



Idaho National Laboratory

# ***2018 Status Report***

## **DOE Research Reactor Infrastructure Program**

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[www.inl.gov](http://www.inl.gov)



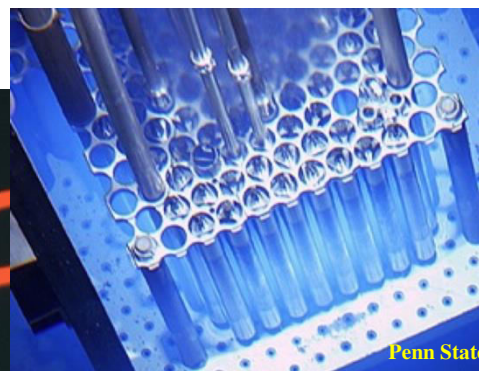
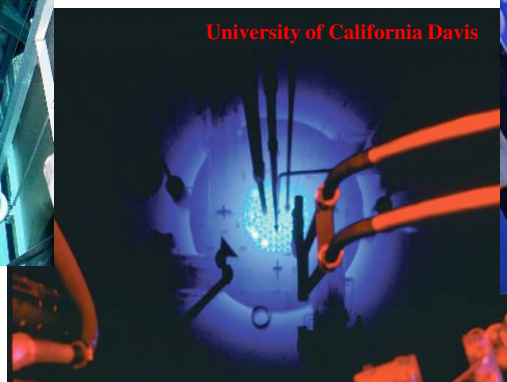
## *Topics for Discussion*

- **Overview of the Research Reactor Infrastructure Program**
- **Accomplishments during the past year**
- **2019 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**

### Idaho National Laboratory

**Project Manager**

**Doug Morrell**

**Quality Engineer – in Idaho**

**Dana Cooper**

**Quality Engineer – in Virginia**

**TBD**

**Nuclear Materials Management**

**Michelle Wilkinson**

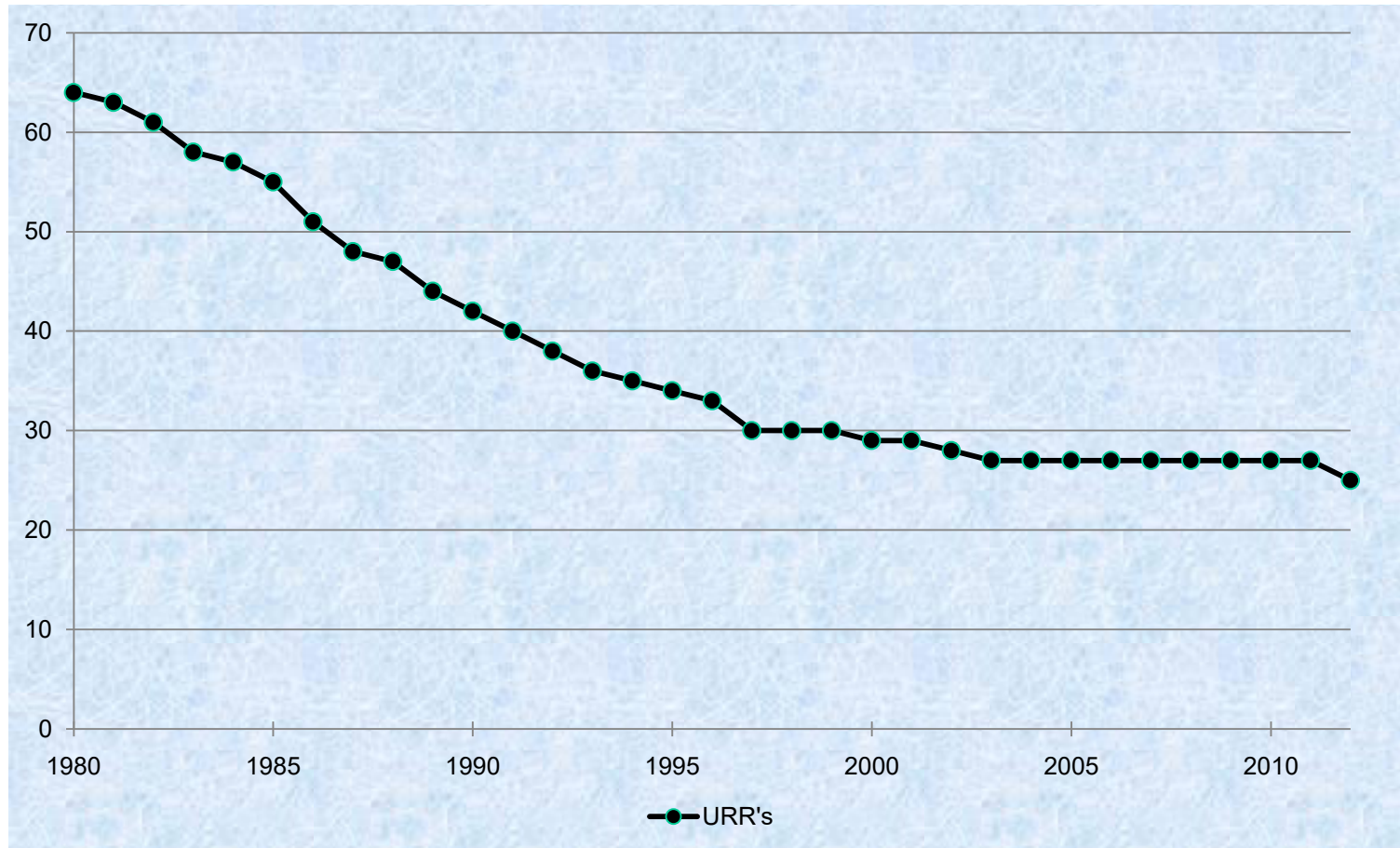
**Subcontract Administration**

**Elise Miller**

## **Points of Contact**

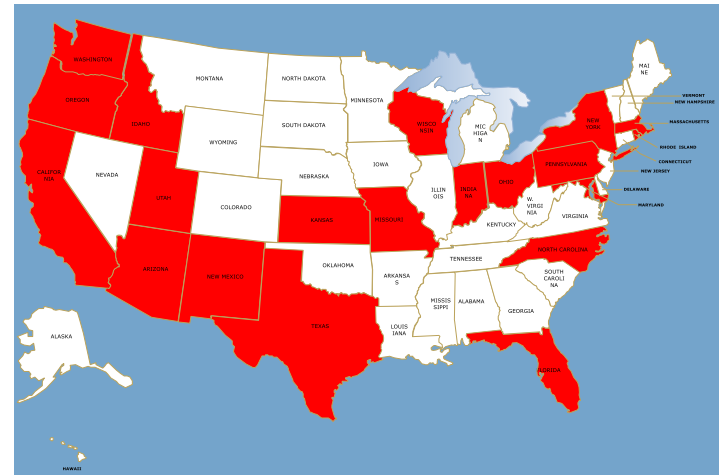
<b><u>Points of Contact</u></b>	<b><u>Organization</u></b>	<b><u>E-Mail Address</u></b>	<b><u>Phone Number</u></b>
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# Operating University Reactor Facilities



# *The Research Reactor Infrastructure Program*

- **Funded by the U.S. Department of Energy**
- **Managed by DOE-HQ 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 Pulsar 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



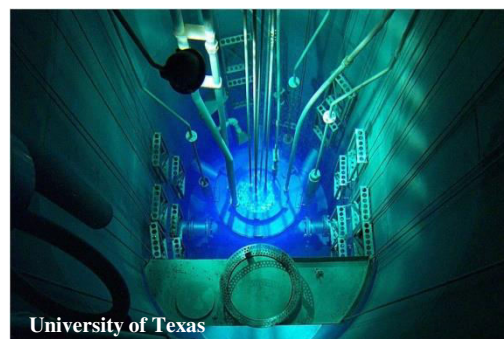
**NC STATE UNIVERSITY**



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

# Reactor Power Levels

<u>Facility</u>	<u>Power</u>	<u>Facility</u>	<u>Power</u>
University of Missouri – Columbia	10 MW	Washington State University	1 MW
Massachusetts Institute of Technology	6 MW	Ohio State University	500 kW
University of California – Davis	2 MW	Reed College	250kW
Rhode Island Nuclear Science Center	2 MW	University of California – Irvine	250 kW
Kansas State University	1.25 MW	University of Maryland	250 kW
Oregon State University	1 MW	Missouri University of S&T	200kW
University of Texas, Austin	1 MW	University of Florida	100 kW
North Carolina State University	1 MW	University of Utah	100 kW
Pennsylvania State University	1 MW	Purdue University	1 kW
Texas A&M University	1 MW & 5W	Idaho State University	5 W
University of Massachusetts – Lowell	1 MW	University of New Mexico	5 W
University of Wisconsin	1 MW	Rensselaer Polytechnic Institute	1 W



## *Projected Fresh Fuel Needs*

<b>University</b>	<b>Next Five Years</b>	<b>Lifetime of Core</b>
<b>MURR</b>	<b>X</b>	<b>X</b>
<b>MIT</b>	<b>X</b>	<b>X</b>
<b>Rhode Island</b>	<b>X</b>	<b>X</b>
<b>Kansas State University</b>	<b>X</b>	<b>X</b>
<b>Penn State University</b>	<b>X</b>	<b>X</b>
<b>Texas A&amp;M</b>	<b>X</b>	<b>X</b>
<b>University of California at Davis</b>	<b>X</b>	<b>X</b>
<b>University of Maryland</b>	<b>X</b>	<b>X</b>
<b>University of Texas</b>	<b>X</b>	<b>X</b>
<b>Washington State University</b>	<b>X</b>	<b>X</b>
<b>Reed College</b>		<b>X</b>
<b>University of California at Irvine</b>		<b>X</b>
<b>Purdue University</b>		<b>X</b>

## *Spent Nuclear Fuel*

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



## **2018 Accomplishments**

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



## **2018 Accomplishments**

- **Shipped thirty eight lightly irradiated TRIGA fuel elements from the Idaho National Laboratory to the University of Texas**
- **Shipped nineteen lightly irradiated TRIGA fuel elements from the Idaho National Laboratory to USGS (Not part of the RRI program)**





## **2018 Accomplishments**

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



## 2018 Accomplishments

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



**TRIGA**  
INTERNATIONAL



# 2019 Forecast

- **Research Reactor Infrastructure Program Annual Report**



## 2019 Forecast

- Provide fuel to maintain university reactors with sufficient fuel to operate at current power levels – MURR, MIT
- Negotiate initial TRIGA fuel fabrication contract with TRIGA International. Fabrication and deliveries starting in 2020.



## 2019 Forecast

- Complete four spent fuel shipments from MURR, MIT
- Complete one spent fuel shipment from RINSC



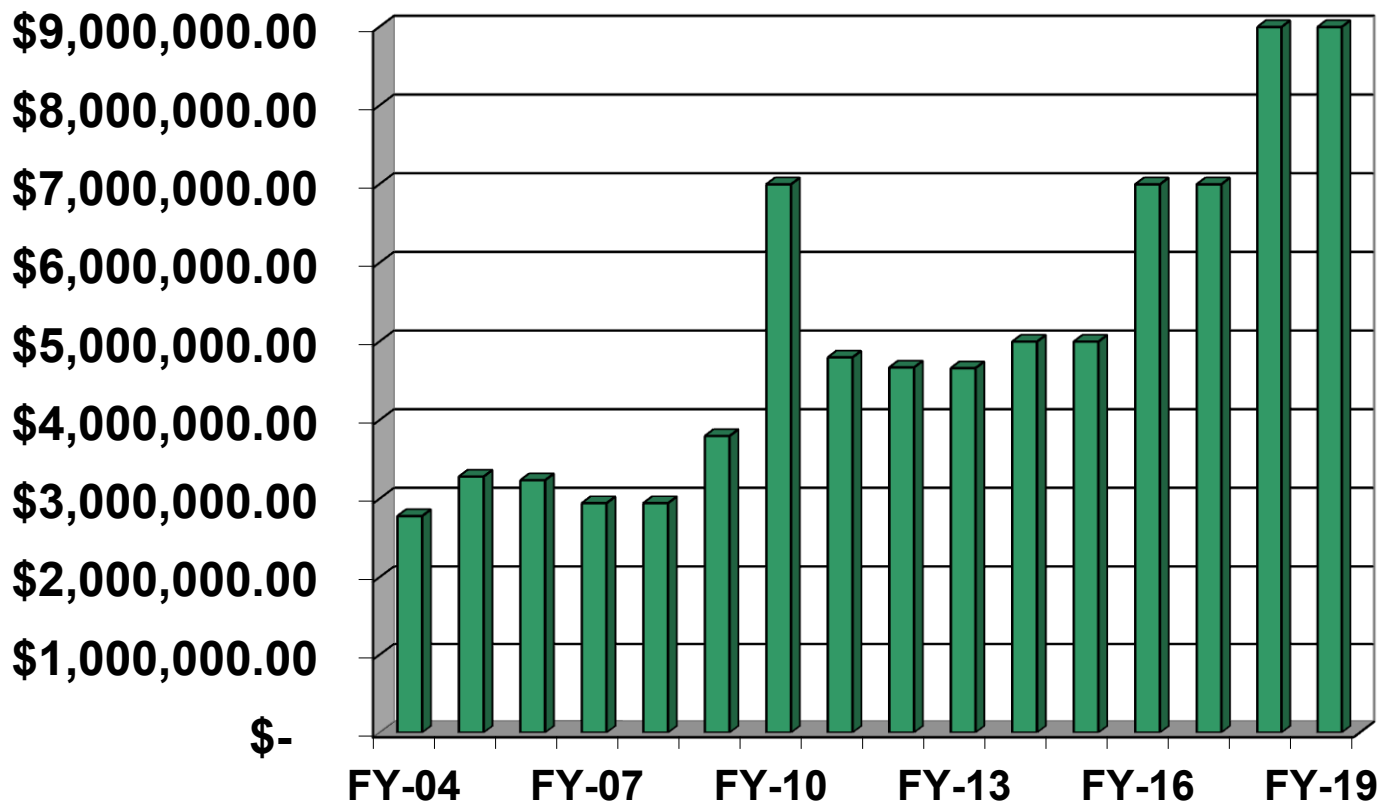
## **Requests for Assistance**

- **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