



U.S. DEPARTMENT OF
ENERGY

Nuclear Energy

**FY 2018 Scientific Infrastructure Support
Funding Opportunity Announcement
DE-FOA-0001773**

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and Capabilities Scientist*

Nuclear Science User Facilities

*Department of Energy Headquarters
Germantown, MD
August 9, 2017*

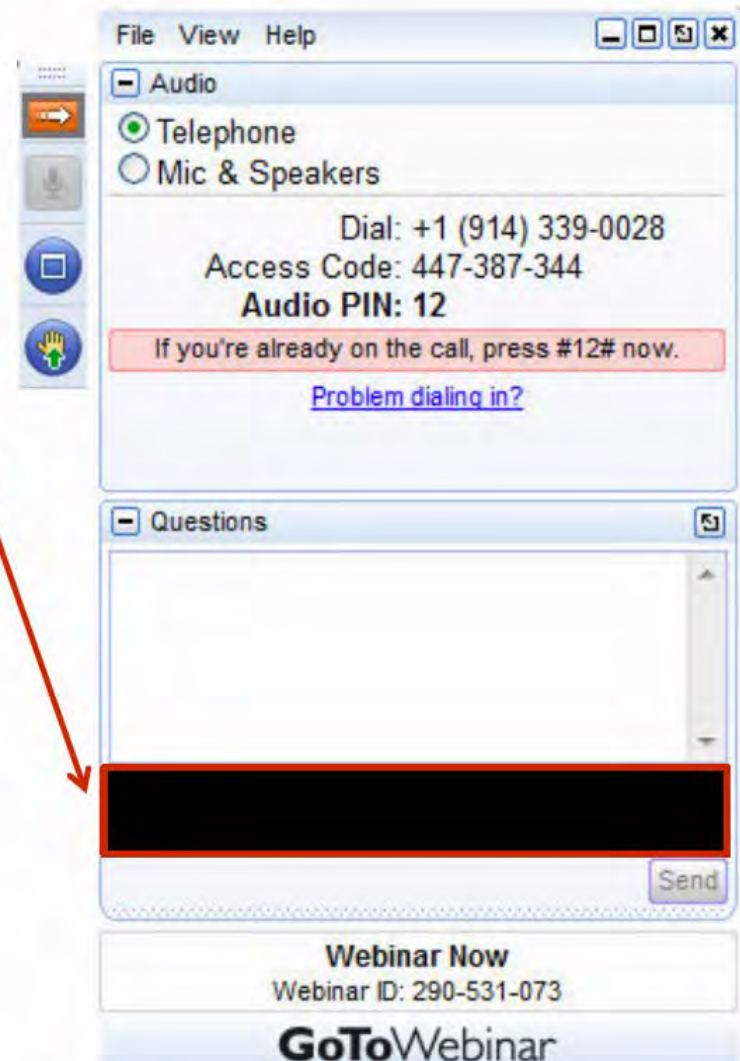


INL/MIS-17-42757

-
- **FOA Overview**
 - **Reactor Upgrades and General Scientific Infrastructure**
 - **Key Changes in the FY 2018 FOA**
 - **Nuclear Energy Infrastructure Database**

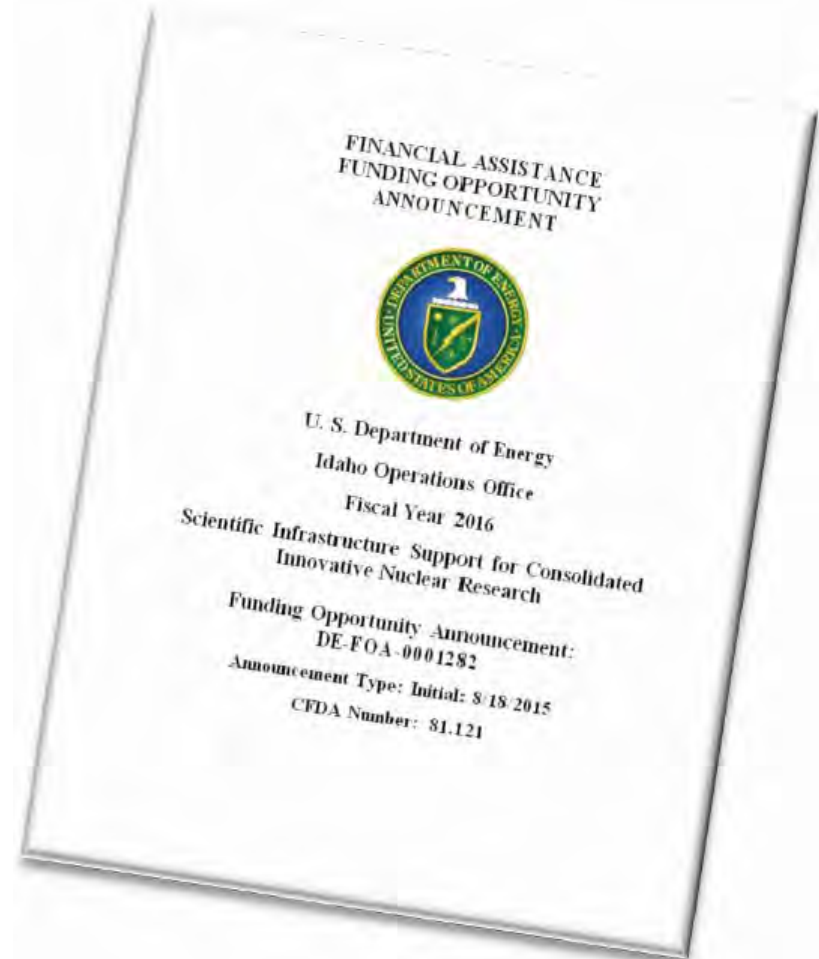
How to Ask Questions During This Webinar

- Submit questions using the GoToWebinar software by typing in the “**Question**” field.
- If your question does not get answered during the allotted time, questions will be answered later and posted on www.neup.gov.
- Specific questions on individual eligibility should be addressed offline.



Objective: To promote efficiency and the effective use of resources

- Presents all anticipated DOE-NE funding opportunities at once
- Allows integration of deadlines to enable better planning
- Presents opportunities to request funding from multiple program elements to maximize research dollars



■ Funding Mechanism

- Universities – Grants issued by DOE-ID

■ Funding Opportunities

- Reactor Upgrades: combines Major and Minor Reactor Upgrade
- General Scientific Infrastructure: for US universities

■ Find FOA (DE-FOA-0001773) at <http://www.grants.gov>

- Apply directly through <http://www.grants.gov>



Important Dates

- **FOA release date:**
August 10, 2017

- **Applications due:**
October 27, 2017

- **Anticipated award
announcement:**
June-July 2018





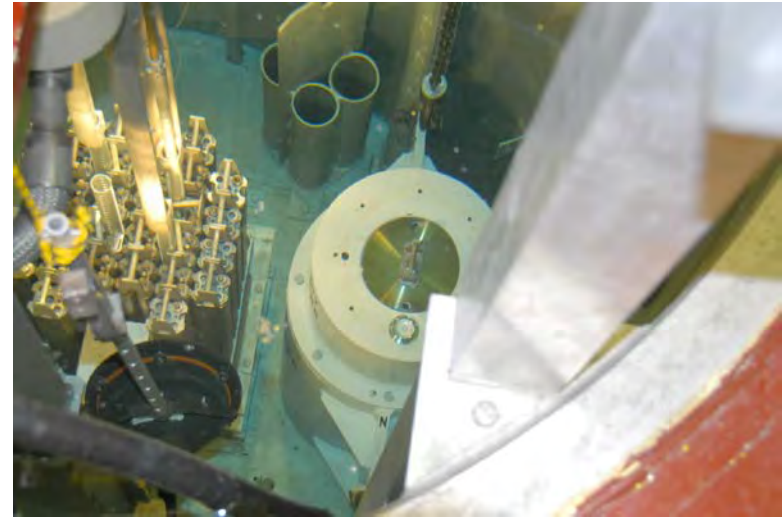
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FOA Organization



Area 1 – University Reactor Upgrades Infrastructure Support



Area 2 – General Scientific Infrastructure Support for Universities

■ Award Size

- Maximum individual award: \$3,000,000
- Expected award range: \$250,000 - \$1,500,000 total
- DOE anticipated to award some smaller awards

■ Period of Performance

- 1+ years

■ Eligibility

- Only educational reactors fueled by DOE (list in FOA)

■ Estimated Funding Level

- Approximately \$3 million



I.C.1 - Applications should be directed to the upgrade of the research reactor, or to the purchase/maintenance of equipment and instrumentation or activities:

1. Related to the safety, performance, control, or operational reliability of the research reactor, including security/safety enhancements required by the federal/state/local regulatory agencies
2. For equipment and instrumentation that significantly improve or expand the research, instruction, training capabilities, or operating capabilities (e.g. utilization or handling of radiological or radioactive materials) of the research reactor facility, including radiation detection and measurement equipment

Please note that the primary purpose of this funding opportunity announcement is the safety, security, and operational reliability of the university research reactors (item 1).

Proposals addressing those needs will be given highest priority.

IV.C.4.4 - Project Timetable and Description of Work

This section should outline as a function of time, year by year, all the important activities or phases of the project, including any activities planned beyond the project period.

Successful applicants must use this project timetable to report progress.

This section should also include a scope of work and execution plan with detail appropriate to the complexity of the project.

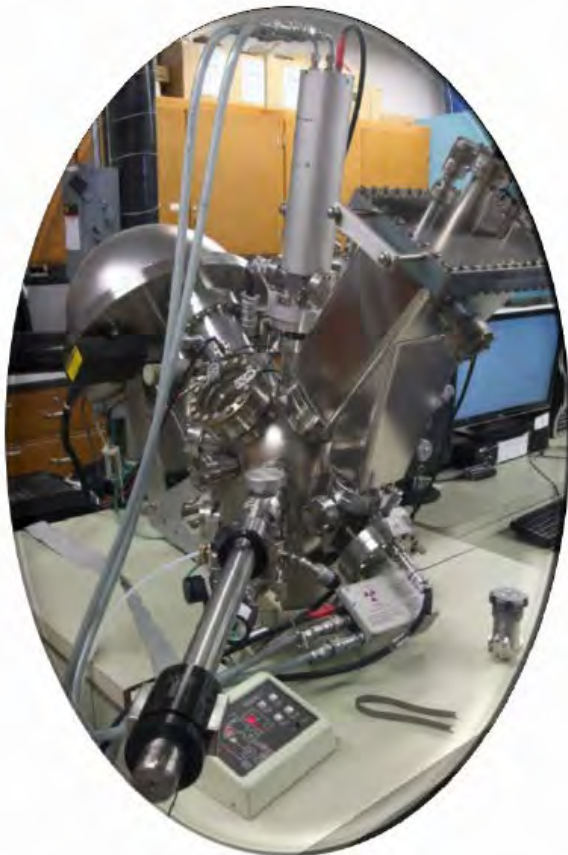
This will form the basis for the Project Implementation merit review listed in Section V.A.2.1.3 and V.A.2.2.3.

■ Review criteria and processes

- Each application will receive a review by both federal and technical reviewers

■ Review Criteria

- **Impact** – (40%) *Potential of the requested equipment, instrumentation or modification to:*
 - Enhance the safety, performance, control or operational reliability of reactor systems, or
 - Increase the quality, safety/security, or efficiency of the operation of the reactor facility, or
 - Improve or expand the research, teaching and training capabilities of the reactor facility.
- **Utilization**– (30%) *As a result of the proposed equipment, the amount of student, faculty, or researcher usage of the capabilities, and the amount and variety of research and/or services actually provided by the facility;*
- **Execution**– (30%) *Capability to implement the full scope of the project including timely project completion, personnel qualifications, budget, and feasibility.*
- Additional review information is available in Part V of the FOA



■ Award Size

- Maximum DOE funding per individual university award: \$2,000,000 – anticipated award size \$250,000

■ Period of Performance

- 1 year

■ Eligibility

- Universities are eligible to submit applications
- One application per institution can be submitted to each area of this FOA.
- University cost match (1:1) required after \$250,000

I.B. NSUF - Specific Areas of Interest

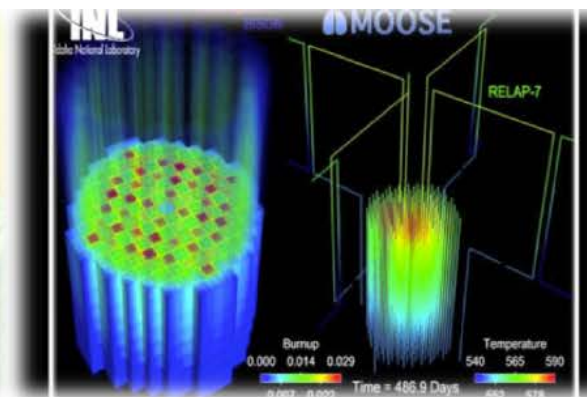
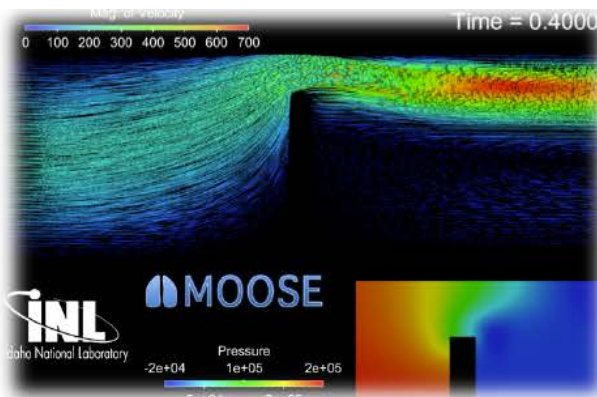
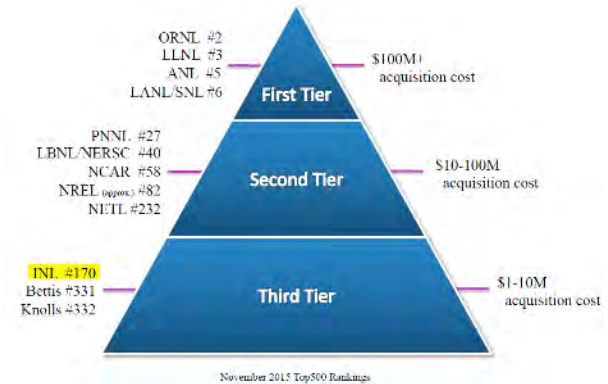
1. Non-LWR thermal hydraulics facilities
2. LWR or non-LWR thermal hydraulics instrumentation development
3. Mechanical testing of irradiated structural materials

I.B. NSUF - Materials Research on Neutron-Irradiated Specimens

- Proposals for capabilities that can accommodate work with radioactive/irradiated materials (>5mr/hr @ 30 cm) will be given higher priority.

I.B. NSUF - Exclusions

- NSUF provides access to high-performance computational resources at INL at no charge to users. (FALCON & FISSION @ INL)
- Proposals requesting to purchase HPC equipment will not be entertained.
- See nsuf.inl.gov or hpcweb.inl.gov for information on accessing HPC resources.



■ Review criteria and processes

- Each application will receive a review by both federal and peer reviewers

■ Review Criteria

- **Impact** - (40%) *Potential of the requested equipment, instrumentation or mod. to:*
 - *facilitate, improve or expand the research (especially ongoing Office of Nuclear Energy research or those proposed in FY 2018 in response to the CINR FOA) and training capabilities;*
- **Utilization** – (30%) *As a result of the proposed equipment:*
 - *the amount of student, faculty, or researcher usage of the capabilities, and*
 - *the amount and variety of research and/or services actually provided by the facility;*
- **Execution**– (30%) *Capability to implement the full scope of the project including timely project completion, personnel qualifications, budget, and feasibility.*
- Additional review information is available in Part V of the FOA

Cost Sharing and GSI Cost Matching

■ Cost Share

- Cost sharing is encouraged, but is not required in any part of this FOA

■ Cost Match

- Cost match is required on university **GSI projects** that exceed **\$250,000**
- Dollar for dollar matching requirement, up to the project ceiling of **\$2,000,000**
 - e.g. \$300,000 application would require a \$50,000 university cost match, making the project total \$350,000
- Anticipated award range will be around \$250,000

■ NSUF Integration

- Applicants should demonstrate the ability to integrate equipment into the Nuclear Science User Facilities program to:
 - create new NSUF partner facilities or
 - bolster capabilities at existing NSUF partner facilities.

■ Review the NSUF Capabilities and Partners at:

- NSUF.INL.gov (partners)
- NSUF-Infrastructure.INL.gov (capabilities)

■ Removed the bonus scoring for NSUF Integration

- Now it is included in the **IMPACT** and **UTILIZATION** sections.



Contact Information



■ Technical questions can be submitted to:

- Brenden Heidrich (Technical Point of Contact)
 - NSUF@INL.gov
 - 208-526-8117
- The Infrastructure FOA Q&A section at www.NSUF.INL.gov

■ Procurement questions can be submitted to:

- JoAnne Hanners (DOE-ID Contract Specialist)
 - hannerj@id.doe.gov
 - 208-526-0852

■ Application Site

- www.grants.gov



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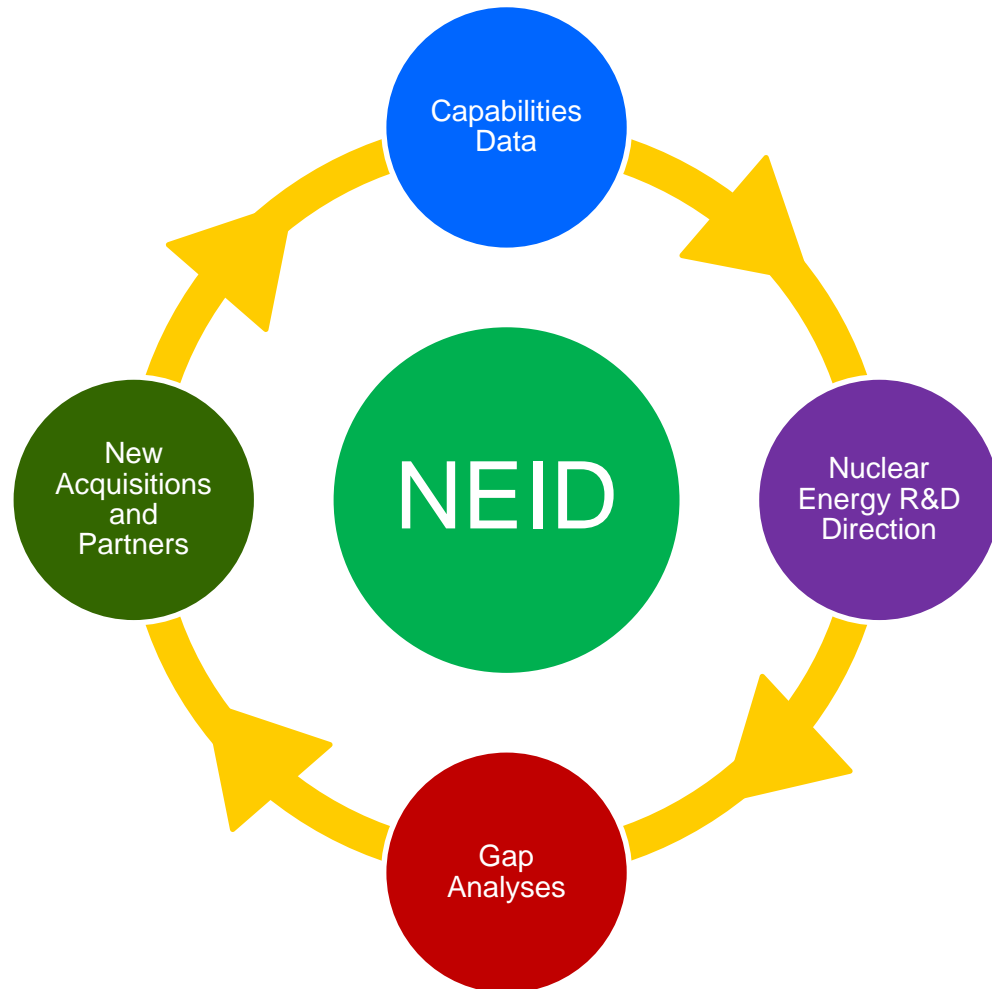
NUCLEAR ENERGY INFRASTRUCTURE DATABASE



Infrastructure Management Program



1. Gather Data on Nuclear Energy R&D Capabilities
2. Estimate Near, Mid and Long-term R&D Directions
3. Use these to perform gap analyses for Nuclear Energy R&D.
4. Assist funding decisions and incorporate the results into the NEID.

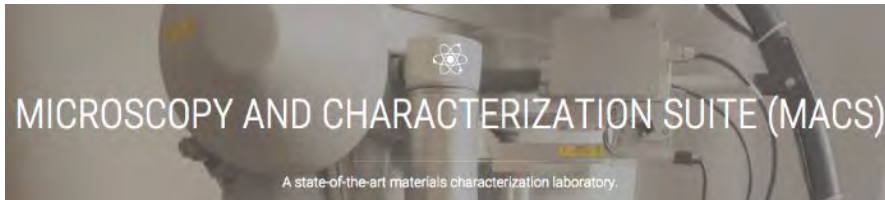




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NEID Organization



FEI Quanta 3D FEG
Focused Ion Beam
SEM Microscope



Institutions

Facilities

Instruments



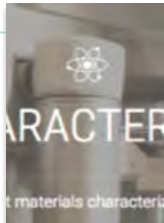
NEID Database Characteristics



Data



140
Institutions



500
Facilities



1000
Instruments

Users



Federal Government
& National
Laboratories



Universities &
NGOs



Nuclear Energy
Industry



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Accessing the Databases



Home Page - NSUF
https://stmsuf.inl.gov

NSUF
Nuclear Science
User Facilities

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Users Meeting
What to expect at this one-of-its-kind workshop

READ MORE →

NEID Access

Master - slave manipulator! Argonne National Laboratory



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Structure



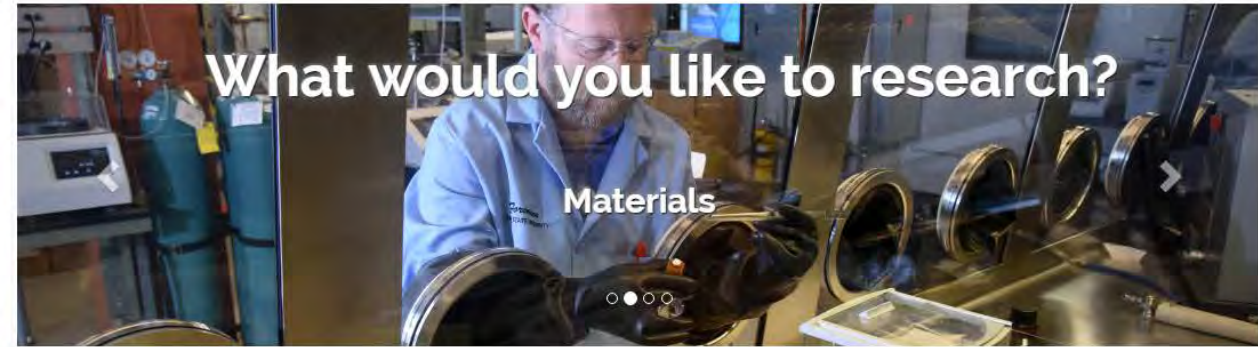
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- Help

Welcome



Quick Search

- Other Searches
- Nuclear Energy Infrastructure Database
 - Nuclear Fuels and Materials Library



Quick Search

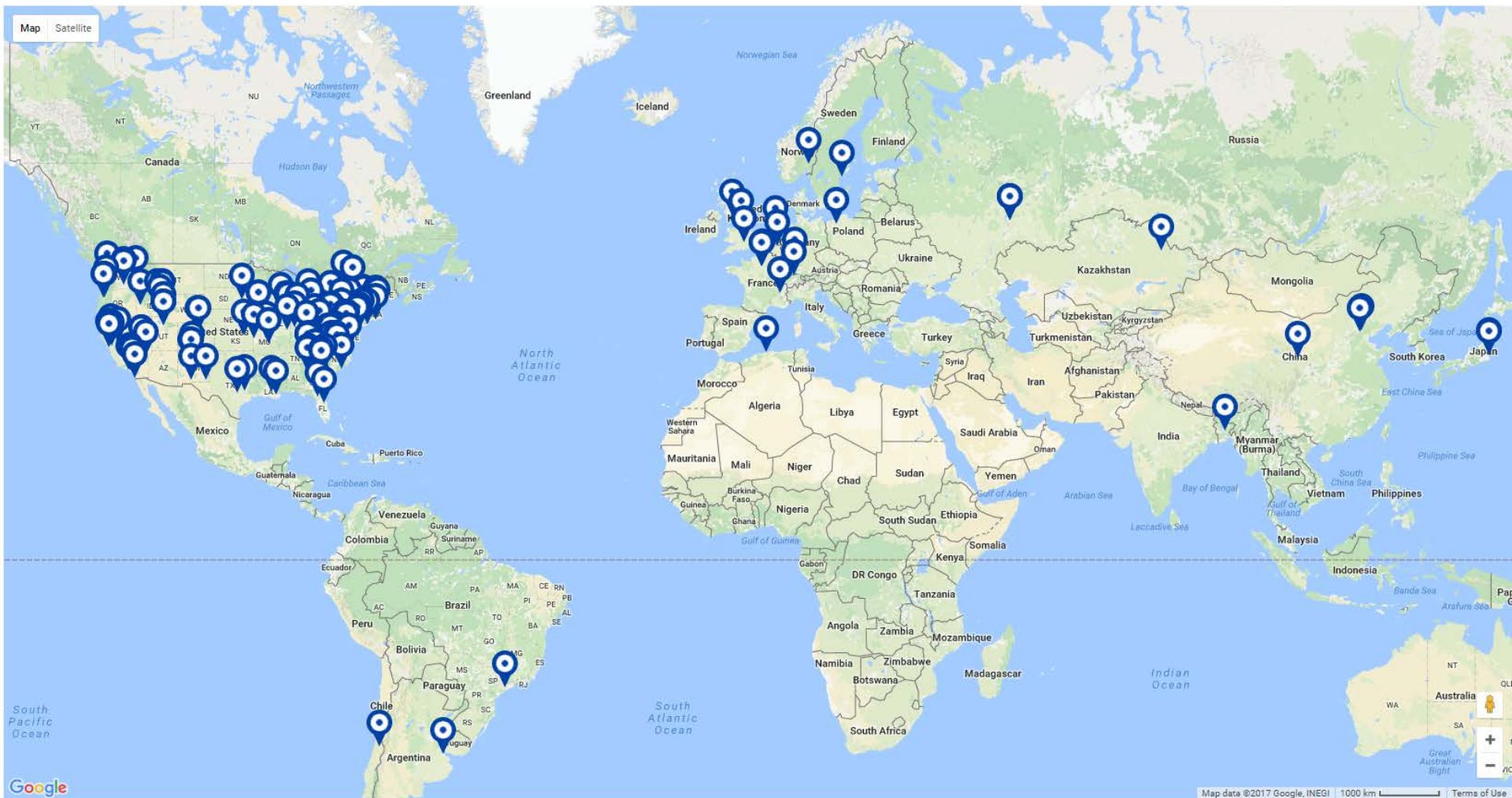
- Other Searches
- Nuclear Energy Infrastructure Database
 - Nuclear Fuels and Materials Library



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World-wide nuclear energy R&D institutions





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Institution Search Idaho National Laboratory



NSUF Infrastructure

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Name Idaho National Laboratory
Owner Type Dept of Energy
State Idaho
Country United States of America
Agreement State No
Website <https://www.inl.gov/>



[View All Instruments](#) [Edit](#)



Facilities

10

| Facility | Abbreviation | Facility Type(s) |
|---|--------------|--|
| Advanced Test Reactor | ATR | Reactor |
| Analytical Laboratory | AL | Hot Cell, Post-irradiation Examination |
| ATR Critical Facility | ATR-C | Reactor |
| ATR Gamma Facility | ATR-GF | Gamma/Neutron Irradiator |
| Battery Test Center | BTC | Technology Testing |
| Bonneville County Technology Center | BCTC | Radio-chemistry |

Specific Facility Advanced Test Reactor

[Edit](#)

| | |
|-----------------------------|--|
| Institution | Idaho National Laboratory |
| Name | Advanced Test Reactor (ATR) |
| Building | TRA-670 |
| Primary Type | Reactor |
| Core Functions | Advanced Fuels and materials irradiation. Water-cooled, high-flux test reactor. |
| Unique Functions | Five in-pile pressurized water loops currently provide prototypic PWR conditions (pressure, temperature, flow, water chemistry) for fuel and material samples with the ability to tailor the neutron flux to meet desired conditions. Each loop has a full range of instrumentation capabilities. Two of the five loops have transient testing capabilities. There are proposed plans to reactivate a sixth water loop. The ATR has a capacity for up to nine water loops. |
| Hotwork Facilities | HFEF |
| Support Equipment | MFC, Test Train Assembly Facility |
| Materials Allowed | beta/gamma only |
| Sample Encapsulation | none |
| Atmosphere | gas/PWR |
| Commissioning Date | 1967 |
| Recent Upgrade | 2013 |
| RAM License | Department of Energy |
| License End Date | 2099 |
| Docket Number | 0 |
| User Facility | Yes |
| Cost To Maintain | 1,250,000 |
| GAIN Partner | No |
| NSUF Partner | Yes |
| NE Use Percentage | 50 |
| Funding Sources | <ul style="list-style-type: none"> DOD DOE-NE |
| Number Of Staff | 305 |
| Point Of Contact | Shawn Hill |
| Email | shawn.hill@inl.gov |
| State | Idaho |
| Website URL | inl.gov/research/advanced-test-reactor-research/ |
| Data Sources | <ul style="list-style-type: none"> Required Assets for a NE Applied R&D Program Facilities for the Future of NE Research INL TYSPs DOE Facilities Inventory Draft (6.16.2014) IAEA Databases (RTF DB, RTR DB & Beamline DB) Facility NSUF User's Guide |

Instruments

[+](#)

| Abbr | Name | Type |
|----------------------------|--|------------------------------|
| | Video Probe (boroscope) | Dimensional |
| | Instron Tensile Tester | Mechanical Properties |
| NRAD | MFC Neutron Radiography Facility | Macroscopic Imaging |
| ATR FFSC | ATR Fresh Fuel Shipping Cask | Cask |
| ATR-GF | Gamma Facility (ATR Canal) | Gamma/Neutron Irradiator |
| Loop 2A | Loop 2A | Reactor Irradiation Position |
| A (1-8) | A Positions (Inboard) | Reactor Irradiation Position |
| A (9-16) | A Positions (Outboard) | Reactor Irradiation Position |
| B (1-8) | B Position (Small) | Reactor Irradiation Position |
| B (9-12) | B Position (Large) | Reactor Irradiation Position |
| H (1-14) | H Positions | Reactor Irradiation Position |
| I (1,6,11,16) | I Positions (Large) | Reactor Irradiation Position |
| I (2-20, except 6, 11, 16) | I Positions (Medium) | Reactor Irradiation Position |
| I (21-24) | I Positions (Small) | Reactor Irradiation Position |
| ON (1-12) OS (1-22) | Outer Tank Irradiation Positions (North and South of Core) | Reactor Irradiation Position |



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Specific "Instrument"

Advanced Test Reactor Gamma Irradiation Facility

NSUF Infrastructure

NSUF / NEID / Browse Institutions / Idaho National Laboratory / Advanced Test Reactor / Gamma Facility (ATR Canal)

- Home
- Browse**
 - Institutions
 - Projects/Materials
- Search
- Admin
- Lists

| | |
|-----------------------------|---|
| Institution Name | Idaho National Laboratory |
| Facility Name | Advanced Test Reactor |
| Name | Gamma Facility (ATR Canal) |
| Abbreviation | ATR-GF |
| Instrument Type | Gamma/Neutron Irradiator |
| Building | TRA-670 (ATR Canal) |
| Materials Allowed | alpha/beta/gamma |
| Radiological Limit | >1R/hr @ 30cm |
| Sample Encapsulation | none |
| Atmosphere | Air |
| Core Functions | Located in the ATR canal, the Gamma Facility is an aluminum dry tube projecting from the spent fuel rack to the top of the ATR canal. The tube contains a removable shielded plug at the top to block shine and is sealed at the bottom and weighted with lead. Spent fuel can be placed in the fuel grid around the gamma facility to generate high gamma fields. The gamma facility has historically been used to determine material degradation in a high gamma field. For example it has been used to determine effects on electronics, wire insulation, and even oil. Test samples must fit inside an aluminum dry tube sealed at the bottom and weighted with lead to prevent floating. The 21-foot tube has a useable inner diameter of 12.7 cm (5 inches) [or 8.9-cm (3.5-in)] and a useable length of 6 m (19 feet - 8 inches) from the top to the lead. The mid-plane of the gamma field is approximately 5.54 m (18 feet - 2 inches) from the top of the tube. During the test, the dry tube is inserted vertically into one of the gamma grid positions. Test samples are lowered through the open end of the dry tube to the gamma field. A shield plug caps the open end of the dry tube and shields the gamma beam emitted from the fuel elements near the lower end of the dry tube. Radiological control surveillance is required whenever the shield plug is removed for sample handling. |
| Unique Functions | The ATR Gamma Facility, formerly designated the ATR Small Gamma Facility, is located toward the east end and on the south side of the ATR storage canal. This is not the original EG&G "Large" Gamma Irradiation Facility, that has been decommissioned. The gamma field is produced by placing irradiated fuel elements in grid locations around the position where the test is inserted. The dose rate of the field produced is approximately 1E+6 R/hr., but can be varied (5E+6 R/hr. maximum) by varying the distance of fuel elements from the test or by selecting fuel of different gamma strengths. That intensity will fall off at the rate of approximately 5% per day as the fission products in the fuel elements decay away. The peak field at the center of the tube was recently measured to be approximately 2.5E+6 rad/hr. The dose rates are normally measured by using high range ionization chambers and instrumentation. These can be lowered into the dry tube for actual counting before installing the test sample hardware. Fuel elements can be moved from one location to another with the dry tube in place. |
| Primary Capability | Gamma Irradiation using ATR fuel elements |
| Support Equipment | Located in Building TRA-670 in the ATR canal. |
| NE Objectives | <ul style="list-style-type: none"> Support the current fleet of current reactors |
| Point Of Contact | Joe Shaw |
| Email | Joe.Shaw@inl.gov |
| City | Idaho Falls |
| State | Idaho |
| Phone | (208)-533-4379 |
| Data Sources | <ul style="list-style-type: none"> Facility NSUF User's Guide |
| Date Of Data | April 4, 2016 |

[Edit](#)

Provides irradiated samples for users to access and conduct research through a competitively reviewed proposal process.

The library includes over 3500 specimens as part of the NSUF awarded research.

Materials Include:

- Steels
- Other alloys
- Ceramics
- Pure materials
- Actinides
- Fission products



INL Legacy
materials

Volunteered
materials from
outside the INL

Supporting
documentation
related to
samples