



Idaho National Laboratory

2016 Status Report

DOE Research Reactor Infrastructure Program

Douglas Morrell

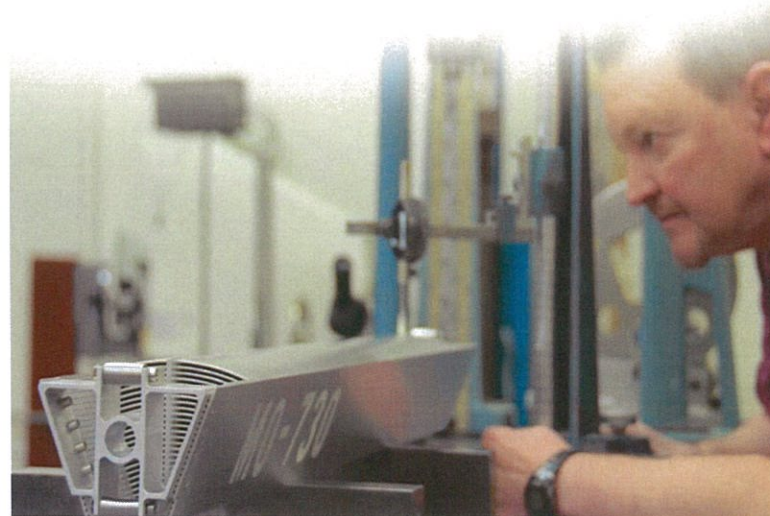
August 23, 2016

www.inl.gov



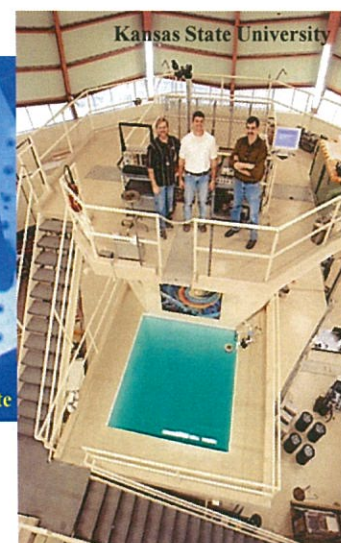
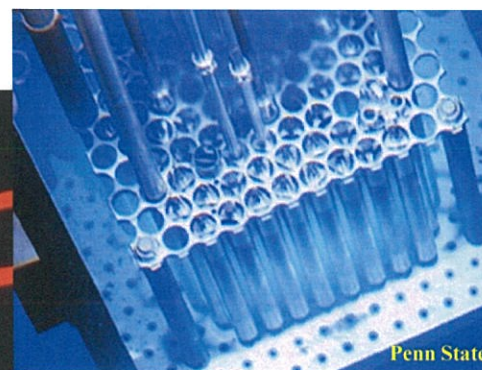
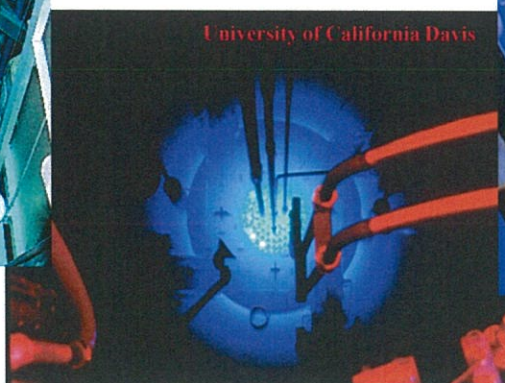
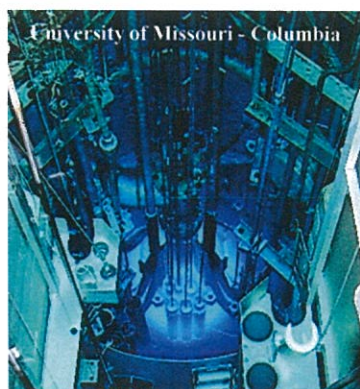
Topics for Discussion

- **Overview of the Research Reactor Infrastructure Program**
- **Accomplishments during the past year**
- **2017 Forecast**
- **Future Challenges**



Purpose of the RRI Program

The purpose of the United State Domestic Research Reactor Infrastructure Program is to provide fresh nuclear reactor fuel to United States universities at no, or low, cost to the university. The title of the fuel remains with the United States government and when universities are finished with the fuel, the fuel is returned to the United States government.



Program Management

DOE HQ

Kenny Osborne

DOE Idaho Operations Office

Brad Heath

Idaho National Laboratory

Project Manager

Doug Morrell

Quality Engineer – in Idaho

Dana Cooper

Quality Engineer – in Virginia

Dave Capp

Nuclear Materials Management

Michelle Wilkinson

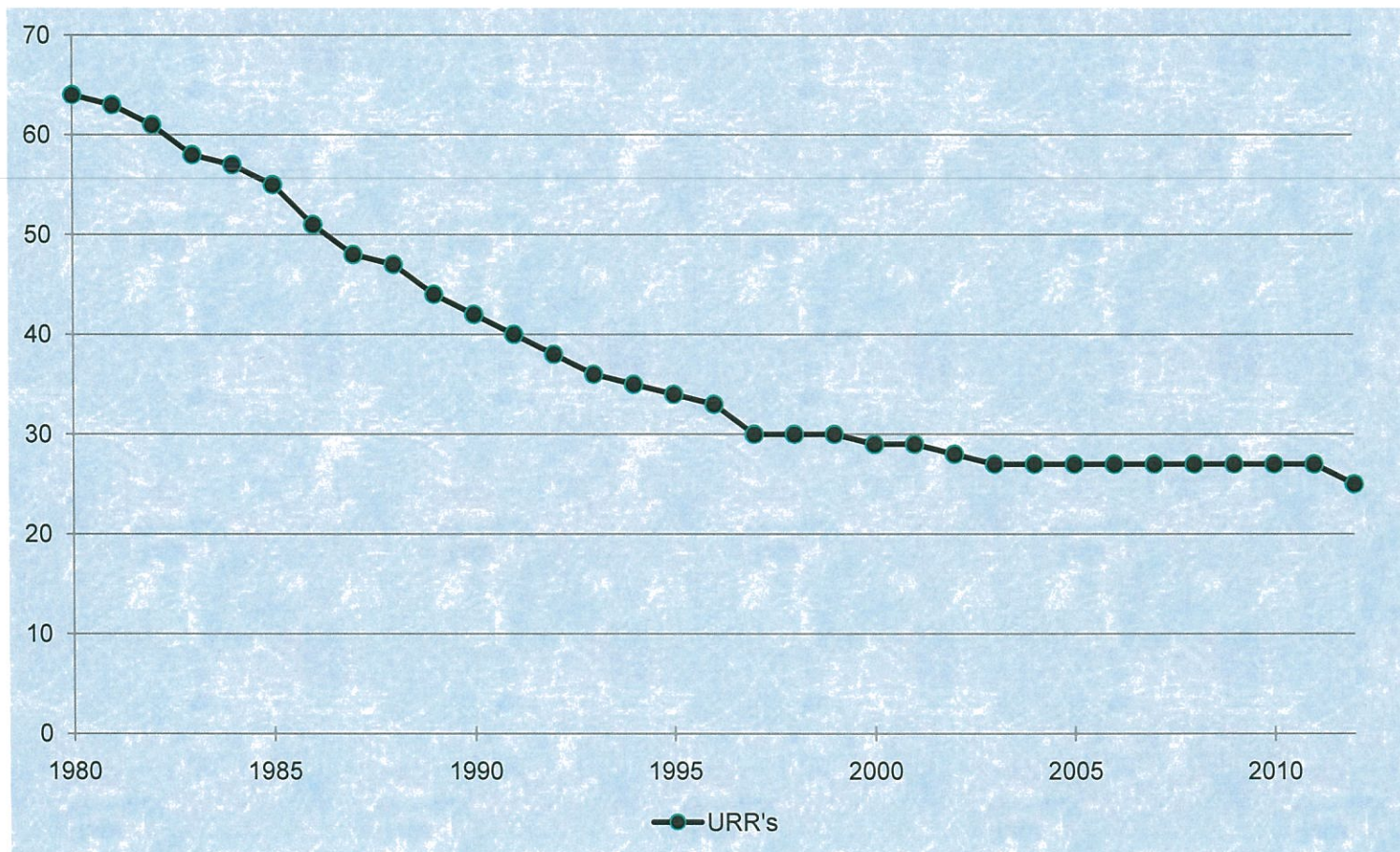
Subcontract Administration

Elise Miller

Points of Contact

<u>Points of Contact</u>	<u>Organization</u>	<u>E-Mail Address</u>	<u>Phone Number</u>
Brad Heath	DOE	heathbk@id.doe.gov	(208) 526-3132
Doug Morrell	INL	douglas.morrell@inl.gov	(208) 526-5876
Dana Cooper	INL	clinton.cooper@inl.gov	(208) 526-3668
Dave Capp	INL	dfcapp@babcock.com	(434) 522-6545
Michelle Wilkinson	INL	d.wilkinson@inl.gov	(208) 526-3322
Elise Miller	INL	elise.miller@inl.gov	(208) 526-2196

Operating University Reactor Facilities



-

University TRIGA Reactor Facilities



- Kansas State University
- Oregon State University
- Penn State University
- Reed College
- Texas A&M
- University of California Davis
- University of California at Irvine
- University of Maryland
- University of Texas at Austin
- University of Utah
- University of Wisconsin
- Washington State University



University Plate Fuel Reactor Facilities



- Massachusetts Institute of Technology
- Missouri University of S&T - Rolla
- Ohio State University
- Purdue University
- Rhode Island Nuclear Science Center
- University of Florida
- University of Massachusetts – Lowell
- University of Missouri – Columbia



University of Missouri-Columbia

Other University Reactor Facilities

Idaho State
UNIVERSITY



NC STATE UNIVERSITY

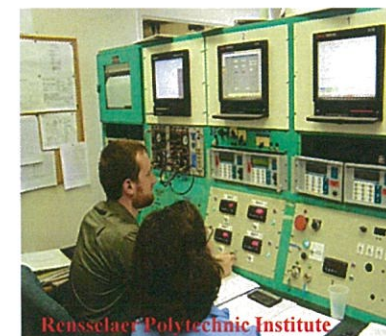
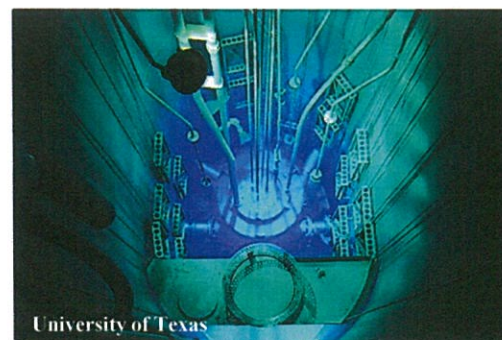
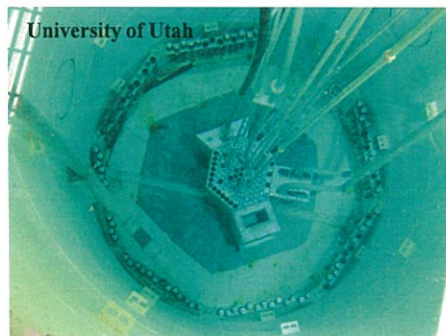


- **AGN Reactors**
 - Idaho State University
 - Texas A&M
 - University of New Mexico
- **Pulstar Reactor**
 - North Carolina State University
- **Critical Facility**
 - Rensselaer Polytechnic Institute

Reactor Power Levels

<u>Facility</u>	<u>Power</u>
University of Missouri – Columbia	10 MW
Massachusetts Institute of Technology	6 MW
University of California – Davis	2 MW
Rhode Island Nuclear Science Center	2 MW
Kansas State University	1.25 MW
Oregon State University	1 MW
University of Texas, Austin	1 MW
North Carolina State University	1 MW
Pennsylvania State University	1 MW
Texas A&M University	1 MW & 5W
University of Massachusetts – Lowell	1 MW
University of Wisconsin	1 MW

<u>Facility</u>	<u>Power</u>
Washington State University	1 MW
Ohio State University	500 kW
Reed College	250kW
University of California – Irvine	250 kW
University of Maryland	250 kW
Missouri University of S&T	200kW
University of Florida	100 kW
University of Utah	100 kW
Purdue University	1 kW
Idaho State University	5 W
University of New Mexico	5 W
Rensselaer Polytechnic Institute	1 W



Projected Fresh Fuel Needs

University	Next Five Years	Lifetime of Core
MURR	X	X
MIT	X	X
Rhode Island	X	X
Kansas State University	X	X
Penn State University	X	X
Texas A&M	X	X
University of California at Davis	X	X
University of Maryland	X	X
University of Texas	X	X
Washington State University	X	X
Reed College		X
University of California at Irvine		X

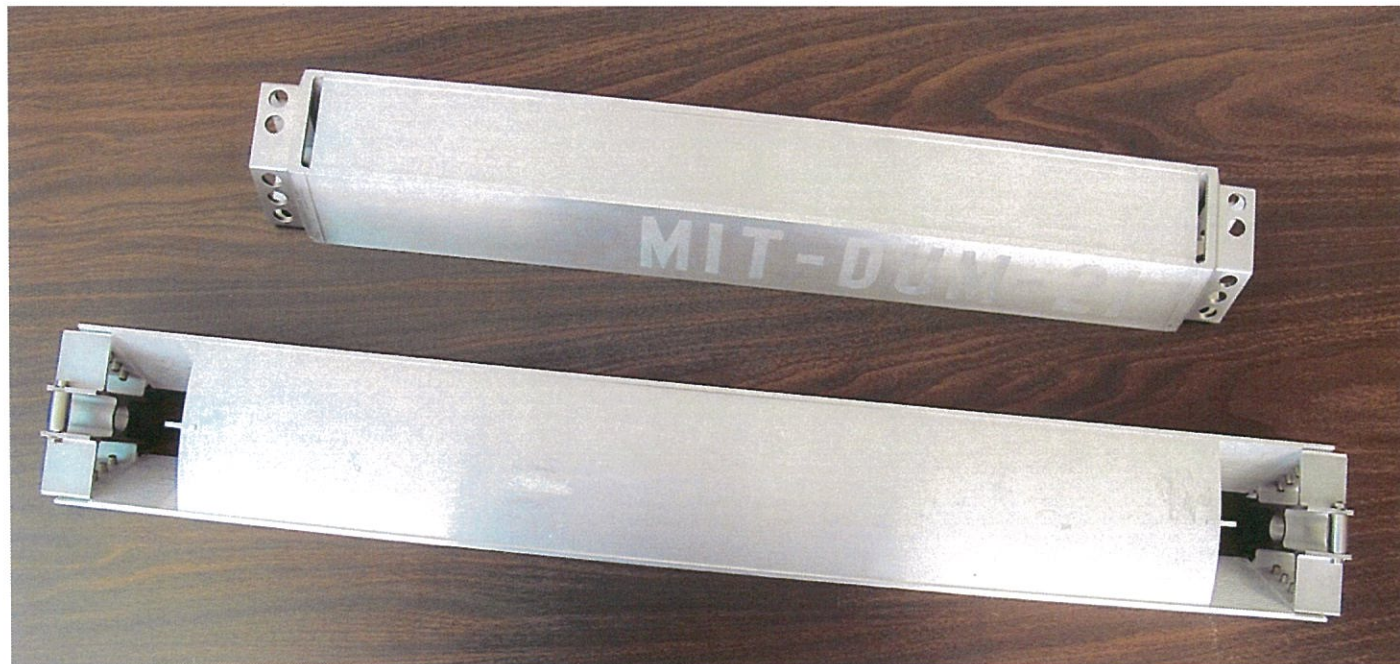
Spent Nuclear Fuel

- **Spent Fuel Transfers to DOE Facilities**
 - **Routine Shipments – MURR, MIT**
 - **Other Shipments – Texas, Penn State, UC Davis**



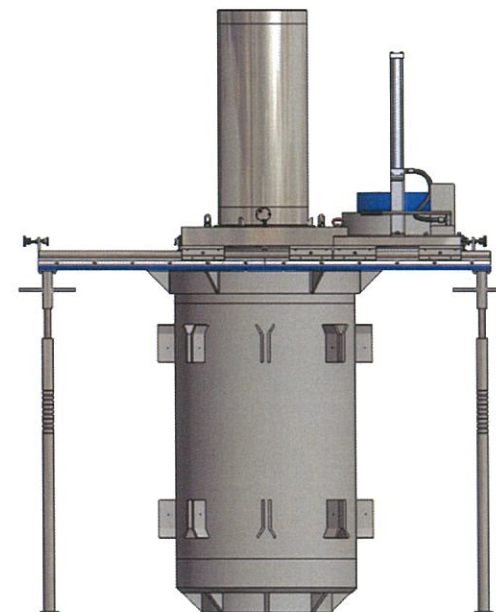
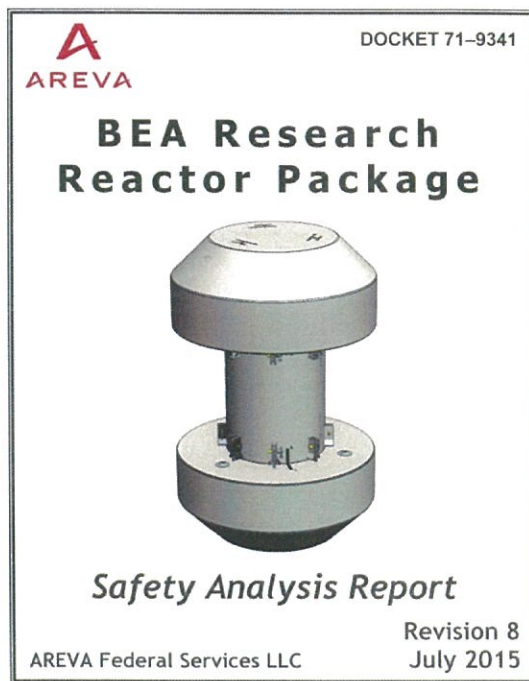
2016 Accomplishments

- Provided fuel to maintain university reactors with sufficient fuel to operate at current power levels – MURR, MIT
- Preparing the Irradiated Fuel Storage Facility at the INL to make first lightly irradiated TRIGA fuel shipment
- Ten fuel boxes were fabricated for NC State.



2016 Accomplishments

- BRR Cask SAR was revised to include all university payloads. Revision has been approved by the NRC.
- BRR cask dry transfer system has been fabricated and tested.



2016 Accomplishments

- **Three shipments of spent nuclear fuel from MURR and MIT to Savannah River Site receipt facility**
- **One shipment remains to be completed in FY-2016.**



2016 Accomplishments

- Assisting TRIGA International with the modifications and upgrades of the TRIGA fuel fabrication line



- NATIONAL ORGANIZATION OF TEST, RESEARCH AND TRAINING REACTORS
-
- July 2014
- Volume 24b, No. 2
- # TRTR
- ## NEWSLETTER
- ### Chairman:
- Melinda Krabachuk
Rand College
- ### Editor:
- Bill Vornatzen
University of
Vermont—Rutland
vornatzen@uvm.edu
- ### Administrative Center:
- Chapman's Column Pg. 3
TRTR 2014 Meeting Pg. 3
Letter Update Pg. 3
TRTR Executive Committee 2013-14 Pg. 3
- ### NRC Inspections:
- NRC Inspections - Region I Pg. 3
NRC Inspections - Region II Pg. 14
NRC Inspections - Region III Pg. 14
NRC Inspections - Region IV Pg. 17
- ### Quarterly News:
- Accidents in Large NRC Pg. 29
Current Energy Scenario Pg. 29
Revision of NRC Annual Fee Schedule for 2014 Pg. 29
- ### New Research Reactor Publications:
- Physical Properties of Plastics and Metals, ATR NREL Pg. 29
Guide for License Renewal Pg. 31
RAD Response Pg. 31
Proposed for ATR Project Pg. 31
License Renewal Case to be Renewed Pg. 31
Workshop at Michigan University Pg. 37
EPSC 2014, Vancouver Pg. 37
- ### Regulatory Oversight and License Process:
- Regulations Pg. 33
2012 Technology and Technology Pg. 35
NRC 100 Highlights Pg. 35
Annual Self-Inspection to Provide Trained Assessment Pg. 37
- ### Emergency Preparedness Plans Update:
- Emergency Response Update Pg. 37
NRC's Nuclear Safety Inspection Award Pg. 38
Release of HFT-2, Nuclear Core Library Pg. 38
Nuclear News Pg. 40
- ### Other Topics:
- License Renewal Pg. 40
Improved Performance: 2014 Status Data Pg. 41
Guidance Code for TRTR Production Pg. 41
More on Radioactive Suppliers Pg. 43
Canadian Nuclear News Center Pg. 43
- ### Canadian Nuclear News Center:
- NUC Pg. 43
Nuclear News Pg. 43
Nuclear News Pg. 43
Nuclear News Pg. 43
Nuclear News Pg. 43
- ### European Nuclear Market:
- European Nuclear Market Pg. 43
European Nuclear Market Pg. 43
European Nuclear Market Pg. 43
European Nuclear Market Pg. 43
European Nuclear Market Pg. 43
- ### Workshop on High-Temperature Nuclear Reactors:
- Workshop on High-Temperature Nuclear Reactors Pg. 50
Workshop on High-Temperature Nuclear Reactors Pg. 50
Workshop on High-Temperature Nuclear Reactors Pg. 50
Workshop on High-Temperature Nuclear Reactors Pg. 50
Workshop on High-Temperature Nuclear Reactors Pg. 50
- ### MARGINALIA
- MARGINALIA Pg. 51
- ## NEXT TRTR MEETING
- August 3rd - 8th
Portland, OR
www.trtr.org

2017 Forecast

- **Research Reactor Infrastructure Program Annual Report**

2014 Annual Report

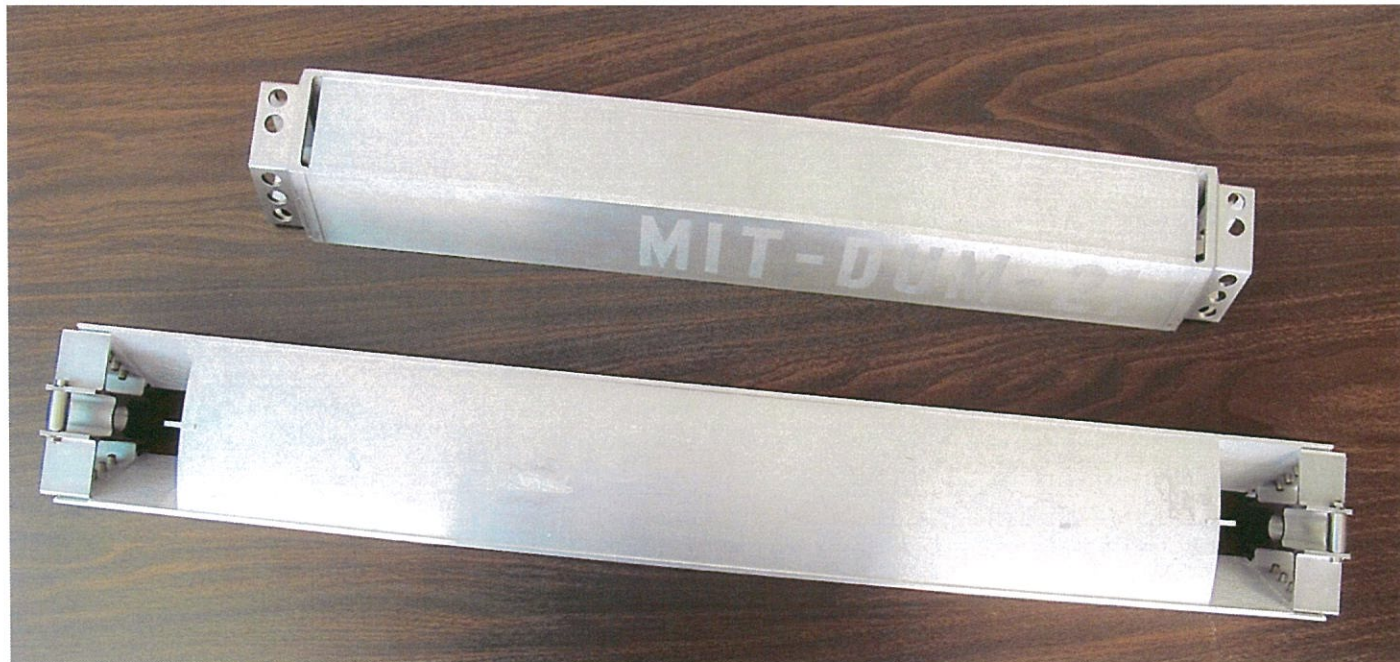
**Research Reactor
Infrastructure Program**



The INL is a U.S. Department of Energy National Laboratory
operated by Battelle Energy Alliance

2017 Forecast

- **Provide fuel to maintain university reactors with sufficient fuel to operate at current power levels – MURR, MIT**



2017 Forecast

- Ship spent nuclear fuel from MURR, MIT



2017 Forecast

- **Complete the first shipment of nineteen lightly irradiated TRIGA fuel from the Irradiated Fuel Storage Facility at the INL to a selected university reactor facility.**



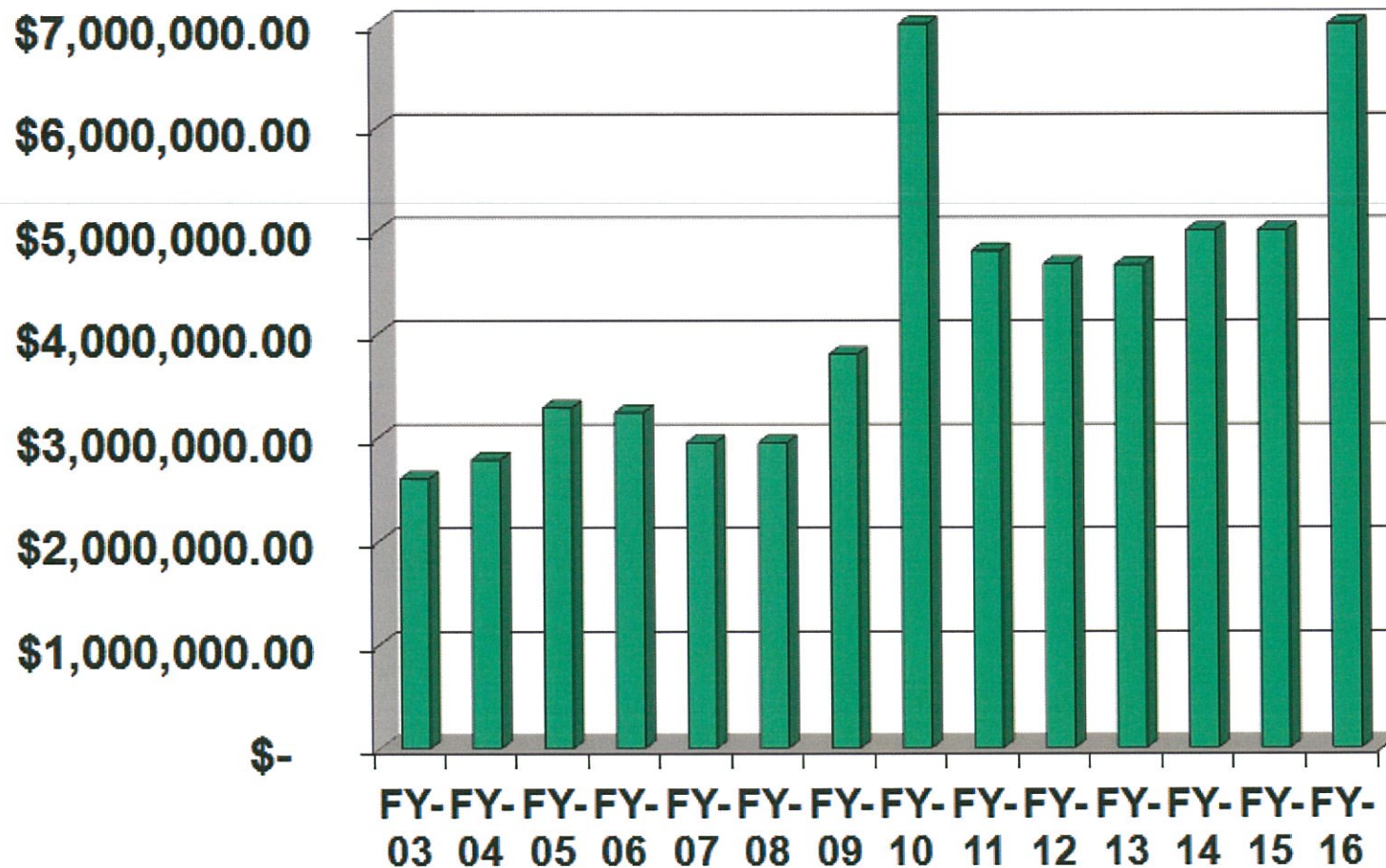
Requests for Assistance

- **Future requests for fresh fuel or spent fuel shipments need to be communicated to program office – Provide documentation to justify request (E-mail or official letter notification preferred)**
- **Other university concerns or assistance requests should be communicated to program for consideration as part of future budget planning activities.**

Future Challenges

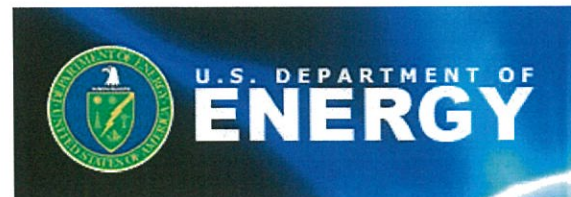
- **Adequate funding to restart TRIGA fabrication line**
- **Fabrication and supply of TRIGA fuel elements**
 - **Fabrication of fuel by TRIGA International**
 - **Reallocation of fresh fuel inventory**
 - **Reuse of lightly irradiated TRIGA fuel elements currently stored at the Irradiated Fuel Storage Facility at the Idaho National Laboratory (only standard 8.5 wt% fuel available)**
- **Receipt of additional Irradiated TRIGA fuel at the Irradiated Fuel Storage Facility**
- **Conversion of MURR and MIT from HEU to LEU fuel type**

Funding Profile





TRTR Team Members



Thank You!

Questions?

