



REQUEST FOR INFORMATION

DE-SOL-0010995

**University, National Laboratory, Industry and
International Input on Potential Additions to the
Nuclear Science User Facilities Nuclear Fuels and
Materials Library**

March 30, 2017

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1 Introduction

The mission of the U.S. Department of Energy (DOE) Office of Nuclear Energy (NE) is to advance nuclear power as a resource capable of meeting the Nation's energy, environmental, and national security needs by resolving technical, cost, safety, proliferation resistance, and security barriers through research and development (R&D).

Developing and maintaining a national R&D framework to achieve NE's mission requires an integrated approach involving people, tools, facilities, and knowledge tied to strategic partnerships. Nuclear research materials are a critical piece of this framework. Thoughtful management of existing nuclear research materials and specimens as well as educated predictions for future research material needs is required, while also providing researchers an effective mechanism to obtain access to unique nuclear energy research material specimens.

1.1 Nuclear Science User Facilities

The Nuclear Science User Facilities (NSUF) was established in 2007 by DOE-NE to support nuclear energy R&D by providing researchers with no-cost-to-the-user access to unique facilities and materials through competitive processes. The NSUF is not a single self-contained facility like most user facilities but represents a consortium of facilities distributed across the U.S. at a number of institutions. The NSUF is centered at and managed from the Idaho National Laboratory (INL), where it was originally founded. NSUF partner facilities include eight universities, plus three Idaho universities and the University of Wyoming that are part of the Center for Advanced Energy Studies (CAES), four national laboratories, one nuclear industry partner, and one affiliated international institution.

1.2 Nuclear Fuels and Materials Library

The Nuclear Fuels and Materials Library (NFML), which is owned by DOE-NE and curated by the NSUF, is a collection of specialized information and nuclear fuel and material specimens from past and ongoing irradiation test campaigns, as well as real-world components retrieved from decommissioned power reactors, and donations from other sources. The NFML can be accessed through a web portal at the NSUF web page [NSUF.INL.gov](https://nsuf.inl.gov) or directly at <https://nsuf-infrastructure.inl.gov/>.

The NFML acts as a repository for a diverse selection of nuclear fuels and materials that are a valuable resource to the nuclear research community. Adding these material assets to the NFML safeguards them from being disposed as waste or lost in long term storage. As the curator of valuable unused or residual fuels and materials, the NSUF maintains the physical inventory and material provenance ensuring that the specimens and corresponding information will not be lost to future researchers. Additions to the library, donated from external sources, coupled with new research specimens, offers nuclear researchers further opportunities to continue advancing the nuclear mission.

2 Requested Information

DOE-NE, through the NSUF, is currently seeking information regarding:

1. **Existing nuclear energy research materials and specimens that can, potentially, be added to the NFML.**
 - Of particular interest are previously irradiated materials and any associated unirradiated reference materials.
 - Unirradiated specialty materials or legacy materials with past or anticipated nuclear applications are also of interest.
 - Anyone interested in donating materials to the NFML should review section 2.2.2 (NFML Acquisition Selection Criteria) of this document.
2. **Future needs for nuclear energy-related material to support ongoing nuclear energy challenges as well as future research advancements in nuclear energy.**
 - Information submitted here will help NSUF identify gaps in available research materials as well as identify research trends to determine what fuels and materials should be considered for future NFML specimen irradiation campaigns.
 - For more information, please refer to section 2.3 (Predictions/Suggestions for Future NE Research Material Needs) of this document.

2.1 Method of Submission for Requested Information

All responses should be submitted to the “FY 2017 NFML RFI” application through the NSUF website “Call/Solicitation Information” function at NSUF.INL.gov/. You will need to create a new account to access the submission page if you do not already have an NSUF account. Contact NSUF at NSUF@INL.gov for assistance in navigating the web site and the registration process.

2.2 Identification of Materials and Specimens for Acquisition

Information about materials and specimens that could be acquired for addition to the NFML can be provided by entering the data into a form on the NSUF web page as noted in section 2.1. If requested information is included in a report or some other form of documentation, this can be uploaded in lieu of completing the web form.

2.2.1 Identify Proposed Specimens and Provide Pedigree Information.

Please provide as much information as you can about the materials. Table 1 lists the information that will be requested on the web form. If some information is unknown at the time, please note that in the provided space. Upload any supporting documentation.

Table 1 Material and Specimen Information Requested via NSUF Web Form

Material or Specimen	Examples
General Information	(including but not limited to)
Material or Specimen Type (dropdown selection)	Irradiation (I), Archive (A), Other (O)
Institution (material owner)	DOE, EPRI, University, etc.
Reference Name	Experiment or Project Name
Point of Contact for Material or Specimens	
POC Email or Phone	
Material Type (dropdown selection)	Fuel, Ceramic, Steels/Alloys, Graphite, Other
Research Area (dropdown selection)	Structural, Fuel Cycle, Instrumentation, Other
Notes	
Specimen Information (multiple specimens and/or types can be entered)	
Irradiation Facility (dropdown selection)	ATR, EBR-II, LANSCE, HFIR
Material Name	SS316, AM-243, 14YWT
Specimen Type (dropdown)	TEM, Tensile, disk, bar, spring, other
Number of Specimens	
Pedigree Information	Examples
Irradiation Conditions	(including but not limited to)
Dates of Irradiation	
Reactor Position	ATR-B7
Environment (cladding, fuel, etc.)	Helium/Argon
Temperature	
Dose or Burn-up	
Flux	1.2E+14
Fluence	6.02E+21
Documentation/Reports/Publications	(Uploads including but not limited to)
Material Certifications	<ul style="list-style-type: none"> Commercial alloy or quality level certifications Independent chemical analysis
Specimen Characteristics	<ul style="list-style-type: none"> Specimen geometry, dimensions and tolerances Fabrication and processing conditions
Material Characteristics	<ul style="list-style-type: none"> Thermomechanical and thermophysical properties characterization Microstructural Characterization (grain size, precipitate etc.

2.2.2 NFML Acquisition Selection Criteria

Fuels and materials added to the NFML are subject to the following stipulations and criteria:

- DOE owns all material in the NFML. Acquisitions may require a transfer of ownership agreement between the donor and DOE. In general, the NSUF would take physical possession of the specimens, although other arrangements are possible.
- NSUF is the caretaker of the sample specimens, holds them within the NFML, manages their utilization, and maintains specimen pedigree documentation.
- The materials have demonstrated relevance to the nuclear energy research community.
- The materials complement the content of the NFML in uniqueness or need.
- There is strong supporting pedigree information in the form of available data, reports or peer reviewed journal publications.

- In the case of questions over the admittance of sample specimens to the NFML for which DOE NE supported or enabled their production, the final arbiter of decision will reside with the DOE NE Selection Officer.

Establishing the pedigree of the materials in the library is critical to producing high quality research results and is essential if results from the test irradiations are to be used to support programs with stringent quality assurance (QA) requirements. Any acquisitions to the NFML must be accompanied by the pedigree information. In addition, whenever possible, archive material should be supplied with any irradiated materials.

2.3 Predictions/Suggestions for Future NE Research Material Needs

The NSUF performs periodic irradiation campaigns to populate the NFML with specimens for future investigations. Advancements in NE R&D efforts demand continued examination of traditional nuclear reactor fuels and materials as well as exploring alternative and non-traditional fuels and materials. DOE-NE and the NSUF are interested in input from respondents about materials that may have future nuclear energy applications or that could be irradiated as part of NSUF campaigns to fill gaps in the current NFML inventory.

The NFML is currently populated with legacy reactor fuels and materials and specimens from ongoing NSUF experiments. The majority of library specimens are traditional steels and alloys used for cladding and other structural materials. An overview of the NFML contents is provided in Figures 1 and 2.

The NSUF requests information and/or suggestions on potential additions to the NFML that can be produced through further irradiation tests. All responses should be submitted to the “FY 2017 NFML RFI” application through the NSUF website “Call/Solicitation Information” function at NSUF.INL.gov/. You will need to create a new account to access the submission page if you do not already have an NSUF account. Contact NSUF at NSUF@INL.gov for assistance in navigating the web site and the registration process.

Table 2 Suggested Material Information Requested via NSUF Web Form

Suggested Material	Examples (including but not limited to)
Material Type (dropdown selection)	Fuel, Ceramic, Steels/Alloys, Graphite, Other
Material Name	SS316, AM-243, 14YWT
Specimen Type (dropdown)	TEM, Tensile, disk, bar, spring
Temperature	
Dose or Burn-up	
Flux	
Fluence	
Additional Information:	

2.4 Other Information

Provide any other relevant information you feel is important for the purpose of this RFI and not otherwise already covered.

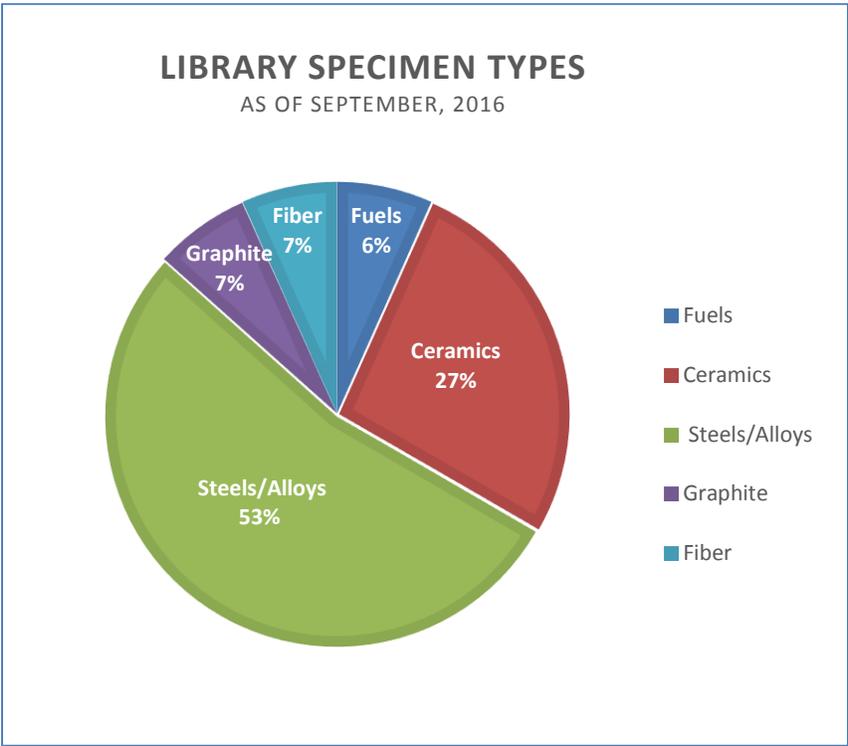


Figure 1. NFML Material Types

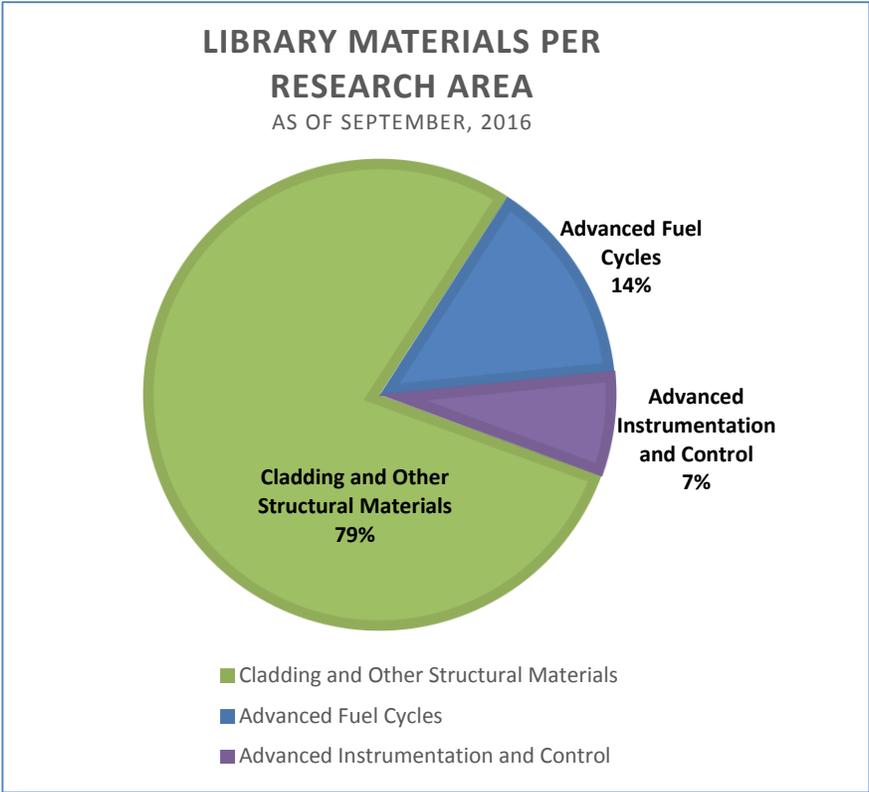


Figure 2. NFML Research Areas

3 Participant Eligibility to Respond to RFI

Information is being sought from educational institutions, National Laboratories, private-sector institutions, international research entities, and any other interested party.

4 Program Guidelines

This market research request is done under the Federal Acquisition Regulation (FAR), Parts 10 – Market Research and FAR subpart 15.201(e) – Requests for Information.

5 Intellectual Property Rights

Participants are advised that their RFI response package should be submitted without any restrictive markings. However, if restrictions are required in order to fully explain a response, the participant is responsible to mark the cover page and any and all submittal documents appropriately. Respondents are strongly discouraged from placing any restrictive markings on submissions as they may limit DOE's ability to use the submitted information.

6 Communications Protocol

Responses must be submitted through NSUF.INL.gov to be considered. You must create an account to access the submission site. Submit electronic submissions through the “Call/Solicitation Information” function at NSUF.INL.gov. If you have problems completing the registration process or submitting your response, contact NSUF by email at NSUF@inl.gov.

7 Schedule

7.1 Submission Time and Date

The DOE will accept packages in response to this RFI No. DE-SOL- 0010995 through **8:00 p.m. ET, June 30, 2017.**

This announcement does not impose any obligation on the Government nor does it signify any intent for a contract or other form of award.

8 Disclaimers

- a. DOE does not plan to send individual acknowledgements or replies to respondents to the RFI. However, DOE may conduct one-on-one meetings with entities that respond to this request if clarification or additional information is required to improve the DOE's understanding of the comments provided. If DOE decides to hold one-on-one meetings, applicable interested parties will be contacted. The decision to meet with a company one-on-one has no bearing on the worthiness of its RFI submittal or on any future offerings.
- b. This is a request for information only. It has no direct relation to other DOE Funding Opportunity Announcements or solicitations. DOE does not presently intend to solicit or award any kind of contract or financial assistance; this RFI is issued only with the intent of obtaining information.

- c. Any response to this RFI is voluntary and does not commit the Government to any expense or obligation. This request does not impose any obligation on the Government or signify a firm intention to enter into a contract. No costs associated with responding to this RFI or participating in any subsequent meetings will be borne by the Government.
- d. DOE does not intend to publish the results of the responses to this RFI.