

**Program Announcement  
To DOE National Laboratories  
LAB 04-10**

***Atmospheric  
Radiation Measurement Program***

**SUMMARY:** The Office of Biological and Environmental Research (BER) of the Office of Science (SC), U.S. Department of Energy (DOE), hereby announces its interest in receiving proposals for research projects in experimental and theoretical studies of the effects of clouds on the atmospheric radiation balance in conjunction with the Atmospheric Radiation Measurement (ARM) Program as part of the U.S. Global Climate Change Science Program (USCCSP). This notice requests new proposals and renewal proposals of currently funded research by DOE under previous ARM Program notices that are relevant to the terms of reference for this announcement and responsive to the particular needs defined below.

**DATES:** Researchers are encouraged (but not required) to submit a brief preproposal for programmatic review. The deadline for submission of preproposals is March 15, 2004. Early submission of preproposals is encouraged to allow time for meaningful responses.

Formal proposals submitted in response to this notice must be received by 4:30 p.m., E.D.T., April 9, 2004, to be accepted for merit review and to permit timely consideration for award in Fiscal Year 2005. Awards are expected to begin on or about November 1, 2004.

**ADDRESSES:** Preproposals referencing Program Announcement LAB 04-10, may be sent to the program contact, Dr. Wanda Ferrell, via electronic mail at: [wanda.ferrell@science.doe.gov](mailto:wanda.ferrell@science.doe.gov) or by U. S. Postal Service Mail at: Dr. Wanda Ferrell, Office of Biological and Environmental Research, Climate Change Research Division, SC-74/Germantown Building, U.S. Department of Energy, 1000 Independence Ave., SW, Washington, DC 20585-1290. Electronic mail is recommended to speed up response to preproposal.

Formal proposals in response to Program Announcement LAB 04-10 are to be submitted as 2 paper copies of the proposal and one CD containing the proposal in PDF format. Color images should be submitted as a separate file in PDF format and identified as such. These images should be kept to a minimum due to the limitations of reproducing hardcopies. They should be numbered and referred to in the body of the technical scientific proposal as Color image 1, Color image 2, etc.

The 2 copies of the proposal and the CD, referencing Program Announcement LAB 04-10, should be sent to: Climate Change Research Division, SC-74/Germantown Building, Office of Biological and Environmental Research, Office of Science, U.S. Department of Energy, 1000 Independence Avenue, SW, Washington, D.C. 20585-1290, ATTN: Program Announcement LAB 04-10.

When submitting by U.S. Postal Service Express Mail, any commercial mail delivery service, or when hand carried by the researcher, the following address must be used: Climate Change Research Division, SC-74, Office of Biological and Environmental Research, Office of Science, U.S. Department of Energy, 19901 Germantown Road, Germantown, MD 20874-1290, ATTN: Program Announcement LAB 04-10.

**FOR FURTHER INFORMATION CONTACT:** Dr. Wanda Ferrell, Office of Biological and Environmental Research, Climate Change Research Division, SC-74, Germantown Building, U.S. Department of Energy, 1000 Independence Ave., SW, Washington, DC 20585-1290, telephone (301) 903-0043, fax (301) 903-8519, Internet e-mail address: [wanda.ferrell@science.doe.gov](mailto:wanda.ferrell@science.doe.gov). Program information is available on: <http://www.science.doe.gov/ober/CCRD/arm.html>.

### **SUPPLEMENTARY INFORMATION:**

**Background:** Atmospheric Radiation Measurement (ARM) Program. Two major scientific objectives of the Climate Change Research Division (CCRD) are: (1) to improve the performance of predictive models of the Earth's climate, and (2) to thereby make more accurate predictions of the response of the climate system to increasing concentrations of greenhouse gases. The purpose of the ARM Program is to improve the treatment of radiation and clouds in the General Circulation Models (GCMs) used to predict future climate. This program is one component of the U.S. Climate Change Science Program that has the goal to improve the capability to accurately simulate and predict climate and climate change. The major component of the ARM Program involves gathering data for the development and testing of models of the atmospheric radiation transfer, properties of clouds, and the full life cycle of clouds with the ultimate goal of developing cloud system resolving models (CSRMs) that directly and accurately simulate cloud-scale physical processes and that can be incorporated into the Multi-Scale Modeling Framework (MMF), also referred to as super parameterization. The ARM program has established sites in three climatic regimes where cloud and radiation data are collected. The first site, Southern Great Plains (SGP), began operation in calendar year 1992, with instruments spread over an area of approximately 60,000 sq. km., centered on Lamont, Oklahoma. The SGP was chosen as a field measurement site for several reasons including its relatively homogenous geography, wide variability of climate, cloud type, and surface flux properties, and large seasonal variation in temperature and specific humidity. The Tropical Western Pacific (TWP) site is the area roughly between 10 degrees N to 10 degrees S of the equator from Indonesia to near Christmas Island. The TWP site consists of stations at Darwin, Australia, and on the islands of Manus, Papua, New Guinea and the Republic of Nauru respectively. This region was selected as an ARM site because it plays a large role in the interannual variability observed in the global climate system. The third site, the North Slope of Alaska (NSA), is located at Barrow, Alaska, with a secondary, inland site near Atkasuk. The NSA site was selected as an ARM site because it provides data about cloud and radiative processes at high latitudes, and by extension, about cold and dry regions of the atmosphere in general. Construction of an ARM Mobile Facility (AMF) was begun in late 2003 with the first deployment expected in late 2004. The AMF has been designed to address science questions beyond those investigated at the current fixed sites. The AMF will deploy instrumentation and data systems similar to those at the fixed ARM sites in NSA and TWP. The AMF will be deployed to sites around the world in various climatic regimes

and sites of opportunity for durations of 6 to 18 months to study the effects of clouds and other atmospheric conditions and properties on radiation. The ARM sites, both mobile and fixed, have been designated as a user facility, the ARM Climate Research Facility (ACRF). Thus, AMF deployments and campaigns at the fixed ARM sites will be determined by a review by the ACRF Science Review Board.

## **Request for Proposal**

This notice requests proposals, both new and renewal that address the broad ARM goal of improving the representation of cloud and radiation processes in climate models. The research areas of interest include the development of algorithms for retrieving the required measurements, studies to improve the understanding of cloud and radiation physical processes, the translation of process study results into process models and parameterizations, and the incorporation of the submodels into climate models. ARM data consist of time series of vertical profiles of certain observables while parameterizations are geared to produce statistical cloud and radiation properties on the scale of several hundred kilometers. Since the format is not amenable to modelers, research is also needed to develop tools and methodologies for making ARM data more useful for the development and testing of submodels.

Specific areas of interest to the ARM program include, but are not limited to:

- Developing new techniques to retrieve the properties of ice clouds and mixed-phase clouds from ARM data.
- Conducting analyses for improving our understanding of cloud and radiation processes including of the 3D cloud-radiation process at scales from the local atmospheric column to the GCM grid square and the relationship between atmospheric radiation and the life-cycle of ice clouds and mixed-phase clouds.
- Developing and testing new cloud and radiation submodels for global climate models.
- Incorporating new cloud and radiation submodels into global climate models and demonstrating the improved performance of the models.
- Developing and applying methodologies to use ARM data more effectively in atmospheric models, both at the cloud resolving model scale and the global climate model scale.
- Quantifying the effects of aerosols on cloud properties and the resulting radiation field, using some combination of ARM observations and physical models.

Proposals are especially encouraged that utilize ARM generated data in the above activities.

**All proposals submitted in response to this Notice must explicitly state how the proposed research will support accomplishment of the BER Climate Change Research Division's (CCRD's) Long Term Measure of Scientific Advancement to deliver improved data and models for policy makers to determine acceptable levels of greenhouse gases in the atmosphere. Submitted proposals that do not contain this information will be returned without review.**

Proposals for research to develop new techniques to retrieve the properties of ice clouds and mixed-phase clouds using ARM data should target their research on methods for deriving long-term records of cloud microphysical and macrophysical properties at multiple locations. The improved retrieval algorithms provide bulk microphysical estimates for clouds at all ARM fixed sites and are expected to include uncertainty estimates.

Proposals for cloud and radiation process analyses should propose studies that elucidate radiative transfer in cloudy atmospheres, including the overlap problem of stratiform cloud layers. These studies may include, but are not limited to, 3-D radiative transfer, representations of cloud overlap, mixed phase clouds, cloud life cycles, feedback processes (especially in the Arctic), and other processes important for clouds, such as convection and turbulence and their effects on radiative transfer. The emphasis on the Arctic feedback is to test the hypothesis that links large climate feedbacks with surface and tropospheric temperatures, surface albedo, cloud cover, deep ocean water production (the global thermohaline ocean circulation pump), and the polar atmospheric heat sink.

Proposals for research to develop and test new cloud and radiation process models should focus on investigating the validity of assumptions that are associated with such models and how well the ensemble of cloud and radiation sub models simulate clouds and their effect on radiation fields in the climate models.

Proposals requesting funds to study incorporation of cloud and radiation parameterizations into global climate models and demonstrating the improved performance of the models are expected to provide a clear plan describing the method to be used to quantify the model improvement. Researchers are strongly encouraged to utilize the tools that have been developed for this purpose in the Climate Change Prediction Program - ARM Parameterization Testbed (CAPT) (<http://www-pcmdi.llnl.gov/capt/>) effort at DOE's Program for Climate Model Diagnosis and Intercomparison (PCMDI).

Proposals for research to develop and apply methodologies to use ARM data more effectively in atmospheric models should focus on converting ARM data that usually consist of time series of vertical profiles of certain observables into a form that is of improved utility by climate modelers. This research area also includes techniques for converting model output to a form that is equivalent ARM measurements, thus, enabling the direct comparison of model-produced cloud properties with ARM observations.

Proposals for research to quantify the effect of aerosols on the radiation field should focus on both the indirect and direct role of aerosols on radiative transfer and cloud properties. Specifically the research should relate observations of radiative fluxes and radiances to the atmospheric composition and use these relations to develop and test parameterizations and/or process models to accurately predict the atmospheric radiative properties. Note, that the DOE Atmospheric Science Program (ASP) is being reconfigured in Fiscal Year 2004, to focus on aerosol radiative forcing with new research to be funded early in Fiscal Year 2005, and will support aerosol research on aerosol processes and resulting properties that influence radiation fields. A joint ARM-ASP working group will be formed to foster and facilitate collaborations between the two programs.

Proposals that require a special field campaign, which has not already been planned and approved by the ARM Program Manager, will not be accepted for consideration.

To ensure that the program meets the broadest needs of the research community and the specific needs of the DOE CCRD, successful researchers are expected to participate as ARM Science Team members in the appropriate working group(s) relevant to their efforts. Costs for participation in ARM Science Team meetings and subcommittee meetings should be based on two trips of 1 week each to Washington, DC, and two trips of 3 days each to Chicago, Illinois.

### **Program Funding**

It is anticipated that approximately \$2 million will be available for awards in Fiscal Year 2005, contingent upon the availability of appropriated funds. Multiple-year funding of awards is expected, with out-year funding also contingent upon the availability of appropriated funds, progress of the research, and programmatic needs. The allocation of funds within the research areas will depend upon the number and quality of proposals received. Awards are expected to begin on or about November 1, 2004. Equal consideration will be given to renewal and new proposals. DOE is under no obligation to pay for any costs associated with the preparation or submission of proposals if an award is not made.

### **Collaboration**

Principal Investigators are strongly encouraged to collaborate with researchers in other institutions, such as: universities, industry, non-profit organizations, federal laboratories and Federally Funded Research and Development Centers (FFRDCs), including the DOE National Laboratories, where appropriate, and to include cost sharing wherever feasible. Additional information on collaboration is available in the Application Guide for the Office of Science Financial Assistance Program that is available via the World Wide Web at: <http://www.sc.doe.gov/production/grants/Colab.html>.

### **Preproposals**

Potential researchers are strongly encouraged to submit a brief preproposal that consists of two to three pages of narrative describing the research objectives and methods of accomplishment. These will be reviewed relative to the scope and research needs of the ARM Program. Principal Investigator (PI) address, telephone number, fax number and e-mail address are required parts of the preproposal. A response to each preproposal discussing the potential program relevance of research that would be proposed in a formal proposal generally will be communicated within 15 days of receipt. Use of e-mail for this communication will decrease the possibility of a delay in responses to the preproposal. The deadline for the submission of preproposals is March 15, 2004. Researchers should allow sufficient time so that the formal proposal deadline is met. SC's preproposal policy can be found on SC's Grants and Contracts Web Site at: <http://www.sc.doe.gov/production/grants/preapp.html>. Please contact Dr. Wanda Ferrell (wanda.ferrell@science.doe.gov).

### **The Proposal**

The technical portion of the proposal should not exceed twenty-five double-spaced pages and should include detailed budgets for each year of support requested. Researchers are asked to use the following ordered format:

- **Field Work Proposal (FWP) Format** (Reference DOE Order 5700.7C) (DOE ONLY)

Also provide the PI's phone number, fax number and e-mail address.

- **Project Abstract Page** ; single page only, should contain title, PI name, and abstract text
- **Budget pages** for each year and a budget summary of project period (using DOE F 4620.1)
- **Budget Explanation**
- **Project Description**
- **Long Term Measure:** All applications submitted in response to this Notice must explicitly state how the proposed research will support accomplishment of the BER Climate Change Research Division's (CCRD's) Long Term Measure of Scientific Advancement to deliver improved data and models for policy makers to determine acceptable levels of greenhouse gases in the atmosphere. Submitted proposals that do not contain this information will be returned without review.
- **Literature Cited**
- **Collaborative Arrangements** (if applicable)
- **Facilities and Resources**
- **Biographical Sketches** should be submitted in a form similar to that of NIH or NSF (two to three pages).
- **Current and Pending Support**
- **Letters of Collaboration** (if applicable)
- **Renewal applications** should include a special section entitled "Accomplishments Under Previous Support." (See <http://www.science.doe.gov/production/grants/App.html>.) This section shall address the following:

- (a) continued relevance of their work to the goals of the ARM Program
- (b) the contribution of work conducted under previous support to the goals of the ARM Program, including a listing of publications and presentations

For researchers who do not have access to the World Wide Web (WWW), please contact Karen Carlson, Office of Biological and Environmental Research, Climate Change Research Division, SC-74/Germantown Building, U.S. Department of Energy, 1000 Independence Ave., SW, Washington, DC 20585-1290, phone: (301) 903-3338, fax: (301) 903- 8519, e-mail: karen.carlson@science.doe.gov; for hard copies of background material mentioned in this solicitation.

The instructions and format described below should be followed. Reference Program Announcement LAB 04-10 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:

Scientific and/or technical merit of the project

Appropriateness of the proposed method or approach

Competency of the personnel and adequacy of the proposed resources

Reasonableness and appropriateness of the proposed budget

The evaluation will include program policy factors such as the relevance of the proposed research to the terms of the announcement, the uniqueness of the proposer's capabilities, and demonstrated usefulness of the research for proposals in other DOE Program Offices as evidenced by a history of programmatic support directly related to the proposed work.

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

Field Work Proposal (FWP) Format (Reference DOE Order 5700.7C) (DOE ONLY)

Proposal Cover Page

Table of Contents

Abstract

Narrative

Literature Cited

Budget and Budget Explanation

Other support of investigators

Biographical Sketches

Description of facilities and resources

Appendix

#### **2.1 Number of Copies to Submit**

Formal proposals in response to Program Announcement LAB 04-10 are to be submitted as 2 paper copies of the proposal and one CD containing the proposal in PDF format. Color images

should be submitted as a separate file in PDF format and identified as such. These images should be kept to a minimum due to the limitations of reproducing hardcopies. They should be numbered and referred to in the body of the technical scientific proposal as Color image 1, Color image 2, etc.

### **3. Detailed Contents of the Proposal**

Proposals must be readily legible, when photocopied, and must conform to the following three requirements: the height of the letters must be no smaller than 10 point with at least 2 points of spacing between lines (leading); the type density must average no more than 17 characters per inch; the margins must be at least one-half inch on all sides. Figures, charts, tables, figure legends, etc., may include type smaller than these requirements so long as they are still fully legible.

#### **3.1 Field Work Proposal Format (Reference DOE Order 5700.7C) (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.

Laboratories may submit proposals directly to the SC Program office listed above. A copy should also be provided to the appropriate DOE operations office.

#### **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 Abstract

Provide an abstract of no more than 250 words. Give the broad, long-term objectives and what the specific research proposed is intended to accomplish. State the hypotheses to be tested. Indicate how the proposed research addresses the SC scientific/technical area specifically described in this announcement.

### 3.5 Narrative

The narrative comprises the research plan for the project and is limited to 5 pages per task. It should contain the following subsections:

**Background and Significance:** Briefly sketch the background leading to the present proposal, critically evaluate existing knowledge, and specifically identify the gaps which the project is intended to fill. State concisely the importance of the research described in the proposal. Explain the relevance of the project to the research needs identified by the Office of Science. Include references to relevant published literature, both to work of the investigators and to work done by other researchers.

**Preliminary Studies:** Use this section to provide an account of any preliminary studies that may be pertinent to the proposal. Include any other information that will help to establish the experience and competence of the investigators to pursue the proposed project. References to appropriate publications and manuscripts submitted or accepted for publication may be included.

**Research Design and Methods:** Describe the research design and the procedures to be used to accomplish the specific aims of the project. Describe new techniques and methodologies and

explain the advantages over existing techniques and methodologies. As part of this section, provide a tentative sequence or timetable for the project.

**Subcontract or Consortium Arrangements:** If any portion of the project described under "Research Design and Methods" is to be done in collaboration with another institution, provide information on the institution and why it is to do the specific component of the project. 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".

### **3.6 Literature Cited**

List all references cited in the narrative. Limit citations to current literature relevant to the proposed research. Information about each reference should be sufficient for it to be located by a reviewer of the proposal.

### **3.7 Budget and Budget Explanation**

A detailed budget is required for the entire project period, which normally will be three years, 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.sc.doe.gov/production/grants/Forms-E.html>

### **3.8 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 devoted to the project.

### **3.9 Biographical Sketches**

This information is required for senior personnel at the laboratory submitting the proposal and at all subcontracting institutions. The biographical sketch is limited to a maximum of two pages for each investigator.

### **3.10 Description of Facilities and Resources**

Describe briefly the facilities to be used for the conduct of the proposed research. Indicate the performance sites and describe pertinent capabilities, 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.

### **3.11 Appendix**

Include collated sets of all appendix materials with each copy of the proposal. Do not use the appendix to circumvent the page limitations of the proposal. Information should be included that may not be easily accessible to a reviewer.

Reviewers are not required to consider information in the Appendix, only that in the body of the proposal. Reviewers may not have time to read extensive appendix materials with the same care as they will read 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.