

**DEPARTMENT OF ENERGY  
OFFICE OF ENVIRONMENTAL MANAGEMENT**



**HANFORD TANK WASTE CLEANUP  
RESEARCH & DEVELOPMENT**

**DOE NATIONAL LABORATORY PROGRAM ANNOUNCEMENT NUMBER:  
LAB 23-EM001**

**ANNOUNCEMENT TYPE: INITIAL**

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<b>Submission Deadline for Proposals:</b>	<b>July 17, 2023 at 5 PM Eastern Time</b>

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## **UPDATES AND REMINDERS**

### RECOMMENDATION

The Department of Energy (DOE) Office of Environmental Management (EM) encourages you to register in all systems as soon as possible. You are also encouraged to submit proposals before the deadline.

### CURRENT AND PENDING SUPPORT AND BIOSKETCHES

The instructions for the content of current and pending support and biosketches have changed. Please read the instructions carefully and follow them.

### INTERAGENCY FORMATS FOR CURRENT AND PENDING SUPPORT AND BIOGRAPHICAL SKETCHES

Interagency common instructions for preparing current and pending support and biographical sketches are being developed. The Science Experts Network Curriculum Vitae (SciENCv) system at <https://www.ncbi.nlm.nih.gov/sciencv/> will be updated to support the forthcoming common instructions and formats. The fillable PDFs at <https://nsf.gov/bfa/dias/policy/nsfapprovedformats/> may not be available in the future. When interagency common formats and instructions are promulgated, their use will be required. EM strongly encourages all researchers to use the online SciENCv system to ensure that their documents are prepared in the appropriate format with the least inconvenience.

### INDIVIDUALS WHO SHOULD NOT SERVE AS MERIT REVIEWERS

Follow the updated instructions in [Section VIII](#) and consider the use of the template available at <https://science.osti.gov/grants/Policy-and-Guidance/Agreement-Forms>. Do not include this list as part of the biographical sketch.

### ACKNOWLEDGMENT OF FEDERAL SUPPORT

EM requests successful proposers follow the Office of Science (SC) guidance about how EM support should be similarly acknowledged. The SC guidance is published at <https://science.osti.gov/funding-opportunities/acknowledgements/>.

### PUBLIC ACCESS

Awards made under this National Laboratory Funding Announcement are subject to DOE's Public Access Plan (<https://www.energy.gov/downloads/doe-public-access-plan>). Full-text versions of scientific publications must be made publicly accessible at no charge to readers.

### EM STATEMENT OF COMMITMENT

The DOE EM is fully and unconditionally committed to fostering safe, diverse, equitable, and inclusive work, research, and funding environments that value mutual respect and personal

integrity. EM is committed to advancing belonging, accessibility, justice, equity, diversity, and inclusion across the portfolio of activities we sponsor. EM’s effective stewardship and promotion of safe, accessible, diverse, and inclusive workplaces that value and celebrate the diversity of people, ideas, cultures, and educational backgrounds across the country and that foster a sense of belonging in our scientific community is foundational to delivering on our mission. We are committed to promoting people from all backgrounds, including individuals and communities that were historically underrepresented and minoritized in science, technology, engineering and mathematics (STEM) fields and the activities we sponsor in recognition of our responsibility to serve the public. We also recognize that harnessing a broad range of views, expertise, and experiences drives scientific and technological innovation and enables the EM community to push the frontiers of scientific knowledge for U.S. prosperity and security. Discrimination and harassment undermine EM’s ability to achieve its mission by reducing productivity, discouraging, or inhibiting talent retention and career advancement, and weakening the integrity of the EM enterprise overall. EM does not tolerate discrimination or harassment of any kind, including sexual or non-sexual harassment, bullying, intimidation, violence, threats of violence, retaliation, or other disruptive behavior at institutions receiving EM funding or other locations where activities funded by EM are carried out. EM collaborates with SC on this Announcement. All applicants and collaborators should familiarize themselves with the SC Statement of Commitment available at <https://science.osti.gov/SW-DEI/SC-Statement-of-Commitment>.

#### PDF GENERATION

The research narrative in a proposal must be one single machine-readable PDF file that contains the DOE Title Page, project narrative, all required appendices, and other attachments. This single PDF file may not be scanned from a printed document and must be uploaded in PAMS. This must be a plain PDF file consisting of text, numbers, and images without editable fields, signatures, passwords, redactions, or other advanced features available in some PDF-compatible software. Do not use PDF portfolios or binders. The research narrative will be read by EM staff using the full version of Adobe Acrobat: Please ensure that the narrative is readable in Acrobat. If combining multiple files into one research narrative, ensure that a PDF portfolio or binder is not created. If creating PDF files using any software other than Adobe Acrobat, please use a “Print to PDF” or equivalent process to ensure that all content is visible in the research narrative. Once a research narrative has been assembled, please submit the combined research narrative file through a “Print to PDF” or equivalent process to ensure that all content is visible in one PDF file that can be viewed in Adobe Acrobat.

Checklist for Avoiding Common Errors:

<b>Item</b>	<b>Issue</b>
Page Limits	Strictly followed throughout proposal, including particular attention to: <ul style="list-style-type: none"> <li>- Research Narrative</li> <li>- Appendix 2 Narrative, if any</li> <li>- Biosketches</li> <li>-</li> </ul>
Personally Identifiable Information	None present in the proposal
Research Narrative	Composed of one PDF file including all appendices
Project Summary / Abstract	Name(s) of applicant, PI(s), PI's institutional affiliation(s), Co-Investigator(s), Co-Investigator's institutional affiliation(s)
DOE Title Page	Follow instructions closely
Budget	Use current negotiated indirect cost and fringe benefit rates
Budget Justification (attached to budget)	Justify all requested costs
Biographical Sketches	Follow page limits strictly and do not include list of collaborators.
Current and Pending Support	Ensure complete listing of all activities including brief abstract of scope of work for all items listed, regardless of the source of support
List of Individuals who Should not Serve as Merit Reviews	Provided as separate file in proposal
PDF Files	Ensure that all PDF files comply with the following standards: <ul style="list-style-type: none"> <li>- Files must be machine-readable.</li> <li>- Files may not be scanned from a printed document.</li> <li>- Files must be plain PDF files consisting of text, numbers, and images without editable fields, signatures, passwords, redactions, or other advanced features available in some PDF-compatible software.</li> <li>- Files must not be PDF portfolios or binders.</li> <li>- Files must be readable in the full version of Adobe Acrobat</li> <li>- If combining multiple files into one research narrative, ensure that a PDF portfolio or binder is not created.</li> </ul>

	<ul style="list-style-type: none"> <li>- If creating PDF files using any software other than Adobe Acrobat, please use a “Print to PDF” or equivalent process to ensure that all content is visible.</li> </ul>
<p>Institutions capable of being funded through the DOE Field Work System</p>	<p>Do not create new institutions in the PAMS website (Portfolio Analysis and Management System at <a href="https://pamspublic.science.energy.gov">https://pamspublic.science.energy.gov</a>) for any DOE/NNSA National Laboratory or DOE Site.</p> <p>Submissions will be evaluated for technical merit, but any resulting funding, work, or awards will be made under the laboratory or site’s contract with DOE. No separate financial assistance awards will be made. No administrative provisions of this Announcement will apply to the laboratory or any laboratory subcontractor.</p>

## **Section I – DOE NATIONAL LABORATORY OPPORTUNITY DESCRIPTION**

**ALL INQUIRIES ABOUT THIS ANNOUNCEMENT SHOULD BE DIRECTED TO:**

**[EM-LabCall@em.doe.gov](mailto:EM-LabCall@em.doe.gov)**

**Program Contact:**

Dr. Ming Zhu  
EM Senior Advisor for Laboratory Policy  
301-903-9240  
[Ming.Zhu@em.doe.gov](mailto:Ming.Zhu@em.doe.gov)

### **SUMMARY**

The DOE Office of Environmental Management (EM) announces its interest in receiving proposals from multi-disciplinary and multi-institutional teams led by DOE National Laboratories in support of the acceleration of the Hanford tank waste cleanup mission. EM’s mission is to “complete the safe cleanup of environmental legacy resulting from decades of nuclear weapons development and government-sponsored nuclear energy research.”<sup>1</sup> The largest portion of the EM’s mission is the cleanup of tank waste at the Hanford Site in southeast Washington State. The Hanford Site must disposition 56 million gallons of chemically hazardous and radioactive waste. The waste is currently stored in 177 single- and double-shell tanks that were built between the 1940s and the 1980s. Efforts to treat the waste are currently underway, but represent a significant portion of the EM budget and environmental liability and are expected to last decades. To address these challenges, EM tasked the Network of National Laboratories for Environmental Management and Environmental Stewardship (NNLEMS) to develop a Research and Development (R&D) Roadmap that identifies opportunities to develop breakthrough technologies. R&D investments into these areas will improve efficiency, while reducing costs and accelerating the schedule for Hanford tank waste cleanup program.<sup>2</sup> The Roadmap can be found at <https://www.energy.gov/em/rd-roadmap-hanford-tank-waste-mission-acceleration>.

To implement the R&D Roadmap, EM is announcing its interest in receiving research proposals from multi-institutional teams led by DOE National Laboratories. Proposals should address the opportunities identified in the R&D Roadmap and described in the Supplementary Information below. These R&D objectives would drastically reduce the overall cost and duration of the Hanford tank waste mission. The opportunities identified in the R&D Roadmap include both those that could be implemented in the near term and have a continuing impact and those technologies that may require more development but could be transformational to the Hanford tank waste mission.

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<sup>1</sup> <https://www.energy.gov/em/mission>

<sup>2</sup> R&D Roadmap for Hanford Tank Waste Mission Acceleration, NNLEMS-2022-00005, Rev. 0, October 2022





## SUPPLEMENTARY INFORMATION

The Hanford tank waste R&D Roadmap identified opportunities where R&D could have a significant impact on the mission. This solicitation is requesting proposals that address those opportunities in the following five focus areas:

- 1) Waste Retrieval, Transport and Closure
- 2) Waste Pretreatment
- 3) Waste Immobilization and Disposal
- 4) Secondary Waste Treatment
- 5) Mission Enablers

**Proposals should focus on one or more of the scientific research areas that are described below. The underlined are top priority areas and will be given a higher priority for funding than the remaining areas. The priority areas have been adjusted to incorporate recommendations from the EM Advisory Board based on their review of the NNLEMS R&D Roadmap.**

### **Focus Area 1: Waste Retrieval, Transport and Closure**

#### *Scientific Objectives and Current Challenges*

Planning and implementing the Hanford tank waste mission is a complex task. The mission will take decades to complete meaning that waste will remain in the Hanford waste tanks during that period. Optimizing processes for retrieving waste from the tanks, transporting waste between tanks and closing high-risk tanks could accelerate the overall mission while reducing the risk associated with storing waste in the tanks with state-of-the-art technologies, such as artificial intelligence or robotics. The waste in the tanks must be characterized prior to removal and disposal, but samples are difficult to obtain. Improved mixing and sampling strategies could improve the quality of that characterization and focus efforts for pretreatment. Innovative techniques for monitoring and repairing at risk tanks could prevent leaks to the environment. Proposals in this area should focus on enhancing the performance of the tank farm systems and the characterization of the waste they contain to mitigate risk and optimize the overall waste mission.

#### *Priority research areas and requirements*

- 1) Increase volume available for tank storage: The availability of waste tank space for storage or staging is an on-going challenge for the tank waste mission. Increased flexibility in storage and staging options at or near the tank farms could improve waste processing capabilities. Proposed approaches should explore a cost benefit analysis for alternative storage options, such as building new tanks, developing modular or mobile tank systems, and tank waste volume reduction (i.e., evaporation).
- 2) Dry waste characterization, monitoring, & retrieval technologies: Novel characterization and retrieval techniques are needed for dry waste. These technologies should reduce the need to introduce liquids to tanks for waste retrievals. The use of water or caustic to mobilize tank

waste sludge generates additional waste and reduces available double shell tank waste storage space. Alternatives may include robotics and should explore retrieval and transport of tank waste sludge material from single-shell tanks.

- 3) Process automation & feedback of monitoring, retrieval, and transport technologies: Improved automation and monitoring technologies which use commercially available tools could help address operational challenges. For example, systems could be enhanced using AI or edge computing to improve process productivity or provide enhanced real-time feedback.
- 4) Risk-based waste retrieval sequencing: The tank closure sequencing is based on many priorities as identified in the *Integrated Waste Feed Delivery Plan*, however waste constituents of concern and the risks they pose to the environment are not prioritized. Proposals are requested to develop information that support DOE prioritization for tank retrieval and closures based on waste constituents of high risk to the environment.
- 5) Formulate & install barriers targeted for constituents of concern at tanks or disposal site with active monitoring: Proposals are requested on the development and installation of barriers at tanks or disposal sites. These barriers could reduce the risk associated with remaining contaminants in tanks once all retrieval options have been exhausted. Novel barriers could also focus on the likelihood or impact of tank leaks. Ideal barriers would include options for active monitoring for contaminants or leaks.
- 6) Improved methods to detect/repair leaks for storage tanks: Non-destructive analysis of the tanks is challenging because of limitations resulting from the current tank infrastructure. These challenges limit the ability to detect and prevent leaks in the tank farms. New technologies are needed that will improve leak detection, prevention, and repair within the limitations of the current tank infrastructure.
- 7) Improved sampling methods for double shell tanks: Improved methods of sampling tank waste are needed to characterize the waste in double shell tanks. The current method is to use grab and core samples. These are difficult to maintain and not always representative of the bulk waste in the tank. New approaches could include improved methods for mixing both bulk waste and tank heels. All approaches should address both the feasibility of implementing the sampling method within the limitations of current double shell tank infrastructure and how accurately the sample represents the bulk tank waste. Proposed methods can include discrete characterization of the material or long-term monitoring of the material properties.

## **Focus Area 2: Waste Pretreatment**

### ***Scientific Objectives and Current Challenges***

Pretreating waste could reduce the overall volume that must be vitrified as part of the Hanford tank waste mission. Removing key contaminants that are problematic in vitrification or complicate disposal, such as organics, aluminum, or actinides, and identifying alternative disposal paths could result in a significant acceleration to the overall mission. These processes could take place in or near the tanks or at a dedicated pretreatment facility. Proposals in this area should focus on identification of process efficiencies, improvement to the chemical understanding tank waste or the development of predictive models.

### ***Priority research areas and requirements***

- 1) In-tank pretreatment of HLW sludge: Problematic contaminants, such as Al,  $\text{PO}_4^{3-}$ ,  $\text{SO}_4^{2-}$ ,  $\text{NO}_3^-$  and halides, significantly impact the high-level waste (HLW) vitrification process. The sludge must be washed, settled and concentrated so these contaminants can be removed. Proposals are requested on improved methods for in-tank pretreatment of HLW sludge.
- 2) At-tank pretreatment of HLW sludge: At-tank pretreatment is needed to provide the necessary sludge processing at a smaller footprint, thus reducing the risk and investment required compared with a large-scale pretreatment facility. Methods devised to allow at-tank pretreatment should, at a minimum, wash and concentrate the sludge and approaches which include additional processing steps, such as aluminum dissolution, are highly desired.
- 3) RCRA organics removal from tank supernate: The presence of Resource Conservation & Recovery Act (RCRA) organics may require that Hanford tank waste identified for non-vitrification be treated for organics before immobilization. New technologies are needed to remove RCRA organics from tank supernate, especially methods which combine multiple methods to address the range of organics that may be present in tank supernate.
- 4) Increased solids concentration during waste processing with water management: The volume of the sludge present in tanks must be concentrated to 15- 20% before treatment in the HLW processing facility. Proposals are requested that provide solutions for sludge concentration beyond the Pretreatment facility. Methods should explore solutions throughout the tank waste process and should address the likelihood of line plugging due to solids settling and the time scales required for solid settling and concentration.
- 5) Improved understanding of aluminum chemistry to optimize sludge processing: Aluminum in HLW sludge exists in a variety of chemical forms and increases the difficulty of processing the sludge. Improved understanding of the chemical behavior of Al in HLW sludge, including precipitation kinetics, mechanisms of hard crust formation, co-anion solubility, and particle aggregation and settling behavior, is required to optimize sludge processing.

### **Focus Area 3: Waste Immobilization and Disposal**

#### ***Scientific Objectives and Current Challenges***

High level waste vitrification has been shown to be the rate limiting step in reaching the goals of the Hanford tank waste mission and improvements in this area could have a large impact on acceleration of tank closures. Several rate-limiting steps within the vitrification process need to be addressed, including melter feed batch times and processing rates, off-gas treatments, and secondary waste management.

#### ***Priority research areas and requirements***

##### **Focus on one or more of the following scientific research areas:**

- 1) Cementitious materials development to improve long-term performance: Improved grout waste forms with well-documented characteristics are necessary before they can be considered for Supplemental Waste Treatment of Low Activity Waste. Developing improved cementitious materials will require consideration of a broad range of requirements, including (i) demonstration of Supplemental Low Activity Waste (SLAW) grout using real waste, (ii) stability of get/immobilization methods (iii) reoxidation of grout waste in the Integrated

- Disposal Facility (IDF), (iv) defining processing requirements for containerized grout, and (v) tank farm specific grout formulations.
- 2) Improved high level waste glass formulations: Recent work has shown promising results for increasing waste loading and reducing the extent of washing and leaching needed before immobilizing the HLW sludge in glasses. Further studies are needed to confirm these preliminary results, including expanded examination of glass properties, experimental data over a broader range of sludge compositions with minimal treatment, and improved modeling of glass properties, among others.
  - 3) NO<sub>x</sub> management through sludge washing or off-gas abatement: Nitrogen based emissions occur from both the HLW and LAW vitrification processes and modifications in vitrification processes that reduce the potential for NO<sub>x</sub> and NH<sub>3</sub> emissions throughout the process is needed. Novel processes for reducing these emissions should also prioritize the reduction of pretreatment tank sludge.
  - 4) Improved transport models/ performance assessments for waste forms: Improvements in transport and performance assessment models of waste forms are needed. Models should take advantage of advances in computing technologies, assessment of data with AI, and other approaches to provide high fidelity models and reduce excessive conservatism.
  - 5) Improvements to high level waste glass melter design & throughput: Current estimates of the tank waste treatment mission indicate that high level waste vitrification is the rate limiting step. Improving the efficiency of this process could have substantial impacts on the overall duration of the mission. Approaches are needed that evaluate and improve known rate-limiting portions of the vitrification process, such as (i) melter feed batch time (ii) heat management (iii) melter processing rates (iv) canister handing, storage, and cooling (v) offgas treatment or (vi) secondary waste management. Proposed approaches should consider challenges in the implementation of the suggested design modifications.

#### **Focus Area 4: Secondary Waste Treatment**

##### ***Scientific Objectives and Current Challenges***

The Hanford tank waste mission will generate significant amounts of secondary waste during vitrification process. This secondary waste will be low level but represents a large volume of the total waste that must be disposed at the Hanford Site. Research in this area should focus on improvements in cementitious waste forms.

##### ***Priority research areas and requirements***

##### **Focus on the following scientific research area:**

- 1) Improved grout waste forms: Next generation cementitious waste forms are needed to handle secondary waste from the Hanford tank waste mission for LAW and HLW, including grout waste forms for both solid and liquid secondary waste. Concepts for new grout compositions should consider improved contaminant retention, including ammonia, I-129, and Tc-99 and should address limitations of long-term disposal of the proposed waste forms.

#### **Focus Area 5: Mission Enablers**

### ***Scientific Objectives and Current Challenges***

There are additional research opportunities that cut across the four research areas listed above. Advances in this area will impact multiple portions of the Hanford tank waste mission and have the potential to have a substantial impact on the reduction of the total cost and duration of the mission.

### ***Priority research areas and requirements***

#### **Focus on one or more of the following scientific research areas:**

- 1) Improved equipment decontamination/ disposal options: A variety of technologies currently used in industry could be deployed for equipment decontamination and disposal within Hanford tank farms and throughout the DOE complex. Proposed studies in this area should focus on implementing and verifying commercially available technologies, singularly or in combination, to improve equipment decontamination and disposal while balancing any secondary waste generation.
- 2) Real time monitoring for liquid process feeds: The availability of real-time monitoring systems that reduce or eliminate the need for regular sampling of the Hanford tanks are critically important for measurement of various physiochemical properties, such as density, particle size, solid and liquid fractions, critical velocity, pH, liquid and solid composition. Development of systems that use commercially available instrumentation is needed and must include performance evaluation of deployable in-tank or at the tanks systems within the limitations of the current Hanford tank infrastructure.
- 3) Develop system model for infrastructure & technology cost evaluation: State-of-the-art manufacturing automation makes use of advanced computational tools. Further, the large data sets available from industrial scale processes can reduce risk and improve associated processes. Proposals are requested that employ a phased approach to developing and deploying a fully integrated system model into the processes used in Hanford tank farms. Proposed systems should build on legacy systems and current plant models and incorporate a range of computational tools for risk modeling, process modeling, design modeling, and decision analysis, among others.
- 4) Alternative disposal options for crystalline silicotitanate ion exchange media: At-tank treatment of waste through the modular treatment technologies with resin has resulted in significant reduction in the waste activity. In this process, cesium is extracted through large module crystalline silicotitanate (CST) columns. New concepts for disposal pathways, other than vitrification, are needed for these CST columns. Concepts for these proposed pathways should address efficient column handling and waste minimization.

#### **Teaming Requirements:**

The proposed research should involve National Laboratory-led, multi-investigator, multidisciplinary research teams whose expertise is needed to address these challenges. Collaborative applications, e.g., submissions of identical proposals by different institutions, will not be accepted under this National Laboratory Program Announcement. EM encourages the teams to include unique capabilities from other Federally Funded Research and Development Centers, academic institutions (including MSIs and Historically Black Colleges and

Universities), and industry for certain research areas that the DOE National Lab complex currently lacks. Proposals must ensure that the lead National Lab performs a greater portion of the scientific and technical work than any other team member. Requests to change the institution performing the greatest portion of the scientific and technical work after a proposal is submitted will result in the proposal being declined unless the request is the result of the lead PI's death, incapacitation, or relocation.

EM is committed to promoting the diversity of investigators and institutions it supports, to strengthen this commitment, proposals are encouraged from teams that include the participation of MSIs<sup>3</sup>.

### **Subawards:**

Multi-institutional teams must submit one proposal from a designated lead DOE National Laboratory with all other team members proposed as subawards.

Other Federal agencies, and another Federal agency's FFRDCs<sup>4</sup> may be proposed as sub-awardees.

Note that the value of any such proposed subaward will be removed from any such prime award: DOE will make separate awards to Federally-affiliated institutions.

### **Annual Meetings:**

The selected awardees will be asked to attend an annual PI meeting related to the topic of the research proposed. Applicants should anticipate a need for travel to attend an annual PI meeting and request appropriate funding in their budgets.

### **Open Science:**

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<sup>3</sup> MSIs are understood broadly to include, but not be limited to, Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Tribally Controlled Colleges and Universities (TCCUs), Asian American Native American and Pacific Islander Serving Institutions (AANAPISIs), Alaska Native and Native Hawaiian Serving Institutions (ANNHs), Native American Serving Non-Tribal Institutions (NASNTIs), and Predominantly Black Institutions (PBIs). Institutions listed in the Strengthening Institutions Program (SIP) are not MSIs. The US Department of Education list of HBCUs can be found at <https://sites.ed.gov/whhbcu/one-hundred-and-five-historically-black-colleges-and-universities/> The US Department of Education maintains records of institutions eligible for recognition as MSIs at <https://www2.ed.gov/about/offices/list/ope/ides/eligibility.html>. For the purposes of this announcement, institutions marked in the most recent eligibility matrix as either being eligible to receive funding or as receiving funding for any program other than SIP will be considered an MSI.

<sup>4</sup> An authoritative list of all Federally Funded Research and Development Centers (FFRDCs) may be found at <https://www.nsf.gov/statistics/ffrdelist/>

EM is dedicated to promoting the values of openness in Federally-supported scientific research, including, but not limited to, ensuring that research may be reproduced and that the results of Federally-supported research are made available to other researchers. These objectives may be met through any number of mechanisms including, but not limited to, data access plans, data sharing agreements, the use of archives and repositories, and the use of various licensing schemes.

The use of the phrase “open-source” does not refer to any particular licensing arrangement, but is to be understood as encompassing any arrangement that furthers the objective of openness.

## **Section II – AWARD INFORMATION**

### **A. TYPE OF AWARD INSTRUMENT**

DOE anticipates awarding laboratory work authorizations under this DOE National Laboratory Program Announcement.

Any awards made under this Announcement will be subject to the provisions of the contract between DOE and the awardee National Laboratory.

DOE will not consider funding multi-institution teams submitted as collaborative proposals, in which each institution must submit its own proposal with an identical common research narrative, under this Announcement. Multi-institutional teams must apply using a prime and subaward model with one proposal submitted by the lead National Laboratory.

### **B. ESTIMATED FUNDING**

DOE anticipates that a total of \$30 million in current year funds will be used to support awards under this Announcement. Additional awards may occur subject to the availability of future year appropriations.

DOE is under no obligation to pay for any costs associated with preparation or submission of proposals. DOE reserves the right to fund, in whole or in part, any, all, or none of the proposals submitted in response to this Announcement.

### **C. MAXIMUM AND MINIMUM AWARD SIZE**

The award size will depend on the number of meritorious proposals received and the availability of appropriated funds.

#### **Ceiling**

\$3,000,000 per year

#### **Floor**

\$1,000,000 per year

### **D. EXPECTED NUMBER OF AWARDS**

The exact number of awards will depend on the number of meritorious proposals and the availability of appropriated funds. Approximately 10 to 15 awards are expected for this Announcement.



#### **E. ANTICIPATED AWARD SIZE**

The final award size will depend on the number of meritorious proposals, the results of peer review, program policy factors, and the availability of appropriated funds.

#### **F. PERIOD OF PERFORMANCE**

DOE anticipates making awards with a project period of up to three years as befitting the project.

Continuation funding (funding for the second and subsequent budget periods) is contingent on: (1) availability of funds appropriated by Congress and future year budget authority; (2) progress towards meeting the objectives of the approved proposal; (3) submission of required reports; and (4) compliance with the terms and conditions of the award.

#### **G. TYPE OF PROPOSAL**

DOE will accept new DOE National Laboratory Proposals under this DOE National Laboratory Announcement. Please only submit a PAMS lab technical proposal in response to this Announcement; do not submit a DOE Field Work Proposal (FWP) at this time. EM will request FWPs later from those selected for funding consideration under this Announcement.

### **Section III – ELIGIBILITY INFORMATION**

#### **A. ELIGIBLE APPLICANTS AND TOPICS**

This is a DOE National Laboratory-only Announcement. FFRDCs from other Federal agencies are not eligible to submit in response to this Program Announcement.

#### **B. COST SHARING**

Cost sharing is not required.

#### **C. ELIGIBLE INDIVIDUALS**

Eligible individuals with the skills, knowledge, and resources necessary to carry out the proposed research as a Principal Investigator (PI) are invited to work with their organizations to develop a proposal. Individuals from underrepresented groups as well as individuals with disabilities are always encouraged to apply.

#### **D. LIMITATIONS ON SUBMISSIONS**

Each proposal must identify a lead DOE National Laboratory. Each DOE National Laboratory is limited to no more than seven (7) proposals as the lead lab, with no more than two (2) proposals per focus area. DOE will consider the latest received submissions to be the institution's intended submissions, thereby removing the earlier submissions from consideration.

DOE encourages multi-institution collaborations involving national laboratories, universities, and other research partners under this Announcement. Entities proposing as a team must designate a lead National Laboratory who will submit an application on behalf of the team members. Only one application is to be submitted for each team. The designated lead National Laboratory must perform a greater percentage of the effort than any other partner organization or sub-awardee. The percentage of effort will be determined by reviewing the total budget for each participating organization as a percentage of the proposed total project costs. If a proposal is received in which the lead National Laboratory is not performing a greater percentage of the effort than each of the other institutional partners, team members, or sub-awardees, as determined by the budget, the proposal will be rejected without further review.

## **Section IV – PROPOSAL AND SUBMISSION INFORMATION**

### **A. ADDRESS TO REQUEST PROPOSAL PACKAGE**

Proposal submission instructions are available in this Announcement on the DOE SC Portfolio Analysis and Management System (PAMS). Screenshots showing the steps in DOE National Laboratory proposal submission are available in the PAMS Help system, accessible by navigating to <https://pamspublic.science.energy.gov> and clicking on the “PAMS Help” link.

Proposals submitted outside of PAMS will not be accepted.

### **B. LETTER OF INTENT AND PRE-PROPOSAL**

#### **1. Letter of Intent**

National Laboratories should submit a list of Lead PIs for all partnering institutions and intended project areas to [EM-LabCall@em.doe.gov](mailto:EM-LabCall@em.doe.gov) for all anticipated proposals by the due date as printed on the cover of this Announcement.

#### **2. Pre-proposal**

Not applicable.

### **C. PROPOSAL SUBMISSION AND CONTENT**

#### **1. Summary of Proposal Contents**

Each DOE National Laboratory proposal will contain the following sections:

- A Cover Page, entered into PAMS as structured data using the on-screen form
- Budget, entered into PAMS as structured data using the PAMS budget form
- Abstract (one page), entered into PAMS as a separate pdf
- Budget justification, entered into PAMS as a separate pdf
- Proposal, combined into a single pdf containing the following information:
  - Proposal Title Page
  - Table of Contents
  - Project Narrative (main technical portion of the proposal, including background/introduction, proposed research and methods, timetable of activities with go/no-go milestones, and responsibilities of key project personnel)
  - Appendix 1: Biographical Sketch(es)
  - Appendix 2: Current and Pending Support
  - Appendix 3: Bibliography and References Cited
  - Appendix 4: Facilities and Other Resources
  - Appendix 5: Equipment
  - Appendix 6: Other Attachments (optional)

## SUBMISSION INSTRUCTIONS

Completed proposals must be submitted into the DOE SC Portfolio Analysis and Management System (PAMS) at <https://pamspublic.science.energy.gov>.

**Important Instructions to the Sponsored Research Office of Submitting Institutions:** EM requires that you create one single machine-readable PDF file that contains the DOE Title Page, project narrative, biographical sketch, current and pending support, bibliography and references cited, facilities and other resources, equipment, and other attachments. This single PDF file may not be scanned from a printed document and must be uploaded in PAMS. This must be a plain PDF file consisting of text, numbers, and images without editable fields, signatures, passwords, redactions, or other advanced features available in some PDF-compatible software. Do not use PDF portfolios or binders. The research narrative will be read by EM staff using the full version of Adobe Acrobat: Please ensure that the narrative is readable in Acrobat. If combining multiple files into one research narrative, ensure that a PDF portfolio or binder is not created. If creating PDF files using any software other than Adobe Acrobat, please use a “Print to PDF” or equivalent process to ensure that all content is visible in the research narrative. Once a research narrative has been assembled, please submit the combined research narrative file through a “Print to PDF” or equivalent process to ensure that all content is visible in one PDF file that can be viewed in Adobe Acrobat.

**WARNING:** The PAMS website at <https://pamspublic.science.energy.gov> will permit you to edit a previously submitted proposal in the time between your submission and the deadline. If you choose to edit, doing so will remove your previously submitted version from consideration. If you are still editing at the time of the deadline, you will not have a valid submission. Please pay attention to the deadline.

## PROPOSAL DUE DATE

The proposal due date is printed on the cover of this Announcement.

## LETTERS

Proposals may not include letters of support or recommendation.

## 2. Abstract

The project summary/abstract is a summary of the proposed activity suitable for distribution to the public and sufficient to permit potential reviewers to identify conflicts of interest. It must be a self-contained document. Provide the name of the applicant, the project title, the PI and the PI's institutional affiliation, any coinvestigators and their institutional affiliations, the objectives of the project, a description of the project, including methods to be employed, and the potential impact of the project (i.e., benefits, outcomes). A sample is provided below:

<p>Project Title</p> <p>A. Smith, Lead Institution (Principal Investigator) A. Brown, Institution 2 (Co-Investigator) A. Jones, Institution 3 (Co-Investigator)</p> <p>Text of abstract</p>
---

The project summary must not exceed 1 page when printed using standard letter-size (8.5 by 11 inch) paper with 1-inch margins (top, bottom, left and right) with font not smaller than 11 point. The one-page project summary/abstract should be placed in a separate, single pdf document and attached on the appropriate screen in PAMS.

If a proposal is recommended for award, the project summary will be used in preparing a public abstract about the award. Award abstracts and titles form a Government document that describes the project and justifies the expenditure of Federal funds in light of the DOE and EM mission statements at <https://energy.gov/mission> and <https://www.energy.gov/em/mission>.

- Do not include any proprietary or sensitive business information.
- DOE may use the abstract may to prepare public reports about supported research.

### **3. Budget and Justification**

The budget must be submitted into PAMS using the PAMS budget form.

Budgets are required for the entire project period. A budget form should be completed for each budget period of the award, and a cumulative budget form for the entire project period will be populated by PAMS. PAMS will calculate the cumulative budget totals for you.

A written justification of each budget item is to follow the budget pages. The budget justification should be placed in a separate, single pdf document and attached on the appropriate screen in PAMS. Further instructions regarding the budget and justification are given below and in the PAMS software.

### **4. Proposal**

DOE TITLE PAGE  
(PART OF PROJECT NARRATIVE)

The following proposal title page information may be placed on a plain page. No form is required. This cover page will not count in the project narrative page limitation.

- The project title:
- Applicant/Institution:
- Street Address/City/State/Zip:
- Postal Address:

- Administrative Point of Contact name, telephone number, email:
- Lead PI name, telephone number, email:
- DOE National Laboratory Announcement Number:
- DOE/EM Program Office:
- DOE/EM Program Office Technical Contact: (select Dr. Philip Wilk (SC) in PAMS)
- Research area or areas as identified in [Section I](#) of this Announcement

## PROJECT NARRATIVE

The project narrative **must not exceed a page limit of 15 pages** of technical information, including charts, graphs, maps, photographs, and other pictorial presentations, when printed using standard letter-size (8.5 x 11 inch) paper with 1 inch margins (top, bottom, left, and right). The font must not be smaller than 11 point. Merit reviewers will only consider the number of pages specified in the first sentence of this paragraph. This page limit does not apply to the Title Page, Budget Page(s), Budget Justification, biographical material, publications and references, and appendices, each of which may have its own page limit defined later in this Announcement.

Do not include any Internet addresses (URLs) that provide supplementary or additional information that constitutes a part of the proposal. Merit reviewers are not required to access Internet sites; however, Internet publications in a list of references will be treated identically to print publications. See Section VIII for instructions on how to mark proprietary proposal information.

**Background/Introduction:** Explanation of the importance and relevance of the proposed work as well as a review of the relevant literature.

**Proposed Research and Methods:** Identify the hypotheses to be tested (if any) and details of the methods to be used including the integration of experiments with theoretical and computational research efforts.

**Timetable of Activities:** Timeline for all major activities including milestones and deliverables, including go/no-go milestones.

**Project Management Plan:** Multi-institutional proposals must include a project management plan that clearly indicates the roles and responsibilities of each organization and indicates how activities will be coordinated and communicated among team members.

**Project Objectives:** This section should provide a clear, concise statement of the specific objectives/aims of the proposed project.

The Project Narrative comprises the research plan for the project. It should contain enough background material in the Introduction, including review of the relevant literature, to demonstrate sufficient knowledge of the state of the science. The major part of the narrative should be devoted to a description and justification of the proposed project, including details of the method to be used. It should also include a timeline for the major activities of the proposed project, and should indicate which project personnel will be responsible for which activities.

There should be no ambiguity about which personnel will perform particular parts of the project, and the time at which these activities will take place.

#### APPENDIX 1: BIOGRAPHICAL SKETCH

Provide a biographical sketch for the PI and each senior/key person as an appendix to your technical narrative.

- Provide the biographical sketch information as an appendix to your project narrative.
- Do not attach a separate file.
- The biographical sketch appendix will not count in the project narrative page limitation.
- The biographical information (curriculum vitae) for each person must not exceed 2 pages when printed on letter-size (8.5 x 11 inch) paper with 1 inch margins (top, bottom, left, and right) with font not smaller than 11 point

Detailed instructions may be found in [Section VIII](#) of this Announcement.

**WARNING:** These instructions have been significantly revised to require disclosure of a variety of potential conflicts of interest or commitment, including participation in foreign government-sponsored talent recruitment programs.

The PI and each senior/key person at the prime applicant and any proposed subaward must provide a list of all sponsored activities, awards, and appointments, whether paid or unpaid; provided as a gift with terms or conditions or provided as a gift without terms or conditions; full-time, part-time, or voluntary; faculty, visiting, adjunct, or honorary; cash or in-kind; foreign or domestic; governmental or private-sector; directly supporting the individual's research or indirectly supporting the individual by supporting students, research staff, space, equipment, or other research expenses. All foreign government-sponsored talent recruitment programs must be identified in current and pending support.

#### APPENDIX 2: CURRENT AND PENDING SUPPORT

Provide a list of all current and pending support for the PI and senior/key personnel, including sub-awardees. Provide the Current and Pending Support as an appendix to your project narrative. Concurrent submission of a proposal to other organizations for simultaneous consideration will not prejudice its review.

- Do not attach a separate file.
- This appendix will not count in the project narrative page limitation.

Detailed instructions may be found in [Section VIII](#) of this Announcement.

#### APPENDIX 3: BIBLIOGRAPHY & REFERENCES CITED

Provide a bibliography of any references cited in the Project Narrative. Each reference must include the names of all authors (in the same sequence in which they appear in the publication),

the article and journal title, book title, volume number, page numbers, and year of publication. For research areas where there are routinely more than ten coauthors of archival publications, you may use an abbreviated style such as the *Physical Review Letters* (PRL) convention for citations (listing only the first author). For example, your paper may be listed as, “A Really Important New Result,” A. Aardvark et. al. (MONGO Collaboration), PRL 999. Include only bibliographic citations. Applicants should be especially careful to follow scholarly practices in providing citations for source materials relied upon when preparing any section of the proposal. Provide the Bibliography and References Cited information as an appendix to your project narrative.

- Do not attach a separate file.
- This appendix will not count in the project narrative page limitation.

#### APPENDIX 4: FACILITIES & OTHER RESOURCES

This information is used to assess the capability of the organizational resources, including sub-awardee resources, available to perform the effort proposed. Identify the facilities to be used (Laboratory, Animal, Computer, Office, Clinical and Other). If appropriate, indicate their capacities, pertinent capabilities, relative proximity, and extent of availability to the project. Describe only those resources that are directly applicable to the proposed work. Describe other resources available to the project (e.g., machine shop, electronic shop) and the extent to which they would be available to the project. For proposed investigations requiring access to experimental user facilities maintained by institutions other than the applicant, please provide a document from the facility manager confirming that the researchers will have access to the facility. Please provide the Facility and Other Resource information as an appendix to your project narrative.

- Do not attach a separate file.
- This appendix will not count in the project narrative page limitation.

#### APPENDIX 5: EQUIPMENT

List major items of equipment already available for this project and, if appropriate identify location and pertinent capabilities. Provide the Equipment information as an appendix to your project narrative.

- Do not attach a separate file.
- This appendix will not count in the project narrative page limitation.

#### APPENDIX 6: OTHER ATTACHMENT

If you need to elaborate on your responses to the PAMS Cover Page, please provide the Other Attachment information as an appendix to your project narrative. Information not easily accessible to a reviewer may be included in this appendix, but do not use this appendix to circumvent the page limitations of the proposal. Reviewers are not required to consider information in this appendix.

- Do not attach a separate file.



- This appendix will not count in the project narrative page limitation.

#### **D. SUBMISSIONS FROM SUCCESSFUL APPLICANTS**

If selected for award, DOE reserves the right to request additional or clarifying information.

#### **E. SUBMISSION DATES AND TIMES**

##### **1. Letter of Intent Due Date**

The letter of intent due date is printed on the cover of this Announcement.

##### **2. Pre-proposal Due Date**

Not Applicable.

##### **3. Proposal Due Date**

The proposal due date is printed on the cover of this Announcement.

You are encouraged to transmit your proposal well before the deadline. Proposals may be submitted at any time between the publication of this Announcement and the stated deadline.

##### **4. Late Submissions**

Proposals received after the deadline will not be reviewed or considered for award.

## Section V - PROPOSAL REVIEW INFORMATION

### A. CRITERIA

#### 1. Initial Review Criteria

Prior to a comprehensive merit evaluation, DOE will perform an initial review to determine that (1) the applicant is eligible for the award; (2) the information required by the Program Announcement has been submitted; (3) all mandatory requirements are satisfied; (4) the proposed project is responsive to the objectives of the Program Announcement, and (5) the proposed project is not duplicative of programmatic work. Proposals that fail to pass the initial review will not be forwarded for merit review and will be eliminated from further consideration.

#### 2. Merit Review Criteria

Proposals will be subjected to scientific merit review (peer review) and will be evaluated against the following criteria, listed in descending order of importance.

- Mission Relevance;
- Scientific and/or Technical Merit of the Project;
- Appropriateness of the Proposed Method or Approach; and
- Competency of Applicant's Personnel and Adequacy of Proposed Resources.

The evaluation process will also include program policy factors such as the relevance of the proposed research to the terms of the DOE National Laboratory Announcement and the agency's programmatic needs, the balance of activities within the program, and the utility of the proposed activities to the broader scientific community. Note that external peer reviewers are selected with regard to both their scientific expertise and the absence of conflict-of-interest issues. Both Federal and non-Federal reviewers may be used, and submission of a proposal constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.

The questions below are provided to the merit reviewers to elaborate the criteria:

#### MISSION RELEVANCE (WEIGHTED 35%)

- Does the proposal demonstrate a clear understanding of the current state of the mission?
- How well does the proposed research align with the mission need to reduce life cycle cost and schedule?
- Does the proposal address implementation of the work within the Hanford tank waste mission?
- For wider applications within the EM complex, is the research useful to more than one mission requirement or beyond the Hanford Site?

#### SCIENTIFIC AND/OR TECHNICAL MERIT OF THE PROPOSED RESEARCH (WEIGHTED 35%)

- Does the proposal provide sufficient technical detail to assess whether the proposed work is scientifically meritorious?
- Does the proposed work attempt to realize its objectives in a way that others have not previously considered or exploited?
- What is the likelihood of achieving valuable results?
- Will the proposed method provide demonstratable improvements over the baselined approach or current technology?
- What is the technology maturity of the proposed work?
- How well does the proposed work fit within or inform the regulatory framework and technical approach of the Hanford tank waste mission?

#### APPROPRIATENESS OF THE PROPOSED METHOD OR APPROACH (WEIGHTED 20%)

- Is the proposal plan sufficient to achieve the proposed results?
- Is this a logical and feasible approach given the current state of science and technology and environmental regulations?
- How well does the proposed management structure ensure project execution and accountability?
- Is the proposal clear with well-defined milestones and appropriate deliverables?
- Does the applicant recognize significant potential problems and consider alternative strategies?
- Are the go/no-go milestones reasonable and appropriate to complete the proposed work?

#### COMPETENCY OF APPLICANT'S PERSONNEL AND ADEQUACY OF PROPOSED RESOURCES (WEIGHTED 10%)

- What is the past performance of the team lead?
- How well qualified is the team to carry out the proposed work?
- What level of partnership exists between the team lead and other team members?
- Are the environment and facilities adequate for performing the proposed effort?
- Are the proposed budget and staffing levels adequate to carry out the proposed work?
- Is the budget reasonable and appropriate for the scope?

### **B. REVIEW AND SELECTION PROCESS**

DOE EM anticipate holding a merit review panel of experts to evaluate proposals submitted to this Announcement. The panel is expected to meet in August.

#### **1. Merit Review**

Proposals that pass the initial review will be subjected to a formal merit review and will be evaluated based on the criteria above.

## **2. Program Policy Factors**

The Selection Official may consider any of the following program policy factors in making the selection, listed in no order of significance:

- Availability of funds
- Relevance of the proposed activity to EM priorities
- Ensuring an appropriate balance of activities within EM programs
- Performance under current awards

## **3. Selection**

The Selection Official will consider the findings of the merit review and may consider any of the Program Policy Factors described above.

## **4. Discussions and Award**

The Government may enter into discussions with a selected applicant for any reason deemed necessary. Failure to resolve satisfactorily the issues identified by the Government will preclude award to the applicant.

## **C. ANTICIPATED NOTICE OF SELECTION AND AWARD DATES**

It is anticipated that the award selection will be completed by the end of September, 2023. It is expected that awards will be made in Fiscal Year 2023.

## **Section VI - AWARD ADMINISTRATION INFORMATION**

### **A. AWARD NOTICES**

#### **1. Notice of Selection**

**Selected Applicants Notification:** DOE will notify applicants selected for award. This notice of selection is not an authorization to begin performance.

**Non-selected Notification:** Organizations whose proposals have not been selected will be advised as promptly as possible. This notice will explain why the proposal was not selected.

#### **2. Notice of Award**

A work authorization/contract modification issued by the contracting officer is the authorizing award document.

### **B. ADMINISTRATIVE AND POLICY REQUIREMENTS**

The following additional policy provisions are applicable to this Announcement. The full text of each provision is in Section VIII of this Announcement and may be accessed by navigating to the hyperlinks below:

[1. Availability of Funds](#)

[2. Commitment of Public Funds](#)

[3. Environmental, Safety and Health \(ES&H\) Performance of Work at DOE Facilities](#)

[4. Evaluation and Administration by Non-Federal Personnel](#)

[5. Federal, State, and Local Requirements](#)

[6. Funding Restrictions](#)

[7. Government Right to Reject or Negotiate](#)

[8. Modification](#)

[9. Proprietary Proposal Information](#)

[10. Publications](#)

### **C. REPORTING**

Annual progress reports from the award investigator will be required and will be due 90 days before the end of each budget year.

## Section VII - QUESTIONS/AGENCY CONTACTS

### A. QUESTIONS

For help with PAMS, click the “External User Guide” link on the PAMS website, <https://PAMSPublic.science.energy.gov/>. You may also contact the PAMS Help Desk, which can be reached Monday through Friday, 9AM – 5:30 PM Eastern Time. Telephone: (855) 818-1846 (toll free) or (301) 903-9610, Email: [sc.pams-helpdesk@science.doe.gov](mailto:sc.pams-helpdesk@science.doe.gov). All submission and inquiries about this DOE National Laboratory Program Announcement should reference the Announcement number printed on the cover.

Please contact the PAMS help desk for technological issues with the PAMS system.

Questions regarding the specific program areas and technical requirements may be directed to the technical contacts listed for each program within the DOE National Laboratory Program Announcement or below.

Please contact the program staff with all questions not directly related to the PAMS system.

### B. AGENCY CONTACTS

PAMS Customer Support	855-818-1846 (toll-free) 301-903-9610 <a href="mailto:sc.pams-helpdesk@science.doe.gov">sc.pams-helpdesk@science.doe.gov</a>
Program Manager Ming Zhu	301-903-9240 <a href="mailto:Ming.Zhu@em.doe.gov">Ming.Zhu@em.doe.gov</a>

### C. DEPARTMENT OF ENERGY, OFFICE OF INSPECTOR GENERAL HOTLINE:

The Office of Inspector General (OIG) maintains a Hotline to facilitate the reporting of allegations of fraud, waste, abuse, or mismanagement in DOE programs or operations. If you wish to report such allegations, you may call, send a letter, or email the OIG Hotline [ighotline@hq.doe.gov](mailto:ighotline@hq.doe.gov). Allegations may be reported by DOE employees, DOE contractors, or the general public. OIG contact information is available at <https://energy.gov/ig/services>.

## Section VIII – SUPPLEMENTARY MATERIAL

### A. HOW-TO GUIDES

#### 1. How Consortia May be Used

##### INCORPORATED CONSORTIA

Incorporated consortia are eligible to apply for funding as a prime recipient (lead organization) or subrecipient (team member).

Each incorporated consortium must have an internal governance structure and a written set of internal rules. Upon request, the consortium must provide a written description of its internal governance structure and its internal rules to the DOE contracting officer. There is no requirement that subawards be formalized into incorporated consortia.

##### UNINCORPORATED CONSORTIA

Unincorporated consortia (team arrangements) must designate one member of the consortium to serve as the prime recipient/consortium representative (lead organization). There is no requirement that subawards be formalized into unincorporated consortia.

Upon request, unincorporated consortia must provide the DOE contracting officer with a collaboration agreement, commonly referred to as the articles of collaboration, which sets out the rights and responsibilities of each consortium member. This agreement binds the individual consortium members together and should discuss, among other things, the consortium's:

- Management structure;
- Method of making payments to consortium members;
- Means of ensuring and overseeing members' efforts on the project;
- Provisions for members' cost sharing contributions; and
- Provisions for ownership and rights in intellectual property developed previously or under the agreement.

Note that a consortium is applied for in one proposal and results in one award with subawards to consortia members. Multi-institutional teams may, if permitted under this Announcement, submit collaborative proposals with each institution submitting its own proposal with an identical research narrative, resulting in multiple awards to the collaborating institutions.

#### 2. How to Prepare and Submit a Proposal

##### SUBMITTING A PROPOSAL

The following information is provided to help with proposal submission. Detailed instructions and screen shots can be found in the user guide. To find the user guide, click the "External User Guide" link on the PAMS home page. Onscreen instructions are available within PAMS.

- Log into PAMS. From the proposals tab, click the “View DOE National Laboratory Announcements” link and find the current announcement in the list. Click the “Actions/Views” link in the Options column next to this Announcement to obtain a dropdown menu. Select “Submit Proposal” from the dropdown.
- Note that you must select one and only one Principal Investigator (PI) per proposal; to do so, click the “Select PI” button on the far right side of the screen. Find the appropriate PI from the list of all registered users from your institution returned by PAMS. (Hint: You may have to sort, filter, or search through the list if it has multiple pages.) Click the “Actions” link in the Options column next to the appropriate PI to obtain a dropdown menu. From the dropdown, choose “Select PI.”
- If the PI for whom you are submitting does not appear on the list, it means he or she has not yet registered in PAMS. For your convenience, you may have PAMS send an email invitation to the PI to register in PAMS. To do so, click the “Invite PI” link at the top left of the “Select PI” screen. You can enter an optional personal message to the PI in the “Comments” box, and it will be included in the email sent by PAMS to the PI. You must wait until the PI registers before you can submit the proposal. Save the proposal for later work by selecting “Save” from the dropdown at the bottom of the screen and then clicking the “Go” button. It will be stored in “My Proposals” for later editing. As a minimum, you must complete all the required fields on the PAMS cover page before you can save the proposal for the first time.
- The cover page, budget, and attachments sections of the lab proposal are required by PAMS before it can be submitted to DOE.
- Complete the sections in PAMS one at a time, starting with the cover page and following the instructions for each section.
- Click the “+View More” link at the top of each section to expand the onscreen instructions. On the budget section, click the “Budget Tab Instructions” link to obtain detailed guidance on completing the budget form.
- Save each section by selecting either “Save” (to stay in the same section) or “Save... and Continue to the Next Section” (to move to the next section) from the dropdown menu at the bottom of the screen, followed by clicking the “Go” button.
- If you save the proposal and navigate away from it, you may return later to edit the proposal by clicking the “View My Existing Proposals” or “My Proposals” links within PAMS.
- You must enter a budget for each annual budget period.
- You must also enter a budget for each proposed sub-award. The sub-award section can be completed using the same steps used for the budget section.
- In the attachments section of the lab proposal, the abstract, the budget justification, and the proposal narrative are required and must be submitted as separate files.
- You must bundle everything other than the budget, abstract, and budget justification into one single PDF file to be attached under “Proposal Attachment.”
- Do not attach anything under “Other Attachments.”
- To upload a file into PAMS, click the “Attach File” button at the far right side of the screen. Click the “Browse” (or “Choose File” depending on your browser) button to search for your file. You may enter an optional description of the file you are attaching. Click the “Upload” button to upload the file.



- Once you have saved all of the sections, the “Submit to DOE” option will appear in the dropdown menu at the bottom of the screen.
- To submit the proposal, select “Submit to DOE” from the dropdown menu and then click the “Go” button.
- Upon submission, the PI will receive an email from the PAMS system <[PAMS.Autoreply@science.doe.gov](mailto:PAMS.Autoreply@science.doe.gov)> acknowledging receipt of the proposal.
- The proposal will also appear under My Proposals with a Proposal Status of “Submitted to DOE.”

Please only submit a PAMS lab technical proposal in response to this Announcement; do not submit a DOE Field Work Proposal (FWP) at this time. EM will request FWPs later from those selected for funding consideration under this Announcement.

#### PROPOSAL PREPARATION

All files submitted a part of a proposal must be PDF files unless otherwise specified in this Announcement. Attached PDF files must be plain files consisting of text, numbers, and images without editable fields, signatures, passwords, redactions, or other advanced features available in some PDF-compatible software. Do not use PDF portfolios or binders.

Please note the following restrictions that apply to the names of all files attached to your proposal:

- Please limit file names to 50 or fewer characters
- Do not attach any documents with the same name. All attachments must have a unique name.
- Please use only the following characters when naming your attachments: A-Z, a-z, 0-9, underscore, hyphen, space, period, parenthesis, curly braces, square brackets, ampersand, tilde, exclamation point, comma, semi colon, apostrophe, at sign, number sign, dollar sign, percent sign, plus sign, and equal sign. Attachments that do not follow this rule may cause the entire proposal to be rejected or cause issues during processing.

#### RESUBMISSION OF PROPOSALS

Proposals submitted under this announcement may be withdrawn from consideration by using the PAMS website at <https://pamspublic.science.energy.gov>. Proposals may be withdrawn at any time between when the applicant submits the proposal and when DOE makes the proposal available to merit reviewers. Such withdrawals take effect immediately and cannot be reversed. Please exercise due caution. After the proposal is made available to merit reviewers, the applicant may contact the DOE program office identified in this Announcement to request that it be withdrawn.

After a proposal is withdrawn, it may be resubmitted, if this Announcement is still open for the submission of proposals. Such resubmissions will only count as one submission if this Announcement restricts the number of proposals from an applicant.

## IMPROPER CONTENTS OF PROPOSALS

Proposals submitted under this Announcement will be stored in controlled-access systems, but they may be made publicly available if an award is made. As such, it is critical that applicants follow these guidelines:

- Do not include information subject to any legal restriction on its open distribution, whether classified, export control, or unclassified controlled nuclear information.
- Do not include sensitive and protected personally identifiable information, including social security numbers, birthdates, citizenship, marital status, or home addresses. Pay particular attention to the content of biographical sketches and curriculum vitae.
- Do not include letters of support from Federal officials.
- Do not include letters of support on Federal letterhead. Letters that are not letters of support (such as letters confirming access to sites, facilities, equipment, or data; or letters from cognizant contracting officers) may be on Federal letterhead.
- Clearly mark all proprietary or trade-secret information.

### **3. How to Prepare a Biographical Sketch**

A biographical sketch is to provide information that can be used by reviewers to evaluate the PI's potential for leadership within the scientific community. Examples of information of interest are invited and/or public lectures, awards received, scientific program committees, conference or workshop organization, professional society activities, special international or industrial partnerships, reviewing or editorship activities, or other scientific leadership experiences.

EM recommends the use of the format approved by the National Science Foundation (NSF), which may be generated by the Science Experts Network Curriculum Vitae (SciENcv), a cooperative venture maintained at <https://www.ncbi.nlm.nih.gov/sciencv/>, and is also available at <https://nsf.gov/bfa/dias/policy/nsfapprovedformats/biosketch.pdf>. If an interagency common format for a biographical sketch has been promulgated, that format must be used in a proposal. The use of a format required by another agency is intended to reduce the administrative burden to researchers by promoting the use of common formats.

Requested information may be appended to a biographical sketch, whether produced from a fillable PDF or in SciENcv.

EM strongly recommends the use of SciENcv to reduce administrative burden by allowing the use of digital persistent identifiers, including the Open Researcher and Contributor ID (ORCID).

Do not attach a listing of individuals who should not be used as merit reviewers: This information is no longer collected as part of a biographical sketch.

### **4. How to Prepare a List of Individuals Who Should Not Serve as Reviewers**

To assist in identifying individuals who should not serve as merit reviews, provide the following information for each and every senior/key person who is planned to be or is identified in Section A of the proposal budget for the applicant and any proposed subrecipients:

- Advisees (graduate students or postdocs) of the senior/key person
- Advisors of the senior/key person while a graduate student or a postdoc
- Close associates of the senior/key person over the past 48 months
- Co-authors of the senior/key person over the past 48 months
- Co-editors of the senior/key person over the past 48 months
- Co-investigators of the senior/key person over the past 48 months
- Collaborators of the senior/key person over the past 48 months

Do not identify any personnel at the applicant institution or any proposed subrecipient or team institution: Those personnel are prohibited from serving as merit reviewers.

Large collaborations of 10 or more researchers do not require that all collaborators be identified: rather, only list the researchers with whom the senior/key person actually collaborated.

For all identified individuals, provide the following information:

- The senior/key person to whom the individual was an advisee, advisor, close associate, co-author, co-editor, co-investigator, or collaborator, identified by first name and last name
- The individual's first (given) name
- The individual's last (family) name
- The individual's Open Researcher and Contributor ID (ORCID), if known
- The individual's institutional affiliation spelling out acronyms (For joint appointments, separate each institution with a slash ("/"). Do not list departmental affiliations.)
- The reason for listing the individual (advisee, advisor, close associate, co-author, co-editor, co-investigator, collaborator)
- The year when the individual last was a close associate, co-author, co-editor, co-investigator, or collaborator

You may also provide a list of all senior/key personnel who are planned to be or are identified in Section A of the proposal budget for the applicant and any proposed subrecipients.

The lists do not need to be sorted in any method.

The lists must be submitted in tabular format, preferably as Microsoft Excel (.xls or .xlsx) files.

## **5. How to Prepare Current and Pending Support**

Current and Pending support is intended to allow the identification of potential duplication, overcommitment, potential conflicts of interest or commitment, and all other sources of support. The PI and each senior/key person at the prime applicant and any proposed subaward must provide a list of all sponsored activities, awards, and appointments, whether paid or unpaid; provided as a gift with terms or conditions or provided as a gift without terms or conditions; full-time, part-time, or voluntary; faculty, visiting, adjunct, or honorary; cash or in-kind; foreign or domestic; governmental or private-sector; directly supporting the individual's research or indirectly supporting the individual by supporting students, research staff, space, equipment, or other research expenses. All foreign government-sponsored talent recruitment programs must be

identified in current and pending support.

EM recommends the use of the format approved by the National Science Foundation (NSF), which may be generated by the Science Experts Network Curriculum Vitae (SciENcv), a cooperative venture maintained at <https://www.ncbi.nlm.nih.gov/sciencv/>, and is also available at <https://www.nsf.gov/bfa/dias/policy/nsfapprovedformats/cps.pdf>. If an interagency common format for current and pending support has been promulgated, that format must be used in a proposal. The use of a format required by another agency is intended to reduce the administrative burden to researchers by promoting the use of common formats.

For every activity, list the following items:

- The sponsor of the activity or the source of funding.
- The award or other identifying number.
- The title of the award or activity. If the title of the award or activity is not descriptive, add a brief description of the research being performed that would identify any overlaps or synergies with the proposed research.
- The total cost or value of the award or activity, including direct and indirect costs. For pending proposals, provide the total amount of requested funding.
- The award period (start date – end date).
- The person-months of effort per year being dedicated to the award or activity.

If required to identify overlap, duplication of effort, or synergistic efforts, append a description of the other award or activity to the current and pending support.

Requested information may be appended to current and pending support, whether produced from a fillable PDF or in SciENcv.

EM strongly recommends the use of SciENcv to reduce administrative burden by allowing the use of digital persistent identifiers, including the Open Researcher and Contributor ID (ORCID).

Details of any obligations, contractual or otherwise, to any program, entity, or organization sponsored by a foreign government must be provided on request to either the applicant institution or DOE.

## **6. How to Prepare a Budget and Justification**

The following advice will improve the accuracy of your budget request:

- Funds requested for personnel (senior, key, and other) must be justified as the product of their effort on the project and their institutional base salary.
- Funds requested for fringe benefits must be calculated as the product of the requested salary and, if present, the negotiated fringe benefit rate contained in an institution's negotiated indirect cost rate agreement.
- Funds requested for indirect costs must be calculated using the correct indirect cost base and the negotiated indirect cost rate.
- You are encouraged to include the rate agreement used in preparing a budget as a part of the

budget justification.

- Do not prepare a budget justification using the expired DOE form F4260.1.

#### Budget Fields

Section A Senior/Key Person	For each Senior/Key Person, enter the requested information. List personnel, base salary, the number of months that person will be allocated to the project, requested salary, fringe benefits, and the total funds requested for each person. The requested salary must be the product of the base salary and the effort. Include a written narrative in the budget justification that justifies the need for requested personnel. Within the justification, explain the fringe benefit rate used if it is not the standard faculty rate.
Section B Other Personnel	List personnel, the number of months that person will be allocated to the project, requested salary fringe benefits, and the total funds requested for each person. Include a written narrative in the budget justification that fully justifies the need for requested personnel. Within the justification, provide the number of positions being filled in each category of other personnel.
Section C Equipment	For the purpose of this budget, equipment is designated as an item of property that has an acquisition cost of \$5,000 or more and an expected service life of more than one year, unless a different threshold is specified in a negotiated Facilities and Administrative Cost Rate. (Note that this designation applies for proposal budgeting only and differs from the DOE definition of capital equipment.) List <b>each</b> item of equipment separately and justify each in the budget justification section. Do not aggregate items of equipment. Allowable items ordinarily will be limited to research equipment and apparatus not already available for the conduct of the work. General-purpose office equipment is not eligible for support unless primarily or exclusively used in the actual conduct of scientific research.
Section D Travel	For purposes of this section only, travel to Canada or to Mexico is considered domestic travel. In the budget justification, list each trip's destination, dates, estimated costs including transportation and subsistence, number of staff traveling, the purpose of the travel, and how it relates to the project. Indicate the basis for the cost estimate (quotes from vendors or suppliers, past experience of similar items, or some other basis). To qualify for support, attendance at meetings or conferences must enhance the investigator's capability to perform the research, plan extensions of it, or disseminate its results. Domestic travel is to be justified separately from foreign travel. Within the budget justification, detail the number of personnel planning to travel and the estimated per-traveler cost for each trip.
Section E Participant/Trainee Support Costs	If applicable, submit training support costs. Educational projects that intend to support trainees (precollege, college, graduate and post graduate) must list each trainee cost that includes stipend levels and

	<p>amounts, cost of tuition for each trainee, cost of any travel (provide the same information as needed under the regular travel category), and costs for any related training expenses. Participant costs are those costs associated with conferences, workshops, symposia or institutes and breakout items should indicate the number of participants, cost for each participant, purpose of the conference, dates and places of meetings and any related administrative expenses.</p> <p>Indicate the basis for the cost estimate (quotes from vendors or suppliers, past experience of similar items, or some other basis).</p>
<p>Section F Other Direct Costs</p>	<ul style="list-style-type: none"> <li>• <b>Materials and Supplies:</b> Enter total funds requested for materials and supplies in the appropriate fields. In the budget justification, indicate general categories such as glassware, and chemicals, including an amount for each category (items not identified under “Equipment”). Categories less than \$1,000 are not required to be itemized. Indicate the basis for the cost estimate (quotes from vendors or suppliers, past experience of similar items, or some other basis).</li> <li>• <b>Publication Costs:</b> Enter the total publication funds requested. The proposal budget may request funds for the costs of documenting, preparing, publishing or otherwise making available to others the findings and products of the work conducted under the award. In the budget justification, include supporting information. Indicate the basis for the cost estimate (quotes from vendors or suppliers, past experience of similar items, or some other basis).</li> <li>• <b>Consultant Services:</b> Enter total funds requested for all consultant services. In the budget justification, identify each consultant, the services he/she will perform, total number of days, travel costs, and total estimated costs. Indicate the basis for the cost estimate (quotes from vendors or suppliers, past experience of similar items, or some other basis).</li> <li>• <b>ADP/Computer Services:</b> Enter total funds requested for ADP/Computer Services. The cost of computer services, including computer-based retrieval of scientific, technical and education information may be requested. In the budget justification, include the established computer service rates at the proposing organization if applicable. Indicate the basis for the cost estimate (quotes from vendors or suppliers, past experience of similar items, or some other basis).</li> <li>• <b>Subawards/Consortium/Contractual Costs:</b> Enter total costs for all subawards/consortium organizations and other contractual costs proposed for the project. In the budget justification, justify the details.</li> <li>• <b>Equipment or Facility Rental/User Fees:</b> Enter total funds requested for Equipment or Facility Rental/User Fees. In the budget</li> </ul>

	<p>justification, identify each rental/user fee and justify. Indicate the basis for the cost estimate (quotes from vendors or suppliers, past experience of similar items, or some other basis).</p> <ul style="list-style-type: none"> <li>• <b>Alterations and Renovations:</b> Enter total funds requested for Alterations and Renovations. In the budget justification, itemize by category and justify the costs of alterations and renovations, including repairs, painting, removal or installation of partitions, shielding, or air conditioning. Where applicable, provide the square footage and costs.</li> <li>• <b>Other:</b> Add text to describe any other Direct Costs not requested above. Enter costs associated with “Other” item(s). Use the budget justification to further itemize and justify.</li> </ul>
Section G Direct Costs	This represents Total Direct Costs (Sections A through F). PAMS will automatically calculate this.
Section H Other Indirect Costs	Enter the Indirect Cost information, including the rates and bases being used, for each field. Only four general categories of indirect costs are allowed/requested on this form, so please consolidate if needed. Include the cognizant Federal agency and contact information if using a negotiated rate agreement. Within the budget justification, explain the use of multiple rates, if multiple rates are used.
Section I Total Direct and Indirect Costs	This is the total of Sections G and H. PAMS will automatically calculate this.

## 7. How to Register in PAMS

You must register in PAMS to submit a pre-proposal, letter of intent, or DOE National Laboratory proposal.

You may use the Internet Explorer, Firefox, Google Chrome, or Safari browsers to access PAMS.

Notifications sent from the PAMS system will come from the PAMS email address <[PAMS.Autoreply@science.doe.gov](mailto:PAMS.Autoreply@science.doe.gov)>. Please make sure your email server/software allows delivery of emails from the PAMS email address to yours.

Registering to PAMS is a two-step process; once you create an individual account, you must associate yourself with (“register to”) your institution. Detailed steps are listed below.

### CREATE PAMS ACCOUNT:

To register, click the “Create New PAMS Account” link on the website <https://pamspublic.science.energy.gov/>.

- Click the “No, I have never had an account” link and then the “Create Account” button.

- You will be prompted to enter your name and email address, create a username and password, and select a security question and answer. Once you have done this, click the “Save and Continue” button.
- On the next page, enter the required information (at least one phone number and your mailing address) and any optional information you wish to provide (e.g., FAX number, website, mailstop code, additional email addresses or phone numbers, Division/Department). Click the “Create Account” button.
- Read the user agreement and click the “Accept” button to indicate that you understand your responsibilities and agree to comply with the rules of behavior for PAMS.
- PAMS will take you to the “Having Trouble Logging In?” page. (If you have been an EM merit reviewer or if you have previously submitted a proposal, you may already be linked to an institution in PAMS. If this happens, you will be taken to the PAMS home page.)

#### REGISTER TO YOUR INSTITUTION:

1. Click the link labeled “Option 2: I know my institution and I am here to register to the institution.” (Note: If you previously created a PAMS account but did not register to an institution at that time, you must click the Institutions tab and click the “Register to Institution” link.)
2. PAMS will take you to the “Register to Institution” page.
3. Type a word or phrase from your institution name in the field labeled, “Institution Name like,” choose the radio button next to the item that best describes your role in the system, and click the “Search” button. A “like” search in PAMS returns results that contain the word or phrase you enter; you do not need to enter the exact name of the institution, but you should enter a word or phrase contained within the institution name. (If your institution has a frequently used acronym, such as ANL for Argonne National Laboratory or UCLA for the Regents of the University of California, Los Angeles, you may find it easiest to search for the acronym under “Institution Name like.” Many institutions with acronyms are listed in PAMS with their acronyms in parentheses after their names.)
4. Find your institution in the list that is returned by the search and click the “Actions” link in the Options column next to the institution name to obtain a dropdown list. Select “Add me to this institution” from the dropdown. PAMS will take you to the “Institutions – List” page.
5. If you do not see your institution in the initial search results, you can search again by clicking the “Cancel” button, clicking the Option 2 link, and repeating the search.
6. If, after searching, you think your institution is not currently in the database, click the “Cannot Find My Institution” button and enter the requested institution information into PAMS. Click the “Create Institution” button. PAMS will add the institution to the system, associate your profile with the new institution, and return you to the “Institutions – List” page when you are finished.

For help with PAMS, click the “External User Guide” link on the PAMS website, <https://pamspublic.science.energy.gov/>. You may also contact the PAMS Help Desk, which can be reached Monday through Friday, 9AM – 5:30 PM Eastern Time. Telephone: (855) 818-1846 (toll free) or (301) 903-9610, email: [sc.pams-helpdesk@science.doe.gov](mailto:sc.pams-helpdesk@science.doe.gov). All submission and inquiries about this Announcement should reference the number printed on the cover page.



## **B. POLICY PROVISIONS**

### **1. Availability of Funds**

The Government's obligation under this award is contingent upon the availability of appropriated funds from which payment for award purposes can be made. No legal liability on the part of the Government for any payment may arise until funds are made available to the Contracting Officer for this award and until the awardee receives notice of such availability, to be confirmed in writing by the Contracting Officer.

### **2. Commitment of Public Funds**

The Contracting Officer is the only individual who can make awards or commit the Government to the expenditure of public funds. A commitment by other than the Contracting Officer, either explicit or implied, is invalid.

### **3. Environmental, Safety and Health (ES&H) Performance of Work at DOE Facilities**

With respect to the performance of any portion of the work under this award which is performed at a DOE-owned or controlled site, the recipient agrees to comply with all state and Federal ES&H regulations, and with all other ES&H requirements of the operator of such site.

Prior to the performance on any work at a DOE-Owned or controlled site, the recipient shall contact the site facility manager for information on DOE and site specific ES&H requirements.

The recipient shall apply this provision to all sub-awardees at any tier.

### **4. Evaluation and Administration by Non-Federal Personnel**

In conducting the merit review evaluation, the Government may seek the advice of qualified non-Federal personnel as reviewers. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The applicant, by submitting its proposal, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign a conflict of interest and a certificate of confidentiality prior to reviewing a proposal. Non-Federal personnel conducting administrative activities must sign a non-disclosure agreement.

### **5. Federal, State, and Local Requirements**

With respect to the performance of any portion of the work under this award, the recipient agrees to comply with all applicable local, state, and Federal ES&H regulations. The recipient shall apply this provision to all sub awardees at any tier.

### **6. Funding Restrictions**

Funding for all awards and future budget periods are contingent upon the availability of funds

appropriated by Congress and the availability of future-year budget authority.

## **7. Government Right to Reject or Negotiate**

DOE reserves the right, without qualification, to reject any or all proposals received in response to this DOE National Laboratory Announcement and to select any proposal, in whole or in part, as a basis for negotiation and/or award.

## **8. Modification**

Notices of any modifications to this DOE National Laboratory Announcement will be posted on the Grants and Contracts website (<http://science.osti.gov/grants/>).

## **9. Proprietary Proposal Information**

Patentable ideas, trade secrets, proprietary or confidential commercial or financial information, disclosure of which may harm the applicant, should be included in a proposal only when such information is necessary to convey an understanding of the proposed project. The use and disclosure of such data may be restricted, provided the applicant includes the following legend on the first page of any document included in the proposal that contains such proprietary information and specifies the pages of the document which are to be restricted:

“The data contained in pages \_\_\_\_\_ of this document have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this applicant receives an award as a result of or in connection with the submission of this proposal, DOE shall have the right to use or disclose the data herein to the extent provided in the award. This restriction does not limit the government’s right to use or disclose data obtained without restriction from any source, including the applicant.”

To protect such data, each line or paragraph on the pages containing such data must be specifically identified and marked with a legend similar to the following:

“The following contains proprietary information that (name of applicant) requests not be released to persons outside the Government, except for purposes of review and evaluation.”

## **10. Publications**

Researchers are expected to publish or otherwise make publicly available the results of the work conducted under any authorization resulting from this Announcement. Publications and other methods of public communication describing any work based on or developed under an authorization resulting from this Announcement must contain an acknowledgment of EM support. The author’s copy of any peer-reviewed manuscript accepted for funding must be announced to DOE’s Office of Scientific and Technical Information (OSTI) and made publicly available in accordance with the laboratory’s management and operating (M&O) contract.