

**Program Announcement  
to  
DOE National Laboratories  
LAB 12-743**

***Research, Development and Training in Isotope Production***

**SUMMARY:**

The Office of Nuclear Physics (NP), Office of Science (SC), U.S. Department of Energy (DOE), hereby announces its interest in receiving proposals for Research and Development (R&D) on alternative methods to produce enriched stable and radioactive isotopes needed for a wide variety of research and applications. The proposed research and development should generate data or lead to new and innovative technologies, or improvements to existing technologies, to foster enhanced production of isotopes that will benefit research and applications in medicine, homeland security, the physical sciences, biological and geological sciences, energy, and industry. Proposals proposing novel and effective ways to train and develop personnel with knowledge and skills related to the production, processing, purification, and distribution of enriched stable and radioactive isotopes are encouraged.

Applications submitted by institutions to the companion Funding Opportunity Announcement will be evaluated competitively with proposals submitted to this Announcement. If an applicant proposes to collaborate with one or more DOE Laboratories, a separate proposal must be submitted by each collaborating Laboratory. The narrative in the Laboratory proposal must clearly describe the scope, schedule and budget for the Laboratory work. Both the applicant and the collaborating Laboratory must clearly indicate the linkage between the two proposals in the narrative of their respective proposals.

**NOTE 1:** The significant needs for methods of Mo-99 production are recognized. However, development of new production modalities for this isotope is currently being pursued under programs sponsored by the National Nuclear Security Administration (NNSA). Thus, proposals exclusively involving proposed modes of Mo-99 production are excluded from this call. Technologies associated with the production and recovery of other isotopes resulting from the fission of uranium, are NOT excluded from this call.

**NOTE 2:** The importance of He-3 to many areas of research and application is clearly recognized. The Department of Energy's supply of He-3 is also under the purview of NNSA, so proposals exclusively involving proposed modes of He-3 production are excluded from this call.

Projects under this Announcement will be funded under the auspices of the Isotope Development and Production for Research and Applications Program operating in the Office of Nuclear Physics in the United States Department of Energy's Office of Science. Contingent upon the availability of FY 2013 appropriated funds, it is anticipated that a total amount of about

\$2,800,000 will be available under this opportunity. It is anticipated that at least two projects will be selected for funding for FY2013. Furthermore, if a sufficient number of quality proposals are received additional proposals may be selected for funding to begin in FY2014. In that case, at least two additional awards may be made contingent upon the availability of FY2014 appropriated funds of about \$2,800,000. Awardees will be selected guided by a peer review conducted in accordance with 10 CFR Part 605.10. The specific evaluation criteria are presented later in this Announcement.

The general goal of this funding opportunity is to support efforts that will improve or develop new production and processing techniques of stable and radioactive isotopes in short supply, and to train the next generation workforce involved in the production, processing and distribution of isotopes. In establishing priorities for the program, the Office of Nuclear Physics considers guidance from the Nuclear Science Advisory Committee on Isotopes (NSACI) as documented in the following two reports:

*Compelling Research Opportunities using Isotopes*, NSAC Isotopes Subcommittee, April 23, 2009 ([http://science.energy.gov/~media/np/pdf/NSACI\\_Final\\_Report\\_Charge1.pdf](http://science.energy.gov/~media/np/pdf/NSACI_Final_Report_Charge1.pdf))

*Isotopes for the Nation's Future A Long Range Plan*, NSAC Isotopes Subcommittee, August 27, 2009 ([http://science.energy.gov/~media/np/nsac/pdf/docs/nsaci\\_ii\\_report.pdf](http://science.energy.gov/~media/np/nsac/pdf/docs/nsaci_ii_report.pdf))

Other background information pertinent to the purposes of this FOA may be found in:

*The Frontiers of Nuclear Science—a Long Range Plan*, DOE/NSF Nuclear Science Advisory Committee, December, 2007  
([http://science.energy.gov/~media/np/nsac/pdf/docs/nuclear\\_science\\_low\\_res.pdf](http://science.energy.gov/~media/np/nsac/pdf/docs/nuclear_science_low_res.pdf))

*Workshop on the Nation's Needs for Isotopes: Present and Future*, August, 2008  
([http://science.energy.gov/~media/np/pdf/program/docs/workshop\\_report\\_final.pdf](http://science.energy.gov/~media/np/pdf/program/docs/workshop_report_final.pdf))

*Advancing Nuclear Medicine Through Innovation*, National Academy of Sciences (2007), National Academies Press (<http://dels.nas.edu/Report/Advancing-Nuclear-Medicine-Through-Innovation-2007/11985>)

**A companion Funding Opportunity Announcement to (FOA) DE-FOA-0000743 will also be posted at Grants.gov and on the SC Grants and Contracts website at:**  
<http://www.science.doe.gov/grants>.

#### **DATES:**

Full proposals submitted in response to this Announcement must be received no later than Friday, September 28, 2012, 11:59 pm ET, to be accepted for merit review and to permit timely consideration for award in Fiscal Year 2013.

Please see the SUBMISSION section below for further instructions on the method of submission for the proposal.

## **SUBMISSION INSTRUCTIONS:**

Have your LAB administrator submit the entire LAB proposal and Field Work Proposal (FWP) via Searchable FWP (<https://www.osti.gov/fwp>). If you have questions about who your LAB administrator is or how to use Searchable FWP, please contact the Searchable FWP Support Center. All submissions and inquiries about this Program Announcement must reference Program Announcement LAB 12-743.

## **FOR FURTHER INFORMATION CONTACT:**

**Program Manager:** Dr. Dennis Phillips  
Office of Nuclear Physics  
Office of Science  
U. S. Department of Energy  
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## **SUPPLEMENTARY INFORMATION:**

### **Program Objective:**

The mission of the Office of Nuclear Physics Isotope Development and Production for Research and Applications (IDPRA) Program is to develop, produce and distribute enriched stable and radioactive isotope products that are in short supply. Many isotopes are high-priority commodities of strategic importance for the Nation and are essential for energy, medical and national security applications, and basic research. A goal of the program is to make critical isotopes more readily available to meet domestic U.S. needs. Community-sponsored studies and workshops have identified a number of enriched stable and radioactive isotopes in short supply that are needed by the research and applied sciences communities. The reliable availability of isotopes for research is crucial for many U.S. scientists to stay engaged at the forefront of scientific advances and discoveries.

The IDPRA Program is steward of the Isotope Production Facility (IPF) at Los Alamos National Laboratory (LANL), the Brookhaven Linear Isotope Producer (BLIP) facility at BNL, and hot cell facilities for processing isotopes at Oak Ridge National Laboratory (ORNL), BNL and LANL. The Program also coordinates and supports isotope production at a suite of university, national laboratory, and federal accelerator and reactor facilities throughout the Nation to promote a reliable supply of domestic isotopes.

Scientists at universities, national laboratories or private companies are encouraged to submit proposals that focus on the development of advanced, cost-effective and efficient technologies for producing, processing, recycling, and distributing isotopes in short supply. Successful research programs should lead to creation of data and/or technology that facilitate an increased supply of isotopes important to end-users of the materials and that complement the existing portfolio of isotopes produced and distributed by the IDPRA Program.

All aspects of research into the science of isotope production are of interest in this regard including:

- Novel or improved capabilities for inducing the transmutation in targets to create radioisotopes;
- Optimum selection of the materials and effective design of targets for the production of radioisotopes;
- Innovative approaches to model and predict behavior and yields of targets undergoing irradiation in order to minimize target failures during routine isotope production;
- Chemical and physical processes to recover and purify radioisotopes from activated targets, legacy materials, or facility components;
- Automation of production and processing techniques to enhance efficiency and safety of the production of radioisotopes; and
- New and innovative production methods for enriching stable isotopes, including electromagnetic and non-electromagnetic physical or chemical separation methods.

Also, proposals that contribute to the training of the next generation of nuclear scientists and engineers in technical areas related to isotope production and processing are strongly encouraged.

**NOTE 3: All entities submitting proposals to this Announcement must recognize the moral and legal obligation to comply with export controls and policies that relate to the transfer of knowledge that has relevance to the production of special nuclear materials (SNM). Please see 10 C.F.R. PART 810—ASSISTANCE TO FOREIGN ATOMIC ENERGY ACTIVITIES for further information.**

Proposals requesting support for research and development in one or more specific objectives should include a separate task for each objective. For each task the proposal should address the specific activities required to reach the goal; the method or approach to be taken; a cost-breakdown of the effort; the personnel required to carry out the effort; and the deliverable result of the task. Consideration should be given to the performance, cost, schedule, impact and benefit for producing the isotope product(s) that would result from the task. Each task should describe a realistic schedule, which includes a minimum of one clearly defined technical milestone per quarter. Milestones will be used to track progress of supported work. Equipment, supplies and materials required to accomplish the proposed tasks must be identified and detailed costs and procurement schedule shall be provided. Funds needed for travel associated with the project must be disclosed and justified. Proposers should note that they will be required to report formally on a regular basis regarding R&D expenditures and progress towards achieving the milestones and deliverables of the proposed effort. Material or financial institutional contributions to the effort, if any, should be clearly indicated.

### **Collaboration**

Collaborative research projects with other institutions, such as universities, industry, non-profit organizations, and Federally Funded Research and Development Centers (FFRDCs), including the DOE National Laboratories, are encouraged under this Announcement. Proposals submitted

from different institutions, which are directed at a single research activity, should clearly indicate they are part of a proposed collaboration and contain a brief description of the overall research project. However, each proposal must have a distinct scope of work and a qualified principal investigator who is responsible for the research effort being performed at his or her institution. If a university is part of a proposed collaboration, the university must submit a separate proposal that meets all the essentials stated above. It is highly recommended to include on the first page of the proposal narrative a simple table listing every collaborating institution/PI and the amount of funding requested by each. Further information on preparation of collaborative proposals may be accessed via the Internet at: <http://science.doe.gov/grants/colab.asp>.

**NOTE 4: THE DETAILED PROCEDURE FOR SUBMITTING A COLLABORATIVE PROPOSAL CAN BE ACCESSED VIA THE WEB AT:**

<http://www.sc.doe.gov/grants/colab.asp>.

**PROGRAM FUNDING:**

It is anticipated that up to \$2,800,000 will be available under this ANNOUNCEMENT in FY 2013, and maintained in outyears, contingent on the availability of appropriated funds. It is anticipated that this ANNOUNCEMENT will be used as the basis for proposal evaluation and funding for both FY2013 and FY2014. Proposals may request project support for one year only but may present projected outyear budget requests.

DOE is under no obligation to pay for any costs associated with the 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.

**The instructions and format described should be followed. You must reference Program Announcement LAB 12-743 on all submissions and inquiries about this program.**

**OFFICE OF SCIENCE  
GUIDE FOR PREPARATION OF SCIENTIFIC/TECHNICAL PROPOSALS  
TO BE SUBMITTED BY NATIONAL LABORATORIES**

Proposals from National Laboratories submitted to the Office of Science (SC) as a result of this Program Announcement will follow the Department of Energy Field Work Proposal process with additional information requested to allow for scientific/technical merit review. The following guidelines for content and format are intended to facilitate an understanding of the requirements necessary for SC to conduct a merit review of a proposal. Please follow the guidelines carefully, as deviations could be cause for declination of a proposal without merit review.

**1. Evaluation Criteria**

After an initial screening for eligibility and responsiveness to this Announcement, proposals will be subjected to a formal scientific merit review (peer review). The proposals will be evaluated against the following criteria, which are listed in descending order of importance:

Each proposal should address the following **review criteria**:

1. Scientific and/or technical merit of the proposed project – both the nuclear physics research and the application of that research;
2. The Appropriateness of the proposed method or approach;
3. The Competency of the applicant's personnel;
4. The adequacy of the proposed resources, and the reasonableness and appropriateness of the proposed budget; and
5. Any other factors relevant to the proposed project.

The evaluation process will include program policy factors such as the relevance of the proposed research to the terms of the Announcement and the agency's programmatic needs. 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.

## **2. Summary of Proposal Contents**

- Field Work Proposal (FWP) Format (Reference DOE Order 412.1A) (DOE ONLY)
- Proposal Cover Page
- Table of Contents
- Budget (DOE Form 4620.1) and Budget Explanation
- Abstract (one page)
- Narrative (main technical portion of the proposal, including background/introduction, proposed research and methods, timetable of activities, and responsibilities of key project personnel - 12-page limit)
- Literature Cited
- Biographical Sketch(es)
- Description of Facilities and Resources
- Other Support of Investigator(s)
- Appendix (optional)

### **2.1 Submission Instructions**

Have your LAB administrator submit the entire LAB proposal and FWP via Searchable FWP (<https://www.osti.gov/fwp>). All submissions and inquiries about this Program Announcement must reference Program Announcement LAB 12-743. If you have questions about who your LAB administrator is or how to use Searchable FWP, please contact the Searchable FWP Support Center.

#### **For further information contact:**

**Program Manager:** Dr. Dennis Phillips  
Office of Nuclear Physics  
Office of Science  
U. S. Department of Energy  
**Phone:** 301-903-7866  
**E-Mail:** [Dennis.Phillips@science.doe.gov](mailto:Dennis.Phillips@science.doe.gov)

### 3. Detailed Contents of the Proposal

Adherence to type size and line spacing requirements is necessary for several reasons. No researcher should have the advantage, or by using small type, of providing more text in his or her proposal. Small type may also make it difficult for reviewers to read the proposal. Proposals must have 1-inch margins at the top, bottom, and on each side. Type sizes must be at least 11 point. Line spacing is at the discretion of the researcher but there must be no more than 6 lines per vertical inch of text. Pages should be standard 8 1/2" x 11" (or metric A4, i.e., 210 mm x 297 mm).

#### 3.1 Field Work Proposal Format (Reference DOE Order 412.1A) (DOE ONLY)

The Field Work Proposal (FWP) is to be prepared and submitted consistent with policies of the investigator's laboratory and the local DOE Operations Office. Additional information is also requested to allow for scientific/technical merit review.

#### 3.2 Proposal Cover Page

The following proposal cover page information may be placed on plain paper. No form is required.

Title of proposed project

SC Program announcement title and number: **Research, Development and Training in Isotope Production (LAB 12-743)**

Name of laboratory

Name of principal investigator (PI)

Position title of PI

Mailing address of PI

Telephone of PI

Fax number of PI

Electronic mail address of PI

Name of official signing for laboratory\*

Title of official

Fax number of official

Telephone of official

Electronic mail address of official

Requested funding for each year; total request

Use of human subjects in proposed project:

If activities involving human subjects are not planned at any time during the proposed project period, state "No"; otherwise state "Yes", provide the IRB Approval date and Assurance of Compliance Number and include all necessary information with the proposal should human subjects be involved.

Use of vertebrate animals in proposed project:

If activities involving vertebrate animals are not planned at any time during this project, state "No"; otherwise state "Yes" and provide the IACUC Approval date and Animal Welfare Assurance number from NIH and include all necessary information with the proposal.

Signature of PI, date of signature  
Signature of official, date of signature\*

\*The signature certifies that personnel and facilities are available as stated in the proposal, if the project is funded.

### **3.3 Table of Contents**

Provide the initial page number for each of the sections of the proposal. Number pages consecutively at the bottom of each page throughout the proposal. Start each major section at the top of a new page. Do not use unnumbered pages, and do not use suffices, such as 5a, 5b.

### **3.4 Budget and Budget Explanation**

A detailed budget is required for the entire project period and for each fiscal year. It is preferred that DOE's budget page, Form 4620.1 be used for providing budget information\*. Modifications of categories are permissible to comply with institutional practices, for example with regard to overhead costs.

A written justification of each budget item is to follow the budget pages. For personnel this should take the form of a one-sentence statement of the role of the person in the project. Provide a detailed justification of the need for each item of permanent equipment. Explain each of the other direct costs in sufficient detail for reviewers to be able to judge the appropriateness of the amount requested.

Further instructions regarding the budget are given in section 4 of this guide.

\* Form 4620.1 is available at web site: <http://www.science.doe.gov/grants/budgetform.pdf>

### **3.5 Abstract**

Summarize the proposal in one page. Give the project objectives (in broad scientific terms), the approach to be used, and what the research is intended to accomplish. State the hypotheses to be tested (if any). At the top of the abstract give the lead DOE national Laboratory, project title, names of all the investigators and their institutions, and contact information for the principal investigator, including e-mail address.

**3.6 Narrative** (main technical portion of the proposal, including background/introduction, proposed research and methods, timetable of activities, and responsibilities of key project personnel).

The narrative comprises the research plan for the project and is limited to **maximum of 25 pages**. 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 methods 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. It is important that the 25-page technical information section



provide a complete description of the proposed work, because reviewers are not obliged to read the Appendices. Proposals exceeding these page limits may be rejected without review or the first 25 pages may be reviewed without regard to the remainder.

All proposals submitted in response to this LAB Announcement must explicitly state how the proposed project will support the accomplishment of the program goals and the NP mission, including the project's impact on proposals of interest to the Office of Science.

If any portion of the project is to be done in **collaboration** with another institution (or institutions), provide information on the institution(s) and what part of the project it will carry out. Further information on any such arrangements is to be given in the sections "Budget and Budget Explanation," "Biographical Sketches," and "Description of Facilities and Resources."

### **3.7 Literature Cited**

Give full bibliographic entries for each publication cited in the 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. Include only bibliographic citations. Principal investigators should be especially careful to follow scholarly practices in providing citations for source materials relied upon when preparing any section of the proposal.

### **3.8 Biographical Sketches**

This information is required for senior personnel at the institution submitting the proposal and at all subcontracting institutions (if any). The biographical sketch is limited to a maximum of two pages for each investigator and must include:

*Education and Training.* Undergraduate, graduate and postdoctoral training, provide institution, major/area, degree and year.

*Research and Professional Experience.* Beginning with the current position list, in chronological order, professional/academic positions with a brief description.

*Publications.* Provide a list of up to 10 publications most closely related to the proposed project. For each publication, identify the names of all authors (in the same sequence in which they appear in the publication), the article title, book or journal title, volume number, page numbers, year of publication, and website address if available electronically. Patents, copyrights and software systems developed may be provided in addition to or substituted for publications.

*Synergistic Activities.* List no more than five professional and scholarly activities related to the effort proposed.

To assist in the identification of potential conflicts of interest or bias in the selection of reviewers, the following information must also be provided in each biographical sketch.

*Collaborators and Co-editors:* A list of all persons in alphabetical order (including their current organizational affiliations) who are currently, or who have been, collaborators or

co-authors with the investigator on a research project, book or book article, report, abstract, or paper during the 48 months preceding the submission of the proposal. Also, include those individuals who are currently or have been co-editors of a special issue of a journal, compendium, or conference proceedings during the 24 months preceding the submission of the proposal. Finally, list any individuals who are not listed in the previous categories with whom you are discussing future collaborations. If there are no collaborators or co-editors to report, this should be so indicated.

*Graduate and Postdoctoral Advisors and Advisees:* A list of the names of the individual's own graduate advisor(s) and principal postdoctoral sponsor(s), and their current organizational affiliations. A list of the names of the individual's graduate students and postdoctoral associates during the past five years, and their current organizational affiliations.

### **3.9 Description of Facilities and Resources**

Facilities to be used for the conduct of the proposed research should be briefly described. Indicate the pertinent capabilities of the institution, including support facilities (such as machine shops), that will be used during the project. List the most important equipment items already available for the project and their pertinent capabilities. Include this information for each subcontracting institution (if any).

### **3.10 Other Support of Investigators**

Other support is defined as all financial resources, whether Federal, non-Federal, commercial, or institutional, available in direct support of an individual's research endeavors. Information on active and pending other support is required for all senior personnel, including investigators at collaborating institutions to be funded by a subcontract. For each item of other support, give the organization or agency, inclusive dates of the project or proposed project, annual funding, and level of effort (months per year or percentage of the year) devoted to the project.

### **3.11 Appendix**

Information not easily accessible to a reviewer may be included in an appendix, but **do not use the appendix to circumvent the page limitations of the proposal**. Reviewers are not required to consider information in an appendix, and reviewers may not have time to read extensive appendix materials with the same care they would use with the proposal proper.

The appendix may contain the following items: up to five publications, manuscripts accepted for publication, abstracts, patents, or other printed materials directly relevant to this project, but not generally available to the scientific community; and letters from investigators at other institutions stating their agreement to participate in the project (do not include letters of endorsement of the project).

## **4. Detailed Instructions for the Budget**

(DOE Form 4620.1 "Budget Page" may be used).

### **4.1 Salaries and Wages**

List the names of the principal investigator and other key personnel and the estimated number of person-months for which DOE funding is requested. Proposers should list the number of postdoctoral associates and other professional positions included in the proposal and indicate the number of full-time-equivalent (FTE) person-months and rate of pay (hourly, monthly or annually). For graduate and undergraduate students and all other personnel categories such as secretarial, clerical, technical, etc., show the total number of people needed in each job title and total salaries needed. Salaries requested must be consistent with the institution's regular practices. The budget explanation should define concisely the role of each position in the overall project.

## **4.2 Equipment**

DOE defines equipment as "an item of tangible personal property that has a useful life of more than two years and an acquisition cost of \$50,000 or more." Special purpose equipment means equipment which is used only for research, scientific or other technical activities. Items of needed equipment should be individually listed by description and estimated cost, including tax, and adequately justified. Allowable items ordinarily will be limited to scientific equipment that is not already available for the conduct of the work. General purpose office equipment normally will not be considered eligible for support.

## **4.3 Domestic Travel**

The type and extent of travel and its relation to the research should be specified. Funds may be requested for attendance at meetings and conferences, other travel associated with the work and subsistence. In order 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. Consultant's travel costs also may be requested.

## **4.4 Foreign Travel**

Foreign travel is any travel outside Canada and the United States and its territories and possessions. Foreign travel may be approved only if it is directly related to project objectives.

## **4.5 Other Direct Costs**

The budget should itemize other anticipated direct costs not included under the headings above, including materials and supplies, publication costs, computer services, and consultant services (which are discussed below). Other examples are: aircraft rental, space rental at research establishments away from the institution, minor building alterations, service charges, and fabrication of equipment or systems not available off-the-shelf. Reference books and periodicals may be charged to the project only if they are specifically related to the research.

### **a. Materials and Supplies**

The budget should indicate in general terms the type of required expendable materials and supplies with their estimated costs. The breakdown should be more detailed when the cost is substantial.

#### **b. Publication Costs/Page Charges**

The budget may request funds for the costs of preparing and publishing the results of research, including costs of reports, reprints page charges, or other journal costs (except costs for prior or early publication), and necessary illustrations.

#### **c. Consultant Services**

Anticipated consultant services should be justified and information furnished on each individual's expertise, primary organizational affiliation, daily compensation rate and number of days expected service. Consultant's travel costs should be listed separately under travel in the budget.

#### **d. Computer Services**

The cost of computer services, including computer-based retrieval of scientific and technical information, may be requested. A justification based on the established computer service rates should be included.

#### **e. Subcontracts**

Subcontracts should be listed so that they can be properly evaluated. There should be an anticipated cost and an explanation of that cost for each subcontract. The total amount of each subcontract should also appear as a budget item.

### **4.6 Indirect Costs**

Explain the basis for each overhead and indirect cost. Include the current rates.