INL/EXT-17-44024-Revision-0

2017 Status Report - DOE Research Reactor Infrastructure Program

Douglas Morrell

September 2017

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

INL/EXT-17-44024-Revision-0

2017 Status Report - DOE Research Reactor Infrastructure Program

Douglas Morrell

September 2017

Idaho National Laboratory
Idaho Falls, Idaho 83415

http://www.inl.gov

Prepared for the
U.S. Department of Energy

Under DOE Idaho Operations Office
Contract DE-AC07-05ID14517

Idaho National Laboratory

2017 Status Report

DOE Research Reactor Infrastructure Program

Douglas Morrell

September 18, 2017

www.inl.gov

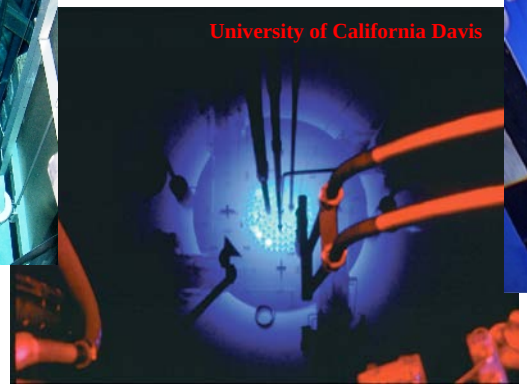
Idaho National Laboratory

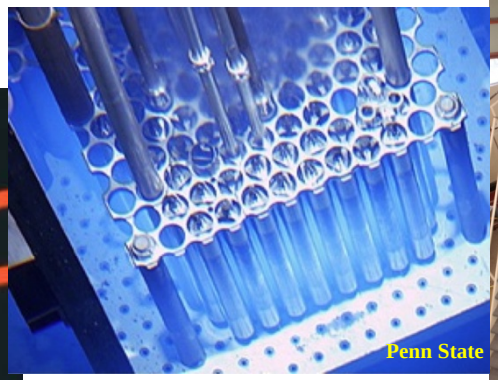
Topics for Discussion

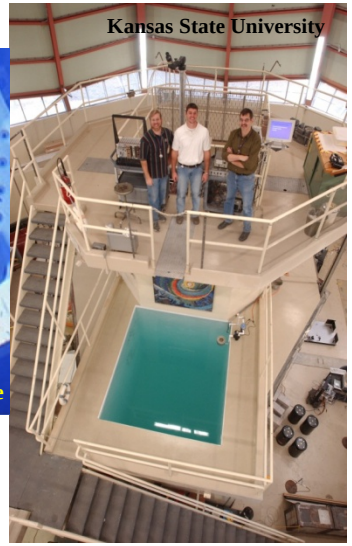
- **Overview of the Research Reactor Infrastructure Program**
- **Accomplishments during the past year**
- **2018 Forecast**
- **Future Challenges**

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.







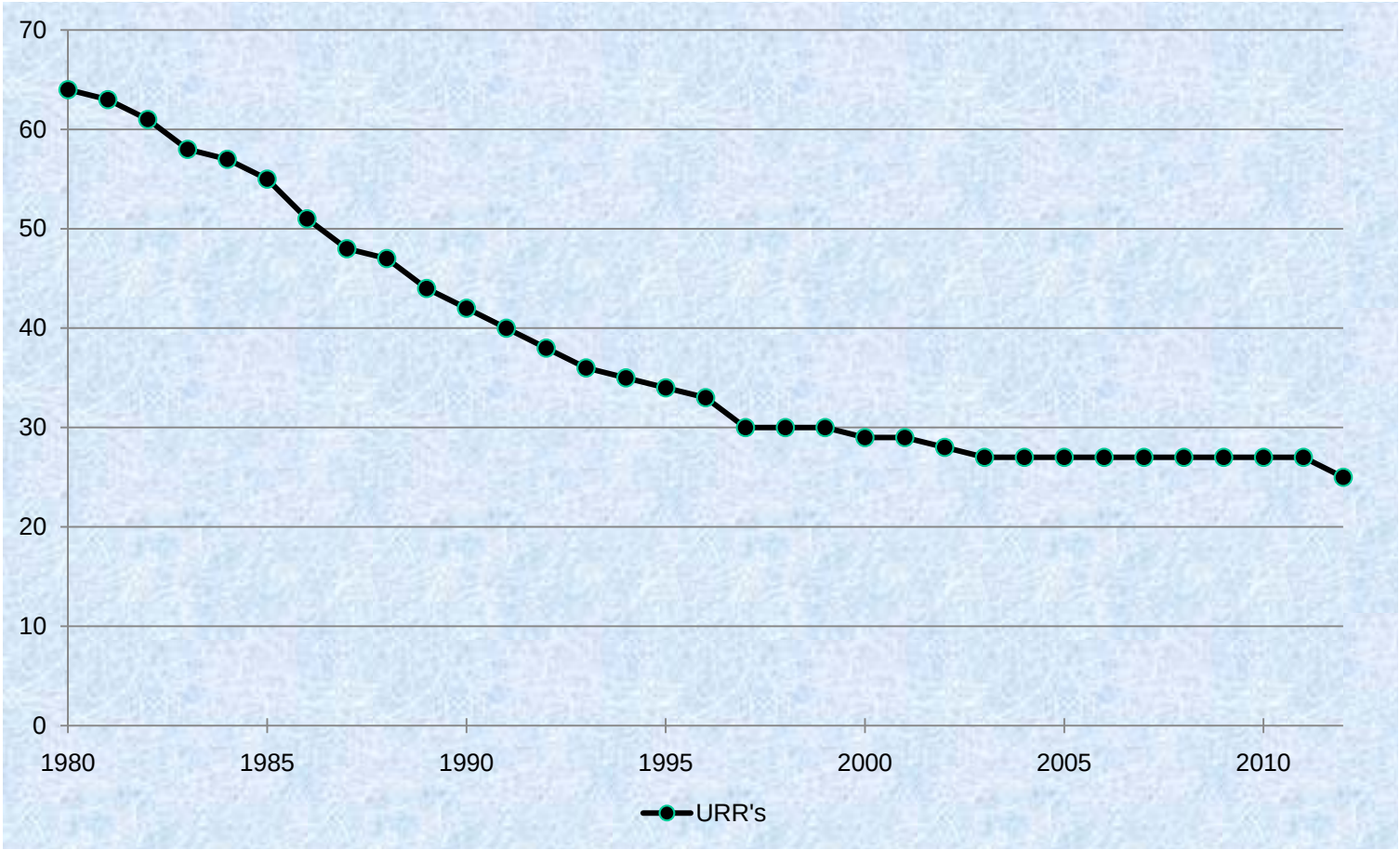
Program Management

DOE HQ	
	Kenny Osborne
	Won Yoon
	Derick Ogg
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

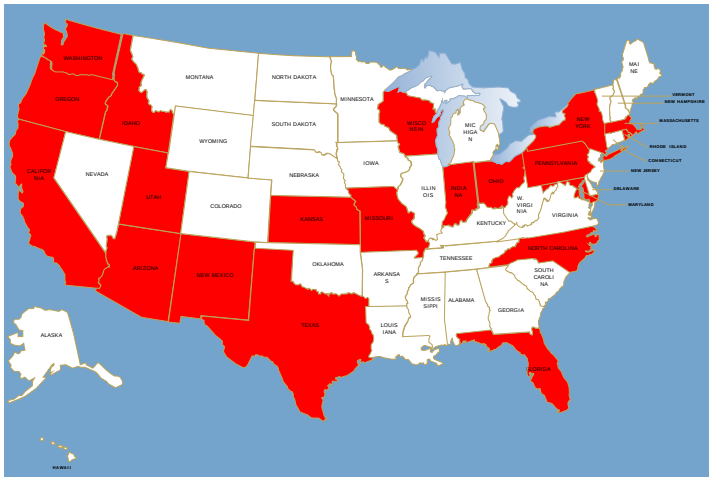
Points of Contact	Organization	E-Mail Address	Phone Number
Doug Morrell	INL	douglas.morrell@inl.gov	(208) 526-5876
Dana Cooper	INL	clinton.cooper@inl.gov	(208) 526-3668
Dave Capp	INL	dfcapp@babcock.com	(434) 522-6545
Michelle Wilkinson	INL	d.wilkinson@inl.gov	(208) 526-3322
Elise Miller	INL	elise.miller@inl.gov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

Operating University Reactor Facilities



The Research Reactor Infrastructure Program

- Funded by the U.S. Department of Energy
- Managed by DOE-ID Operations Office
- Contracted to the INL's Management and Operations Contractor – Battelle Energy Alliance
- Program has been at Idaho since 1977
  - INL subcontracts with 24 U.S. universities to supply fresh nuclear reactor fuel for operations
    - Twelve TRIGA facilities
    - Eight plate fuel facilities
    - Three AGN facilities
    - One Pulstar fuel facility
    - One Critical facility



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

Other University Reactor Facilities

Idaho State University

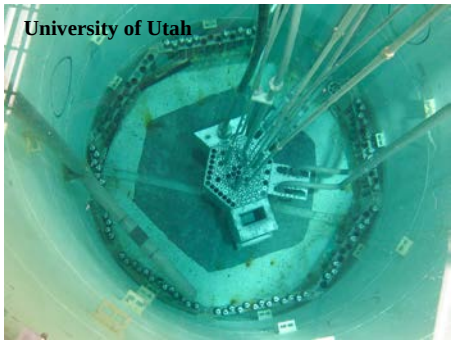
NC STATE UNIVERSITY

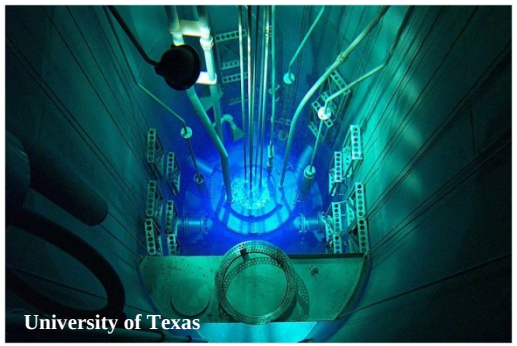
- AGN Reactors
  - Idaho State University
  - Texas A&M
  - University of New Mexico
- Pulstar Reactor
  - North Carolina State University
- Critical Facility
  - Rennselaer Polytechnic Institute

Reactor Power Levels

Facility	Power
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

Facility	Power
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
Rennselaer Polytechnic Institute	1 W


University of Utah


University of Texas


Rensselaer Polytechnic Institute

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

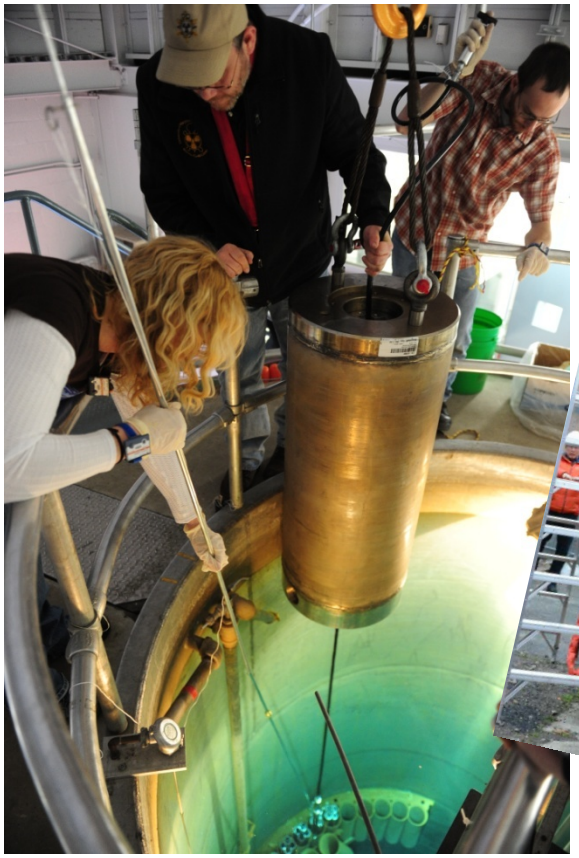
- **Spent Fuel Transfers to DOE Facilities**
  - **Routine Shipments – MURR, MIT**
  - **Other Shipments – Texas, Penn State, UC Davis**

2017 Accomplishments

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

2017 Accomplishments

- **Shipped nineteen lightly irradiated TRIGA fuel elements from the Idaho National Laboratory to the University of Maryland**



2017 Accomplishments

- **Three shipments of spent nuclear fuel from MURR to Savannah River Site receipt facility**
- **One shipment from MIT scheduled**

2017 Accomplishments

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

2018 Forecast

- **Research Reactor Infrastructure Program Annual Report**

2018 Forecast

- **Provide fuel to maintain university reactors with sufficient fuel to operate at current power levels – MURR, MIT**
- **Provide 2,000 kilograms of Deuterium to MIT**

2018 Forecast

- **Complete four spent fuel shipments from MURR, MIT**
- **Complete shipment of spent Deuterium from MIT**
- **Prepare for one spent fuel shipment from Rhode Island (Shipment to be completed in FY-19)**

2018 Forecast

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

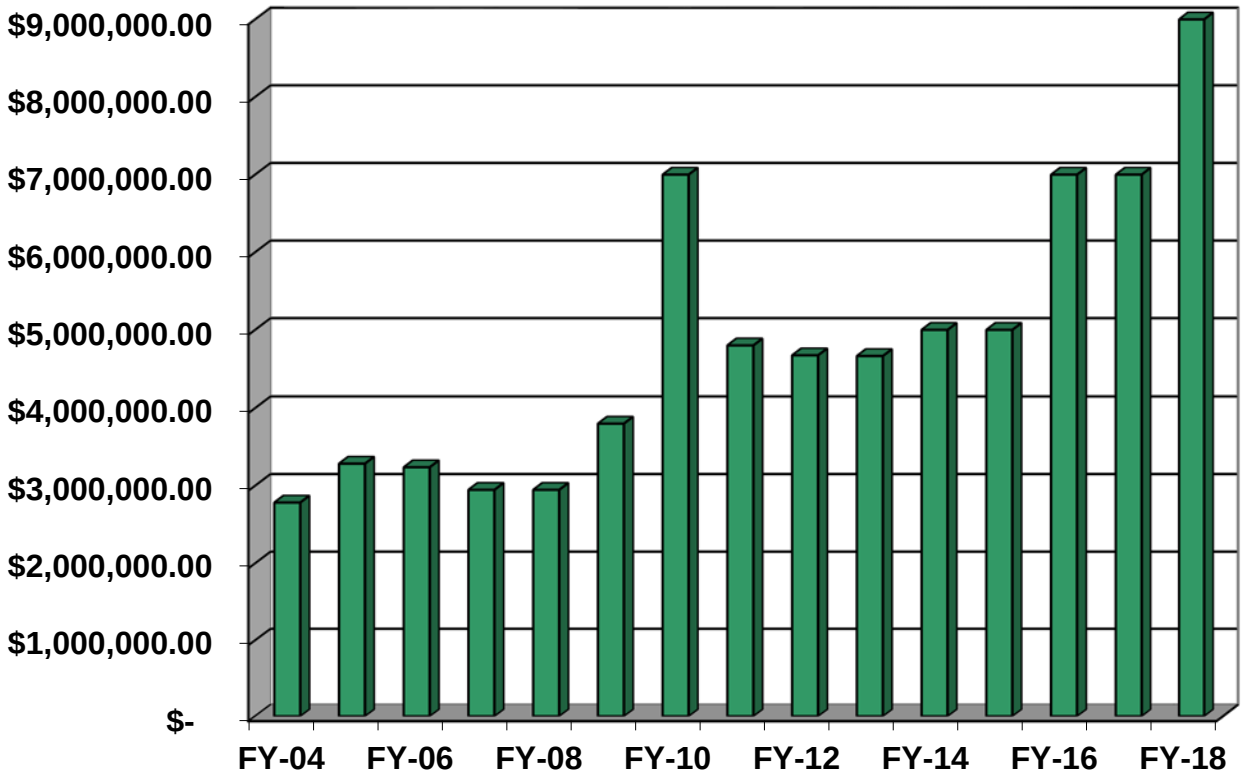
Requests for Assistance

- **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

- **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!

Easy Questions?

Idaho National Laboratory