



U.S. Department of Energy

CALL FOR PROPOSALS (CFP) NO. NEUP-002-12

For Integrated Research Projects Proposals

By Battelle Energy Alliance (BEA)

on behalf of the

U.S. Department of Energy's Office of Nuclear Energy

ISSUE DATE: May 25, 2012

PROPOSAL DUE DATE: July 9, 2012

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FY 2012 NEUP Integrated Research Projects (IRP) Call for Proposals (CFP) Amendments

Changes made to the FY 2012 NEUP IRP CFP are provided below:

■ AMENDMENT 1 (PAGE 5)

Specific FY 2012 NEUP IRP Scope Description

The following **bolded** text in the first paragraph has been modified in regard to the total cost:

In FY 2012, NE will accept proposals for three IRPs, including Advanced Nuclear Cladding and Fuel Materials with Enhanced Accident Tolerance for Current Generation & GEN III+ Light Water Reactors (\$1.17M/yr totaling up to \$3.5M), **Degradation of Used Nuclear Fuel in Storage (\$1.17M/yr totaling up to \$3.5M)**, and Inherently Safe Light Water Reactors (\$2.0M/yr totaling up to \$6.0M) as described below.

The following text replaces the above **bolded** text:

Degradation of Used Nuclear Fuel in Storage (\$1.46M/yr totaling up to \$4.4M)

■ AMENDMENT 2 (PAGE 7)

2. Used Nuclear Fuel Storage

The following text is no longer applicable to this CFP:

Proposals should be for a period of three years and a total cost not to exceed \$3.5 million.

The following text replaces the above text:

Proposals should be for a period of three years and a total cost not to exceed \$4.4 million.

■ AMENDMENT 3 (PAGE 8)

3. ESTIMATED FUNDING

The following text is no longer applicable to this CFP:

The NEUP planning estimates have identified up to \$13 million to be available in FY 2012 to fund the multi-year IRP awards under this CFP pending final program determination.

The following text replaces the above text:

The NEUP planning estimates have identified up to \$13.9 million to be available in FY 2012 to fund the multi-year IRP awards under this CFP pending final program determination.

■ AMENDMENT 4 (PAGE 24)

Section 10.5.2

The following text is no longer applicable to this CFP:

Fully Executed Organizational Conflicts of Interest Certification, Form PROC-3204 (available on the NEUP website).

The following replaces the above text:

Conflict of Interest Information, Required Conflict of Interest Form (available within the application).

■ AMENDMENT 5 (PAGE 25)

Section 10.5.3

The following text and form are no longer applicable to this CFP:

Foreign Ownership Control or Influence over Contractor Representation, Form PROC 2113 (Questionnaire, Certification, Consultant Certification, List of Owners, or Change of Company Name forms), as applicable. Form is available on the NEUP website.

1. INTRODUCTION

This solicitation is the fiscal year (FY) 2012 Call for Proposals (CFP) for Integrated Research Projects (IRP) by the Department of Energy's (DOE) Office of Nuclear Energy (NE) Nuclear Energy University Programs (NEUP). This CFP supports NE and NEUP missions and goals described below:

The primary mission of the Office of Nuclear Energy is to advance nuclear power as a resource capable of meeting the Nation's energy, environmental, and national security needs by resolving technical, cost, safety, proliferation resistance, and security barriers through research, development, and demonstration as appropriate.

The Nuclear Energy University Programs mission is to engage the U.S. university community to conduct program directed, program supporting, and mission supporting research and development (R&D), related infrastructure improvements, and student education support to build world class nuclear energy and workforce capability as an integral component of the Office of Nuclear Energy.

The goal of NEUP is to support outstanding, cutting-edge, and innovative research at U.S. universities through the following:

- Administering NEUP R&D awards to support NE's goal of integrating R&D at universities, national laboratories, and industry to revitalize nuclear education and support NE's R&D program objective as defined in the NE R&D Roadmap
- Attracting the brightest students to the nuclear professions and supporting the Nation's intellectual capital in Nuclear Engineering and relevant Nuclear Science, such as Health Physics, Nuclear Materials Science, Radiochemistry, and Applied Nuclear Physics
- Improving relevant university and college infrastructures for conducting R&D and educating students
- Supporting NE's goal of facilitating the transfer of knowledge from an aging nuclear workforce to the next generation of workers.

This CFP includes a set of mandatory requirements and evaluation criteria that will factor into the selection of successful proposals.

The primary point of contact for questions regarding this solicitation is Greg Bala from the NEUP Integration Office. However, all technical scope questions must be submitted through the question and answer feature located in the CFP section of the NEUP website accessible via its home page located at www.neup.gov.

In preparation for this IRP CFP and other planned NEUP fiscal year (FY) 2012 solicitations, a NEUP workshop was held on August 9-10, 2011, in Chicago, IL. Additionally, a pre-

solicitation workshop was held May 2, 2012, in Washington DC. Outcomes of these events were captured as proceedings and are available via the www.neup.gov website. These workshop proceedings are an important source of background information. Applicants are encouraged to read and become familiar with these documents before responding to the solicitation or entering data on the online proposal submittal system. Pre-solicitation information describing the scope of work and other information was also posted online and distributed on April 12, 2012, to assist potential applicants in preparing to respond to this CFP.

NOTE: *All information and instructions required to respond to this CFP are accessible at www.neup.gov. Applicants who have participated in previous NEUP solicitations using the online system may use the same log-in credentials to enter the secure NEUP website beginning at 10 a.m. MT on May 25, 2012, and ending at 5 p.m. MT on July 9, 2012. Offerors requiring new credentials can create an account as needed. Offerors MUST submit their proposal(s) electronically through the NEUP website. NO hard copy proposals will be accepted.*

2. IRP SUMMARY DESCRIPTION AND GENERAL REQUIREMENTS

NEUP's goal is to support outstanding, cutting-edge, and innovative (R&D) at United States (U.S.) universities. Dr. Peter Lyons, Assistant Secretary for Nuclear Energy, affirmed an update to the NEUP strategy commencing in FY 2011 to include a three-component, graded approach to its program based upon appropriate program linkage and relevance. The three components are Program Directed (PD), Program Supporting (PS), and Mission Supporting (MS).

IRPs are a significant element of the NEUP program and represent the PD component of the NEUP strategy by providing R&D solutions that is most directly relevant to the near-term, significant needs of the NE R&D programs. IRPs complement the other NEUP components, which include PS & MS university-based R&D awards, PS University Reactor and General Equipment Infrastructure Grants, and MS Student Fellowship and Scholarship Grants.

IRPs are significant, three-year projects within specific research areas. The research areas (IRP CFP scope) will address specific needs, problems or capability gaps identified and defined by the NE R&D programs and are intended to develop a capability within each area. These projects will be multidisciplinary and require multi-institutional partners. IRPs may include a combination of evaluation capability development, research program development, experimental work, and computer simulations.

For FY 2012, NE has identified the three topic areas described below as presenting a critical barrier to achieving its goals as defined in the NE R&D Roadmap. Within the NEUP R&D structure, each IRP will comprise a highly-collaborative team, spanning multiple scientific, engineering, and, where appropriate, economics and public-policy disciplines. IRPs are to be led by universities partnering with top talent across the full spectrum of R&D performers. Each IRP is expected to deliver an exemplary product for use within the NE R&D portfolio. IRPs will bring together the skills and talents of multiple investigators to enable fundamental research of a scope and complexity that would not be possible with the standard individual

investigator or small group research project. As such, the IRPs will strengthen and complement the existing portfolio of the single Principal Investigator and small group research projects currently supported within NEUP. The IRPs will foster unique scientific collaboration that will be critical to success and must be backed by a meaningful and sustained investment.

Although a proposing team must have a lead university and at least one other university, the team is encouraged to include multiple universities and non-university partners (e.g., Industry/Utility, International, and Underrepresented Groups). Also, the Department strongly encourages effective partnerships and will include this criterion as part of its program relevancy evaluation and scoring. Accordingly, industry partners are strongly encouraged and may receive funding support from the project. International partners are equally encouraged on a non-government funding basis, and consideration will be given to proposals that include effective partnerships with underrepresented groups. Universities that partner with Minority-Serving Institutions (e.g., Historically Black Colleges and Universities, Hispanic Serving Institutions, Tribal Serving Institutions) may receive additional points during proposal evaluation (see Section 8.2.2.3). The following link provides the current list of minority serving institutions: <http://www.ed.gov/about/offices/list/ocr/edlite-minorityinst.html>.

No more than 20 percent of the project funds provided by the government can go to non-university participants, including all government-funded national laboratory and industry/utility partner shares combined. Cost-sharing is encouraged, but not required.

Note that funding is for U.S. based researchers only. Foreign organizations are encouraged to collaborate if their role is focused on fundamental research and they are neither a denied party nor a party that requires an export license; however, such participants are not eligible for U.S. government funding.

Lead Principal Investigators for a currently-funded IRP are precluded from being a Lead Principal Investigator in response to this solicitation, but are not precluded from being a participant as a collaborator.

Specific FY 2012 NEUP IRP Scope Descriptions

In FY 2012, NE will accept proposals for three IRPs, including Advanced Nuclear Cladding and Fuel Materials with Enhanced Accident Tolerance for Current Generation & GEN III+ Light Water Reactors (\$1.17M/yr totaling up to \$3.5M), Degradation of Used Nuclear Fuel in Storage (\$1.46M/yr totaling up to \$4.4M), and Inherently Safe Light Water Reactors (\$2.0M/yr totaling up to \$6.0M) as described below:

1. Advanced Nuclear Cladding and Fuel Materials with Enhanced Accident Tolerance for Current Generation & GEN III+ Light Water Reactors

Recent events in the nuclear industry have increased interest in developing advanced nuclear fuels with enhanced tolerance to accidents. During accident and off-normal conditions, the fuel and the associated cladding material in a light water reactor experiences significant rapid heating and significantly higher temperatures. These increased temperatures can result in: increased internal pressures of the fuel; higher fuel-cladding temperatures; coolant boiling and evaporation; exothermic oxidation of the zirconium-based cladding; and the production of hydrogen gas, which can become explosive. Research is needed on advanced materials and/or fuel-cladding concepts suitable for use in existing light-water reactors or light-water reactors with design certifications (GEN-III+) that would improve performance and safety, both during reactor service and during long-term storage in spent fuel cooling pools.

The Department of Energy's NEUP is seeking proposals for an IRP to develop one or more advanced cladding materials and/or fuel-cladding concepts with enhanced accident tolerant characteristics. Improvements to the fuel/cladding system may be accomplished through many possible approaches including innovative designs (e.g. coatings/liners for zirconium-based cladding), novel materials, or combinations of the two. Some design objectives identified as important to improve accident tolerance include: higher temperature and strength capability, reduced or eliminated hydrogen generation, improved fission product retention, and increased resistance to bulk steam oxidation. In all cases the material must withstand the expected thermal neutron flux during the residence time in a light water reactor without significant degradation in structural properties.

The proposed accident tolerant advanced materials and concepts must be able to be qualified for use in currently operating reactors and reactors with design certifications and should not require significant plant modifications to implement. Proposed concepts must maintain or improve: cycle length, reactivity coefficients, safety margins such as departure from nucleate boiling, and response to design-basis accidents. Emerging areas in material science, such as nanotechnology, may prove useful in developing new and innovative designs although others are possible.

Proposals are sought from research teams to conduct research and development with the goal of producing one or more advanced materials and/or fuel-cladding concepts that would enhance the accident tolerance of the nuclear fuel system. Proposals should be for a period of three years and a total cost not to exceed \$3.5 million.

The proposal should include a detailed evaluation and identification of the relevant conditions during accidents and off-normal events and identify the resultant technical requirements that would guide research and development. A desired outcome of this IRP is the identification of one or more advanced materials or materials systems along with physical samples that can be tested in DOE facilities, e.g., LOCA testing, and irradiation testing at Advanced Test Reactor user facility or other national laboratory reactor. Therefore, proposals should include development, preliminary irradiation, and demonstration within the allotted time period of technical feasibility.

This IRP may recognize and be coordinated with, if desired, another IRP on Inherently Safe Light Water Reactors.

2. Used Nuclear Fuel Storage

The Department of Energy's NEUP is seeking proposals for an IRP related to extended storage of used nuclear fuel (UNF). Material degradation issues associated with long-term behavior of high burnup UNF (>45 gigawatt-days/metric ton) is of specific concern. This IRP is an extension of an earlier IRP that concentrated on hydride effects and creep of fuel cladding, canister corrosion, and advanced instrumentation and monitoring systems. This IRP is focused on other issues related to other components of the storage system. DOE is also interested in more efficient packaging of canisters as identified in item numbers 4 through 9. Interested Proposers are encouraged to visit the NEUP website (www.neup.gov) to review what has been awarded to date. The list below contains the research activities for processes and degradation mechanisms for long-term storage system components that the DOE has a high interest in. Therefore, proposals that address all of the nine issues below will be given the highest consideration for award since all activities are important. However, the DOE also recognizes that addressing all of these issues in a proposal may be very difficult for some university teams. To address this issue, the first three items must be included and at least four of the remaining six must also be included in the proposal. If the first three and at least four of the remaining items are not included in the proposal it will be considered as non-responsive and it will not be evaluated. Again it is emphasized that proposals with all nine items included will be given highest consideration. Activities of interest include:

1. Fuel assembly hardware
2. Neutron poisons
3. Bolts and seals of casks and possible canisters
4. Reducing canister drying times issues
5. Materials that could be added to a canister to maintain geometry configuration
6. Sealing canisters without welding
7. Rapid welding of canisters
8. Rapid processing of canisters at a utility to reduce radioactive dose
9. Numerical modeling for more efficient loading of canisters with used nuclear fuel.

The funding will support research and development to better understand long-term degradation mechanisms relevant to these processes and components of the storage system. Proposed activities should address, where possible and appropriate, the need to develop data applicable to time periods significantly longer than the period of testing. Proposed experimental and modeling approaches must be developed enough to be operational in a laboratory by the end of the three-year period of performance. The product of this research could eventually inform the technical basis for extended storage.

Proposals should be for a period of three years and a total cost not to exceed \$4.4 million. The proposal may include a combination of experimental work and computer simulations.

3. Inherently Safe Light Water Reactors

The 2011 earthquake and nuclear accident in Japan have generated renewed interest in the development of advanced nuclear reactor systems that are inherently safe. Generation III+ reactors designs have shown substantial reductions in the probability of reactor core damage with elements of passive safety; however, there may be opportunities for further improvements.

The Department of Energy's NEUP is seeking proposals for an IRP to develop advanced light water reactor designs with inherent safety features. Emerging designs for Small Modular Reactors are already leveraging many of the enhanced safety characteristics of compact reactor systems. This IRP should focus on larger (around 1000 megawatt electric) light water reactor designs that further improve the performance and inherent safety compared to existing Generation III+ light water reactor systems. These improvements may be achieved through novel and innovative reactor systems, components, materials, new fuel forms (including non-UO₂ fuels), or passive safety features that are substantially different from those used in existing designs. In addition to safety and reliability, consideration should be given to improved performance compared to existing Generation III+ designs with respect to each of the Generation IV performance goals, including sustainability (fuel utilization/waste minimization), economics, proliferation resistance, and physical protection.

In order to fully realize the potential of these advanced systems, the reactor system and fuel must be addressed in an integrated approach. The project must include conceptual designs and safety analysis, with specifically defined performance criteria, that would support and justify the development of an inherently safe light water reactor based system. A comprehensive research plan for addressing key issues related to development and commercialization of innovative features, including the use of experimental facilities necessary to develop critical components and subsystems of the proposed design, should be included. The proposal should clearly indicate the substantive research expected to be completed under this IRP.

Proposals are sought from research teams prepared to conduct research and development with the goal of producing designs that are inherently safe. Proposals should be for a period of three years and a total cost not to exceed \$6.0 million.

This IRP may recognize, and be coordinated with, if desired, another IRP on Advanced Nuclear- Cladding and Fuel Materials with Enhanced Accident Tolerance for Current Generation & GEN III+ Light Water Reactors.

The above IRPs will foster unique scientific collaboration that will be critical to success, and must be backed by a meaningful and sustained investment. Funding will be competitively awarded to the IRPs selected based on a 50:50 combination of external peer-review and internal relevancy review as detailed by this CFP. IRP progress will be monitored and guided by an associated NE advisory panel with final approval held by the Selection Official (SO).

3. ESTIMATED FUNDING

The NEUP planning estimates have identified up to \$13.9 million to be available in FY 2012 to fund the multi-year IRP awards under this CFP pending final program determination. The actual level of funding in each research area will ultimately depend on the availability of funds within the FY 2012 appropriation for the DOE NE R&D programs.

4. ELIGIBILITY INFORMATION

Any proposal submitted in response to this CFP must be submitted by a designated lead U.S. university or college that is required to team with at least one additional university partner. In addition, collaborations between universities and Underrepresented Groups, Minority-Serving Institutions (e.g., Historically Black Colleges and Universities, Hispanic Serving Institutions, Tribal Serving Institutions), International Partners, or Industry is strongly encouraged. The following link provides the current list of minority serving institutions: <http://www.ed.gov/about/offices/list/ocr/edlite-minorityinst.html>.

Any number of universities may team together on the proposal and share the funding at their discretion. No more than 20 percent of the project funds provided by the government can go to non-university participants, including all government-funded national laboratory and industry/utility partner shares combined. Cost-sharing is encouraged, but is not required.

Funding is for faculty, staff and students at U.S. universities only. Foreign faculty, staff and students at U.S. universities are allowed to participate in projects. While collaborations with foreign organizations are allowed, these participants are not eligible for U.S. funding under this CFP. Their role must be focused on fundamental research and they must not be a denied party or a party that requires an export license.

5. IRP DEVELOPMENT REQUIREMENTS

5.1. OVERVIEW

Proposed IRPs should take a holistic, systems approach to science and technology, and will act as an integrator of basic and applied R&D. The scientific problems to be addressed by the IRPs are inherently interdisciplinary. IRPs require personnel with varied skills and expertise in areas that may include physics, chemistry, computer science, materials science, and engineering, among other possible areas.

In addition, it will be critical for IRP research teams to understand, in depth, the potential NE needs in order to implement a sustainable and viable technology. This will be a true collaboration between the NE R&D programs and IRPs; which must combine exceptional skill and creativity in energy technology research with cutting-edge expertise in the specific problems to be addressed, either by including researchers specializing in this field or developing strong partnerships and working relationships with the individuals and institutions, governmental and non-governmental, that have been engaged in research on these or related problems. IRPs are also expected to develop enabling technologies to facilitate and accelerate this research.

5.2. EQUIPMENT AND OPERATION

Allowable costs include those necessary to purchase research equipment and instrumentation required to execute the proposed project. No new construction (new buildings or major modifications to existing buildings) or major multi-use equipment procurements will be allowed as part of sub-contracts awarded as a result of this CFP. If equipment is to support multiple projects, its cost shall be appropriately allocated across each supported project.

Applicants should secure access to needed scientific instrumentation and test facilities, including DOE user facilities. Be advised that access to and funding for many DOE user facilities is determined and administered separately from outside of this CFP. See Section 5.10.

5.3. TECHNICAL CAPABILITIES AND INSTRUMENTATION

IRPs must include all technical capabilities considered necessary by the applicant to implement their proposed approach, including experimental and computational tools. In order to carry out the proposed research program, IRPs shall develop core capabilities in or have access to the full range of synthetic, characterization, manipulation, and computational capabilities. A portion of the research may be devoted to developing new technological capabilities for overcoming challenges that cannot be addressed with currently available technologies and instrumentation. Research capabilities and resources to be accessed outside of IRPs should be clearly identified.

5.4. MANAGEMENT

DOE recognizes that effective management of scientific facilities, programs, and projects is critical to research success and its overall contribution to the NE R&D mission. IRPs must have well-designed management plans for their establishment and execution, to include research, technology development, resources (both personnel and physical resources), and scientific data. Management plans should include provisions for coordination with other basic and applied R&D activities supported by the Department. IRP management structure must enable empowered scientist-managers to execute quick decisions to shape the course of research. In addition, each IRP will be monitored and guided by an associated NE advisory panel, whose membership will be composed of DOE-NE program personnel and their designated technical liaisons at the national laboratories. IRP execution shall be periodically reported and monitored for continued project funding.

Key elements for successful IRP management include:

- a clear lead university with strong scientific leadership and central location for the IRP;
- to the extent that there is geographic distribution of the IRP participants, a clear commitment to applying state-of-the-art technology and frequent virtual meetings to enable meaningful long distance collaboration; and most importantly

- a clear organization and management plan for achieving the collaborative and synergistic goals of a IRP and “infusing” a culture of empowered central research management throughout the IRP.

IRPs will be subject to regular and rigorous peer review of their scientific program and their management structure, policies, and practices. See also Section 7.3.4.1.1 provisions.

5.5. STAFFING

IRPs should be led by internationally-recognized scientists or engineers. Lead Principal Investigators for a currently-funded IRP are precluded from being a Lead Principal Investigator in response to this solicitation, but are not precluded from being a participant as a collaborator. IRP consortiums may be composed of diverse institutions including academia, national laboratories, non-profit research institutes, industry/utilities, and international partners. IRP research teams should strive to achieve the synergies that arise when individuals with forefront expertise in different methodologies, technologies, disciplines, and areas of content knowledge tackle a problem together, overcoming impasses by attacking the issue from fresh angles and discovering novel solutions.

5.6. QUALITY ASSURANCE AND INFORMATION MANAGEMENT

Applicants should have sound quality assurance plans for all aspects of the proposed IRP programs. National and international standards for quality assurance for the different categories of experimentation to be carried out by the IRP should be identified and plans for qualifying for International Organization for Standardization (ISO) and/or other certifications should be described in the application, as appropriate.

5.7. DELIVERABLES / BENCHMARKS

IRPs are expected to have deliverables or benchmarks that help focus the objectives of the research to the proposed goals they are addressing and include the ability to respond to program direction.

5.8. RESEARCH INTEGRATION AND COORDINATION

Applicants should describe plans for integrating the results of their fundamental research and technology development with other basic and applied R&D activities supported by the Department, including the work conducted by other IRPs.

If applicants identify essential research and technology capabilities that are beyond the scope of the proposed IRP’s skills and resources then the applicant should demonstrate plans for obtaining these additional capabilities, including collaboration with outside experts.

5.9. COLLABORATION

When appropriate, IRPs are expected to foster and encourage robust interaction with collaborators to accomplish the scope of R&D defined by this CFP. Applicants are encouraged to provide information regarding their plans to create a research environment that promotes diverse collaboration, when appropriate, to enable organizational cognizance of international capabilities, industry/utility readiness, technology transfer, and assisting the transition of developed technologies to industrial development.

NEW: A letter of support from non-Federal partners (e.g., industry, utility, international) is required to describe the level and type of support contemplated for the project.

5.10. OTHER CONSIDERATIONS

Successful execution of IRPs to address the workscopes described in Section 2 may be enhanced by use of irradiation and/or post-irradiation examination (PIE) capabilities available at universities and in government facilities such as research reactors and DOE user facilities. DOE does not consider that such capabilities are essential to completion of the defined workscopes, and applicants who include use of irradiation and/or PIE services in their proposals bear the primary responsibility for arranging any required access agreements. Although DOE will attempt to facilitate access to user facilities upon request, applicants should in no way assume that access to government facilities/capabilities will be granted. Proposals that fully address access to facilities/capabilities required to meet all IRP objectives will be evaluated more favorably than projects that assume such access will be available. Access to each DOE User facility requires a unique proposal separate from the IRP.

While capital investment in instrumentation and equipment may be included as part of the IRP awards, usage and leverage of existing facilities, including the Department's user facilities, is encouraged. DOE user facilities, including nuclear reactors, light sources, neutron sources, nanoscale science research centers, advanced computational facilities, and other specialized user facilities, are considered foundational resources for a vast range of the scientific user community. As such, they are expected to serve as independent resources for IRPs, when appropriate. Funding for activities at DOE user facilities is managed separately from this CFP and should not be included in IRP budget requests in response to this CFP.

6. QUESTIONS AND CONTACTS

Points-of-contact for each IRP are available on the NEUP website at www.neup.gov; however, all technical scope questions must be submitted through the question and answer feature located on the CFP section of the website accessible via the NEUP at www.neup.gov.

7. **BASIS FOR AWARD**

7.1. SELECTION METHOD

NEUP will apply a competitive range selection process whereby relevant evaluation factors will be assessed, including cost considerations, to select the successful applicants. The application evaluation and award process will be based on written information, references, and independent pre-award assessment actions as outlined within this solicitation. The competitive range selection process will be conducted as follows:

Written Proposals - Offeror shall provide a written proposal, fully compliant with the electronic submittal requirements specified on the NEUP website. NEUP will make a determination as to the responsiveness of each proposal to the solicitation requirements.

Cost Considerations - To assess the cost component of the proposal, NEUP will perform a review of the detailed cost proposal to determine reasonableness of the labor and non-labor costs for performing the proposed work.

NEUP may solicit from available sources, including references and past clients identified by the Offeror, experience and past performance information on an Offeror or key personnel, and consider such information in its evaluation. Offerors are reminded to submit their best initial proposal as NEUP may award without further discussions. However, if deemed advantageous to the government, a second selection phase may be used wherein a down selected group of proposers would be requested to present an overview of their proposals. If NEUP determines that revised proposals or best and final offers are necessary, NEUP may solicit them from only those Offerors deemed by NEUP (based upon evaluation of current proposals) to have a reasonable chance to be selected for award, (i.e., the competitive range.)

7.2. MANDATORY REQUIREMENTS

Within the submission form, Offeror shall identify nuclear energy-related Federal funding sources by source, project name, monetary amount and length of term received by the Principal Investigator or collaborators currently in place or received within the past three years.

Within the written proposal, Offeror shall address the mandatory (go/no-go) requirements. Only proposals deemed fully compliant with the mandatory requirements shall be eligible for continued evaluation. If an Offeror cannot meet, or does not address compliance with the following mandatory (go/no-go) requirements, its proposal may be considered nonresponsive and in such cases would not be evaluated further. Each Offeror (i.e., lead U.S. university submitting a proposal) is responsible for obtaining the commitment of each of their teaming partners to the mandatory requirements; their submittal of a response to this CFP is indicative of each teaming partner's acceptance of the mandatory requirements. Prior to award of any resultant contract, the Offeror must demonstrate that the proposed team has been formed and all teaming partner agreements are finalized.

Table 1. DOE NEUP IRP CFP Mandatory Requirements

No.	Requirement	Description	Evaluation
1	Commitment to reporting and budget requirements	Commitment to quarterly reporting to NE advisory panel. The quarterly report will provide status and progress information on R&D, deliverables, milestones, schedule and budget. <u>Annual Report</u>. The annual report is due each year within one month of the anniversary of the contract award date. The fourth quarter report is accepted as an annual report, but is required to include a more rigorous level of detail and a section describing the future outlook of the R&D.	Go/No-Go
2	10 CFR 851 “Worker Safety and Health Program”	If Offeror proposes work scope to be conducted at a DOE facility, the work performed at DOE facilities shall be conducted in accordance with 10 CFR 851, “Worker Safety and Health Program” requirements.	Go/No-Go
3	Export Control	Each offeror to the CFP and their partners are responsible for their own compliance with all U.S. Export Control regulations in the performance of any work that is funded through the NEUP program. Offerors and partners who are selected to perform work in accordance with this CFP agree to have in place a documented export control process by the time a contract is awarded. Offerors and partners can contact the U.S. Departments of Commerce, State, Energy and Treasury for guidance as to applicable licensing requirements and other restrictions. By participating in this CFP, Offerors and partners acknowledge that the work proposed will be subject to all export control regulations that may prohibit or restrict: (i) transactions with certain persons, and (ii) the type and level of technologies and services that may be exported. These regulations include, without limitation, the Arms Export Control Act, the Export Administration Act, the International Economic Emergency Powers Act, the Atomic Energy Act and regulations issued pursuant to these including the Export Administration Regulations (EAR) (15 CFR Parts 730-774), the International Traffic in Arms Regulations (ITAR) (22 CFR Parts 120-130), and the Nuclear Regulatory Commission and Department of Energy export regulations (10 CFR Parts 110 and 810). Offerors and partners acknowledge that export control requirements may change and that the export of goods, technical data or services from the U.S. without an export license or other governmental authorization may result in both civil and criminal liability.	Go/No-Go

No.	Requirement	Description	Evaluation
4	Standard Research Subcontract	Offeror must agree to the terms and conditions of a standard research subcontract (available on the NEUP website), without exceptions. If the lead institution has a current blanket agreement in place with BEA and is awarded an IRP contract in response to this CFP, then the NEUP IRP award will be added to the existing blanket (i.e. Release or Task Order). If no current blanket exists, the action will be awarded under a stand-alone standard research subcontract.	Go/No-Go
5	Quality Assurance	Each offeror to the CFP and their partners need to implement QA requirements based on a specific scope of work and associated deliverables. QA requirements were identified on the QA Requirements Form. Offerors and partners who are selected to perform work in accordance with this CFP agree to adhere to the specified QA requirements through use of university procedures or procedures/templates/guidance provided by NEUP. Offerors shall document acceptance to the QA requirements in the CFP.	Go/No-Go
6	Commitment to prepare additional contract elements	Depending on the nature and terms of agreements already in place with BEA, Offerors should be prepared to provide the following: University Contract Office Approval, Current Negotiated Rate Agreement, University Travel Policy, Resumes for other degreed individuals, faculty members, and administrators, Forecast of monthly accrual based on best estimate of costs incurred.	Go/No-Go

7.3. WRITTEN PROPOSAL

7.3.1. Application Forms

Application forms and instructions are available via www.neup.gov.

7.3.2. Limitation on Number of Lead Applications

A specific university may not submit more than **one** application as the prime applicant for this particular CFP in each of the IRP areas. Upon receipt of the first application from a designated lead university, receipt of any subsequent applications from that university will be deemed non-responsive and rejected without further review. However, there is no limit to the number of applications to which a specific eligible entity may participate as a team member/subcontractor.

7.3.3. IRP Summary/Abstract

The IRP summary/abstract must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained document that identifies the name of the applicant, key personnel proposed for the project (e.g., the IRP Lead Principal Investigator, the Project Director/Principal Investigator(s)), the project title, the objectives of the project, a description of the project, including methods to be employed, the potential impact of the project (i.e., benefits, outcomes), and, for collaborative projects, the dollar value of the effort to be performed by each participant over the period of performance and a brief description of the capacity in which the participant will be participating. This document must not include any proprietary or sensitive business information as the Department may make it available to the public. The project summary must not exceed 1 page when printed using standard 8.5" by 11" paper with 1" margins (top, bottom, left and right) {single spaced} with font not smaller than Times New Roman 12 point.

It will be up to the applicant to define key personnel and the role they will play in accomplishing the project. Key personnel include such positions as IRP Lead Principal Investigator, project manager, deputy project manager, principal investigator(s), etc., or any other persons having a significant role in the successful outcome of the IRP project. Personnel identified in the application proposal as key personnel will be expected to devote a significant amount of their time toward the project, unless otherwise acceptably justified in the applicant's proposal.

7.3.4. Technical Proposal

7.3.4.1. Project Narrative

The project narrative must not exceed 50 pages, including charts, graphs, maps, photographs, and other pictorial presentations, when printed using standard 8.5" by 11" paper with 1" margins (top, bottom, left, and right). **EVALUATORS WILL ONLY REVIEW THE NUMBER OF PAGES SPECIFIED IN THE PRECEDING SENTENCE.** A cover page and table of contents must be included at the beginning of the project narrative but neither will count against the page limit. Furthermore, information required to be submitted in the requested appendices are not subject to the project narrative page limit. Headers/footers containing page numbers and project titles/logos may be inserted within the required 1" margins. The font must not be smaller than Times New Roman 12 point. Do not include any Internet addresses (URLs) that provide information necessary to review the application, because the information contained in these sites will not be reviewed. See Part 13.1.3 for instructions on how to mark proprietary application information. **The contents of the project narrative are specified in order to ensure that the merit reviewers have the necessary information to conduct proper evaluations.** All project narratives are to include all components of the IRP Management Plan.

7.3.4.1.1. IRP Management Plan

This section must provide a clear, substantive overview of the vision, management, and organization of the proposed IRP. Offeror shall provide a written narrative addressing its strategy to execute R&D that supports the specified Technical Work Scope. The documentation provided shall include the items specified below:

- Proposal Title (Do not use all CAPS for proposal title.)
- Technical Work Scope Identification
- Proposed Scope Description
- Logical path to accomplishing scope including descriptions of tasks
- Milestones and Deliverables
- Type/description of facilities that will be used to execute the scope
- Schedule: Define timelines for executing the specified work scope
- The roles and responsibilities of each partnering organization in the execution of the workscope
- Unique challenges to accomplishing the work and innovations expected to mitigate such challenges
- Information, data, plans, or drawings necessary to explain the details of Offeror's proposal
- Quality Assurance (QA): Describe the applicable QA requirements and how they will be met. This can be a simple statement agreeing to comply with the QA requirements as described by NEUP on the website and any additional requirements deemed necessary during contracting.
- References are included in the 50 page limit
- Name file: 2012 CFP Narrative "Insert ID#."

7.3.4.2. Capabilities

Infrastructure Requirements: In a separate document, Offeror shall identify the infrastructure (e.g., facilities, equipment, and instrumentation) required to execute the proposed scope of work. Describe the non-labor (e.g., facilities, equipment, and instrumentation) resources available and accessible to the Offeror and are required to execute the scope of work. Describe any unique equipment and/or existing facilities that are needed, are accessible, and will be used to execute the scope of work (see Section 5.10). Discuss the adequacy of these resources and identify any gaps. See the electronic proposal submission form for document guidance.

This call allows for the Offeror to propose the purchase of equipment required to conduct the proposed work. Any property acquired under subcontracts resulting from this CFP will be subject to the terms and conditions of the BEA standard research subcontract. This document is available via the NEUP website: www.neup.gov. (Name File: 2012 CFP Capabilities "Insert ID#.")

7.3.4.3. Technical Expertise and Qualifications (Vitas):

Offer shall name all teaming partners by name and organization, as well as their proposed roles and responsibilities. For the IRP Lead Principal Investigator, principal investigator and collaborators, the Offeror shall provide a brief vita that lists:

- Contact information;
- Academic and professional credentials;
- Relevant professional history;
- Five recent relevant publications or commensurate professional experiences; and
- Name File: 2012 CFP Last Name of Collaborator “Insert ID#.”

7.3.4.4. Letters of Support

The Offeror shall include letters of support on company stationery and signed by an appropriate company official. See Section 5.9. (Name File: 2012 CFP Letter of Support “Insert ID#.”)

7.3.4.5. Pricing

The Offeror shall use the spreadsheet, “CFP Budget Form example.xls” to provide all pricing information for execution of the proposed scope of work. Note that the required information is for the lead university, as well as for each partner. Additional pricing information beyond that requested may be provided, but will be used at the discretion of NEUP. The budget form is available via the NEUP website. (Name File: 2012 CFP Budget “Insert ID#.”)

Budget worksheets shall contain one worksheet for each consortium member, including national laboratories and industry/utility partners, and a roll up worksheet. Provide name, phone number, and email address for a single point of contact from the lead university grants and contracting department or equivalent entity.

8. REVIEW AND SELECTION CRITERIA

8.1. INITIAL REVIEW CRITERIA

Prior to the merit review, NEUP will perform an initial review to determine that (1) the applicant is eligible for the award; (2) the information required by the announcement has been submitted; (3) all mandatory requirements are satisfied; and, (4) the proposed project is responsive to the objectives of the IRP in question and this CFP.

8.2. MERIT REVIEW CRITERIA

Applications meeting the initial review criteria will then be evaluated by two panels: one Technical Peer Review Panel and one NE Program Relevancy Review Panel, which will review applications using the Technical Peer Review and Relevancy criteria listed below. Following completion of the Review Panel evaluations, a team comprised of Federal officials will review the applications and the Review Panel evaluations, and make award recommendations to the SO after consideration of program policy and other relevant subjective factors, as appropriate.

NEUP will evaluate and score each Offerors' proposal based on the information submitted in response to this CFP. Points for the technical score will be calculated as specified below:

8.2.1. Technical Peer Review (50%)

Applications will be subjected to formal merit review and will be evaluated against the following four criteria. Included within each criterion are the detailed questions that reviewers will consider in evaluating each criterion.

8.2.1.1. Scientific and/or technical merit of the project (12.5%)

- Does the research proposed directly address the specific need of the appropriate IRP?
- Does the research proposed for the IRP address the described need in an effective and impactful manner?
- Does the application present a balanced and comprehensive program of research that, as needed, supports experimental, theoretical, and computational efforts and develops new approaches in these areas?
- What is the likelihood that the applicant can overcome key scientific challenges and shift research directions in response to promising developments?
- Are the elements of the proposed research appropriately integrated, coordinated, and synergistic?

8.2.1.2. Appropriateness of the proposed method or approach (12.5%)

- Are the strategy and the plan for the development and operation of the proposed IRP, including the need for an IRP approach involving several senior/key personnel, the means for achieving an integrated IRP, and plans for leadership and guidance for the scientific and technical direction, appropriate?
- Does the applicant present a comprehensive management plan for a world-leading program that encourages high-risk, high-reward research and encourages synergisms among investigators, thus demonstrating that the whole is substantially greater than the sum of the individual parts?

- Does the applicant present an organizational structure that delineates the roles and responsibilities of senior/key personnel and describes the means of providing external oversight and guidance for scientific and technical direction and approval of the research program?
- Are the applicant's plans (if any) for education, outreach and training in the proposed IRP appropriate?
- Are the plans (if any) for external collaborations and partnerships reasonable and appropriate?
- Are the roles and intellectual contributions of the IRP Lead Principal Investigator, Principal Investigator(s), and each senior/key person adequately described and appropriate?
- Does the applicant proposal maximize the use of DOE user facilities and existing equipment?
- How effectively does the proposed research relate to existing and planned research programs at the host institution?
- Are environment, safety and health issues responsibly anticipated and addressed?

8.2.1.3. Competency of the applicant's personnel and adequacy of the proposed resources (12.5%)

- Do the applicant's senior/key personnel have a proven record of research in the disciplines needed for success in this project?
- Is the proposed access to existing research space, instrumentation and facilities at the host institutions and its partners likely to meet the needs of the proposed IRP?
- Is there adequate access to experimental and computational capabilities as needed to ensure successful completion of the proposed research - including access to research capabilities and resources outside of the IRP?
- Do the lead institution and the senior/key personnel for the IRP have proven records of success in project, program, and personnel management for projects of comparable magnitude?
- Do the lead institution and the IRP Lead Principal Investigator have proven records of success in project, program, and personnel management of diverse teams of science and technical professionals?
- Is the plan for recruiting any additional scientific and technical personnel including new senior staff, students and postdocs reasonable and appropriate?
- Will the IRP leadership have the capability to communicate effectively with scientists of all disciplines?
- Will the IRP Lead Principal Investigator and senior/key personnel be fully available to the proposed IRP, particularly taking into account their potential involvement in other major projects?
- Does each participating institution possess adequate systems for ensuring environmental, health and safety support and oversight?

8.2.1.4. Reasonableness and appropriateness of the proposed budget (12.5%)

- Is the requested budget for developing the proposed IRP appropriate, including realistically estimated costs for existing and new equipment and instrumentation?
- Is the requested operating budget for the proposed IRP reasonable for the planned scientific program?
- Are all subcontracts, travel, student costs, and other ancillary expenses adequately justified and estimated?

8.2.2. Relevancy Review (50%)

The Relevancy Review Panel will consider the following program policy and management factors in the selection process:

8.2.2.1. Program Factors (20%)

- Diversity of research activities that will address the scientific challenges and use-inspired research as articulated in the DOE-NE Roadmap;
- Relation of the proposed IRPs to the core research activities within the DOE-NE Fuel Cycle R&D and Reactor Concepts RD&D programs;
- Benefits to the government of making awards for distinct technologies and/or approaches.
- The extent to which the proposed project will address basic science, technology, economic, and policy issues hindering the U.S.'s ability to become energy secure and economically strong while being good stewards of the planet by reducing green house gas emissions.

8.2.2.2. Cost Factors (20%)

- The degree to which award of the proposed project optimizes use of the available DOE funding to achieving NE program goals.
- Reasonableness of the proposed project cost. This includes evaluation of the allocation among multiple participating team organizations where applicable, reasonableness of proposed costs for each task, and overall project cost.

8.2.2.3. Collaboration Factors (10%)

- Potential for developing synergies between the proposed IRP and other DOE-NE research activities;
- Level and contribution of participation by non-university partners (e.g., Industry/Utility, International, and Underrepresented Groups). Industrial or International partnerships are required for the proposal to receive the maximum points available.
- The degree to which Minority-Serving Institutions (MSI) contribute to the proposal's ability to support the relevant program element or overall NE mission. MSI partnerships are not required for projects to be evaluated as unquestionably relevant, but partnerships may be allocated additional points (up to 3%), not to exceed maximum available points, if evaluated to contribute as described above.

9. REVIEW AND SELECTION PROCESS

9.1. MERIT REVIEW

Applications that pass the initial review will be subjected to a formal merit review and will be evaluated based on the criteria cited above. NEUP may, as part of the merit review process, schedule face-to-face meetings between representatives of one or more applicants and members of one or more of the merit review panel(s) to allow merit review panel members to obtain answers to their questions or additional information about the contents of applications. Applicants may be required to travel to a designated location for a presentation to one or more of the merit review panels.

9.2. SELECTION

The SO will consider all relevant objective and subjective information related to the IRP application process, including the merit review panel recommendations, Federal officials' review, program policy and management factors, and the amount of funds available.

9.3. DISCUSSIONS AND AWARD

NEUP may enter into discussions with selected applicants for any reason deemed necessary, including but not limited to: (1) proposed budget is not appropriate or reasonable for the requirement; (2) only a portion of the application is selected for award; (3) NEUP needs additional information to determine that the recipient is capable of complying with the requirements in 10 CFR Part 600; and/or (4) special terms and

conditions are required. Failure to resolve satisfactorily the issues identified by NEUP will preclude award to the selected applicant.

9.4. COMPETITIVE RANGE

If NEUP determines that revised proposals or best and final offers are necessary, NEUP may solicit them from only those Offerors deemed by NEUP (based upon evaluation of the applications) to have a reasonable chance to be selected for award (i.e., the competitive range).

10. PROPOSAL SUBMITTAL REQUIREMENTS

10.1. PROPOSAL DUE DATE:

The proposal is due by 5:00 p.m. MT on July 9, 2012. Applicants MUST submit their responses through the NEUP website using the electronic proposal submission form.

10.2. CFP SCHEDULE

Issue CFP	May 25, 2012
Full Proposals Due	July 9, 2012
Selection Review Completed and Awards Announced	September 2012

10.3. LATE PROPOSALS

Proposals received after the designated date and time (i.e., late) may be retained without opening, with the Offeror notified of this decision. Extension of the proposal due date shall be at the sole discretion of NEUP on behalf of its sponsor, the Department.

10.4. PROPOSAL PACKAGING

Responses must be submitted as specified on the NEUP website to allow technical, pricing, and capabilities to be evaluated separately. The files shall be named as specified on the NEUP website.

10.5. FORMAT AND CONTENT REQUIREMENTS

The following must be completed and submitted to NEUP using the NEUP website (Note: Specified forms are provided at the website).

10.5.1. Technical Proposal

See the electronic proposal submission form for document guidance.

10.5.2. Conflict of Interest Information, Required Conflict of Interest Form (available within the application).

The Offeror must provide, for itself and all partners, full disclosure of all previous current and planned contract activities where the Offeror is providing assistance on the same or similar matters to any other organization.

10.5.3. Pricing:

Submit core information using the budget spreadsheet and associated guidance provided on the NEUP website. The budget spreadsheet shall be submitted with the file name 12-ID# budget form.xls (example: 12-000 budget form.xls). A copy of the spreadsheet is provided on the NEUP website as CFP Budget Form example.xls.

Provide the following types of supporting documents with the budget spreadsheet: published fee schedules for laboratory equipment use, vendor quotes for equipment purchases, catalog prices for materials and supplies, details of the basis of estimate for the proposals budget, indirect rate agreement.

(Applies only to academic partners.) Offeror shall submit a cost proposal on the basis of fully burdened hourly labor rates for each of the labor categories proposed. **All participating organizations' adders shall be in accordance with their current negotiated rate agreement with the Department of Health and Human Services or the Office of Naval Research.** Offerors fully burdened rates shall include, but not be limited to, the following:

- Offerors overhead, e.g., the cost of maintaining places of business, fringe benefits, statutory benefits, other direct and indirect costs (Indirect rate agreement)
- Costs of owning, renting, leasing, operating, and maintaining equipment and services typically required in the staffing support business, e.g., telephones (fixed and mobile), pagers, faxes, office machines (computers, copiers, fax machines, filming equipment, plotters, printers, servers, networks, data ports for customer electronic access, data storage and retrieval systems, filing systems, furniture, developing and maintaining Offerors standards/guides and procedures.
- Costs of normal and customary human resource and department manager functions, e.g., staff oversight, employee performance assessments, awards, promotions, transfers, disciplinary actions, and terminations.
- Costs for routine business mail and express delivery (for delivery within three business days).
- Costs for routine printing jobs.

Capabilities: Submit all capabilities information in accordance with the guidance provided on the NEUP website. The required capabilities information and associated guidance is provided on the electronic proposal submission form.

Commitment that the Offeror will comply with the mandatory (Go/No-Go) requirements identified above, Basis for Award and evidence that Offeror has the capabilities to meet the requirements set forth in the CFP. The commitment is made by checking the Terms and Conditions box located on the electronic proposal submission form available on the NEUP website.

Failure to submit any of the foregoing, at NEUP's discretion, could result in the Offeror being determined non-responsive.

11. SPECIAL CONSIDERATIONS

11.1. OMBUDSMAN PROGRAM:

Offeror is hereby notified that protests relative to this solicitation shall be resolved through BEA's Ombudsman Program (Phone: (208) 526-4513).

12. PROPOSAL INSTRUCTIONS

12.1. INTERPRETATIONS AND EXCEPTIONS

Offerors shall submit proposals on the basis of compliance with the CFP requirements. Any interpretation of the requirements by the Offeror may be considered an exception and treated accordingly (i.e., establish the proposal as non-responsive.) Offerors must obtain NEUP concurrence/clarification regarding its interpretation to classify its proposal as compliant with, or an exception to, the CFP requirements. Any exception must be documented as part of the proposal and priced as an alternative.

If Offeror takes exception to any CFP requirement, either technical or administrative, it shall be so stated in the proposal and formatted as follows: technical exceptions shall be numbered and attached to the technical proposal in a single document; administrative exceptions shall be numbered and attached to the price proposal; and each exception shall be clearly and completely defined.

12.1.1. Rights Reserved by NEUP

NEUP reserves the following rights:

- To accept or reject any proposal with or without prior discussion with the Offeror and to disregard minor irregularities in proposals received.
- To conduct any necessary pre-award survey and analysis to evaluate an Offeror's capabilities to comply with the requirements of this CFP.
- To conduct a pricing audit to facilitate a determination of the reasonableness of proposed pricing.

Offerors are advised that although negotiations and a request for best and final may follow receipt of proposals, award may be made without further discussions on proposals received. Thus, proposals should be submitted initially on the most favorable terms of price, technical compliance, and completeness.

12.1.2. Proposal Validity Period

A proposal shall remain firm for 180 days after the proposal due date, unless otherwise specified by the Offeror.

12.1.3. Proprietary Information:

NEUP prefers that applicants provide a proposal without proprietary information; however, if proprietary data/information is essential to the effective presentation of the applicant's proposal, please adhere to the following:

- If it is possible to do so without degrading the effectiveness of the presentation, place all proprietary data in a separate document as an attachment or appendix to the appropriate proposal volume.
- Each page containing proprietary data must be marked with the following legend, an alternative legend that NEUP specifically agrees to accept, or a statement that the documents are submitted pursuant to a specifically identified written agreement between you and NEUP defining the duties and obligations of the parties relative to the proprietary data: ***"This contains 'proprietary data', furnished under BEA Call for Proposals No. NEUP-002-12, which may be duplicated and used by BEA with the express limitations that the "proprietary data" may not be disclosed outside BEA and the U. S. Government."*** Contact the Procurement Agent if the legend furnished by BEA is not considered appropriate, must be revised, or should be replaced by a written agreement controlling submittal of proprietary data.

12.1.4. Discrepancies in the Request for Proposal

Should an Offeror find discrepancies in, or omissions from, the CFP, its attachments or related documents, or should Offeror be in doubt as to the meaning of any requirements, Offeror shall notify NEUP and obtain correction or clarification prior to submitting its proposal.