



SMALL BUSINESS INNOVATION RESEARCH PHASE I

Program Solicitation No. PR-NC-02-10155

ISSUE DATE: March 28, 2002

CLOSING DATE: May 23, 2002 *

* CAUTION - See Section V, Paragraph J.9(c), Instructions to Offerors,
concerning Late Proposals and Modifications.

Your proposal with an **original and nine (9) copies** (including all appendices) shall be received at one of the following addresses by **12:00 p.m. (noon) local time on May 23, 2002.**

U.S. MAIL:

U.S. Environmental Protection Agency
Attention: Marsha Johnson, SBIR Phase I
RTP Procurement Operations Division (D143-01)
Research Triangle Park, NC 27711

HAND-CARRIED/COURIER ADDRESS:

U.S. Environmental Protection Agency
Attention: Marsha Johnson, SBIR Phase I
RTP Procurement Operations Division (D143-01)
4930 Old Page Road
Research Triangle Park, NC 27709

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I. PROGRAM DESCRIPTION

A. The Environmental Protection Agency (EPA) invites small business firms to submit research proposals under this Small Business Innovation Research (SBIR) Solicitation. The SBIR program is a phased process uniform throughout the Federal Government of soliciting proposals and awarding funding agreements for research (R) or research and development (R&D) to meet stated agency needs or missions.

EPA is interested in advanced technologies in nanomaterials and pollution prevention, air and water pollution control, solid and hazardous waste management, environmental monitoring and analytical technologies, and environmental bioterrorism detection and decontamination where the research will serve as a base for technological innovation and commercialization. The proposed research must directly pertain to EPA's environmental mission and must be responsive to EPA program interests included in the topic descriptions in this solicitation.

In order to facilitate proposal reviews by external peer reviewers with specialized expertise and by EPA technical personnel with focused program needs and priorities, offerors must designate a research topic for their proposal. The same proposal may not be submitted under more than one topic, but an organization may submit separate proposals on different topics or different proposals on the same topic as long as the proposals are not duplicates of the same research principle modified to fit the

topic. If such duplicates are submitted, only one will be reviewed. Refer to Sections IV, V, and VII for additional requirements. Where similar research is discussed under more than one topic, the offeror should choose the topic most relevant to the proposed research. It is the complete responsibility of offerors to select and identify the best topic for their proposals.

B. Offerors are responsible for submitting proposals, and any modifications or revisions, so as to reach the Government office designated in this solicitation by the time specified in this solicitation. See Section V, Paragraph J.9(c), Instructions to Offerors, Concerning Late Proposals and Modifications.

THIS SOLICITATION IS FOR SBIR PHASE I ONLY.

To stimulate and foster technological innovation, including increasing private sector applications of federal research or R&D, EPA's program follows the SBIR program's uniform process:

(1) **PHASE I.** Phase I involves a solicitation of proposals to conduct feasibility related experimental research or R&D related to described agency requirements. The objective of this phase is to determine the technical feasibility and preliminary commercialization potential of the proposed effort and the quality of performance of the small concern with a relatively small agency investment before consideration of further federal support in Phase II. The Government is not obligated to fund any specific Phase I proposal. The maximum dollar amount of this Phase I solicitation is \$70,000 and the term of performance should not exceed six months.

(2) **PHASE II.** Phase II proposals may only be submitted by Phase I award winners invited to submit proposals. Phase II is the principal research or R&D effort and Phase II projects should normally be completed in two years. The objective is to continue the research or R&D initiated under Phase I and work toward commercialization of the technology. Phase II awards are expected to include full scale testing of the technology, but may not necessarily complete the total research and development that may be required to satisfy commercial or federal needs beyond the SBIR program. Completion of the research and development may be through Phase III. The Agency is under no obligation to fund any proposal or any specific number of proposals in a given topic. It also may elect to fund several or none of the proposed approaches to the same topic.

It is anticipated that approximately 10 Phase II awards will be made, each with a dollar amount of \$225,000 and a two year term of performance. For Phase II,

the Agency is planning to offer a Phase II Option under which Phase II offerors may submit a proposal for \$70,000 additional funding to expand R&D efforts to accelerate the project from full-scale testing and demonstration to full commercialization. EPA federal funds must be designated strictly for advancing the research related elements of the project. No automatic preference shall be given to offers which address the option; however, in the case where an offeror addresses the option in its proposal, the entire proposal including the option shall be evaluated. The Agency would have a unilateral right to exercise the option after EPA's acceptance of the company's detailed commercialization plan, including documentation showing that at least \$100,000 was transferred to the contractor from one or more third-party investors, such as a venture capital firm, an "angel" investor, local, state or federal non-SBIR funding source, or another company under a partnership, licensing or joint venture arrangement, or any combination of third parties. The Government is not obligated to fund any specific Phase II proposal.

For technologies awarded Phase I contracts under this solicitation, the follow-on Phase II Solicitation will be issued on/about September 25, 2003, and proposals will be due on/about November 26, 2003. It is expected that each Phase II proposal will be evaluated on the results of Phase I, the Phase II program plan, and the commercial potential of the Phase II proposal. The evaluation criteria will be as follows:

PHASE II CRITERIA

1. Results of Phase I and degree to which research objectives and identified customer needs were met. Demonstration of performance/cost effectiveness and environmental benefits associated with the proposed research, including risk reduction potential.
2. Quality and soundness of the Phase II research plan to establish the technical and commercial viability of the proposed concept as evidenced through technology prototypes or initial commercial demonstrations.
3. Qualifications of the principal/key investigator, supporting staff, and consultants. Time commitment of principal/key investigator, adequacy of equipment and facilities, and proposed budget to accomplish the proposed research. Adequacy of Phase II Quality Assurance Summary.
4. Potential of the proposed concept for significant commercialization applications. The quality and adequacy of the commercialization plan to produce

an innovative product, process, or device and to put technology prototypes or initial Phase II applications into commercial production and sales.

5. The offeror's SBIR or other research commercialization record. Existence of second phase funding commitments from private sector or non-SBIR funding sources. Existence of third phase follow-on commitments and presence of other indicators of commercial potential of the idea.

(3) **PHASE III.** Where appropriate and needed in order to complete the research and development, there may be a third phase which is funded by:

1. Non-federal sources of capital for commercial applications of SBIR funded research or research and development.
2. Federal Government with non-SBIR federal funds for SBIR-derived products and processes that will be used by the Federal Government.
3. Non-SBIR federal funds for the continuation of research or research and development that has been competitively selected using peer review or scientific review criteria.

C. Each offeror submitting a proposal must qualify as a small business for research or R&D purposes at the time of award. In addition, the primary employment of the principal investigator must be with the small business firm at the time of award and during the conduct of the proposed research. Principal investigators who appear to be employed by a university must submit a letter from the university stating that the principal investigator, if awarded an SBIR contract, will become a less-than-half-time employee of the university. Also, a principal investigator who appears to be a staff member of both the applicant and another employer must submit a letter from the second employer stating that, if awarded an SBIR contract, he/she will become a less than half-time employee of such organization. Letters demonstrating that these requirements have been fulfilled must be submitted prior to contract award to the addressee stated in Section VI of this solicitation. Failure to do so may jeopardize award. Also, for both Phase I and Phase II, the research or R&D work must be performed in the United States. "United States" means the 50 states, the Territories and possessions of the United States, the Commonwealth of Puerto Rico, the Trust Territory of the Pacific Islands, and the District of Columbia.

D. For Phase I the Government anticipates the award of approximately \$1.75 M in firm fixed price contracts at

approximately \$70,000 each including profit, but reserves the right to change either the number of awards or the amount of the individual awards depending on the outcome of the selection process. The contractor's period of performance is expected to be six months. Award of any contract(s) resulting from this solicitation shall be to the responsible offeror(s) with the highest rankings after evaluation in accordance with Section IV. Source selection will not be based on a comparison of cost or price. However, cost or price will be evaluated to determine whether the price, including any proposed profit, is fair and reasonable and whether the offeror understands the work and is capable of performing the contract.

E. All inquiries concerning this solicitation shall be submitted to the following E-mail address:

johnson.marsha@epa.gov

If E-mail is not available to you, written or telephone inquiries may be directed to:

U.S. Environmental Protection Agency
 Attention: Marsha Johnson, SBIR Phase I
 RTP Procurement Operations Division (D143-01)
 Research Triangle Park, N.C. 27711
 (919) 541-0952

Potential offerors are encouraged to communicate via E-mail.

II. DEFINITIONS

For purposes of this solicitation, the following definitions apply:

Research or Research and Development: Any activity that is:

- (1) A systematic, intensive study directed toward greater knowledge or understanding of the subject studied.
- (2) A systematic study directed specifically toward applying new knowledge to meet a recognized need.
- (3) A systematic application of knowledge toward the production of useful materials, devices, and systems or methods, including design, development, and improvement of prototypes and new processes to meet specific requirements.

Funding Agreement: Any contract, grant, or cooperative agreement entered into between any federal agency and any small business concern for the performance of experimental, developmental, or research work funded in whole or in part by the Federal Government.

Subcontract: Any agreement, other than one involving an employer-employee relationship, entered into by a Federal Government funding agreement awardee calling for supplies or services required solely for the performance of the original funding agreement.

Small Business Concern: A small business concern is one that, at the time of award of Phase I and Phase II funding agreements, meets the following criteria:

- (1) Is independently owned and operated, is not dominant in the field of operation in which it is proposing, has its principal place of business located in the United States, and is organized for profit;
- (2) Is at least 51 percent owned, or in the case of a publicly owned business, at least 51 percent of its voting stock is owned by United States citizens or lawfully fully admitted permanent resident aliens (if this applies, appropriate documentation must be submitted).
- (3) Has, including its affiliates, a number of employees not exceeding 500, and meets the other regulatory requirements found in 13 CFR Part 121. Business concerns, other than investment companies licensed, or state development companies qualifying under the Small Business Investment Act of 1958, 15 U.S.C. 661, et. seq., are affiliates of one another when either directly or indirectly:

- (A) one concern controls or has the power to control the other; or
- (B) a third party or parties controls or has the power to control both.

Control can be exercised through common ownership, common management, and contractual relationships. The term "affiliates" is defined in greater detail in 13 CFR 121. The term "number of employees" is defined in 13 CFR 121. Business concerns include, but are not limited to, any individual, partnership, corporation, joint venture, association, or cooperative.

Socially and Economically Disadvantaged Small Business Concern: A socially and economically disadvantaged small business concern is one:

(1) That is at least 51 percent owned by (i) an Indian tribe or a native Hawaiian organization, or (ii) one or more socially and economically disadvantaged individuals, and

(2) Whose management and daily business operations are controlled by one or more socially and economically disadvantaged individuals.

Socially and Economically Disadvantaged Individual: A member of any of the following groups:

- (1) Black Americans;
- (2) Hispanic Americans;
- (3) Native Americans (American Indians, Eskimos, Aleuts, or Native Hawaiians);
- (4) Asian-Pacific Americans (persons with origins from Burma, Thailand, Malaysia, Indonesia, Singapore, Brunei, Japan, China, Taiwan, Laos, Cambodia (Kampuchea), Vietnam, Korea, The Philippines, U.S. Trust Territory of the Pacific Islands (Republic of Palau), Republic of the Marshall Islands, Federated States of Micronesia, the Commonwealth of the Northern Mariana Islands, Guam, Samoa, Macao, Hong Kong, Fiji, Tonga, Kiribati, Tuvalu, or Nauru);
- (5) Subcontinent Asian (Asian-Indian) Americans (persons with origins from India, Pakistan, Bangladesh, Sri Lanka, Bhutan, the Maldives Islands, or Nepal); and
- (6) Members of other groups designated from time to time by SBA pursuant to Section 124.103 of 13 CFR Ch.1(1-1-99 edition).

Women-Owned Small Business Concern: A small business concern that is at least 51 percent owned by a woman or women who also control and operate it. "Control" in this context means exercising the power to make policy decisions. "Operate" in this context means being actively involved in the day-to-day management.

Primary Employment: More than one-half of the principal investigator's time is spent in the employ of the small business.

United States: The 50 States, the Territories and possessions of the United States, the Commonwealth of Puerto Rico, the Trust Territory of the Pacific Islands, and the District of Columbia.

Commercialization: The process of developing markets and producing and delivering products for sale (whether by the originating party or by others); as used here, commercialization includes both government and commercial markets.

III. PROPOSAL PREPARATION INSTRUCTIONS AND REQUIREMENTS

A. PROPOSAL PAGE LIMIT

Proposals submitted in response to this Phase I of the SBIR program shall not exceed a total of **25 pages**, one side only. The only exception would be regarding the requirements set forth in Section III.D.12, "Prior SBIR Awards". The **25 pages** should include the cover page, budget, and all enclosures or attachments. Pages should be of standard size (8 ½" x 11"; 21.6 cm x 27.9 cm) with 2.5 cm margins and type no smaller than 10 point font size. All pages must be consecutively numbered. **Proposals in excess of the 25-page limitation shall not be considered for review or award.** Any additional attachments, appendices, or references beyond the 25-page limitation shall result in the proposal not being considered for review or award. A letter of transmittal is not necessary. If one is furnished, it must not be attached to every copy of the proposal. If a letter of transmittal is attached to every copy of the proposal, it will be counted as page 1 of the proposal. No binders are necessary. If binders are provided, they will be counted as pages even if no printing or writing is thereon.

B. PROPOSAL COVER SHEET

The offeror shall photocopy (or download from the Internet) and complete Appendix A as page 1 of each copy of each proposal. **No other cover is permitted.** When downloading the solicitation from the Internet, Appendix A may print on two pages, but will only count as one page per Appendix. Offerors may reformat the forms to correct spacing and pagination errors, however, identical information must be provided.

The original of the cover sheet must contain the pen-and-ink signatures of the authorized negotiator and the person authorized to sign the proposal.

C. ABSTRACT OR SUMMARY

The offeror shall complete Appendix B as page 2 of each proposal. Appendix B is limited to 1 page. The technical abstract should include a brief description of the problem or opportunity, the innovation, project objectives, and description of the effort. In summarizing anticipated results, the implications of the approach (for both Phases I and II) and the potential commercial applications of the research shall be stated. **THE ABSTRACT IS USED EXTENSIVELY DURING THE EXTERNAL PEER REVIEW AND EPA INTERNAL PROGRAMMATIC REVIEW.** The project summary of successful proposals will be published by EPA and, therefore, must not contain proprietary information.

D. TECHNICAL CONTENT

Begin the main body of the proposal on page 3. As a minimum, the following shall be included:

1. IDENTIFICATION AND SIGNIFICANCE OF THE PROBLEM OR OPPORTUNITY.

A clear statement of the specific technical problem or opportunity addressed and the environmental benefits. **INFORMATION ON THE ENVIRONMENTAL BENEFITS ASSOCIATED WITH THE TECHNOLOGY IS A VERY IMPORTANT PART OF THE EXTERNAL PEER REVIEW AND EPA INTERNAL PROGRAMMATIC REVIEW.** Where appropriate, proposals should describe the positive and negative environmental benefits based on an assessment of the full life cycle of the new product or technology. Life Cycle Assessment (LCA) refers to the analysis of impacts throughout all stages of a product or process from production to use to disposal. Integration of a life cycle perspective into the environmental analysis typically considers impacts from raw materials extraction, manufacture, packaging, distribution, and disposal.

2. PHASE I OBJECTIVES. State the specific objectives of Phase I research and development effort, including the technical questions it will try to answer to determine the feasibility of the proposed approach.

3. PHASE I WORK PLAN. This section provides a detailed description of the work plan. The work plan should describe what will be done, where it will be done, and how the R/R&D will be carried out. The work planned to achieve each task should be discussed in detail, to enable a complete scientific and technical evaluation of the work plan. A work schedule also should be provided.

4. RELATED RESEARCH OR R&D. Describe significant research or R&D that is directly related to the proposal including any conducted by the project manager/principal investigator or by the proposing firm. Describe how it relates to the proposed effort, and any planned coordination with outside sources. Offerors must demonstrate their awareness of key recent research or R&D conducted by others in the specific topic area by providing appropriate references from the literature and other published documents.

5. KEY PERSONNEL AND BIBLIOGRAPHY OF DIRECTLY RELATED WORK. Identify key personnel involved in Phase I including their directly related education, experience, and bibliographic information. Where vitae are extensive, summaries that focus on the most relevant experience or publications are desired and may be necessary to meet proposal size limitations.

6. RELATIONSHIP WITH FUTURE RESEARCH OR RESEARCH AND DEVELOPMENT. State the anticipated results of the proposed approach if the project is successful (Phase I and II). A discussion of cost-effectiveness is paramount, especially comparing the state-of-the-art approaches with the proposed approach. Discuss the significance of the Phase I effort in providing a foundation for Phase II R/R&D effort.

7. FACILITIES. A detailed description, availability, and location of instrumentation and physical facilities proposed for Phase I should be provided.

8. CONSULTANTS. Involvement of consultants in the planning and research stages of the project is permitted. If such involvement is intended, it should be described in detail and vitae should be provided.

9. COMMERCIALIZATION PLAN. Provide an abbreviated 2-3 page plan related directly to producing an innovative product, process, or device and getting it into commercial production and sales. Comprehensive business plans (that are company rather than project oriented) are not desired. The Phase I plan is a roadmap toward producing a detailed Phase II Commercialization Plan, which will be required as part of the Phase II Application.

NOTE: The Small Business Research and Development Enhancement Act of 1992 allows discretionary technical assistance to SBIR awardees. The Agency may provide up to \$4,000 of SBIR funds for technical assistance per award. EPA intends to provide Phase I awardees with

technical assistance through a separate EPA arrangement. For Phase I, this assistance will be in addition to the award amount. For Phase II, the law allows each awardee to expend up to \$4,000 per year of the award amount for technical assistance services.

The Phase I plan should provide limited information on the subjects described below. Explain what will be done during Phase I to decide on applications, markets, production, and financing. The Commercialization Plan should address:

- a. **SBIR Project:** Brief description of the company, its principal field(s) of interest, size, and current products and sales. A concise description of the SBIR project and its key technical objectives.
- b. **Commercial Applications:** Potential commercial applications of the research results specifying customers and specific needs that will be satisfied. Have you or do you intend to file for one or more patents as a result of the SBIR project?
- c. **Competitive Advantages:** What is particularly innovative about the anticipated technology or products? (Innovation may be expressed in terms of applications, performance, efficiencies, or reduced cost. To determine if your innovation is likely to result in intellectual property that may be legally protected, it helps to conduct a patent search and look for related work being funded by EPA or another federal agency. A fact sheet on how to search for patents and related federally-funded work is provided in Appendix E.) What significant advantages in application, performance, technique, efficiency, or costs, do you anticipate your new technology will have over existing technology? (In order to assess such advantages, it is useful to compare the anticipated performance of your technology against substitutable products currently being sold or emerging out of R&D. If regulations, industry standards, or certifying requirements apply to your technology or product, these provide useful criteria for comparing your anticipated performance with potentially competing technology and products. However, other expressions of end-user needs also may contain important criteria.)
- d. **Markets:** What are the anticipated specific markets for the resulting technology, their estimated size, classes of customers, and your estimated market share 5 years after the project is completed and/or first sales? Who are the major competitors in the markets, present and/or anticipated?

e. **Commercialization:** Briefly describe how you plan to produce your product. Do you intend to manufacture it yourself, subcontract the manufacturing, enter into a joint venture or manufacturing agreement, license the product, etc.? Briefly describe the approach and steps you plan to take to commercialize the research results to significant sales. Do you plan to market the product yourself, through dealers, contract sales, marketing agreements, joint venture, sales representatives, foreign companies, etc.? How do you plan to raise money to support your commercialization plan?

10. SIMILAR OR CLOSELY RELATED SBIR AWARDS. If the small business concern has received ANY prior Phase I or Phase II award(s) from EPA or any federal agency for similar or closely related research, submit name of awarding agency, date of award, funding agreement number, amount and topic or subtopic title. **DESCRIBE THE TECHNICAL DIFFERENCES AND REASONS WHY THE PROPOSED NEW PHASE I RESEARCH IS DIFFERENT FROM RESEARCH CONDUCTED UNDER PRIOR SBIR AWARDS.** (This required proposal information **shall** be counted toward proposal pages count limitation.)

11. DUPLICATE OR EQUIVALENT SBIR PROPOSALS. A firm may elect to submit essentially equivalent work under other federal Program Solicitations. In these cases, a statement must be included in each such proposal indicating: the name and address of the agencies to which proposals were submitted or from which awards were received; date of proposal submission or date of award; title, number, and date of solicitations under which proposals were submitted or awards received; specific applicable research topics for each proposal submitted or award received; titles of research projects; name and title of project manager or principal investigator for each proposal submitted or award received. (This information **shall** count toward proposal pages count limitation.)

12. PRIOR SBIR AWARDS. If the small business concern has received ANY prior Phase II award from any federal agency in the prior 5 fiscal years, submit name of awarding agency, date of award, funding agreement number, amount, topic or subtopic title, follow-on agreement amount, source and date of commitment, and current commercialization status for each Phase II. (This required proposal information shall be included as an attachment to the proposals and **shall not** be counted toward proposal pages count limitation.)

E. COST BREAKDOWN/ PROPOSED BUDGET

Complete the budget form in Appendix C and include the form immediately after proposal Section D.11. Photocopy the form for the required copies for submission. Incorporate the copy of the budget form bearing the original signature into the copy of the proposal bearing the original signature on the cover page. The budget form will count as one page in the 25-page limit. If budget explanation pages are included, they will count toward the 25-page limit.

F. PHASE I QUALITY ASSURANCE NARRATIVE STATEMENT

Offerors must state whether or not their proposal involves the performance of environmental technology, whether hardware based or via new techniques. This quality assurance narrative statement should not exceed two pages and will be included in the 25-page limitation for the proposal. The narrative statement must for each of the following items either address the required information or explain why the item does not apply to the proposed research.

1. Discuss the activities to be performed or hypothesis to be tested and criteria for determining acceptable data quality. (Note: Such criteria may be expressed in terms of precision, accuracy, representativeness, completeness, and comparability. These criteria also must be applied to determine the acceptability of existing or secondary data to be used in the project.)
2. Describe the study design, including sample type and location requirements, any statistical analyses that were used to estimate the types and numbers of samples required for physical samples, or equivalent information for studies using survey and interview techniques.
3. Describe the procedures for the handling and custody of samples, including sample collection, identification, preservation, transportation, and storage.
4. Describe the procedures that will be used in the calibration and performance evaluation of the sampling and analytical methods and equipment to be used during the project.
5. Discuss the procedures for data reduction and reporting, including a description of statistical analyses to be used and of any computer models to be de-

signed or utilized with associated verification and validation techniques.

6. Describe the quantitative and/or qualitative procedures that will be used to evaluate the success of the project, including any plans for peer or other reviews of the study design or analytical methods prior to data collection.

A more detailed Proposal Quality Assurance Plan will be required in Phase II. The plan will be required as part of the first monthly report under the Phase II contract.

IV. METHOD OF SELECTION AND EVALUATION CRITERIA

All Phase I proposals will be evaluated and judged on a competitive basis by peer reviewers from outside EPA. Proposals will be initially screened to determine responsiveness. As noted in Section III, proposals exceeding the 25-page limitation will not be considered for review or award. Also, as noted in Section I, any proposal addressing more than one research topic, or failing to identify the research topic by letter symbol on the cover page, will not be considered for review or award. Proposals passing this initial screening will be reviewed for technical merit by external panels of technical experts, using the technical evaluation criteria described in A.1 below. Each of the criteria are equal in value. These panels will assign each proposal an adjectival rating of “excellent”, “very good”, “good”, “fair”, or “poor”, using the specified criteria. The proposals assigned “excellent” and “very good” ratings, will then be subjected to the programmatic review within EPA, to further evaluate these applications in relation to program priorities and balance using the criteria specified in A.2 below. Each proposal will be judged on its own merit. The Agency is under no obligation to fund any proposal or any specific number of proposals in a given topic. It also may elect to fund several or none of the proposed approaches to the same topic or subtopic.

A. TECHNICAL EVALUATION CRITERIA

1. EXTERNAL PEER REVIEW. The external peer review panels will utilize the following evaluation criteria to rate each proposal. The criteria are of equal importance.

CRITERIA

- a. The scientific and technical significance of the proposed technology and its appropriateness to the research topic. Quality and soundness of the research plan to establish the technical and commercial feasibility of the concept.
- b. The uniqueness/ingenuity of the proposed concept or application as technological innovation. Originality and innovativeness of the proposed research toward meeting customer needs and achieving commercialization of the technology.
- c. Potential demonstration of performance/cost effectiveness and environmental benefits associated with the proposed research, including risk reduction potential.
- d. Qualifications of the principal/key investigator, supporting staff, and consultants. Time commitment of principal/key investigator, adequacy of equipment and facilities, and proposed budget to accomplish the proposed research. Adequacy and quality of the Quality Assurance Narrative Statement.
- e. Potential of the proposed concept for significant commercial applications. Potential for the commercialization plan to produce an innovative product, process or device and to put it into commercial production and sales. Potential market and competition and other financial/business indicators of commercialization potential and the offeror's SBIR or other research commercialization record.

All peer reviewers will be required to sign an agreement to protect the confidentiality of all proposal material, and to certify that no conflict of interest exists between the reviewer and the offeror. A copy of both forms is available upon request; however, the identity of the reviewer will not be released.

2. EPA PROGRAMMATIC REVIEW. The proposals that received ratings of "excellent" or "very good" by the External Peer Review Panel will be subject to the programmatic review by EPA program managers using the criteria set forth below to select which of the "excellent" and "very good" proposals will be funded. Projects will not be funded where EPA determines the proposed research is already being supported by EPA or another known source. The evaluation criteria "a" through "c" are of equal value and will be used to

evaluate the applications in relation to program priorities, balance, and programmatic relevancy.

CRITERIA

- a. The potential of the technology to meet Agency program priorities and to strengthen the overall balance of the SBIR program. How well the technology fits into EPA's overall research strategy.
- b. The potential of the technology for significant environmental benefits and for strengthening the scientific basis for risk assessment/risk management in the Agency research topic area.
- c. The potential of the technology to have broad application or to impact large segments of the population.

B. RELEASE OF PROPOSAL REVIEW INFORMATION

After final award decisions have been announced, the technical evaluations of the offeror's proposal will be provided to the offeror. The identity of the reviewer shall not be disclosed.

V. CONSIDERATIONS

A. AWARDS

The Government anticipates award of approximately 25 firm-fixed-price contracts of up to \$70,000 each including profit. It is expected that these contracts will be awarded with a contract start date of April 1, 2003. The period of performance for the contracts should not exceed six (6) months. The primary consideration in selecting proposals for award will be the technical merit of the proposal. Proposals shall be evaluated in accordance with the Technical Evaluation Criteria stated in IV.A. above. Source selection will not be based on a comparison of cost or price. However, cost or price will be evaluated to determine whether the price, including any proposed profit, is fair and reasonable and whether the offeror understands the work and is capable of performing the contract.

This current solicitation is for Phase I only, and the Government is not obligated to fund any specific Phase I proposal.

Funds are not presently available for this contract. The Government's obligation under this contract is contin-

gent upon the availability of appropriated funds from which payment for contract purposes can be made. No legal liability on the part of the Government for any payment may arise until funds are made available to the Contracting Officer for this contract and until the Contractor receives notice of such availability, to be confirmed in writing by the Contracting Officer.

B. REPORTS

1. The Contractor shall furnish two (2) copies of a monthly letter report stating progress made. One (1) copy of the report shall be submitted to the Project Officer and one (1) copy to the Contract Specialist. The reports shall be submitted within 7 calendar days after the end of the reporting period. Specific areas of interest shall include progress made and difficulties encountered during the reporting period, and a statement of activities anticipated during the subsequent reporting period. The report shall include any changes in personnel associated with the project. Also, the first month's report shall contain a work plan and schedule of accomplishments for the subsequent months of the project. The Monthly Report shall include, as an attachment, a copy of the monthly voucher for the same period.

2. Two (2) copies of a comprehensive final report on the Phase I project must be submitted to the Project Officer by the completion date of the contract. The Contract Specialist shall receive one copy. This final report shall include a single-page project summary as the first page, identifying the purpose of the research, a brief description of the research carried out, the research findings or results, and potential applications of the research in a final paragraph. The balance of the report should indicate in detail the research objectives, research work carried out, results obtained, and estimates of technical feasibility. The report should include a discussion of any commercialization activity carried out during Phase I as well as future commercialization plans.

3. Two (2) hard copies (and one copy on a disk in Word Perfect or ASCII format) of a publishable (cleared for the general public) 2-3 page Executive Summary of the final report for Phase I must be submitted to the Project Officer by the completion date of the contract. This special report should be a true summary of the report, including the purpose of the project, work carried out, and results. The summary should stress innovativeness and potential commercialization. The Executive Summary will be placed

on the EPA SBIR Web Site, and therefore, it should include the specific results the company is willing to release to the public.

C. PAYMENT SCHEDULE

Phase I payments will be made as follows:

Eighteen percent (18%) of the total contract price upon receipt and acceptance of a proper invoice with each of the first five monthly reports. The remainder shall be paid upon receipt and acceptance of the final report. Pursuant to the provisions of FAR 52.232-25, "Prompt Payment", payment will be rendered within thirty (30) days after receipt of a proper invoice.

D. INNOVATIONS, INVENTIONS AND PATENTS

1. LIMITED RIGHTS INFORMATION AND DATA

a. Proprietary Information

Information contained in unsuccessful proposals will remain the property of the offeror. The Government may, however, retain copies of all proposals. Public release of information in any proposal submitted will be subject to existing statutory and regulatory requirements.

If proprietary information is provided by an offeror in a proposal which constitutes a trade secret, proprietary commercial or financial information, confidential personal information or data affecting the national security, it will be treated in confidence to the extent permitted by law, provided this information is clearly marked by the offeror with the term "confidential proprietary information" and provided the following legend appears on the title page of the proposal:

"For any purpose other than to evaluate the proposal, these data shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed in whole or in part, provided that if a funding agreement is awarded to this offeror as a result of or in connection with the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the funding agreement. This restriction does not limit the Government's right to use information contained in the data if it is obtained from another source without restriction. The data subject to this restriction is contained in pages _____ of this proposal."

Any other legend may be unacceptable to the Government and may constitute grounds for removing the proposal from further consideration and without assuming any liability for inadvertent disclosure.

b. Alternative to Minimize Proprietary Information: Offerors shall limit proprietary information to only that absolutely essential to their proposal.

c. Rights in Data Developed Under SBIR Funding Agreements: The Contract will contain a data clause which will provide the following:

SBIR RIGHTS NOTICE (MAR 1994)

These SBIR data are furnished with SBIR rights under Contract No. _____ (and subcontract _____ if appropriate). For a period of four (4) years after acceptance of all items to be delivered under this contract, the Government agrees to use these data for Government purposes only, and they shall not be disclosed outside the Government (including disclosure for procurement purposes) during such period without permission of the Contractor, except that, subject to the foregoing use and disclosure prohibitions, such data may be disclosed for use by support Contractors. After the aforesaid 4-year period the Government has a royalty-free license to use, and to authorize others to use on its behalf, these data for Government purposes, but is relieved of all disclosure prohibitions and assumes no liability for unauthorized use of these data by third parties. This Notice shall be affixed to any reproductions of these data, in whole or in part.

d. Copyrights

With prior written permission of the Contracting Officer, the Awardee normally may copyright and publish (consistent with appropriate national security considerations, if any) material developed with EPA support. EPA receives a royalty-free license for the Federal Government and requires that each publication contain an appropriate acknowledgment and disclaimer statement.

e. Patents

Small business concerns normally may retain the principal worldwide patent rights to any invention developed with Governmental support. The Government receives a royalty-free license for Federal Government use, reserves the right to require the patent holder to license others in certain circumstances, and requires that anyone exclusively licensed to sell the invention in the United States must normally manufacture it domestically. To the

extent authorized by 35 U.S.C. 205, the Government will not make public any information disclosing a Government-supported invention for a 4-year period to allow the Awardee a reasonable time to pursue a patent.

E. COST SHARING

Cost sharing is permitted for proposals under this Program Solicitation; however, cost sharing is not required nor will it be an evaluation factor in consideration of your proposal.

F. FEE OR PROFIT

Reasonable fee (estimated profit) will be considered under this solicitation. For guidance purposes, the amount of profit normally should not exceed 10% of total project costs.

G. JOINT VENTURES OR LIMITED PARTNERSHIPS

Joint ventures and limited partnerships are eligible provided the entity created qualifies as a small business as defined in this Program Solicitation.

H. RESEARCH AND ANALYTICAL WORK

1. For Phase I, a minimum of two-thirds of the research and/or analytical effort must be performed by the proposing small business concern unless otherwise approved in writing by the Contracting Officer.

2. For Phase II, a minimum of one-half of the research and/or analytical effort must be performed by the proposing small business concern unless otherwise approved in writing by the Contracting Officer.

I. CONTRACTOR COMMITMENTS

Upon award of a funding agreement, the Awardee will be required to make certain legal commitments through acceptance of numerous clauses in Phase I funding agreements. The outline that follows is illustrative of the types of clauses to which the Contractor would be committed. This list should not be understood to represent a complete list of clauses to be included in Phase I funding agreements, nor to be specific wording of such clauses. Copies of complete terms and conditions are available upon request.

1. INSPECTION. Work performed under the contract is subject to Government inspection and evaluation at all times.

2. EXAMINATION OF RECORDS. The Comptroller General (or a duly authorized representative) shall have the right to examine any directly pertinent records of the awardee involving transactions related to this contract.

3. DEFAULT. The Government may terminate the contract if the Contractor fails to perform the work contracted.

4. TERMINATION FOR CONVENIENCE. The contract may be terminated at any time by the Government if it deems termination to be in its best interest, in which case the Contractor will be compensated for work performed and for reasonable termination costs.

5. DISPUTES. Any dispute concerning the funding agreement that cannot be resolved by agreement shall be decided by the Contracting Officer with right of appeal.

6. EQUAL OPPORTUNITY. The awardee will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin.

7. AFFIRMATIVE ACTION FOR VETERANS. The awardee will not discriminate against any employee or application for employment because he or she is a disabled veteran or veteran of the Vietnam era.

8. AFFIRMATIVE ACTION FOR HANDICAPPED. The awardee will not discriminate against any employee or applicant for employment because he or she is physically or mentally handicapped.

9. OFFICIALS NOT TO BENEFIT. No Government official shall benefit personally from the contract.

10. COVENANT AGAINST CONTINGENT FEES. No person or agency has been employed to solicit or secure the contract upon an understanding for compensation except bonafide employees or commercial agencies maintained by the Contractor for the purpose of securing business.

11. GRATUITIES. The contract may be terminated by the Government if any gratuities have been offered to any representative of the Government to secure the contract.

12. PATENT AND COPYRIGHT INFRINGEMENT. The Contractor shall report each notice or claim of patent or copyright infringement based on the performance of the contract.

13. AMERICAN MADE EQUIPMENT AND PRODUCTS. When purchasing equipment or a product under the

SBIR funding agreement, purchase only American-made items whenever possible.

J. ADDITIONAL INFORMATION

1. The Program Solicitation is intended for informational purposes and reflects current planning. If there is any inconsistency between the information contained herein and the terms of any resulting SBIR funding agreement, the terms of the funding agreement are controlling.

2. Before award of an SBIR funding agreement, the Government may request the offeror to submit certain organizational, management, personnel, and financial information to assure responsibility of the offeror.

3. The Government is not responsible for any monies expended by the offeror before award of any funding agreement.

4. This Program Solicitation is not an offer by the Government and does not obligate the Government to make any specific number of awards. Also, awards under the SBIR program are contingent upon the availability of funds.

5. The SBIR program is not a substitute for existing unsolicited proposal mechanisms. Unsolicited proposals shall not be accepted under the SBIR program in either Phase I or Phase II.

6. If an award is made pursuant to a proposal submitted under this Program Solicitation, the Contractor will be required to certify that he or she has not previously been, nor is currently being, paid for essentially equivalent work by any agency of the Federal Government.

7. Notwithstanding the relatively broad definition of R/R&D in Section II, Definitions, hereof, awards under this solicitation are limited to APPLIED forms of research. Proposals that are surveys, including market, state-of-the-art and/or literature surveys, which should have been performed by the offeror prior to the preparation of the proposal, or the preparation of allied questionnaires and instruction manuals, shall not be accepted. If such proposals are submitted, they shall be considered as not in compliance with the solicitation intent, and therefore, technically unacceptable.

8. The requirement that the offeror designate a topic, and only one topic, (see page 1, Section I above) also is necessary. EPA receives hundreds of proposals each year and has special teams of reviewers for review of each research topic. In order to assure that proposals are evaluated

by the correct team, it is the complete responsibility of the offeror to select and identify the best topic.

9. Instructions to Offerors - Competitive Acquisition (May 2001) FAR 52.215-1

(a) *Definitions. As used in this provision—*

“Discussions” are negotiations that occur after establishment of the competitive range that may, at the Contracting Officer’s discretion, result in the offeror being allowed to revise its proposal.

“In writing,” “writing,” or “written” means any worded or numbered expression that can be read, reproduced, and later communicated, and includes electronically transmitted and stored information.

“Proposal modification” is a change made to a proposal before the solicitation’s closing date and time, or made in response to an amendment, or made to correct a mistake at any time before award.

“Proposal revision” is a change to a proposal made after the solicitation closing date, at the request of or as allowed by a Contracting Officer as the result of negotiations.

“Time,” if stated as a number of days, is calculated using calendar days, unless otherwise specified, and will include Saturdays, Sundays, and legal holidays. However, if the last day falls on a Saturday, Sunday, or legal holiday, then the period shall include the next working day.

(b) *Amendments to solicitations.* If this solicitation is amended, all terms and conditions that are not amended remain unchanged. Offerors shall acknowledge receipt of any amendment to this solicitation by the date and time specified in the amendment(s).

(c) *Submission, modification, revision, and withdrawal of proposals.*

(1) Unless other methods (e.g., electronic commerce or facsimile) are permitted in the solicitation, proposals and modifications to proposals shall be submitted in paper media in sealed envelopes or packages (i) addressed to the office specified in the solicitation, and (ii) showing the time and date specified for receipt, the solicitation number, and the name and address of the offeror. Offerors using commercial carriers should ensure that the proposal is marked on

the outermost wrapper with the information in paragraphs (c)(1)(i) and (c)(1)(ii) of this provision.

(2) The first page of the proposal must show—

(i) The solicitation number;

(ii) The name, address, and telephone and facsimile numbers of the offeror (and electronic address if available);

(iii) A statement specifying the extent of agreement with all terms, conditions, and provisions included in the solicitation and agreement to furnish any or all items upon which prices are offered at the price set opposite each item;

(iv) Names, titles, and telephone and facsimile numbers (and electronic addresses if available) of persons authorized to negotiate on the offeror’s behalf with the Government in connection with this solicitation; and

(v) Name, title, and signature of person authorized to sign the proposal. Proposals signed by an agent shall be accompanied by evidence of that agent’s authority, unless that evidence has been previously furnished to the issuing office.

(3) Submission, modification, revision, and withdrawal of proposals.

(i) Offerors are responsible for submitting proposals, and any modifications or revisions, so as to reach the Government office designated in the solicitation by the time specified in the solicitation. If no time is specified in the solicitation, the time for receipt is 4:30 p.m., local time, for the designated Government office on the date that proposal or revision is due.

(ii)(A) Any proposal, modification, or revision received at the Government office designated in the solicitation after the exact time specified for receipt of offers is “late” and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late offer would not unduly delay the acquisition; and—

(1) If it was transmitted through an electronic commerce method authorized by

the solicitation, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of proposals; or

(2) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of offers and was under the Government's control prior to the time set for receipt of offers; or

(3) It is the only proposal received.

(B) However, a late modification of an otherwise successful proposal that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.

(iii) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the proposal wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

(iv) If an emergency or unanticipated event interrupts normal Government processes so that proposals cannot be received at the office designated for receipt of proposals by the exact time specified in the solicitation, and urgent Government requirements preclude amendment of the solicitation, the time specified for receipt of proposals will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

(v) Proposals may be withdrawn by written notice received at any time before award. Oral proposals in response to oral solicitations may be withdrawn orally. If the solicitation authorizes facsimile proposals, proposals may be withdrawn via facsimile received at any time before award, subject to the conditions specified in the provision at 52.215-5, Facsimile Proposals. Proposals may be withdrawn in person by an offeror or an authorized representative, if the identity of the person requesting withdrawal is established and the person signs a receipt for the proposal before award.

(4) Unless otherwise specified in the solicitation, the offeror may propose to provide any item or combination of items.

(5) Offerors shall submit proposals in response to this solicitation in English, unless otherwise permitted by the solicitation, and in U.S. dollars, unless the provision at FAR 52.225-17, Evaluation of Foreign Currency Offers, is included in the solicitation.

(6) Offerors may submit modifications to their proposals at any time before the solicitation closing date and time, and may submit modifications in response to an amendment, or to correct a mistake at any time before award.

(7) Offerors may submit revised proposals only if requested or allowed by the Contracting Officer.

(8) Proposals may be withdrawn at any time before award. Withdrawals are effective upon receipt of notice by the Contracting Officer.

(d) Offer expiration date.

Proposals in response to this solicitation will be valid for the number of days specified on the solicitation cover sheet (unless a different period is proposed by the offeror).

(e) Restriction on disclosure and use of data. Offerors that include in their proposals data that they do not want disclosed to the public for any purpose, or used by the Government except for evaluation purposes, shall—

(1) Mark the title page with the following legend: This proposal includes data that shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed—in whole or in part—for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this offeror as a result of—or in connection with—the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in these data if it is obtained from another source without restriction. The data subject to this restriction are contained in sheets [insert numbers or other identification of sheets]; and

(2) Mark each sheet of data it wishes to restrict with the following legend: Use or disclosure of data

contained on this sheet is subject to the restriction on the title page of this proposal.

(f) Contract award.

(1) The Government intends to award a contract or contracts resulting from this solicitation to the responsible offeror(s) whose proposal(s) represents the best value after evaluation in accordance with the factors and subfactors in the solicitation.

(2) The Government may reject any or all proposals if such action is in the Government's interest.

(3) The Government may waive informalities and minor irregularities in proposals received.

(4) The Government intends to evaluate proposals and award a contract without discussions with offerors (except clarifications as described in FAR 15.306(a)). Therefore, the offeror's initial proposal should contain the offeror's best terms from a cost or price and technical standpoint. The Government reserves the right to conduct discussions if the Contracting Officer later determines them to be necessary. If the Contracting Officer determines that the number of proposals that would otherwise be in the competitive range exceeds the number at which an efficient competition can be conducted, the Contracting Officer may limit the number of proposals in the competitive range to the greatest number that will permit an efficient competition among the most highly rated proposals.

(5) The Government reserves the right to make an award on any item for a quantity less than the quantity offered, at the unit cost or prices offered, unless the offeror specifies otherwise in the proposal.

(6) The Government reserves the right to make multiple awards if, after considering the additional administrative costs, it is in the Government's best interest to do so.

(7) Exchanges with offerors after receipt of a proposal do not constitute a rejection or counteroffer by the Government.

(8) The Government may determine that a proposal is unacceptable if the prices proposed are materially unbalanced between line items or subline items. Unbalanced pricing exists when, despite an acceptable total evaluated price, the price of one or more contract line items is significantly overstated or understated as indicated by the application of cost or price analysis

techniques. A proposal may be rejected if the Contracting Officer determines that the lack of balance poses an unacceptable risk to the Government.

(9) If a cost realism analysis is performed, cost realism may be considered by the source selection authority in evaluating performance or schedule risk.

(10) A written award or acceptance of proposal mailed or otherwise furnished to the successful offeror within the time specified in the proposal shall result in a binding contract without further action by either party.

(11) The Government may disclose the following information in postaward debriefings to other offerors:

(i) The overall evaluated cost or price and technical rating of the successful offeror;

(ii) The overall ranking of all offerors, when any ranking was developed by the Agency during source selection;

(iii) A summary of the rationale for award; and

(iv) For acquisitions of commercial items, the make and model of the item to be delivered by the successful offeror.

VI. SUBMISSION OF PROPOSALS

A. Your proposal with an original and nine (9) copies shall be received at one of the following addresses by 12:00 p.m. (noon), local time, on May 23, 2002.

U.S. MAIL ADDRESS:

U.S. Environmental Protection Agency
Solicitation No. PR-NC-02-10155 - SBIR Phase I
Closing Date: May 23, 2002 at 12:00 p.m. (noon)
Attention: Marsha Johnson, SBIR Phase I
RTP Procurement Operations Division (D143-01)
Research Triangle Park, NC 27711

HAND CARRIED/COURIER ADDRESS:

U.S. Environmental Protection Agency
Solicitation No. PR-NC-02-10155 - SBIR Phase I
Closing Date: May 23, 2002 at 12:00 p.m. (noon)

Attention: Marsha Johnson, SBIR Phase I
 RTP Procurement Operations Division (D143-01)
 4930 Old Page Road
 Research Triangle Park, NC 27709

IMPORTANT!!! Please note Section V, Paragraph J.9(c) concerning Late Proposals, Modifications of Proposals and Withdrawal of Proposals.

Telegraphic, telecopied, or facsimile proposals will NOT be considered for award.

B. Please do not use special bindings or covers. Staple the pages in the upper left corner of the cover sheet of each proposal.

C. All copies of a proposal shall be sent in the same package.

D. The proposal should be self-contained and written with the care and thoughtfulness accorded papers for publication.

VII. SCIENTIFIC AND TECHNICAL INFORMATION SOURCES

(See Appendix D)

VIII. SBIR PHASE I RESEARCH TOPICS

Program Scope: The objective of this solicitation is to increase the incentive and opportunity for small firms to undertake cutting edge, high-risk, or long-term research that has a high potential payoff if the research is successful. Federal support of the front-end research on new ideas, often the highest risk part of the innovation process, may provide small businesses sufficient incentive to pursue such research.

EPA's SBIR program does not fund basic research or literature searches. It is recognized that any research and development project starts out as a concept of the inventor. Basic theoretic research studies and preliminary laboratory testing of the concept often are needed to develop an idea. Literature and other surveys and questionnaires also are needed to rule out duplication and inappropriate research

study and process detail, finally leading to the process design of a prototype apparatus or process that could be tested to show the feasibility of the innovation. These basic research activities and preliminary studies should be completed before preparing an SBIR proposal.

Proposals only offering computer expert systems, computer models, and computer-aided design activities are unacceptable. Computer activities may be helpful tools in the early identification of pollution problems and possible solutions, but they do not directly reduce pollution. They cannot be used in lieu of applied laboratory research to determine the feasibility of a pollution control process. Also, proposals that only offer the performance of a design activity cannot be judged, as it is impossible to guess what sort of apparatus or process will result. Without a straightforward description of the process and/or apparatus to be tested, there can be no determination of the scientific and technical quality of the work plan. Proposals only offering such design activities are unacceptable.

Program Topics: The proposed research must directly pertain to EPA's environmental mission and must be responsive to EPA program interests included in the topic descriptions of this solicitation. The research should be the basis for technological innovation resulting in new commercial products, processes, or services which benefit the public and promote the growth of the small business. This solicitation covers nanotechnologies and pollution prevention, drinking water and wastewater treatment, control of air pollution, solid and hazardous waste management, environmental monitoring and analytical technologies, and environmental bioterrorism detection and decontamination.

Processes involving anthropogenic radioactive materials or the application of fertilizers are addressed by other agencies and are not included in this solicitation. Technologies that only involve fuel savings without direct environmental benefits, also are addressed by other agencies and are not included in this solicitation. Specific topics of this solicitation include:

A. NANOMATERIALS AND CLEAN TECHNOLOGY

Research is needed to apply the principles of nanotechnology to the areas of environmental monitoring and pollution prevention and control. Nanotechnology is defined as the creation of functional materials, devices, and systems through control of matter at the scale of 1 to 100 nanometers, and the exploitation of novel properties and phenomena at the same scale. EPA is particularly interested in nanotechnologies that reduce the use and release of toxic

pollutants, especially persistent, bioaccumulative toxics, hazardous air pollutants, and volatile organic compounds. Nanotechnology is emerging as a technology platform with potential for great environmental breakthroughs and significant commercial applications. This nanomaterials topic area is closely related to other topics in the solicitation. Specific areas of interest include, but are not limited to:

- Environmentally benign manufacturing processes. Green nanotechnology that eliminates or minimizes harmful emissions and material waste from industrial processes or that improves reuse or our ability to recycle.
- New nanoporous filters for removal of gaseous pollutants and particulates from contaminated air streams.
- Nanofiltration membranes for organic solvent recovery and similar applications.
- Nanoparticulate catalysts for utilization in VOC treatment devices and related applications.
- Development of microelectromechanical systems (MEMS) and nanotechnology based devices for use in environmental analytical and monitoring instrument devices including sensors and nano plumbing components.
- Metal free nano laminated coatings and nanomaterials with smart characteristics including reactive coatings that destroy or immobilize toxic compounds.
- Development of technology for solvent free production of nano size high performance ceramic powders and similar materials.
- High surface area nano materials for new coatings and environmental applications.
- Nanomaterial sensors for rapid and precise process control and environmental monitoring. EPA is particularly interested in remote, *in-situ*, real-time and continuous measurement of species at trace (ppt) concentrations. Sensors that utilize lab-on-a-chip technology also are of interest.

Clean Technology, the second part of this topic, includes pollution prevention, waste minimization, green chemistry, and several industry-specific engineering interests. Pollution prevention includes source reduction practices that reduce the release of any hazardous or non-haz-

ardous substance, including fugitive emissions. This topic includes equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, and substitution of raw materials. While improvements in housekeeping, maintenance, training, or inventory control may result in pollution prevention, these activities are outside the scope of EPA's SBIR program.

Green chemistry involves reducing or eliminating the use or generation of hazardous substances, including feedstocks, reagents, solvents, products, and byproducts. Green chemistry involves the design, manufacture, and use of chemical products and processes and includes chemical synthesis, catalysis, detection, analysis, monitoring, separation processes, and reaction conditions. Of particular interest are green chemistry projects that reduce the generation of pollutants that contain persistent, bioaccumulative, and toxic chemicals. Examples of pollution prevention and green chemistry areas of interest include, but are not limited to:

- Novel cost-effective separation methods and long-life coatings.
- Development of new cost-competitive, low-temperature sterilization processes to replace the use of ethylene oxide (EO). (For background information, see: <http://www.h2e-online.org/> and <http://www.aha.org/ar/comment/ethylene.asp>.)
- Changes in the composition of end products that would allow fundamental changes in the production process, in the use of raw materials, or that reduce the relative environmental impact resulting from their use and disposal. Of particular interest are mercury-free products such as lighting, switches, and thermostats, and products used in a hospital setting. (For information on hospital products, see: <http://www.sustainablehospitals.org>.)

Another part of this topic includes engineering proposals that focus on industry-specific process technology and production equipment, including modernization, modification, or better control of process equipment. Process inputs, including changes in raw materials, either to different materials (e.g., water instead of organic solvents) or materials with different specifications (e.g., lower contaminant levels) also are of special interest. Priority sectors include industries under EPA's Sector-Based, Sustainable Industries Partnership Program (see the Web site: <http://www.sectorstar.org>) and the Design for the Environment/Small Business Partnership, including metal finishing, printing, electronics, garment and fabric care, shipbuilding

and ship repair, foundries, die casting, meat processing, specialty batch chemicals, adhesives manufacturing, and safer chemicals and processes for automotive repair facilities and automobile and appliance assembly plants. An example of EPA's needs is provided below:

- Shipbuilding and Repair Industry: EPA is interested in cleaner technologies and product substitutions that result in low or zero-leaching of toxic metals from water-borne vessels into water coming into contact with these vessels. Contact water includes process and wash water, runoff, and the water bodies where ships operate. Examples of product substitutions include metal-free marine coatings and new ship construction materials.

B. PREVENTION AND CONTROL OF AIR POLLUTION

Research is needed on new, innovative, and cost-effective approaches that prevent or control emissions of nitrogen oxides (NO_x), fine particles, volatile organic compounds (VOCs), or toxic air pollutants (TAPs) from stationary sources. Systems that can be used to control combinations of these pollutants are of particular interest. Areas of interest include, but are not limited to:

- Innovative and cost-effective technologies to control emissions of sulfur trioxide (SO₃) from stationary sources. Sources of particular interest include coal-fired boilers and smelters.
- Advanced systems to capture gaseous contaminants such as acid gases, dioxins, and TAPs. Techniques that simultaneously control multiple pollutants, such as SO₂ and NO_x, or SO₂ and mercury or SO₂, NO_x, and mercury are of special interest.
- Innovative and cost-effective techniques to control directly emitted submicron size particles, secondary particles, and organic compounds from stationary sources. Sources of particular interest include boilers and smelters.
- Innovative and cost-effective NO_x, SO₂, and mercury controls for stationary sources such as coal-fired electric utility boilers. Cost-effective techniques to control emission streams with low concentrations of TAPs. VOC and TAP emission controls and prevention technologies for area sources, such as gasoline marketing operations,

surface coating operations, and solvent usage related to consumer and commercial products.

- New, cost-effective sulfur oxides control techniques for the large number of smaller SO₂ emitters targeted for regulation by states. Many of these sources impact short-term air quality standards due to their relatively high concentration of SO₂ in stack gases.
- Cost-effective techniques to control and/or remove toxic air emissions, such as heavy metals, nitroaromatics, and other extraordinarily active mutagens in vent and flue gases from combustion and/or industrial sources. Mercury from coal-fired combustors is of special interest. Also included are isocyanates from auto refinish spray painting and brominated flame retardant dust from plastics manufacturing operations.
- Innovative clay-based or other inexpensive sorbents for selective removal of toxic and other air pollutants from coal-fired power plant emissions. Control of mercury is of special interest.
- Technologies that allow leaking valves to be safely repaired online.

C. TREATMENT AND MONITORING OF DRINKING WATER

EPA needs new technologies, especially for small systems, for removal of organic and inorganic contaminants and disinfection by-products, and protection from disease-causing organisms. Innovation is needed to upgrade existing techniques as well as to develop new approaches to address these problems. Areas of interest include, but are not limited to:

- Development of innovative unit processes, particularly for small systems, for removal of contaminants such as perchlorate, aluminum and pesticides, and pathogens such as *Cryptosporidium* and cyst-like organisms and emerging pathogens like caliciviruses, microsporidia, echoviruses, coxsackieviruses, adenoviruses, and others on the Drinking Water Contaminant Candidate List. More information is available from the following Web site:

<http://www.epa.gov/OGWDW/ccl/cclfs.htm#table1>.

- Alternatives to chlorine disinfection for removing pathogenic microorganisms, including innovative applications of ultraviolet radiation and processes that improve overall effectiveness while using reduced amounts of disinfectant.
- Development of efficient, cost-effective treatment processes for removing disinfection by-product precursors and innovative methods that minimize their formation.

New approaches also are needed to solve drinking water monitoring and measurement problems. EPA is interested in the adaptation or extension of existing techniques from other, non-environmental fields that can provide significant improvements in current environmental measurements. Specific areas of interest include, but are not limited to:

- Portable measurement technologies that can be used in the field to eliminate packaging and shipping samples to distant laboratories, and yield real-time information at a lower cost. Such technologies need to be rugged, sensitive, and suitable for the wide variety of drinking water samples that are commonly analyzed. Rapid field tests also are needed to respond to spills and accidents.
- Improved measurement of microbial pathogens in drinking water systems is of special interest. Improved methods for *Cryptosporidium* are a priority. Better methods also are needed for measuring other cyst-like organisms and emerging pathogens like caliciviruses, microsporidia, echoviruses, coxsackieviruses, adenoviruses, and others on the Drinking Water Contaminant Candidate List.
- Research is needed to develop sensitive, accurate, and specific rapid-screening technologies and methods to detect algal neurotoxins and cytotoxins in source water and drinking water. The analytical techniques should be appropriate for use in measuring algal toxin occurrence at or shortly after the time of sample collection.

D. MUNICIPAL AND INDUSTRIAL WASTEWATER TREATMENT

Research is needed to improve existing municipal wastewater treatment processes and treatment and management of septage and sewage sludge (biosolids). Existing

treatment and management systems often fail to perform as intended due to unforeseen factors not considered in the plant design, usually related to upsets in the process itself or inefficiencies in ancillary treatment and control processes. Specific areas of interest include, but are not limited to:

- New, cost-effective technologies that improve treatment efficiency at municipal wastewater treatment facilities with design flows less than 50,000 gallons per day.
- Cost-effective alternatives to the chlorination of outfalls from municipal wastewater treatment plants, emphasizing the identity and characteristics of by-products associated with the alternative treatments.
- Innovative, cost-effective techniques for removing phosphorus and nitrogen nutrients from municipal wastewater, particularly in small (<10,000 population) or decentralized systems.
- Innovative methods to manage and treat septage and new techniques for unsewered residential and commercial wastewaters.
- Cost-effective treatment technologies for removal of pesticides from discharges to surface waters.

Research is needed to address environmental and public health problems associated with industrial sources including mining and animal feeding operations. Innovative methods are needed to improve existing industrial wastewater treatment processes, which often fail to perform as intended due to unforeseen factors not considered in the plant design, usually related to upsets or inefficiencies in the treatment processes. Mercury-contaminated surface waters and ground waters and technologies that remove oil and other contaminants from surface waters are of special interest. Areas of interest include, but are not limited to:

- Technologies to control discharges from concentrated animal feeding operations (CAFOs) including beef cattle feedlots; hog, sheep, chicken, and turkey operations; and dairy farms. (For more information, see: <http://epa.gov/ost/guide/cafo/index.html>.)
- Process concepts and modifications to enhance reliability of achieving high efficiencies for industrial wastewater treatment systems from facilities with design flows less than 50,000 gallons per day.

- Economical processes for treating drainage from abandoned factories, coal mines, etc., including low-cost treatment of drainage, coal mine spoils, overburden, leachate, and tailings.
- Low-cost processes for controlling wastewater discharges containing volatile or toxic organic pollutants, pesticides or oil/fuels.
- Mercury-contaminated surface water and ground water is of special interest. Technologies are needed to remove mercury in its various forms including methylmercury. Also needed are innovative technologies and robust extractants (i.e., cross-linked polystyrene polymers, selective ion-exchange resins, special membranes) that selectively remove mercury even in the presence of competing metal ions (e.g., Hg(II), Cd).

E. HAZARDOUS WASTE MANAGEMENT AND SITE REMEDIATION

This topic includes management of hazardous solid waste and sediments, and remediation of contaminated sites, soils, sediments, and ground water. Management, treatment, and recycling of municipal and industrial solid waste is included in Topic F. Innovative approaches are needed for hazardous wastes, including incineration and other treatment, and disposal in conventional or special landfills. Contaminated sediments now appear to be the main source of toxic contaminants in many bays, lakes, and rivers. Areas of interest include, but are not limited to:

- Innovative methods for the operation and control of high temperature waste combustion incinerators that lead to reduced contaminant release through air, water, or residual ash streams. Of special interest is mercury, one of the worst emission problems for waste incinerators. The current technology for capturing mercury is injection of sorbents/reactants into the flue which results in the capture of mercury along with fly ash in electrostatic precipitators or baghouses. This creates a problem with disposal of the mercury-contaminated fly ash or scrubber solution. Improved technologies are needed to retrofit incinerators for optimum capture of the mercury and minimization of mercury-contaminated waste by-products.
- Advanced hazardous constituent destruction technologies using cost-effective thermal, chemical and biological detoxification methods.

- Innovative ways of preventing or treating/detoxifying wastes prior to land disposal, particularly those containing highly *persistent*, *bioaccumulative*, and *toxic* constituents (e.g., improved means of leaching toxic constituents from wastes in a landfill environment to render the wastes innocuous within the period of operation and post-closure care). Of particular interest are immobilization technologies suitable for mercury-bearing wastes. More information on the Agency's strategy for "PBT Chemicals" is available at the following Web site: <http://www.epa.gov/pbt>.

This topic also includes remediation of organically contaminated soil, sediments and ground water and treatment or removal of heavy metals at contaminated sites. Certain locations within the United States have become contaminated with heavy metals and hazardous and toxic organic substances. Contaminants have permeated and adsorbed onto soils, diffused to interstitial saturated zones, dissolved into ground waters, and migrated to subsurface aquifers. In many instances, contaminants have exhibited physical and chemical properties that make them difficult to remove from the environment. Contaminants may exist in subsurface deposits as immobile gums or sludges difficult to access. They may be resistant to normal subsurface chemical and biological degradation processes. They may strongly adsorb on soil structures and be only slightly soluble in aqueous concentrations.

Proposals are solicited that will result in the development of innovative, cost-effective methods for the *in-situ* or *ex-situ* treatment or control of heavy metals and hazardous organic wastes. Also needed are *in-situ* technologies that mobilize contaminants to make them more amenable to subsequent *ex-situ* or *in-situ* treatment or extraction. Innovative and cost-effective technologies are needed in areas including, but not limited to:

- Innovative *ex-situ* and *in-situ* treatment technologies for mercury-contaminated soil, sediments, and ground water are of special interest. Mercury exists as organo-mercury complexes, phenyl mercury, methyl mercury, and mixed mercury wastes. Cost-effective, innovative technologies are needed to treat, remove, or immobilize these forms of mercury.
- Improved treatment and disposal of solid and/or liquid wastes or sediments, including detoxification, solidification, chemical treatment, neutralization, or otherwise fixing organic waste prior to disposal in landfills. Physical methods for subsur-

face mixing to enhance mobilization and mass transfer. Biotreatment methods in the saturated and unsaturated zone.

- Approaches for detecting, degrading, and removing dense non-aqueous phase liquids (DNAPL) from ground water. DNAPLs are usually highly concentrated, small pockets or strands of semi-pure VOCs. Special needs include better methods for locating DNAPL pockets and cost-effective *in-situ* destruction technologies.
- Innovative physical separation, thermal processing (i.e., *in-situ* or high vacuum thermal desorption), electrokinetics, and hydrometallurgical processing technologies are needed to separate and recover mercury. *Ex-situ/in-situ* remediation of mercury in ground water or surface water including low-cost ion exchange resins, polymers, ligands, or ceramic media are of interest to EPA.
- Improvement in recovery and separation systems that enhance the commercial value of heavy metal reaction products.

F. RECYCLING OF MUNICIPAL AND INDUSTRIAL SOLID WASTE

This topic includes management, treatment, and recycling of municipal and industrial solid waste. The nation's municipal solid waste (MSW) recycling infrastructure includes more than 12,000 drop-off sites and some 9,000 curbside programs that collect recyclable materials. MSW recycling is a complex and growing industry ripe for innovation both in the collection of recyclable materials and in the processing of those materials into usable goods. Areas of interest for innovation include, but are not limited to:

- Processes to separate recyclables (e.g., various plastic resins) and to remove contaminants (e.g., adhesives not soluble in water) from recyclable materials.
- Technologies for improving quality control for recycled materials or to identify the extent to which contaminants are present.
- Re-designing products to enhance their recyclability (e.g., recycling-friendly adhesives and better bottle coatings).

- Separation, recovery, and recycling of components from computers, printers, monitors, and consumer electronics.
- Multiple recovery and recycling of different plastic materials in automobile salvage operations.
- Advanced physical separation techniques that make wastes easier to treat or destroy by moving the metal/organic constituents from one medium to another.

G. MONITORING AND MEASUREMENT TECHNOLOGIES

New approaches are needed to solve environmental monitoring and measurement problems, especially measurement of species at trace (ppt) concentrations. EPA is interested in both remote and *in-situ* measurements approaches. EPA also is interested in the adaptation or extension of existing techniques from other, non-environmental fields that can provide significant improvements in current environmental measurements. Specific areas of interest include, but are not limited to:

- New technologies that use optical wavelengths from digital cameras to measure OPACITY. Such technologies must be correlated scientifically with opacity measured using visual EPA Method 9 (see <http://www.epa.gov/ttn/emc/promgate.html>). EPA also is interested in technologies that extract color-dependent information from digital camera pixel images and scientifically relate the data to particle size and relative opacities in the range of 10 - 40 percent as determined by EPA Method 9. (For more information on an alternate opacity compliance system being tested by U.S. Department of Defense, see <http://www.estcp.org/projects/compliance/200119o.cfm>.)
- New, cost-effective continuous AMMONIA monitoring systems, particularly for utilities using Selective Catalytic Reduction (SCR) to control nitrogen oxides.
- Continuous monitors of trace level (ppt) toxic metals and multiple toxic organic pollutants from high-temperature, complex matrix sources such as incinerators, fossil fuel based power plants, cement kilns, and smelters.

- Continuous monitors for measuring volatile organic compounds from emission sources such as tanks, pipes, valves, and contaminated soils.
- *In-situ* measurement of physical, chemical, and biological water quality parameters in surface water. There is interest in devices that can transmit data to remote receiving stations in real time.
- Continuous monitors for measuring organic and inorganic toxicants in municipal and industrial waste water and their toxic effects on receiving waters.
- Alternative ground water monitoring well installation methods that can be used to collect water quality data that are equivalent to or better than traditional well installation methods.

EPA's Office of Solid Waste and Emergency Response (OSWER) has undertaken an initiative to advance new monitoring and characterization technologies for use at hazardous waste sites. (See OSWER's Monitoring and Measurement Technologies for the 21st Century or 21M2 initiative at: <http://clu-in.org/programs/21m2>.) Areas with significant technology needs and gaps include:

- *In-situ* sensors for monitoring ground water contamination and treatment system performance.
- Continuous emissions monitors for use with thermal hazardous waste treatment systems.
- Remote sensing for fence-line monitoring for fugitive emissions and enforcement activities.
- New monitoring methods for total cyanides and cyanide speciation.
- Leak detection technologies for small municipal landfills.
- Monitoring technologies for mining waste sites.
- Technologies for locating and monitoring dense non-aqueous phase liquids (DNAPLs).
- Internal inspection methods for internally lined underground storage tanks.
- Non-invasive monitoring technologies for mercury and heavy metals in soils.

- Leak detection methods for underground storage tanks and pipes.

EPA's Office of Pesticide Programs (OPP) is charged with protecting public health and the environment from risks posed by pesticides, and with promoting safer means of pest control. This topic requests research aimed at increasing OPP's ability to monitor the occurrence and movement of pesticides and their degradation products in the environment. Examples of research needed include, but are not limited to:

- Equipment and methods are needed for *in-situ* monitoring of non-persistent pesticides and pesticide degradation products in soil, water, and air. Time delays in collecting and transporting samples to laboratories for analysis reduces our ability to track the occurrence and movement of pesticides in the environment.
- Simple, accurate pesticide and pesticide degradation product detection methods are needed for homeowner use.
- Methods are needed for detecting and measuring pesticide residues on produce in the field. Also, methods are needed that allow consumers to check produce for the presence of pesticides and pesticide residues on fruit and vegetables at the point of purchase.
- Technologies and methods are needed for measuring the toxicity of chemical mixtures. For example, alachlor, atrazine, and aldicarb show little individual toxicity in concentrations currently observed in the environment. When multiple pesticides are present, the toxicity of the mixture can be significantly greater. New technologies and methods are needed for mixtures.

EPA has established the Endocrine Disruptor Screening Program (EDSP) to determine whether pesticides and certain other substances may interact with endocrine systems (i.e., estrogen, androgen, and thyroid related endpoints) of mammals and non-mammals. As part of this program, EPA is standardizing and validating the EDSP battery of mammalian and non-mammalian toxicity screening assays recommended by the Endocrine Disruptor Screening and Testing Advisory Committee. Because research concerning endocrine disruptors is rapidly evolving, EPA needs new technologies/assays/systems for mammalian and non-mammalian species that may be useful additions or alternatives to the EDSP battery of assays. (For more information, see <http://www.epa.gov/oscpmont/oscpendo/>.)

H. ENVIRONMENTAL BIOTERRORISM DETECTION AND DECONTAMINATION

There are significant efforts throughout the Government to develop and implement systems that combat terrorism and protect the American people and the environment. The EPA SBIR program, as part of the Agency's overall response to terrorism, has identified three special environmental bioterrorism needs for its initial focus: (1) decontamination technologies and systems for high-value and special materials; (2) special decontamination technologies and sampling systems for HVAC systems in smaller buildings; and (3) pretreatment kits to minimize interferences with polymerase chain reaction (PCR) analytical instruments used at smaller drinking water system laboratories. Bioterrorism agents of concern in this program include *Bacillus anthracis* (anthrax), *Francisella tularensis* (tularemia), and *Yersinia pestis* (plague). *Bacillus globigii* is an indicator organism (simulant) that can be used for initial testing of decontamination systems.

- Bioterrorism decontamination systems are needed for high-value and special materials typically found in museums, historic homes, Government buildings, and important civilian buildings. Examples of high-value and special materials include: fibrous tapestries, art, gowns, and clothing; rare books, legal papers, and historic documents; porous ceramics, desks, and historic furniture; and electrical equipment including computers and commercial grade servers. For these special materials, destruction is not an option and they must be decontaminated. Decontamination of these materials also may require special sampling and cleaning tools, liquid and gaseous decontamination systems involving biocides generated on site (devices) or delivered to the site (pesticides regulated under FIFRA), portable and on-site trailer-mounted systems, and technologies to verify that decontamination has been successfully completed. Of special interest are environmentally friendly systems that can replace typical cleaning agents (e.g., chlorine dioxide (ClO₂), decontamination foams, and compounds like ethylene oxide).

- Special decontamination technologies and sampling systems are needed for existing smaller commercial building heating, ventilation, and air-conditioning (HVAC) systems. Of special interest are robots, special tools, and cleaning systems for smaller buildings. Examples of smaller buildings include homes, apartments, and structures with 2-3 stories and/or areas under 100,000 square feet. Environmentally friendly decontamination systems such as ultraviolet, ozone, or sonic cleaning systems are of special interest. Systems also should be able to verify that decontamination has been successfully completed.
- Portable PCR analytical instruments have emerged as viable technologies for timely, sensitive, and accurate field detection and identification of suspected bioterrorism agents. Field portable pretreatment kits are needed for smaller drinking water systems, plants typically serving fewer than 10,000 people, and larger systems without extensive on-site testing laboratory capability. These kits should minimize chemical and biological interferences that inhibit or interfere with the PCR reaction affecting sensitivity, and agent detection and identification. The pretreatment process must not inhibit PCR reactions or interfere with signals used to detect the amplification of DNA/RNA. Pretreatment systems should address chemical/physical/biological differences in drinking water quality in different regions of the country (e.g., pH, hardness, and trace element content).

IX. SUBMISSION FORMS AND CERTIFICATIONS

The attached forms, Appendix A - Proposal Cover Sheet, Appendix B - Project Summary, and Appendix C - SBIR Proposal Summary Budget, should be downloaded and printed from the Internet or photocopied, and completed as indicated under Section III, Proposal Preparation Instructions and Requirements. The purpose of these forms is to meet the mandate of law or regulation and simplify the submission of proposals.

Appendix A
PROPOSAL COVER SHEET
U.S. Environmental Protection Agency,
SMALL BUSINESS INNOVATION RESEARCH PHASE I
SOLICITATION NO. PR-NC-02-10155

PROPOSAL TITLE _____

FIRM NAME: _____

MAILING ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

AMOUNT REQUESTED: \$ _____ PROPOSED DURATION (PHASE I): 6 MOS
(Not to Exceed \$70,000)

*****Proposals submitted in response to this solicitation will be valid for 300 days*****

TOPIC (check one)

- ___ A. Nanomaterials and Clean Technology
- ___ B. Prevention and Control of Air Pollution
- ___ C. Treatment and Monitoring of Drinking Water
- ___ D. Municipal and Industrial Wastewater Treatment
- ___ E. Hazardous Waste Management and Site Remediation
- ___ F. Recycling of Municipal and Industrial Solid Waste
- ___ G. Monitoring and Measurement Technologies
- ___ H. Environmental Bioterrorism Detection and Decontamination

CERTIFICATIONS AND AUTHORIZATIONS: Answer Y(Yes) or N(No)

- ___ 1. The above concern certifies that it is a small business concern and meets the definition as stated in the program solicitation.
- ___ 2. The above concern certifies that a minimum of 2/3 of the research and/or analytical effort will be performed by the proposing firm.
- ___ 3. If the proposal does not result in an award, is the Government permitted to disclose the title and technical abstract page of your proposed project, and the name, address, and telephone number of the official of the proposing firm to any inquiring parties?
- ___ 4. The above concern certifies that it is a woman owned small business concern and meets the definition as stated in the program solicitation.*
- ___ 5. The above concern certifies that it is a socially and economically disadvantaged small business concern and meets the definition as stated in the program solicitation.*
- ___ 6. Do you plan to send, or have you sent, this proposal or a similar one to any other federal agency? If yes, which? Use acronym(s) for each agency, (e.g., DOD, NIH, DOE, NASA, etc.) _____
- ___ 7. Choose one of the following to describe your Organization Type:
___ Individual ___ Partnership ___ Corporation ___ LLC

* For information purposes only.

8. Provide the following information: Tax Identification No: _____
Dun & Bradstreet Number: _____
Common Parent Name: _____

ENDORSEMENTS

Authorized Negotiator:	Person Authorized to Sign Proposal:
Print Name: _____	Print Name: _____
Title: _____	Title: _____
Telephone: _____	Telephone: _____
Fax: _____	Fax: _____
E-mail: _____	E-mail: _____
Signature: _____	Signature: _____
Date: _____	Date: _____

PROPRIETARY NOTICE: For any other purpose than to evaluate the proposal, these data shall not be disclosed outside the Government and shall not be duplicated, used or disclosed in whole or in part, provided that if a funding agreement is awarded to this offeror as a result of or in connection with the submission of these data the Government shall have the right to duplicate, use or disclose the data to the extent provided in the funding agreement. This restriction does not limit the Government's right to use information contained in the data if it is obtained from another source without restriction. The data in this proposal subject to this restriction are contained on pages _____ of this proposal.

Appendix B
U.S. ENVIRONMENTAL PROTECTION AGENCY
SMALL BUSINESS INNOVATION RESEARCH PROGRAM
SOLICITATION NUMBER PR-NC-02-10155
SBIR- PHASE I

PROJECT SUMMARY (Limit to One Page)

FIRM NAME, ADDRESS, TELEPHONE AND FAX NUMBER, AND E-MAIL ADDRESS:

Firm Name: _____ Telephone: _____

Address: _____ Fax: _____

_____ E-mail: _____

TITLE OF PROPOSAL: _____

TOPIC LETTER AND DESCRIPTION: _____

NAME, TITLE AND E-MAIL ADDRESS OF PRINCIPAL INVESTIGATOR/PROJECT MANAGER: _____

TECHNICAL ABSTRACT, RESULTS, AND POTENTIAL COMMERCIAL APPLICATION
(Limit to 400 Words; Must be Publishable):

Appendix C
SBIR PROPOSAL SUMMARY BUDGET
(See Instructions on Reverse Side)

Organization and Address

A. DIRECT LABOR (PI and other staff, list separately) Hours/Est. Rate:

	\$

B. OVERHEAD:

	\$
--	----

C. OTHER DIRECT COSTS: (list separately)

	\$

D. TRAVEL: List purpose and individuals and/or title

	\$

E. CONSULTANTS: (List Est. Rate and Hours)

	\$

F. GENERAL AND ADMINISTRATIVE:

	\$

TOTAL COSTS (Total of A through F above)

	\$
--	----

G. PROFIT (___ %) Not to exceed 10% of total project costs

	\$
--	----

TOTAL PROJECT PRICE (Total Costs + Profit)

	\$
--	----

PRINT NAME:

TITLE:

--	--

SIGNATURE: _____

DATE SUBMITTED: _____

This proposal is submitted in response to EPA SBIR Program Solicitation No. PR-NC-02-10155 and reflects our best estimate as of this date.

INSTRUCTIONS FOR APPENDIX C

The purpose of this form is to provide a vehicle whereby the offeror submits to the Government a pricing proposal of estimated costs with detailed information for each cost element, consistent with the offeror's cost accounting system.

If the completed summary is not self-explanatory and/or does not fully document and justify the amounts requested in each category, such documentation should be contained, as appropriate, on a budget explanation page immediately following the budget in the proposal. The form Appendix C will count as one page in the 25-page limit, and any budget explanation pages included will count separately toward the 25-page limit. (See below for discussion on various categories.)

A. Direct Labor - List individually all personnel included, the estimated hours to be expended and the rates of pay (salary, wages, and fringe benefits).

B. Overhead - Specify current rate(s) and base(s). Use current rate(s) negotiated with the cognizant federal negotiating agency, if available. If no rate(s) has (have) been negotiated, a reasonable rate(s) may be requested for Phase I which will be subject to approval by EPA. Offerors may use whatever number and types of overhead rates that are in accordance with their accounting systems and approved by the cognizant federal negotiating agency, if available.

C. Other Direct Costs - List all other direct costs which are not otherwise included in the categories described above, i.e., computer services, publication costs, subcontracts, etc. List each item of permanent equipment to be purchased, its price, and explain its relation to the project.

D. Travel - Address the type and extent of travel and its relation to the project.

E. Consultants - Indicate name, daily compensation, and estimated days of service.

F. General and Administrative (G&A) - Same as B. Above.

G. Profit - Reasonable fee (estimated profit) will be considered under this solicitation. For guidance purposes, the amount of profit normally should not exceed 10% of total project costs.

Appendix D
SCIENTIFIC AND TECHNICAL INFORMATION SOURCES

State-of-the-art information, including service and cost details, useful in preparing SBIR proposals or in guiding research efforts may be obtained from the following sources:

National Technical Information Service (NTIS)
5288 Port Royal Road
Springfield, VA 22161
(513) 569-7562

EPA Headquarters Library (3404)
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
(202) 260-5922

The Hazardous Waste Collection and Database are available for use in the EPA Headquarters Library, the 10 EPA Regional libraries, EPA laboratories in Ada, OK; Edison, NJ; Las Vegas, NV; Research Triangle Park, NC; and the National Enforcement Investigations Center in Denver, CO. The Database runs on an IBM AT/XT or compatible equipment and may be purchased from NTIS using the NTIS order number PB87-945000.

The Environmental Quality Instructional Resources Center
1200 Chambers Road, R.310
Columbus, OH 43212
(614) 292-6717
[Especially related to Drinking Water and Waste Water Treatment]

National Small Flows Clearinghouse (SWICH)
P.O. Box 7219
Silver Spring, MD 20910
1-800-677-9424
[Topic themes include source reduction, recycling, composting, waste combustion, collection, transfer, disposal, landfill gas, and special wastes]

ACCESS EPA (#055-000-00509-5) 1995 Edition

A consolidated guide to EPA information resources, services, and products. It provides access to:

- Public information tools
- Major EPA dockets
- Clearinghouses and hotlines
- Records management programs
- Major EPA environmental databases
- Library and information services
- State environmental libraries

“ACCESS EPA” may be ordered at a cost of \$16.00 each from the U.S. Government Printing Office, New Orders, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954, or telephone (202) 512-1800, or from NTIS using order number PB-147438.

Vendor Information System for Innovative Treatment Technologies (VISITT) Profiles 325 innovative technologies available from 204 vendors to treat ground water in situ, soil, sludges, and sediments. Includes technologies in all stages of development—bench, pilot, or full. VISITT is available at no charge on diskettes compatible with personal computers using DOS operating systems. To order VISITT diskettes and user manual, and to become a registered user, call the VISITT Hotline at 1-800-245-4505.

ENVIROSENSE

Internet: <http://www.epa.gov/envirosense>

ES includes numerous databases and addresses industry and small business needs by establishing specific compliance assistance, P2, regulatory and specific industry sector (SIC) data sets.

Appendix E COMMERCIALIZATION FACTSHEET

(Finding Commercial Products; Conducting a Patent Search; Searching for Federal Research; Standards/Certifying Bodies)

FINDING COMMERCIAL PRODUCTS

The technology you are proposing may already be being sold in the market. There are five Web searches recommended as the minimum for determining if the technology is commercially available. In each case, when having trouble look for the FAQs (Frequently Asked Questions) or other advice on searching.

Web Search using General Search Engines

There are around 320 million indexed Web pages and the Web continues to grow exponentially. One problem with this rate of growth is that no single Web search engine is capable of indexing the whole of cyberspace. We recommend using at least one meta-engine and two search engines.

A meta-engine is a search engine which searches other engines that actually catalog or index sites. Examples are Metacrawler (<http://www.metacrawler.com/>) and Dogpile (<http://www.dogpile.com>). We use that search to identify which search engines seem to be producing the best results and then use those engines for more complicated queries which cannot be supported by metacrawler and other meta-engines.

Two engines for more detailed searches at present are Hotbot's More Options page (<http://www.hotbot.com/default.asp?MT=&SM=MC&DV=7&RG=.com&act.super=+More+Options+&DC=10&DE=2&v=2&OPs=MDRTP>) and Alta Vista's Advanced Query page (<http://www.altavista.digital.com/cgi-bin/query?pg=aq>). Both engines allow you to search new groups (Usenet) as well as the Web. Hotbot has the largest number of pages indexed by any Web browser as this is written. Alta Vista has the next most extensive coverage. Unfortunately, queries are constrained to the options presented. Alta Vista supports any Boolean query you can design. Both sites have a search by subject feature that provides another path to sites of interest. Because Digital Equipment Corporation, who maintains Alta Vista, is a high tech company, this engine has traditionally been strong on indexing science and technology sites.

When searching, expand or narrow your keywords over time. For example, when searching for "sapphire liquid crystal displays," you may want to broaden to liquid crystal displays or just displays. Also, remember to use abbreviations such as LCD.

Thomas Register of American Manufacturers: Long a staple of corporate buyers and market researchers, you can access Thomas Register on-line for free at <http://www.thomasregister.com/>. Once you obtain your free membership, you can search the 155,000 companies by product. You may have to try a few different keywords to get hits.

Hoovers : Hoovers on-line at <http://www.hoovers.com> provides access to profiles on over 12,000 companies. These are the major firms in America, including subsidiaries of foreign operations. By using the keyword search, you can look for companies making products in areas related to your technology. Hoovers provides hypertext links to go to the company's Web page. Phone, fax, and street address are also provided. If you cannot find the information on the Web, ask for relevant product literature from their marketing departments.

Press Releases: PR Newswire (<http://www.prnewswire.com/>) redistributes corporate press releases. It provides coverage of newly released products that might not otherwise be found on the Web.

Patents: We discuss patent searches in the next section. Look for patents related to your technology, then examine the assignee field. Companies licensing or patenting technology in areas related to your technology are competitors that may be introducing products similar to the one you are considering proposing. Search for their Web pages using one of the resources above.

CONDUCTING A PATENT SEARCH

What is a patent? A patent is a right to an invention that is granted by the U.S. Government or a foreign government. It gives the holder an exclusive right to use an invention during a period of time. In the United States, before a patent can be issued, the inventor must demonstrate his or her invention is new and non-obvious. To be new, an invention must not have been known nor made by others in the U.S. The invention also cannot have been previously patented or presented in a publication prior to the claimed date on which the invention was made. Patents are handled by the U.S. Patent Office.

Non-obvious is established with reference to what would be obvious to a person of ordinary skill in the relevant technology (or technologies) at the time of the invention. A general rule is that the more complicated the technology and the greater the rate at which it is developing, the higher the skill-level of that hypothetical ordinary person. Non-obvious is determined by examining prior patents, technical publications, and non-secret work being conducted. Usually, some aspect of an invention will be non-obvious and thus capable of being patented.

It is important to recognize that different rules apply in different countries. In the United States, you have one year from the time of first disclosure, use, publication, or sale of an invention to patent the invention. Where more than one person or group makes a claim to be the inventor, the patent goes to the person or group that can demonstrate priority in time. Overseas, the rules are different. Usually, the invention must be patented before any public disclosure, use, publication, or sale. In case of a dispute, priority goes to the first person or group to apply for a patent, regardless of who may actually be the inventor. You can, however, get the same overseas priority rights you would get from simultaneously filing overseas and in the United States if you file in each relevant country within 12 months of a U.S. patent application.

How to search for U.S. patents: To search the Patent Office go to <http://patents.uspto.gov/index.html>.

The Boolean search capability of the Patent Office enables constructing complicated searches to narrow in on patents of interest. It allows two terms Booleans in the first search, with more complicated queries when refining a search. You can search specific sets of years or the entire database. The advanced search gives you the ability to look in any or all of the fields in the patent—a very nice feature. Coverage includes all patents issued no later than one week earlier. It includes all utility, design, and plant patents since 1976. Claims and pictures are not included. (See below, Reading Patents.)

The IBM Patent server contains over 2 million patents. Where drawings are part of the patent, they have been scanned in and can be viewed. Off the home page, you have the option of searching from 1995 to present or 1971 to present. Hypertext links on the home page let you search by patent number, use Boolean Logic, or do a text search in various sections of the patent. Try to be as targeted as possible in your search terms. For example, “environmental monitor” will return 42 patents issued in 1995 or later on IBM’s server. “Mercury monitor,” by comparison, returns only three.

Reading Patents: Once you have found a patent that looks relevant for your interests, examine the abstract and the claims. The abstract provides an overview of what is covered. The claims give you the specific scope of the patent.

There are three paths for finding other patents of interest, once you have found the first one. The first method is to look at the class (or classes) of the patent. You can find patents addressing similar problems by looking in those classes. To fine tune the classes to use, look at a number of relevant patents. Examine the classes that are listed on the patent. Select those classes that most frequently appear across your sample of patents for further examination.

The second method is to look at the patents cited as references. The final method is to look at patents that reference the one you are examining. By searching text, relevant classes, and patents referred to or referencing relevant patents, you can quickly determine if a U.S. patent has been issued on a technology of interest. CAUTION: Examining U.S. patents does not assure you that the technology has not been patented elsewhere. Further, if the patent is only applied for and has not yet been issued, you will not find it.

SEARCHING FOR FEDERAL RESEARCH

There are two sets of publicly available data on Federal Research. FEDRIP, or Federal Research in Progress, provides access to current civilian agency research. FEDRIP includes:

- Department of Agriculture
- Department of Energy
- Department of Veterans Affairs
- Environmental Protection Agency
- Federal Highway Administration
- National Institutes of Health
- NASA
- National Science Foundation
- U.S. Geological Survey
- National Institute of Standards and Technology
- Nuclear Regulatory Commission
- Small Business Innovation Research

Parts of FEDRIP may be searched for free at The Community of Science, (<http://fundedresearch.cos.com/>). Separate databases exist for the National Institutes of Health, NSF, USDA, and the SBIR program—which means you must do multiple searches. You can also search projects of the Medical Research Council of the United Kingdom. To search all of FEDRIP, go to <http://grc.ntis.gov/fedrip.htm>. There is a \$350 fee.

In addition, by going to an agency's Web site, you can find information on their current and/or past awards. The National Technical Information Service (NTIS) is the designated repository of research reports. It contains technical reports and other government-produced information products. The free access parts may be searched at <http://www.ntis.gov/>.

Perhaps the best comprehensive resource for searching is the RAND's RaDiUS at <http://www.rand.org/radius/>. RaDiUS, stands for "Research and Development in the United States." It is the first comprehensive database that tracks in real-time the research and development activities and resources of the U.S. Government. Among its sources are the following: the Catalog of Federal Domestic Assistance (CFDA); USDA's Current Research Information System (CRIS); HHS's Computer Retrieval of Information on Scientific Projects (CRISP) and Information for Management, Planning, Analysis, and Coordination (IMPAC) system; DoD's R-1 and R-2 Budget Exhibits and Work Unit Information Summaries (WUIS); DOE's laboratory information system; the Federal Assistance Awards Data System (FAADS); the Federal Procurement Data System (FPDS); OMB's MAX system; DVA's R&D Information System (RDIS); NSF's Science and Technology System (STIS); and NASA's 507 System.

You must be a Government Contractor to subscribe to RaDiUS. The small business fee is \$1,000 per year per password.

STANDARDS AND CERTIFYING BODIES

If you are going to introduce a commercial product, it most likely will have to meet certain standards and be certified as meeting those standards. For example, we all are familiar with the Underwriter Laboratories (UL) seal found on household electrical products—a certification of safety under normal use.

A wide range of bodies creates standards or certifies products. To find relevant standards, we recommend beginning at the American National Standards Institute's "Internet Resources for Standards Developers," located at: <http://web.ansi.org/public/library/internet/resources.html>. The site provides links to U.S. bodies developing standards.

In the U.S., private sector laboratories, like UL commonly do certification. These organizations rely on standards developed by consensus bodies such as the American Society for Testing and Materials (<http://www.astm.org/>) or federal agencies such as EPA. ASTM maintains an International Directory of Testing Laboratories at: <http://astm.365media.com/astm/labs/>. The Directory can be searched by geographic location, laboratory name, subject area, or keywords.

IMPORTANT!!

IF YOU WISH TO RECEIVE AN ACKNOWLEDGMENT CARD TO CONFIRM RECEIPT OF YOUR PROPOSAL, PLEASE COMPLETE A STANDARD SELF-ADDRESSED POSTCARD CONTAINING THE FOLLOWING INFORMATION AND ATTACH TO THE ORIGINAL OF EACH PROPOSAL:

Please type the following and fill in the blanks as appropriate:

This will acknowledge the receipt of your proposal titled:

Topic Letter ____. The evaluation of proposals and the award of SBIR Contracts will require approximately 10 months, and no information on proposal status will be available until final selection(s) is made. Your proposal has been assigned EPA No. _____ (to be filled in by EPA).

Date: _____

REVERSE SIDE: Please type the following in the upper left-hand corner (return address) and self-address the card to your corporate official. (Postcards that do not meet postal service standards will not be returned.)

U.S. EPA
RTP/POD (D143-01)
RTP, NC 27711

Official Business
Penalty for Private Use \$300

Your Firm Name
Address
City, State Zipcode
