Program Announcement to DOE National Laboratories
LAB 11-448

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 on alternative methods to produce and separate stable and radioactive isotopes needed for a wide variety of research and proposals. The proposed research and development should provide new and innovative technologies, or improvements to existing technologies, to foster the enhanced production of isotopes that will benefit research and proposals in medicine, homeland security, the physical sciences, biological and geological sciences, and industry. Award proposals proposing novel and effective ways to enhance education and training of personnel with expertise to improve and develop new methods in the production, processing, purification, and distribution of stable and radioactive isotopes are invited.

NOTE: 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 National Nuclear Security Administration (NNSA). Thus, proposals exclusively involving proposed modes of Mo-99 production are excluded from this call.

Projects under this Program Announcement will be funded under the auspices of the Isotope Development and Production for Research and Proposals 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 2011 appropriated funds, it is anticipated that a total amount of $3,000,000 will be available under this Announcement. It is anticipated that at least two awards will be made. Awardees will be selected guided by a peer review. 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 (NSAC-I) as documented in the following two reports:

> *Compelling Research Opportunities using Isotopes*, NSAC Isotopes Subcommittee, April 23, 2009 (http://www.er.doe.gov/np/nsac/docs/NSACI_Final_Report_Charge1.pdf)

Isotopes for the Nation's Future A Long Range Plan, NSAC Isotopes Subcommittee, August 27, 2009 (http://www.er.doe.gov/np/nsac/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://www.er.doe.gov/np/nsac/docs/Nuclear-Science.High-Res.pdf)

Workshop on the Nation's Needs for Isotopes: Present and Future, August, 2008 (http://www.er.doe.gov/np/program/docs/Workshop%20Report_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)

LETTER OF INTENT:

Letters of Intent are not required.

DATES:

Full proposals submitted in response to this Announcement must be received no later than Monday, April 18, 2011, 11:59 pm ET, to be accepted for merit review and to permit timely consideration for award in Fiscal Year 2011.

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 11-448.

FOR FURTHER INFORMATION CONTACT:

Program Manager: 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

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 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 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 U.S. scientists to stay engaged at the forefront of scientific advances and discoveries in isotope-using sciences.

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 breakthroughs 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 stable isotopes, including electromagnetic and non-electromagnetic 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.

Applications requesting support for research and development in one or more areas should include a separate task for each area. For each task the application should address the specific goal of the effort; the method or approach to be taken; a cost-breakdown of the effort; the personnel required to carry out the effort; the deliverable result of the task. Consideration should be given to the performance, cost, schedule, impact and benefit for producing the isotope product that would result from the task. Each task should describe a realistic schedule, which includes a minimum of one milestone per quarter. Milestones will be used to track progress of supported work. Equipment and hardware required to accomplish the proposed tasks must be identified and detailed costs and procurement schedule shall be provided. Applicants 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. Institutional contributions to the effort should be clearly indicated.

Collaboration

Collaborative research projects with other institutions, such as universities, industry, non-profit organizations, federal laboratories and Federally Funded Research and Development Centers (FFRDCs), which include the DOE National Laboratories, are strongly encouraged. In the case of collaborative proposals submitted from different institutions that are directed at a single research activity, each proposal must have a different scope of work and a qualified principal investigator who is responsible for the research effort being performed at his or her institution. There must be a single technical description of the proposed work, and separate face pages and budget pages for each institution. The scope of work at each institution must be clearly specified. Collaboration with researchers at FFRDCs (Fermi National Accelerator Lab and other DOE national labs are examples of FFRDCs), is encouraged under this Announcement. The procedure for submitting a collaborative proposal can be accessed via the web at: http://www.sc.doe.gov/grants/Colab.asp. This section provides specific details regarding collaborating institutions.

PROGRAM FUNDING:

It is anticipated that approximately $3,000,000 will be available for new projects in Fiscal Year 2011, subject to availability of appropriated funds. The number of awards will depend on the number of meritorious proposals and the availability of appropriated funds. Multiple year awards should be requested. A minimum of three years and a maximum of five years will be considered. Out-year funding will be provided on an annual basis subject to availability of funds.

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 11-448 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:

1) Scientific and/or Technical Merit of the Project;
2) Appropriateness of the Proposed Method or Approach;
3) Competency of Researcher's Personnel and Adequacy of Proposed Resources; and
4) Reasonableness and Appropriateness of the Proposed Budget.

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 - 30-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 11-448. 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: 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

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 Isotope Production (LAB 11-448)**
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 30 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 30-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 30 pages may be reviewed without regard to the remainder.

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.