

**Program Announcement
To DOE National Laboratories
LAB 09-29**

*Fusion Research
on the
National Spherical Torus Experiment*

SUMMARY:

The Office of Fusion Energy Sciences (OFES) of the Office of Science (SC), U.S. Department of Energy (DOE), hereby announces its interest in receiving proposals for collaborative research on the National Spherical Torus Experiment (NSTX) at Princeton Plasma Physics Laboratory. The NSTX program addresses two of the long term goals of the OFES program: **Configuration Optimization and developing a Predictive Capability for Burning Plasmas**. Proposals for collaborative research must support the NSTX Program in addressing key scientific issues related to these goals, such as Macroscopic Plasma Physics, Multi-Scale Plasma Physics, Plasma Boundary Interfaces, Waves and Energetic Particles, and Plasma Start-up and Ramp-up without a Solenoid, and Integration of Physics and Operational Requirements for Achieving Burning Plasma Conditions. To be considered for funding, proposers must have discussed their proposed research with the NSTX National Research Program Leaders and must include a Record of Discussion that specifies the benefits of proposed research to the NSTX research program and the interface support required to carry it out. Proposals to renew on-going NSTX collaborative research must include a list of project goals from the previous statement of work and a summary of the actual accomplishments.

DATES: Potential researchers are encouraged (but not required) to submit a brief Letter-of-Intent by **September 8, 2009**. The Letter-of-Intent will provide advance information on general scope of planned research, and will help the Program Manager to plan the peer review.

Formal proposals submitted in response to this Announcement must be received by 8:00 p.m., Eastern Time, October 8, 2009, to be accepted for merit review and to permit timely consideration for award in Fiscal Year 2010.

Please see the "Addresses" section below for further instructions on the methods of submission for the full proposal.

ADDRESSES: Letters-of-Intent, referencing Program Announcement **LAB 09-29** should be sent to Mr. John Sauter by E-mail: john.sauter@science.doe.gov , with copies to Dr. Stephen Eckstrand at: steve.eckstrand@science.doe.gov and Dr. Nirmol Podder at Nirmol.Podder@science.doe.gov. Please use "Program Announcement **LAB 09-29 Letter-of-Intent**" as the subject of the email.

Please have your lab administrator submit the entire lab proposal and 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 at Telephone: 865-241-1844, E-mail: FWPSupport@osti.gov.

Also, to assist in expediting the review process, please submit via Federal Express, a single PDF file of the entire LAB proposal and FWP on a CD along with two hard copies to the address below.

Please send the CD and 1 hard copy via Federal Express to:

Mr. John Sauter
U.S. Department of Energy
Office of Fusion Energy Sciences, SC-24.2/GTN
19901 Germantown Road
Germantown, MD 20874-1290
ATTN: Program Announcement LAB 09-29

GENERAL INQUIRIES ABOUT THIS ANNOUNCEMENT SHOULD BE DIRECTED TO:

Scientific/Technical Program Contacts:

Nirmol Podder, Program Manager
Phone: 301-903-9536
Fax: 301-903-4716
E-Mail: Nirmol.Podder@science.doe.gov

or

Stephen Eckstrand, Program Manager
Phone: 301-903-5546
Fax: 301-903-4716
E-Mail: Steve.Eckstrand@science.doe.gov

Communications related to the formal proposal should use "Program Announcement LAB09-29" in the subject line.

SUPPLEMENTARY INFORMATION:

The programmatic goals of NSTX are to evaluate the attractiveness of a compact spherical torus (ST) configuration such as a Fusion Engineering Science Facility (FNSF) as a next-step in the Fusion Energy Sciences program, and to contribute to resolving important issues in predicting the physics of burning plasmas anticipated in ITER. The NSTX program addresses two of the long term goals of the Office of OFES program: Configuration Optimization and development of a Predictive Capability for Burning Plasmas.

In support of the above goal, the scientific goal of the NSTX is to advance fusion plasma science by determining and understanding the physics principles of the Spherical Torus (ST), which is characterized by strong magnetic field curvature and high BT (the ratio of the average plasma pressure to the applied toroidal magnetic field pressure) due to the low aspect ratio of its toroidal plasma. These unique properties extend and complement the normal aspect ratio lower BT tokamak in addressing the overarching scientific issues in magnetic fusion energy science. These issues are organized in topics of Macroscopic Plasma Physics, Multi-scale Transport Physics, Plasma Boundary Interfaces, Waves and Energetic Particles, and Start-up, Ramp-up and Sustainment without Solenoid, and Integration of Physics and Operational Requirements for achieving burning plasma conditions. These topics are consistent with the FESAC Priorities Panel report (http://www.ofes.fusion.doe.gov/more_html/FESAC/PP_Rpt_Apr05R.pdf).

More detail of the NSTX program is described in the peer reviewed five-year research program for NSTX starting in FY 2009, available at http://nstx.pppl.gov/DragNDrop/Five_Year_Plans/2009_2013/. An NSTX Program Letter providing updated information on the NSTX research priorities and collaboration opportunities during the next three years, accounting for the advice of the NSTX Program Advisory Committee, is available at http://nstx.pppl.gov/DragNDrop/Program_PAC/Program_Letters/NSTX_Program_Letter_FY2010-12.pdf

Research on NSTX is carried out by a broadly based research team, which includes scientific personnel from many of the leading U.S. fusion research institutions. These researchers are involved in nearly all areas of research on NSTX. The following sections provide a description of the research goals for the topical areas that are included in this solicitation.

- I. Macroscopic Plasma Physics**
- II. Multi-Scale Plasma Physics**
- III. Plasma Boundary Interfaces**
- IV. Waves and Energetic Particles**
- V. Start-up, Ramp-up, and Sustainment without a Solenoid**
- VI. Integration of Physics and Operational Requirements**

The following sections provide a brief description of the research topics of high priority in the NSTX Program during FY 2010-2013, for which collaborative research proposals are solicited by DOE.

NSTX Research Priorities for FY 2010-2013

The projected NSTX priorities for FY 2010-2013 are provided below and grouped in the following scientific areas:

I. Macroscopic Plasma Physics - role of magnetic structure in plasma confinement and the limits to plasma pressure in sustained magnetic configurations.

- I-1. Determine the physics of RWM stabilization, by both passive and active means, and apply this understanding to reliably sustain high-beta low-aspect-ratio plasmas.*

I-2. *Study the impact of low aspect ratio, high beta, large ion gyro-radius, and strong flow shear on classical and neoclassical tearing mode stability.*

I-3. *Characterize and mitigate the effects of disruptions in the ST.*

II. Multi-Scale Plasma Physics - physical processes that govern the confinement of heat, momentum, and particles in plasmas.

II-1. *Determine the role of low-k turbulence in causing anomalous energy and momentum transport, and understand the influence of plasma rotation on low-k and high-k turbulence.*

II-2. *Determine the modes (low-k, high-k, electrostatic, electromagnetic, Alfvénic) responsible for causing anomalous electron transport.*

II-3. *Determine the relationship between observed particle and impurity transport and measured and simulated micro-turbulence.*

III. Plasma Boundary Interfaces - interface between fusion plasma and its lower temperature plasma-facing material surroundings.

III-1. *Measure and understand the impact of a liquid lithium divertor (LLD) on particle control, energy confinement, and H-mode pedestal transport and stability. Further, analyze the surface characteristics of the LLD and the interactions between the LLD and the edge plasma including the transport of lithium from the edge to the core under both steady-state and transient edge conditions.*

III-2. *Characterize the parallel and cross-field transport of heat and particles in the Scrape-Off-Layer (SOL), understand the linkage between SOL transport and turbulence and the peak heat flux to the divertor, and develop means for divertor heat-flux mitigation for NSTX and upgraded/next-step ST facilities.*

III-3. *Understand the H-mode pedestal characteristics that provide access to small ELM and ELM-free regimes in the ST, and understand how boundary modifications including plasma shaping, 3D fields, and lithium impact pedestal transport and ELM stability.*

IV. Waves and Energetic Particles - use of waves and energetic particles to sustain and control high-temperature plasmas.

IV-1. *Study and optimize high-harmonic fast-wave (HHFW) heating and current drive in deuterium H-mode plasmas, with emphasis on understanding and minimizing parasitic loss mechanisms including: interactions between the HHFW and Neutral Beam Injection (NBI) fast ions, surface wave excitation, sheaths, and other RF-induced changes to the plasma edge.*

IV-2. *Study the range of observed energetic-particle-driven instabilities (for example Toroidal Alfvén Eigenmode (TAE) avalanches) and their possible role in redistribution of neutral-beam-driven current.*

IV-3. *Measure and understand Electron Bernstein Wave (EBW) emission from over-dense plasmas with emphasis on maximizing mode conversion efficiency by minimizing collisional damping and conversion efficiency fluctuations.*

V. Start-up, Ramp-up and Sustainment without solenoid - physical processes of magnetic flux generation and sustainment.

V-1. *Assess non-inductively-driven plasma current ramp-up utilizing high-harmonic fast-wave heating and current-drive with increased RF power and with improved resilience to variations in plasma edge density.*

V-2. *Develop and characterize efficient plasma current start-up utilizing techniques such as coaxial helicity injection, plasma guns, and poloidal-field ramp-up incorporating the impact of increased divertor pumping and increased ECH pre-ionization and heating power.*

VI. Integration of Physics and Operational Requirements - physics synergy of external control and self-organization of the plasma.

VI-1. *Achieve and maintain high-performance plasmas with reduced density and collisionality. Produce discharges with increased non-inductive current fraction - in particular via changes in the neutral beam current drive efficiency, core and pedestal confinement and stability, edge bootstrap current, and impurity content.*

Letters-of-Intent

A brief (one-page) Letter-of-Intent is strongly encouraged (but not required) prior to submission of a full proposal. The Letter-of-Intent will serve notice of the intent to submit a formal proposal, and the following information will aid the Program Manager in structuring the peer-review process. The letter of intent should identify the institution; the Principal Investigator's name, telephone number, and e-mail address; the title of the proposed project; and names and institutions of any proposed collaborators. The Letter-of-Intent should also include a narrative describing the research project objectives and methods of accomplishment.

PROGRAM FUNDING:

It is anticipated that up to **\$1,700,000** per year will be available for multiple projects to be initiated in **Fiscal Year 2010**, contingent on the availability of appropriated funds. Proposals may request project support for up to three years, with out-year support contingent on the availability of funds, progress of the research, and programmatic needs. Annual budgets are expected to range from **\$100,000 to \$800,000 total cost**. It is anticipated that awards will begin on or about **April 1, 2010, with a proposed project period of April 1, 2010 through March 31, 2013**.

Submission Information

Full Proposal

The Project Description must not exceed 20 pages, including tables and figures, but exclusive of attachments. The proposal must contain an abstract or project summary, short vitae, and letters of intent from collaborators, if appropriate.

Full proposals adhering to DOE Field Work Proposal format (**Reference DOE Order 412.1**) are to be prepared and submitted consistent with policies of the investigator's laboratory and the local DOE Operations Office. Laboratories may submit proposals directly to the SC Program Office listed above. A copy should also be provided to the appropriate DOE Operations Office.

The instructions and format described below should be followed. You must reference Program Announcement **LAB 09-29** 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

Proposals will be subjected to formal merit review (peer review) and will be evaluated against the following criteria which are listed in descending order of importance:

A. Scientific and/or technical merit of the project;

- What important problem(s) in plasma science or fusion science does this proposal address?*
- How will the proposed research contribute to the NSTX program during the next three years and how important is this contribution likely to be?
- How does the proposed research compare with other research in its field, both in terms of scientific and/or technical merit and originality?
- What is the likelihood that it will lead to new or fundamental advances in its field?
- In the case of a proposal to renew an on-going research project, how well has the proposer performed under the existing award?
- In answering this question, please refer to the topics described in Supplemental Information.

B. Appropriateness of the proposed method or approach;

- To what extent are the conceptual framework, methods, and analyses adequately developed and likely to lead to scientifically valid conclusions?
- What innovative concepts or methods will be employed in the proposed research?
- Are there significant potential problems and, if so, how well does the proposer address these potential problems?

C. Competency of the proposer's personnel and adequacy of the proposed resources;

- How well qualified are the proposer's personnel to carry out the proposed research? (If appropriate, please comment on the scientific reputation and quality of recent research by the principal investigator and other key personnel.)
- Please comment on the proposer's research environment and resources.
- To what extent does the proposed research take advantage of unique facilities and capabilities and/or make good use of collaborative arrangements?
- In the case of a proposal to renew an on-going research project, have the proposer's personnel played a leading role in any aspect of the NSTX program?

D. Reasonableness and appropriateness of the proposed budget.

The reviewers are also asked to comment on **Other Appropriate Factors**:

- What are the overall strengths and weaknesses of the proposal?
- Could the proposed research make a significant contribution to another field?
- If applicable, what are the educational benefits of the proposed activity?

The evaluation will include program policy factors such as the relevance of the proposed research to the terms of the announcement, the Department's programmatic needs, and quality of previous performance. External peer reviewers are selected with regard to both their scientific expertise and the absence of conflict-of-interest issues. 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. Proposals found to be scientifically meritorious and programmatically relevant will be selected in consultation with DOE selecting officials depending upon availability of funds in the DOE budget. Funding under this Notice is limited to supporting research activities based in the U.S., though subcontracts with limited funding for collaborators outside the U.S. may be allowed with appropriate justifications. The selected projects will be required to acknowledge support by DOE in all public communications of the research results.

2. Summary of Proposal Contents

- Field Work Proposal (FWP) Format (Reference DOE Order 5700.7C) (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, recent accomplishments, proposed research and methods, timetable of activities, and responsibilities of key project personnel)
- Literature Cited
- Biographical Sketch(es)
- Description of Facilities and Resources
- Other Support of Investigator(s)
- Appendix (optional)

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
 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

Provide an abstract of less than 400 words. 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 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 **20 pages (maximum)**. 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 20-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.

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 \$25,000 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.