

DATE: February 19, 2025

SUBJECT: **Request for Letters of Interest (LOI) - Architect/ Engineer (A/E) Team Selection**
FRONTIER Building Feasibility Study
PSU Project #001009100
University Park, PA

TO: Architecture Firms

The Pennsylvania State University (Penn State/PSU) is excited to begin the Architecture/Engineering (A/E) Team selection process for the FRONTIER Building Feasibility Study (FRONTIER). Penn State is utilizing our standard qualification-based A/E Team selection process for this study.

FRONTIER, which stands for “Forging a Renaissance of Nuclear Through Innovation Entrepreneurship and Research” is a research platform that will include the deployment of a nuclear microreactor at the University Park Campus of Penn State. FRONTIER will include the following components: reactor bays and support equipment, labs, education/training spaces, office and a visitor center totaling 75,000 gsf. The Penn State website for this project is located at <https://frontier.psu.edu>.

The functional specification for FRONTIER includes requirements for safety, security, research, design, and miscellaneous plant operations. The guiding principles for FRONTIER are encapsulated as “5-E,” which includes 1) Engineering Research, 2) Engagement (with the community), 3) Energy Production, 4) Environmental Sustainability, and 5) Efficiency of cost and schedule deployment.

This study will include input from all relevant Penn State University stakeholders and the Post-Industrial Midwest and Appalachia Nuclear Alliance (PIMA NA). Penn State stakeholders include:

- The College of Engineering,
- Ken and Mary Alice Lindquist Department of Nuclear Engineering,
- The FRONTIER Community Engagement Team,
- The Office of Physical Plant Environmental Health and Safety,
- The Office of Physical Plant Planning Design and Properties, and
- Penn State Sustainability

PROJECT OVERVIEW

Micro nuclear reactors are compact, next-generation power sources designed for safety, reliability, and sustainability. Unlike traditional reactors, microreactors use advanced technology to minimize risks while providing a consistent and carbon-neutral energy source. Their small size makes them versatile and adaptable, suitable for various applications in remote locations, emergency situations, and research.

In May 2022, Penn State and Westinghouse entered a groundbreaking partnership to research and develop micro-reactors for clean, sustainable energy. This collaboration is the first of its kind between Westinghouse and a university in the United States, marking a significant step toward integrating nuclear innovations into societal needs. The *eVinci microreactor* is designed to meet diverse energy needs, from large communities to remote applications. Its compact size allows for easy transportation and quick installation, making it a viable solution for areas lacking reliable energy sources.

The Westinghouse 15 MWth eVinci microreactor design will be used for the research platform. The eVinci microreactor design offers continuous power for at least 8 years on a single fuel load. It is expected that the reactor will come online in the 2028 to 2029 timeframe.

FRONTIER is a project under the auspices of the Post-Industrial Midwest and Appalachia Nuclear Alliance (PIMA NA). The platform will advance the PIMA objectives and provide research opportunities to all PIMA stakeholders, both academic and industry.

Pennsylvania's history as a hub of energy innovation, industrial capacity, and skilled labor is one of evolution and leadership. FRONTIER will position Penn State, Pennsylvania, and the Appalachia Region for the next century of energy and manufacturing innovation, independence, and global leadership.

Building upon the Penn State legacy of excellence, FRONTIER will establish Penn State and the Centre Region as the destination for nuclear engineering & science, energy, and advanced manufacturing education, research, and workforce development. The microreactor research platform in combination with laboratory, visitor, and education spaces will enable the acceleration of the development and application of microreactors through advanced research and development, outreach, education, and training.

PROJECT GOALS AND BUILDING PROGRAM

The FRONTIER microreactor research platform and visitor center is a comprehensive initiative aimed at advancing nuclear research and community engagement at Penn State. The program goals are encapsulated in the "5-E" framework, which includes Engineering Research, Engagement with the community, Energy Production, Environmental Sustainability, and Efficiency of cost and schedule deployment. An important goal of the program is expanding community engagement through the establishment of a visitor center, which will be operational before the actual facility construction begins. This center will provide educational and interactive experiences to the public, fostering a better understanding of nuclear energy and its benefits.

Platform Versatility

- The FRONTIER platform, while designed specifically for the current Westinghouse eVinci reactor design, should also have the flexibility to potentially use updated Westinghouse designs, if the need arises.
- From a functional standpoint, fixed safety and security related facility elements such as shielding and physical barriers should be designed for eVinci and potential updates.
- The variable and reactor specific elements such as controls will be designed based on the eVinci reactor, however these elements should be designed in a modular form to allow for their replacement if necessary.
- A second microreactor bay will be needed for a future microreactor that will be delivered, installed, and prepared in advance of end-of-life for the initial microreactor for transition of

operations. The initial microreactor will remain onsite for an extended time following the transition to enable decommissioning and preparation for transport to a Westinghouse processing facility.

- The facility must support compliance with all federal, state, and local regulatory requirements for a research and test reactor facility to include delivery and removal of a microreactor.

Research Adaptability and Building Functionality

The initial concept is to design and construct a new facility bringing together reactor operations, research, outreach, and education. The reactor operations spaces should enable continuous operations using the Westinghouse e-Vinci microreactor technology (with the flexibility outlined above). This would include 2 microreactor bays along with the power conversion and support equipment for an operating microreactor. Additional spaces will house state-of-the-art facilities providing:

- 1) Reactor bays and supporting equipment (25,000 gsf)
- 2) Research laboratories, faculty offices, and the community visitor center with a Digital Twin 3D visualization space (25,000 gsf)
- 3) Optional: Classroom, training spaces (25,000 gsf)

Options for site arrangement might be required to accommodate safety and security requirements for eVinci deployment. Security for research and test reactor facilities and handling radioactive materials with controlled personnel and vehicle access will be required in the site design.

The FRONTIER platform will provide the potential for integrated energy systems research by inclusion of renewable energy infrastructure into the FRONTIER platform.

- Support the development of microreactor technology by enabling end-users to test the possibility of employing the generated heat, radiation, electricity or a combination thereof for their specific use-case.
 - Efficient energy storage systems
 - turbine for electricity delivery
 - Isotope production
- The FRONTIER project may include associated space adjacent to the reactor:
 - Laboratory space*
 - Faculty offices
 - Student classrooms
 - External research space (PIMA members / other industry collaborators)
 - Training simulator (digital twin) to be designed to emulate a real operating unit. This will include utilizing real data from equipment qualification and computer simulations. The simulator will also include stochasticity to reflect real operating data point uncertainties.
 - Visitor Center for community engagement providing educational and interactive experiences for a wide range of audiences.

*The following technical considerations should be accounted for in laboratory space design, including size, layout and number of separate areas required:

- Process heat utilization research to provide thermal coupling capability
- Neutron beam research for material studies and non-destructive examination.
- Neutron activation analysis to measure minute quantities of an element.
- Radioisotope production for medical and industrial use.
- Hot cell facilities required.

- Small animal lab for testing medical use of isotopes.
 - Medical imaging facilities.
 - Ready access to radiochemistry labs without the need for transporting radioactive materials.
 - Neutron irradiation for materials testing for fission and fusion reactors.
 - Neutron transmutation doping of silicon, gemstone coloration, etc.
 - Education and training in all nuclear technology areas for operators, maintenance and operational staff of nuclear facilities, radiation protection personnel, regulatory personnel, students, and researchers.
 - For design purposes, it should be assumed that the research facility users may potentially perform activities simultaneously.
- The research conducted at FRONTIER will drive advancements in microreactor technology, including:
 - Developing applications for microreactor-generated heat and electricity to decarbonize industrial processes.
 - Supporting the production of medical radioisotopes for advanced treatments.
 - Advancing materials science to enable innovations in clean energy.
 - Test and evaluation of unique aspects of microreactor facilities such as delivery, installation, and removal of microreactor designs (inert fuel), security, and safeguards.
 - Connect to existing steam plant facility or electrical grid to give excess heat or electricity generation.

PROJECT SCOPE

The University desires to hire an architectural and engineering consultant team to develop a feasibility study for this proposed new facility. The study may be used as the initial basis of design and for procurement of the design professional. This study should not make any recommendations about advancing the project or make any recommendations about various programmatic options. The preliminary scope of work will include:

- Meet with the University's Building Committee to confirm the scope and program (virtual when possible)
- Meet with users to develop a basic program document (virtual when possible)
- Assist with developing and then summarizing the mission and vision of the project.
- Site analysis of multiple locations (Identify and investigate potential siting options) – identify adjacencies. Provide an assessment of the proposed sites.
- Establish optional program scopes with flexibility and options described above.
- Establish a preliminary budget. Review the budget and provide a high-level breakdown of costs and fees with the committee.
- Renderings of options to support engagement and outreach.
- Utilize e-Builder processes for this study.
- Determine a high-level schedule that includes design and construction durations.
- Review the progress of the scope, program, and related data with specific OPP stakeholders prior to submitting the first draft.
- Prepare and submit a draft report and final report for review and comment by the University.
- Assist the project leader with the preparation of graphics and metrics for PDRB Gate 1 Programming

The study may be used as the initial basis of design and for procurement of the design professional. This study should not make any recommendations about advancing the project or make any recommendations about various programmatic options.

PROJECT DELIVERY METHOD, and OWNER REQUIREMENTS

PSU anticipates executing the Architect-Engineer contract shortly after team selection. The programming efforts will start upon the execution of the agreement. We anticipate the study to be completed by **Spring 2026**.

It is critically important that the Architectural/Engineering team have experience with:

1. Complex research environments and laboratories to include the use and storage of radioactive materials with complex federal, state, and local regulatory requirements.
2. Integrated, controlled security access to enable operations and researcher access to authorized personnel only while also providing controlled access for visitor center spaces.
3. Creation of flexible research facilities that are cost effective, well thought-through design solutions.

The following supplemental documents are relevant to this RFP:

- Form of Agreement. Included is the link to our Form of Agreement 1-S:
<https://oppwiki.atlassian.net/wiki/spaces/OPPDCS/pages/5409499/Division+00+-+Procurement+and+Contracting+Requirements#Division00-ProcurementandContractingRequirements-005200PROFESSIONALAGREEMENTS>

Please review this agreement to ensure that your firm accepts all terms and conditions as written. In submitting a proposal for this project, you acknowledge that you concur, without exception, with all terms, conditions and provisions of Form of Agreement 1-S.

- Office of the Physical Plan (OPP) Standards. The web sites www.opp.psu.edu and <https://oppwiki.atlassian.net/wiki/spaces/OPPDCS/overview> provide information regarding specific design submission requirements and standards, of the University.
- OPP High Performance Standards. The University has a commitment to environmental stewardship and requires the maximum possible use of sustainable and energy-efficient designs and specifications, for architectural, site, utility, structural, mechanical, electrical, and plumbing work. Refer to the following link for the University's high performance standards that exceed building code minimum requirements:
<https://oppwiki.atlassian.net/wiki/spaces/OPPDCS/pages/5409436/01+80+00+PERFORMANCE+REQUIREMENTS>

Apart of this is PSU's High-Performance Building Design Standards: Building projects shall comply with ASHRAE Standard 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings, 2010 version AND as superseded by more stringent requirements of ASHRAE Standard 189.1 Standard for the Design of High-Performance Green Buildings, 2011 version. The standard defines a minimum requirement of LEED Certified for this project.

ARCHITECT/ENGINEER (A/E) TEAM SELECTION PROCESS AND SCHEDULE

The University will perform a three-step A/E team selection process, with three assessments: Letter of Interest, Proposals, and Interviews (if needed).

This is the process to select the full A/E team, including: the architectural team, engineering team, and specialty consultants (if needed). At the next step of the process, each of the invited architectural firms will create and define their entire proposed design team. At this initial step, it is at your discretion to what level you define your proposed A/E team.

A/E Team Selection Schedule

- Interested Lead/Prime firms must submit an electronic copy of your Letter of Interest by Noon, Eastern Standard Time (EST) on **March 14, 2025**
- The Screening Committee will review the respondents to this Request for Letters of Interest and determine a Long-list of firms.
- The Long-listed firms will be invited to respond to a Request for Proposal, both of which will be posted to this website by the end-of-day on **April 1, 2025**.
- Proposal responses from the Long-listed teams are due in my office at **Noon EST on April 25, 2025**
- Up to three short-listed firms will be chosen from the RFP respondents. The short-list results and interview notice will be posted to this website by the end-of-day on **May 20, 2025**
- Video interviews (Zoom), if needed, will be scheduled for **June 13, 2025**.

LETTER OF INTEREST SUBMISSION REQUIREMENTS

If your firm/team is interested in pursuing this project, please submit a Letter of Interest that, at the least, includes the following:

1. A brief statement detailing your firm's profile (firm size, characteristics, unique qualifications, etc.). There is no requirement to identify the full A/E team at this stage, but firms that wish to include an architectural partner should describe their partner's anticipated role on the project.
2. Outline your firm's experience in the planning/design/execution of facilities of a similar program, scope, size, complexity, and campus setting. Convey your firm's experience programming, planning and delivering similar nuclear science teaching and research environments. Highlight expertise in planning and space utilization analysis along with experience developing building programs. Highlight applicable experience to the space types described in this document.
3. Your firm's vision of what, beyond purely functional issues, constitutes the essence of this type of facility. To indicate to the Screening Committee your understanding of the uniqueness of this project, discuss some of the key issues that are important in a project of this type.
4. Within your Letter of Interest, include a sampling of your previous relevant experience and provide illustrative examples.

As applicable throughout your Letter of Interest, provide professional credit to architectural

partners (including design architect, architect of record, and academic / lab planning partners) for all projects discussed within the proposal and for all project images shown.

Please limit your submission to five (5) total, single sided, 8-1/2 x 11 pages. If a cover letter is included, it must be within the five (5) pages. Send a PDF of the submission electronically to nsullivan@psu.edu and jat280@psu.edu by the submission deadline. Include the name and email address of your team's main contact for the A/E selection process within your submission.

You may visit the public areas of the campus/site during this A/E Selection process. But guided campus/site tours are not provided at this stage. We may arrange for scheduled visits later in the selection process if possible.

Participation in this A/E Team Selection process is voluntary and at no cost or obligation to Pennsylvania State University. PSU reserves the right to waive any informality, in any or all submissions, and to reject any submission or portion thereof. PSU reserves the right to modify dates as/if it deems necessary. News releases pertaining to this project will not be made without prior approval from PSU, and then only in coordination with PSU. All information, documents, and correspondence shared within the A/E selection process are to remain confidential, and as such, are not to be made public in any manner. Additionally, the University may hold all proposals for up to 45 days.

Please contact me or project manager Julie Patrick (814.865.8768 or jat280@psu.edu) with any questions regarding the projects or the A/E Selection process.

Respectfully,



Neil Sullivan, CEFP, AICP, PLA, LEED AP
University Planner
The Pennsylvania State University
814.863.3158
nsullivan@psu.edu

CC: Screening Committee