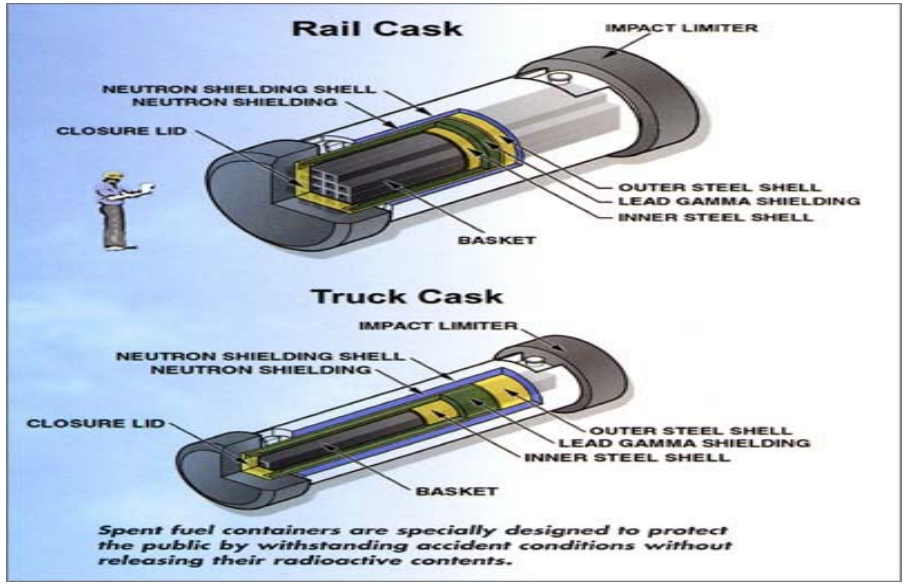
I. Remote inspection
II. In-package sensors
III. Security

NEUP Funding Opportunity Announcement Overview

Transportation and Disposal System Components

Transportation System

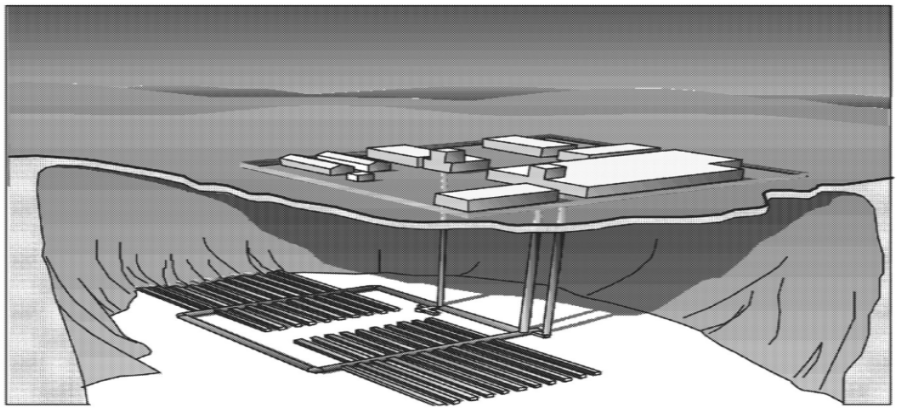
- Overpack/TADS
- Rolling Stock (industry)
- Heavy Haul Transports (industry)



Disposal System

Structures, Systems and Components performance

- Non-site (non-media) specific



U.S. DEPARTMENT OF ENERGY

Nuclear Energy

NEUP Funding Opportunity Announcement Overview

UFD Campaign National Labs Participants

Pacific Northwest NATIONAL LABORATORY

SRNL SAVANNAH RIVER NATIONAL LABORATORY

Los Alamos NATIONAL LABORATORY

Sandia National Laboratories

Argonne NATIONAL LABORATORY

Science in the National Interest

Lawrence Livermore National Laboratory

ornl OAK RIDGE NATIONAL LABORATORY

INL Idaho National Laboratory

BERKELEY LAB

U.S. DEPARTMENT OF ENERGY

Nuclear Energy

NEUP Funding Opportunity Announcement Overview

- Under the NEUP competitive process there are two types of awards made. One is:
  - **Research and Development Projects (R&D)s**
    - seek to align university research with DOE priorities
    - Support projects that focus on the needs and priorities of key NE fuel cycle programs and mission-supporting research

U.S. DEPARTMENT OF ENERGY

Nuclear Energy

13-4834 Improving the Understanding of the Coupled Thermal-Mechanical-Hydrologic Behavior of Consolidating Granular Salt

Purpose:

Obtaining an improved understanding of coupled thermal-mechanical-hydrologic behavior of consolidating granular salt in the near-field environment and as a barrier for a mined repository in salt

This work will produce an improved model for this behavior and will result in greater confidence in granular salt consolidation as a principal strategy for permanent isolation

Summary of Project Plan:

Enhance the ability to predict granular salt consolidation as it compacts to high fractional densities and very small permeabilities by

- Measuring the consolidation (pore volume reduction) and corresponding changes in hydrologic and thermal properties of granular rock salt at high fractional densities.
- Interpreting deformation mechanisms as a function of moisture, temperature and stress conditions from microstructural observations on consolidated samples, and
- Extending an existing constitutive model to include coupled thermal-mechanical-hydrologic behavior of consolidating granular salt.

Logistics:

Principal Investigator:
John Stormont

Institution:
University of New Mexico

Duration:
3 years

Total Funding Level:
$640,000

Progress to date:

Initial consolidation testing was initiated on WIPP Granular salt. During the consolidation measurements, gas flow through the sample is being measured. Evaluation of existing constitutive model with new data is underway. The load frame in which these measurements are being made is shown in the photo.

NEUP Funding Opportunity Announcement Overview

- Under the NEUP competitive process the other type of award is:
  - **Integrated Research Projects (IRP)s**
    - significant three-year awards for projects that address specific research issues and capability gaps identified and defined by the NE R&D programs
    - Intended to develop a capability within each specified area
    - Projects are multidisciplinary and require multi-institutional partners

U.S. DEPARTMENT OF ENERGY

Nuclear Energy

IRP 14-7356 Multi-Sensor Inspection and Robotic Systems for Dry Storage Casks

This topic is important because:

Design and development of advanced monitoring and testing equipment that will employ robotics to permit direct access to and characterization of dry cask storage system components within the confined spaces and hazardous environment of the dry storage cask system.

Summary of Project Plan:

- **Develop sensors, monitoring methodologies, and a delivery system to ensure safe dry storage of used nuclear fuel**
- **Use laser induced breakdown spectroscopy and Raman spectroscopy delivered via an optical fiber to enable in-situ surface composition characterization;**
- **Use compact electromagnetic active transducers for ultrasonic guided wave based methods to nondestructively inspect the canister and weld regions**
- **Employ a hybrid robotically guided wand system to provide access to the hazardous environment within confined spaces of the dry storage cask ventilation system.**

PI:

Cliff Lissenden

Institution:

Penn State

Duration:

3 years

Total Funding:

$3,000,000

Status:

Project recently funded near end of CY2014; work being initiated

NEUP Funding Opportunity Announcement Overview

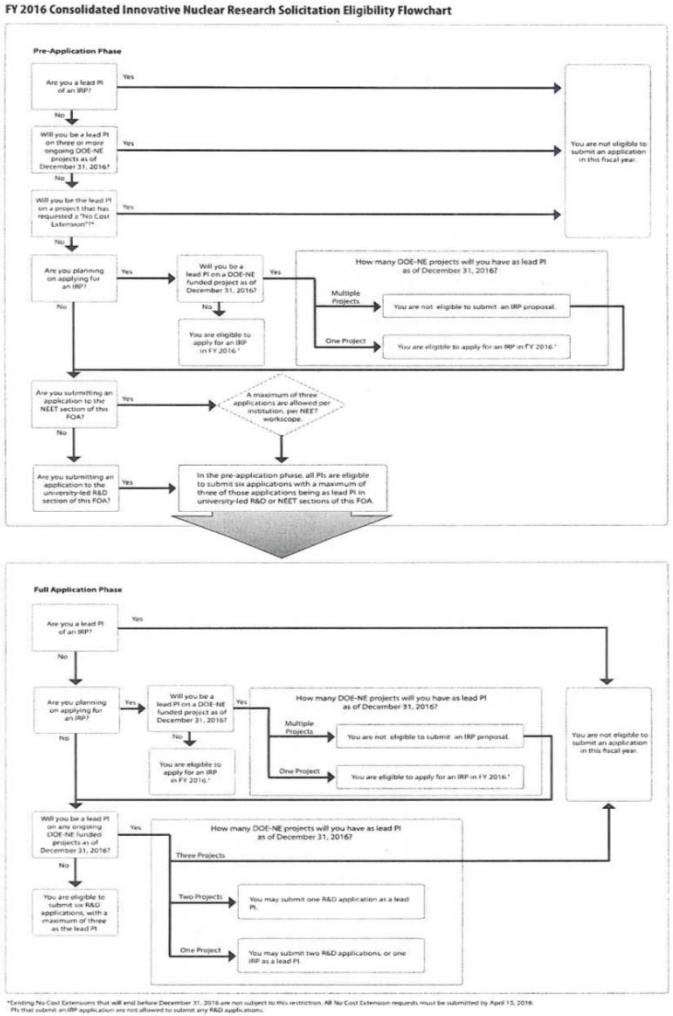
R&Ds

- $800,000 award range
- 3 year award duration
- No-Cost Time Extensions possible
- Appendix A of the FOA

IRPs

- $3 Million award range (have been awarded up to $4 Million)
- 3 year award duration (can be up to 4 years award duration)
- No-Cost Time Extensions possible
- Appendix C of the FOA

NEUP Funding Opportunity Announcement Overview



- **FY 2016 CINR NEUP Application Eligibility Flowchart**
  https://neup.inl.gov/SiteAssets/FY_2016_Documents/FY16_CINR_FOA_Eligibility_Flowchart-New.pdf
  - **Pre-Application Phase Ineligibility**
  - **Full Application Phase Ineligibility**
    - **Lead PI of an IRP**
    - **Lead PI on 3 or more DOE projects**
    - **Lead PI on a No-Cost Time Extension DOE project**

U.S. DEPARTMENT OF ENERGY
Nuclear Energy

NEUP Funding Opportunity Announcement Overview

Important Dates

- **FOA Availability**
  - FOA Final Rev Issue date – August
  - Informational Webinar (work scopes) – August

- **NEUP Proposal Submittal**

  NEUP
  - Pre-Application submittals (mandatory except for IRPs - September
  - IRP Applications due - December

Fundamentals

Proposal Submittal

- Technical Abstract
- Technical Proposal
- Collaboration
- PI Vitae

Execution

- Cost and Schedule Reporting
- Quarterly Reports
- Final Report
- Deliverables

Detailed Information

- The NEUP.gov website (neup@inl.gov)
  - questions about schedule, how to apply, review process, etc.

- Drew Thomas
- Review and Outreach Coordinator
- Innovative Nuclear Research Integration Office
- Phone: 208.526.1602
- drew.thomas@inl.gov

NEUP Funding Opportunity Announcement Overview

Questions