June 19, 2023

Douglas Morrell
UFS Project Manager

2023 Status Report

DOE University Fuel Services Program

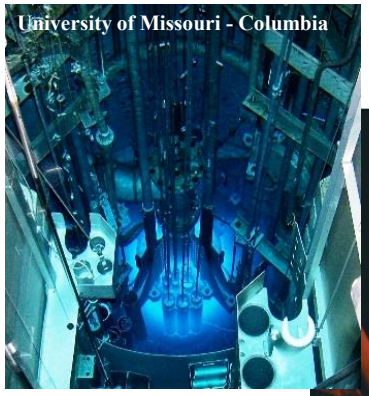
Idaho National Laboratory

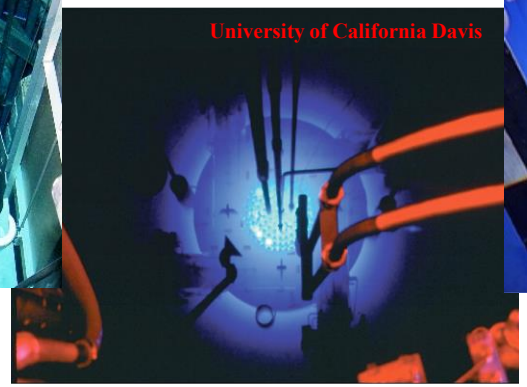
Topics for Discussion

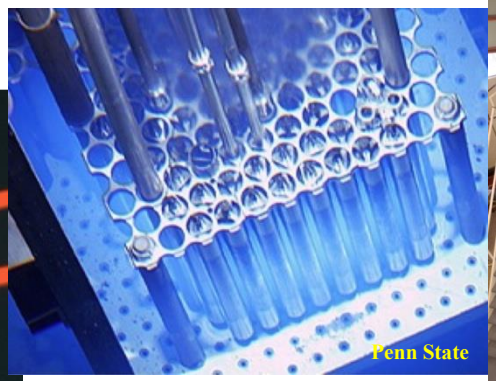
- Overview of the University Fuel Services Program
- Accomplishments during the past year
- TRIGA Fuel
- 2024 Forecast
- Future Challenges

Purpose of the UFS Program

The purpose of the United States Domestic University Fuel Services 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.







UFS does NOT…

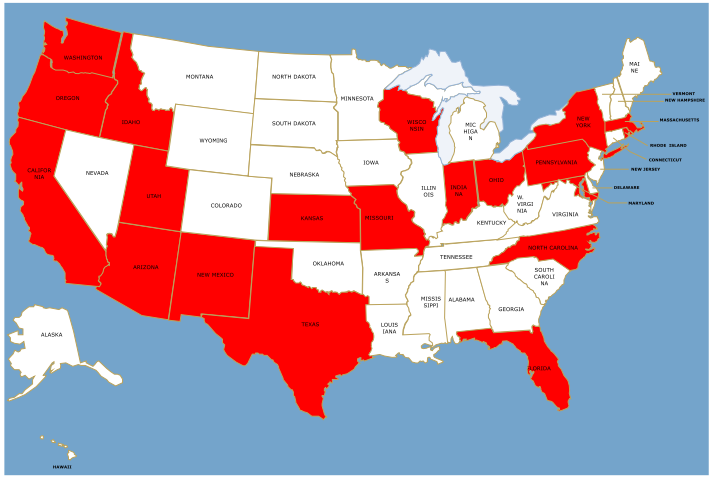
- Develop new fuel types for NRC review and approval
- Provide HALEU or enriched uranium directly to universities
- Provide reactor operation equipment or other ancillary components related to fuel fabrication or assembly.

Program Management

DOE-HQ	**Andrew Boulanger**
DOE-ID	**Nathan McBride**
Idaho National Laboratory	
Project Manager	**Doug Morrell**
Quality Engineer – in Idaho	**Melanie Sokoine**
Quality Engineer – in Virginia	**Tom Chambers**

The University Fuel Services Program

- Funded by the U.S. Department of Energy
- Managed by DOE-HQ and DOE-ID Operations Office
- Contracted to the INL's Management and Operations Contractor – Battelle Energy Alliance
- Program has been in 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 in Irvine
- University of Maryland
- University of Texas in 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

Texas A&M

The University of New Mexico

NC State University

Rensselaer

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

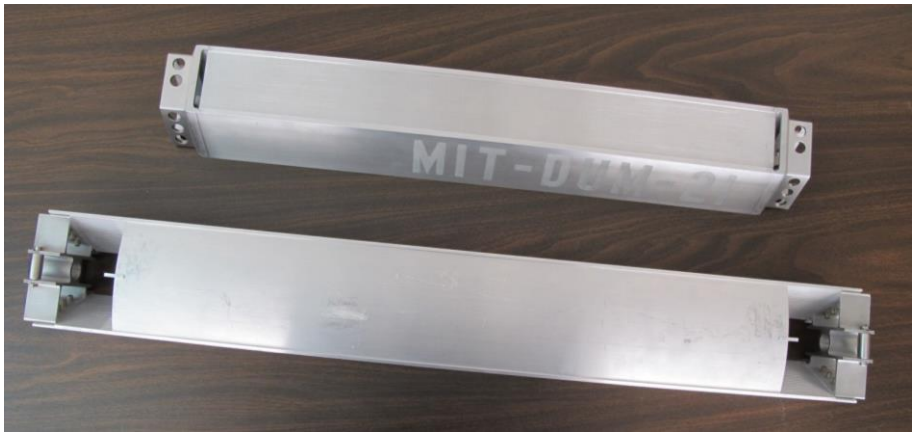
Reactor Power Levels

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	10 kW
Idaho State University	5 W
University of New Mexico	5 W
Rensselaer Polytechnic Institute	1 W

2023 Accomplishments to Date

- Provided fuel to MURR and MIT allowing them to maintain operations at current power levels
- Preparing for transfer of eight TRIGA fuel elements from Penn State University to UC-Davis
- Preparing for shipment of TRIGA fuel elements to Penn State University
- Performing engineering studies for the replacement of PULSTAR fuel for North Carolina State University (3-year project)



2023 Accomplishments to Date

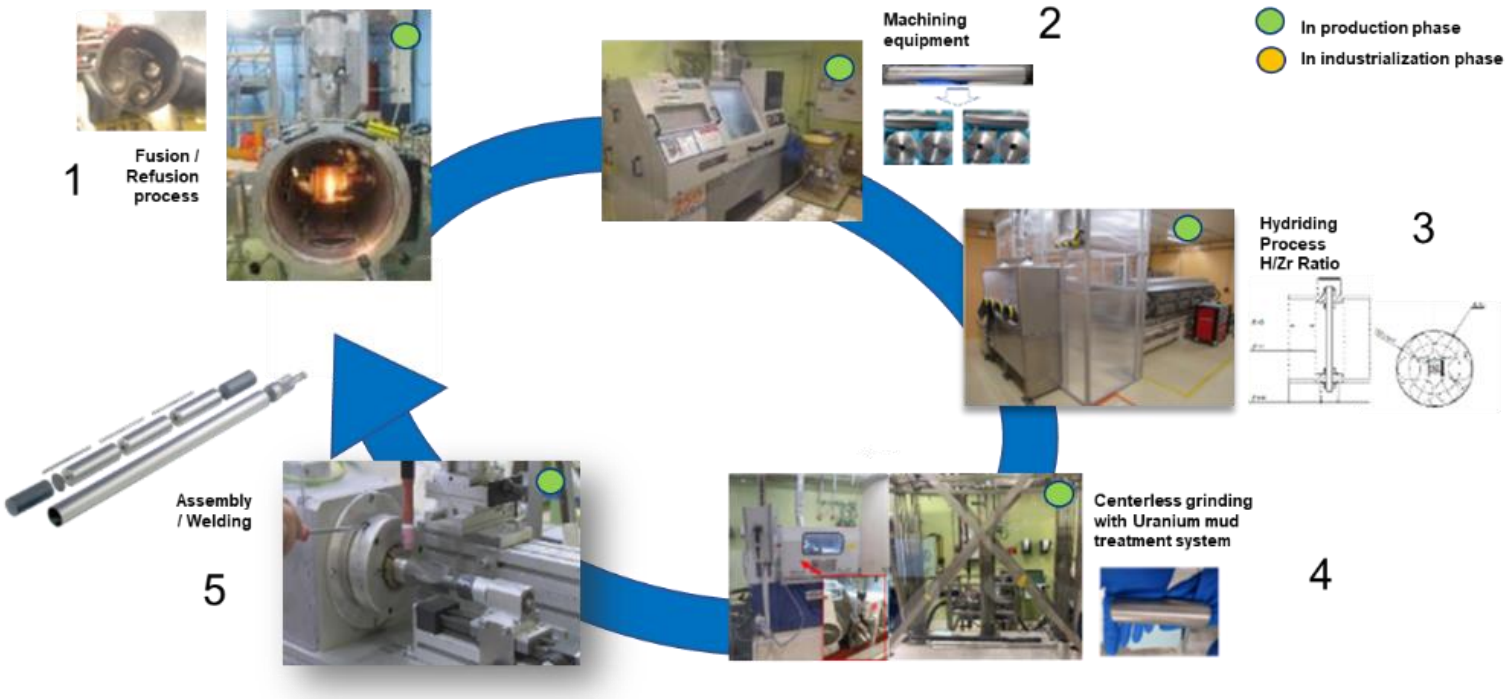
- Three shipments of spent nuclear fuel from MURR to Savannah River Site receipt facility
- One shipment of spent nuclear fuel from MIT to Savannah River Site receipt facility, one more scheduled later this fiscal year

2023 Accomplishments to Date

- **The TRIGA International fuel fabrication line has returned to full production for the first time since 2011 and the first 55 fuel elements are completing fabrication.**

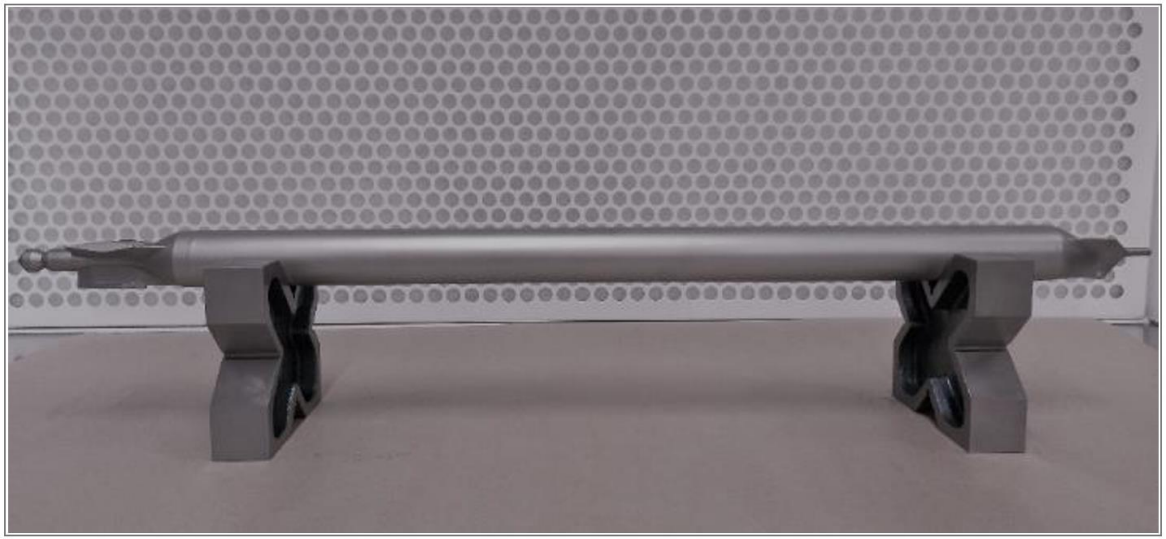
TRIGA Fuel Fabrication Status

- French Nuclear Regulatory Agency (ASN) approved restart of TRIGA fuel fabrication line on December 21, 2021
- TRIGA fuel fabrication line is in full production mode



TRIGA Fuel Fabrication Status

- The first TRIGA fuel element was certified on May 2, 2023
- As of June 19, 2023, 14 fuel elements have been fabricated, inspected and certified for use.

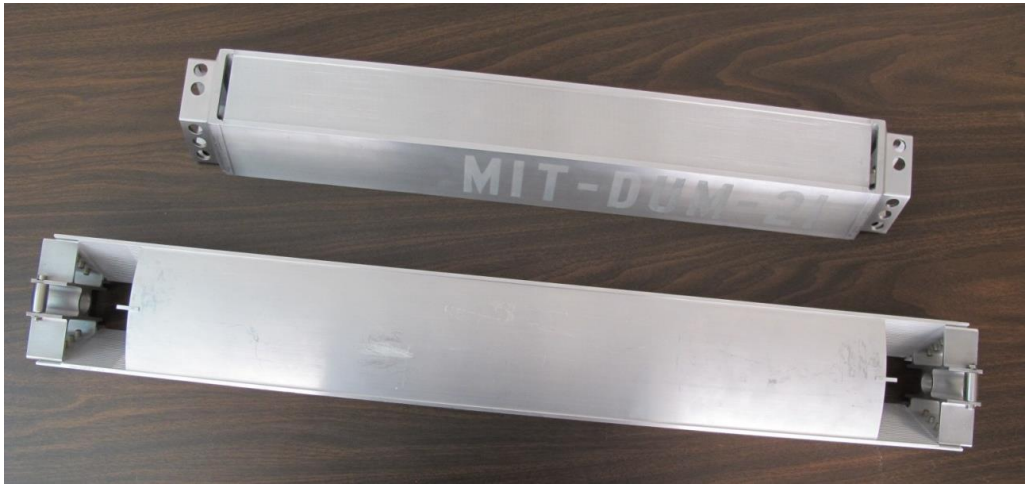


TRIGA Fuel Fabrication Status

- First fabrication contract for 55 fuel elements is nearing completion, Source Inspection scheduled in July
- Second fabrication contract for 83 fuel element has been awarded
- Major equipment issues have been successfully resolved
- First shipment of fuel to Penn State is planned for September 2023
- Storage of New Fuel at Reactor Facilities
  - Amendment Requests for Increased Possession Limits
  - Physical Storage Space
- Fuel Needs Update

2024 Forecast

- Provide fuel to MURR and MIT to maintain current operating power levels
- Continue fabrication of TRIGA fuel elements
- Complete three spent fuel shipments from MURR
- Complete one spent fuel shipment from MIT
- Prepare for TRIGA spent fuel shipments



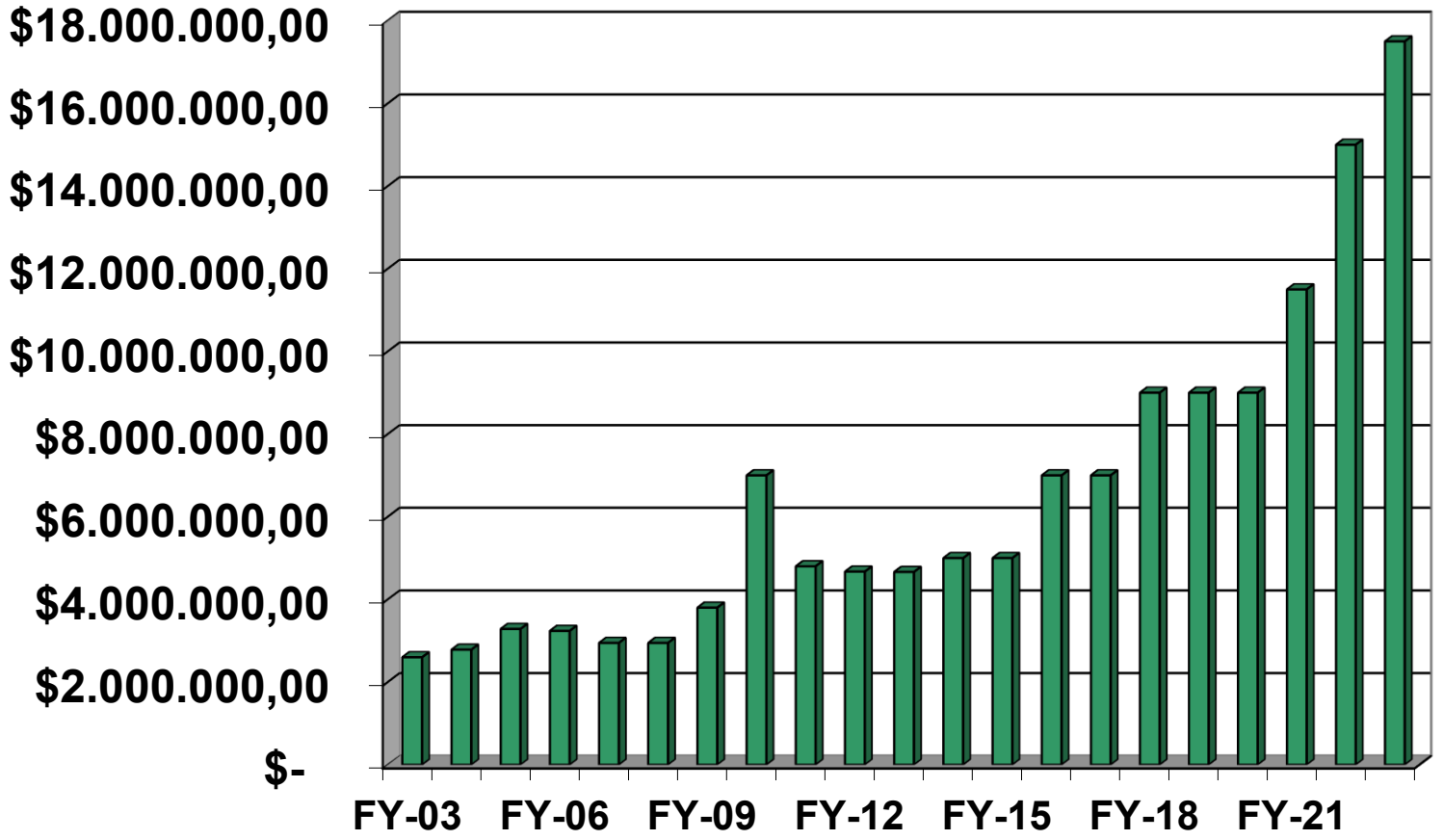
Requests for Assistance

- 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)
- Doug Morrell (208) 201-6595

Future Challenges

- Receipt of Irradiated TRIGA fuel at the Irradiated Fuel Storage Facility located at the Idaho National Laboratory
- Preparation of a fresh TRIGA fuel receipt and storage facility at the Idaho National Laboratory
- Conversion of MURR and MIT from HEU to LEU fuel type
  - MURR & MIT conversion tentatively set for 2031

Funding Profile



RRI Team Members

Thank You!