



# 1997 EPA Research Grants Announcement

**Exploratory Research**  
**Ecosystem Indicators**  
**Issues in Human Health Risk Assessment**  
**Endocrine Disruptors**  
**Ambient Air Quality**  
**Health Effects and Exposures to Particulate Matter and Associated Air Pollutants**  
**Drinking Water**  
**Contaminated Sediments**

**SEE INDIVIDUAL TOPICS FOR APPLICATION SUBMISSION CLOSING DATES**

EPA does not intend to mail this announcement in large quantities. Additional information, forms, etc., should be obtained by consulting our homepage <http://www.epa.gov/ncerqa> and download whatever is needed

## ► Introduction

The U.S. Environmental Protection Agency (EPA), Office of Research and Development (ORD), invites research grant applications in the following areas of special interest to its mission:

- 1. Exploratory Research**
- 2. Ecosystem Indicators**
- 3. Issues in Human Health Risk Assessment**
- 4. Endocrine Disruptors**
- 5. Ambient Air Quality**
- 6. Health Effects and Exposures to Particulate Matter and Associated Air Pollutants**
- 7. Drinking Water**
- 8. Contaminated Sediments**

*EPA plans to collaborate with other agencies in soliciting grant applications in the following research areas. Descriptions of these will appear in separate announcements.*

Water and Watersheds (joint with NSF)  
Technology for a Sustainable Environment (joint with NSF)  
Decision-making and Valuation for Environmental Policy (joint with NSF)  
Harmful Algal Blooms (joint with NOAA, NSF, and ONR)  
Bioremediation (joint with DOE, NSF, and ONR)  
Metal Toxicities Associated with Mixtures: Molecular and Cellular Effects Relevant to Carcinogenesis (joint with NCI)  
Ecosystem Restoration (joint with NASA)  
Arsenic (joint with AWWARF and ACWA)

*This invitation provides relevant background information, summarizes EPA's interest in the topic areas, and describes the application and review process.*

## ► Background

In fiscal year 1995 EPA began an expansion of its investigator-initiated research grants program for academic and not-for-profit institutions (the STAR Program, Science to Achieve Results). Subsequently, this program increased in fiscal years 1996 and 1997, and in fiscal year 1998 EPA anticipates reaching its programmatic goal of \$100 million. As a part of that program, this Request for Applications (RFA) describes the EPA 1997 solicitation. Additional joint programs with the National Science Foundation and other agencies will be announced separately.

## ► EPA Mission and R & D Strategy

The mission of EPA is to protect both environmental quality and human health through effective regulations and other policy implementation. Achievement of this mission requires the application of sound science to assessment of environmental problems and to evaluation of possible solutions. A significant challenge is to support both long-term research that anticipates future environmental problems as well as research that fills gaps in knowledge relevant to meeting current Agency goals. This Request for Applications and the multi-agency solicitations are important steps toward promoting a sound scientific foundation for environmental protection.

EPA's research programs focus on the reduction of uncertainty associated with risk assessment and reduction of risks to human health and ecosystems. Through its laboratories and through grants to academic and other not-for-profit institutions, EPA promotes research in both domains, according the highest priority to those areas in which risk assessors are most in need of new concepts, methods, and data. EPA also fosters the development and evaluation of new risk reduction technologies across a spectrum, from pollution prevention through end-of-pipe controls to remediation and monitoring. In all areas, EPA is interested in research that recognizes issues relating to environmental justice, the concept of achieving equal protection from environmental and health hazards for all people without regard to race, economic status, or culture.

*EPA's extramural research grant programs are administered by ORD's National Center for Environmental Research and Quality Assurance (NCERQA). The individual topic areas are discussed below.*

## RESEARCH TOPICS OF INTEREST

### ► 1. *Exploratory Research*

The mission of EPA is to provide environmental policies, risk assessments, pollution prevention programs, and effective regulations based on sound science. NCERQA is committed to providing the best possible products in areas of scientific research through significant support for long-term research that anticipates future environmental problems and strives to fulfill significant gaps in knowledge relevant to protecting the environment. In part, these goals may be accomplished through this competitive, peer-reviewed extramural program in which investigator-initiated projects in fundamental research can discover solutions to environmental problems and EPA can benefit from close cooperation with the scientific community. Specifically, NCERQA is seeking grant applications to conduct exploratory environmental research based on investigator-initiated proposals in the broad areas listed below. The examples of possible study areas are provided as a guide and should not be interpreted to exclude other studies relevant to the broad topic area.

- 1A. Environmental Biology.** Examples of studies in this area include investigations to elucidate and increase our understanding of environmental biological processes at the molecular, cellular, organism, or population level. The ultimate application of this knowledge should be to better understand the impact human activities or environmental pollution may have on these biological systems.
- 1B. Environmental Chemistry.** Applications submitted in this area may focus on the reaction of chemicals in various environmental media (e.g., air, soil, water) and models predicting the transformation of chemicals in the environment. In addition, studies developing unique or novel analytical techniques for monitoring chemicals in the environment would also be of interest.
- 1C. Physics.** Potential applications in this area may focus on increasing our knowledge of physical processes in the environment, developing models describing the physical transport of anthropogenic substances through the environment, or describing how human activities may impact physical processes.
- 1D. Human Health.** Applications submitted in this topic area may focus on determining the impact exposure to environmental stressors may have on human health. Specifically, toxicological studies for non-cancer or cancer health endpoints may be considered. The results of studies in this topic should lead to improvements or have applications to environmental health risk assessments.
- 1E. Social Science.** Applications submitted in this area may include economic (cost-benefit analysis), public policy (alternative approaches to regulation), and sociological (individual and organizational behavior) aspects of environmental problems. Studies focusing on existing EPA initiatives such as the Common Sense Initiative, Project XL (Excellence and Leadership) and Community-based environmental protection are of particular interest.
- 1F. Environmental Engineering.** Applications submitted in this area may include control, remediation, and prevention technology approaches toward solving high priority environmental problems. Studies focusing on clean products and processes that may prevent pollution are of particular interest. Similarly, analytical tools and methods that assist in the identification of pollution prevention approaches are of interest.

**Funding:** Approximately \$5 million is expected to be available in FY 1997 for new exploratory research grants. The projected award range is \$75,000 to \$125,000/year for up to 3 years.

## ► 2. *Ecosystem Indicators*

The quality of human existence depends on diverse natural resources and healthy ecosystems. Such resources exist and interact within spatially and temporally dynamic ecosystems. However, activities associated with expanding human populations alter these complex ecosystems and thereby threaten their sustainability and the resources and values (e.g., food, fiber, medicine, waste processing, wildlife habitat, fuel, shelter, aesthetic qualities, and recreational opportunities) that they provide. Monitoring ecosystem status and trends is critical for detecting alterations that impact the integrity of ecosystems and their capacity to provide valuable resources into the future.

EPA shares with other Federal agencies the responsibility to assess, prevent, and reverse adverse impacts of human activities on ecosystems. Monitoring all components of an ecosystem (soil, water, air, plants, animals, microorganisms) and their functional interactions is impractical, but certain measurable environmental variables, indicators, can be used as surrogates or markers of the more complete and complex structural and functional attributes that are the cause and consequence of ecosystem integrity and sustainability. An ecological indicator is a characteristic that is related to, or derived from, a measure of a biotic or abiotic variable that can provide quantitative information on ecological structure (component networks) and function (interactions). An indicator should thus contribute to the measurement of ecological integrity and sustainability.

Previous research efforts have largely concentrated on indicators within a single resource type (i.e., wetlands, estuaries, rivers, lakes, streams, or forests), at a single spatial scale and using a single sampling design. While proposed research on single-system, single-scale indicators will be considered in response to this solicitation, research that results in the development or application of ecological indicators that integrate between or among resource types, spatial scales, and/or sampling designs will be given highest priority. A description of a multi-tier framework of sampling designs for monitoring is provided below.

### **Monitoring Framework**

A monitoring framework to track status and trends in the condition of the nation's ecological resources was envisioned by both the National Science and Technology Council's Committee on the Environment and Natural Resources (CENR) and EPA's Environmental Monitoring and Assessment Program (EMAP). These programs recognized that an assessment of ecosystem condition must consider multiple levels of organization (organism, population, community, ecosystem), interactions of resource types (wetlands, estuaries, large rivers, lakes, streams, forests, etc.), multiple spatial scales (local, watershed, regional, national, global), and that various monitoring strategies were needed to answer the diverse questions related to ecosystem condition. A fundamental premise underlying this framework for environmental

monitoring is that no single sampling design can effectively provide all of the information needed to evaluate environmental conditions and guide policy decisions. A tiered structure was developed to emphasize sampling designs based on three spatial scales:

**Level 1 - *Spatially Continuous Monitoring*:** Inventories and remote sensing methods that completely census specific properties across large regions, i.e., political, geophysical or hydrological systems of 10,000 km<sup>2</sup> or more.

**Level 2 - *Spatially Sub-Sampled Surveys*:** Surveys that evaluate the ecological condition of a large area (i.e., state, region, nation, continent) by sampling a subset of the total area. Indicators in Level 2 measure a limited number of properties at multiple sites as representative of the larger region.

**Level 3 - *Integrated Location-Specific Monitoring*:** Monitoring that measures a greater number of properties at a higher frequency and fewer locations than sampling at Level 2. This level is essential for understanding processes that occur at local scales, for documenting the integrated effects of multiple processes, for determining the causes of change detected at Levels 1 and 2, and for developing and testing predictive models of environmental response.

*Ultimately, measurements at all three levels must be performed in a coordinated fashion, allowing an improved understanding of ecosystems and an improved ability to manage those systems for integrity and sustainability.*

## **Objectives**

EPA solicits proposals for research that leads to the development of techniques and indicators that characterize and quantify the integrity and sustainability of ecosystems at local, regional, national, and/or global scales. Applications should address the following prioritized research objectives:

- (1) The highest priority objective is to stimulate the development, evaluation and integration of indicators, suites of indicators, indices, and models to improve local, regional, national, and global monitoring and assessment of ecological integrity and sustainability. EPA recognizes the need to develop system-level indicators that cross resource types, span spatial scales, and integrate sampling designs. Cross resource indicators may be represented by single measurements that reflect and/or integrate conditions in more than one type of ecosystem (e.g., amphibian populations dependent on both terrestrial and aquatic ecosystems) or different measurements made jointly on more than one ecosystem, and then linked together by an algorithm or model (e.g., simultaneously measuring linked aquatic and terrestrial components of a watershed). Integration across spatial scales may include indicators that combine patch size,

vegetation structure, and foliar condition into an index of forest sustainability. Integration among sampling tiers may include techniques that synthesize existing data from different tiers or that combine indicators from different sampling designs to better determine ecosystem condition.

- (2) The second priority objective is to develop indicators of functional processes that contribute to ecological integrity and sustainability. In particular, research is needed on indicators that reflect critical functional associations among indicators from different resource types (e.g., the relationship between indicators of forest canopy and stream biotic integrity).
- (3) The third priority objective is to develop indicators that identify effects of particular stressors of ecological integrity and sustainability. Research is requested that examines the potential of indicators to improve our ability to interpret changes in ecological integrity as a function of stressor type and exposure characteristics. Studies are desired that relate indicators of population or community structure/function to exposure to either chemical, physical, or biological stressors, consistent with clearly stated mechanistic cause-effect hypotheses. Examples include developing indicators of amphibian and reptile reproduction or estuarine plankton composition that would distinguish between the effects of pesticide exposure and of UV-B radiation.

## **Scope of Research**

EPA solicits research proposals related to the development or evaluation of ecological indicators, suites of indicators, indices, and models that could be used to characterize status or trends in multiple-resource ecosystems. Each proposal must address the potential for the proposed techniques to improve our ability to characterize with confidence ecological integrity and sustainability. Applications should provide a reasonable scientific conceptual model to account for the functional relationship between or among indicator(s) and their response to anthropogenic stressors. This solicitation emphasizes the need for indicators that cross resources, span spatial scales, and/or integrate sampling regimes.

## **Instrument**

Applicants may apply for grants on their own behalf or establish interdisciplinary teams. Proposals involving multiple institutions are encouraged but are not necessary. Proposals representing research consortia should clearly identify the lead institution and the basis for allocating research funds.

**Funding:** Approximately \$10 million will be available in fiscal year 1997 for funding proposals in the research areas described. It is anticipated that the annual funding levels (for up to three years) will range from \$100,000 to 300,000 although research involving complex multiple scale issues may be funded up to \$500,000.

### ▶ 3. *Issues in Human Health Risk Assessment*

Various reports have stated concern that EPA's current approaches to risk assessment do not adequately account for cumulative risks arising from complex exposure patterns and human variability due to genetic and other factors. These documents include the National Academy of Sciences (NAS) 1993 report titled, "Pesticides in the Diets of Infants and Children;" the NAS 1994 report on "Science and Judgment in Risk Assessment;" and the 1996 draft report by the President's Commission on Risk Assessment & Risk Management titled, "Risk Assessment and Risk Management in Regulatory Decision-Making."

Several recent pieces of legislation have mandated the consideration of cumulative risk and variability factors and press for stakeholder involvement in the risk characterization process. Specifically, the Food Quality Protection Act of 1996 (FQPA) directs EPA in its assessments of pesticide safety to focus in part on the cumulative effects of pesticides and other substances that have a common mechanism of toxicity and the aggregate of dietary and non-occupational consumer exposure. These reports and laws point to an emerging body of evidence that suggests person-to-person differences in metabolism, genetic pre-disposition, physical environment, and age (infants, children, and elderly) may place certain groups of individuals at an increased risk from environmental stressors. This can result in decreased quality of life and increased illness and mortality.

The traditional standard default approaches used in risk assessment may underestimate the impact of environmental agents on particular groups of individuals. These approaches do not adequately account for complex exposure patterns involving multiple acute exposures and/or exposures to mixtures of toxic chemicals or for the variability in human biological responses to toxic chemicals. Expanded investigation in these areas will benefit risk assessment by providing the tools to identify and characterize high risk groups and by providing fundamental data to develop predictive approaches and more reliable assessment methods.

FQPA also directs the Federal Government to begin providing consumer right-to-know information related to understanding the risks and benefits of aggregate and cumulative exposure.

*Human health risk assessment research is needed in the three areas described below.*

#### **3A. Human Health Effects of Complex Exposure Patterns**

Research is needed on the influence of complex exposures on the non-cancer human health effects of pesticides and other toxic chemicals in the environment. Exposure of human beings to toxic chemicals arises from multiple sources and via multiple pathways. They also occur in a variety of complex temporal patterns. EPA risk assessments have usually focused on individual environmental agents, often considering chronic exposures from individual sources occurring via individual pathways. EPA would like to shift the emphasis to a more broadly based approach which



incorporates multiple sources and pathways of exposure and considers complex exposure patterns such as multiple acute exposures and exposures to mixtures of pesticides and other toxic chemicals. The evaluation of the effects of these complex exposure patterns has been collectively termed cumulative risk assessment.

EPA is interested in sponsoring basic research to develop novel approaches for assessing cumulative human health risk and to develop methods to account for the multiple elements of environmental risk that affect human health: (1) who, what, and/or where is/are being affected? (2) what are the stressors? (3) what are the sources? (4) what are the pathways and routes of exposure? (5) what are the relevant timeframes? and (6) what are the assessment endpoints? Approaches might include measurement-based, multipathway human exposure assessment, toxicological studies, mechanistic research, pharmacokinetic and/or dose-response modeling. *Specifically, this research should include:*

- (1) studies to quantify the cumulative exposures resulting from these complex multipathway exposure patterns, including studies utilizing environmental, biological, and/or behavioral data, and
- (2) toxicological and other studies that investigate the neurological, developmental, reproductive, and other non-cancer human health effects of these exposures, with the aim of developing dose-response relationships.

The exposure patterns used in these studies should have a demonstrated relationship to actual or potential human exposures. Also, the studies should compare acute, episodic, and chronic exposure regimes and/or compare the effects of chemical mixtures with those of the single chemicals in the mixtures.

### **3B. Variability in Human Responses to Environmental Agents**

Research is needed to study the impact of genetic polymorphisms on human susceptibility to the effects of toxic chemicals in the environment. The intent should be to quantify these variabilities within the general population. These studies might also extend to the incorporation of results into dose-response models for use in risk assessment. *Of interest would be molecular, epidemiological, and other types of research to examine:*

- (1) The causes and extent of interindividual variability in susceptibility to neurological, developmental, reproductive, and other non-cancer health effects resulting from exposure to toxic chemicals in the environment;
- (2) Possible relationships between susceptibility and such covariates as age, race, ethnicity, and sex; and
- (3) Approaches for improving the default assumption that individual humans on average have the same susceptibility as populations of humans in epidemiological studies.

### 3C. Consumer Right-to-Know

The FQPA requires the federal government to provide consumer right-to-know information in a format understandable to a lay person. Such information would be distributed to large retail grocers for public display related to the risks and benefits of pesticide chemical residues in or on food purchased by consumers with recommendations to consumers for reducing dietary exposure to pesticide chemical residues in a manner consistent with maintaining a healthy diet. Therefore, research is needed on how best to communicate the results of these more comprehensive assessments.

Risk communication research is needed: (1) to identify optimal communication strategies and tools with which to disseminate information and educate consumers, and (2) determine what kinds of information consumers will find most useful. Research is needed to explore whether any adjunct or complementary communication strategies (e.g., public information, health information campaign) would contribute to assuring that the public receives accurate, pertinent, and useful information. Factors that could be explored include, but need not be limited to: (1) strategies for increasing comprehensibility and retention of information, (2) strategies to motivate behavioral changes to reduce potential exposures, and (3) identifying factors key to ensuring understanding and cultural acceptability to minorities and potentially susceptible subpopulations.

<p><b>Funding:</b> About \$5 million is expected to be available in fiscal year 1997 for awards in this program area. The projected award range is \$50,000 to \$300,000/year for up to three years.</p>
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## ► 4. *Endocrine Disruptors*

Evidence has been accumulating that humans and domestic and wild species have suffered adverse health consequences resulting from exposure to environmental chemicals that interact with the endocrine system. These pollutants are collectively referred to as “endocrine disruptors,” a term broadly defined as “an exogenous agent that interferes with the production, release, transport, metabolism, binding, action, or elimination of natural hormones in the body responsible for the maintenance of homeostasis and the regulation of developmental processes.”

In response to growing public health concerns related to chemicals in the environment which have the potential to act as endocrine disruptors, the Office of Research and Development of the EPA included Endocrine Disruptors as a high priority research issue in the ORD Strategic Plan and has developed an Endocrine Disruptors Research Plan. The plan identifies the need for three broad categories of research: biological-effects studies, exposure studies, and studies on the linkage of exposure and effects. Grant applications are sought in each category. The focus of the research may range from studies on wildlife populations and laboratory organisms, to humans, in both laboratory and field settings.

*EPA has developed a three-year plan for the solicitation of research applications from the scientific community. In the forthcoming first year of the plan, research topics of interest include:*

- (1) Development and validation of *in vivo* and *in vitro* test methods to screen toxicants, singly or in mixtures, for endocrine-disrupting activity in vertebrate and invertebrate species. Methods may employ tissues, cell lines, isolated receptors, and enzymes *in vitro*, as well as bioassays and hormone measurements *in vivo*.
- (2) Development of new measurement and analytical methods, including the development of field-portable devices for endocrine disruptors in various media, e.g., air, water, soil.
- (3) Studies in animal models on the modes and mechanisms of action of endocrine disruptors on neuroendocrine, reproductive, immune, and central nervous systems at the molecular, cellular, or functional levels resulting from exposure during development, with emphasis on identification of sensitive subpopulations (age/sex). Studies may include physiologically-based pharmacokinetic (PB-PK), physiologically-based toxicokinetic (PB-TK), and biologically-based dose-response (BBDR) models.
- (4) Development of QSAR models of endocrine disruption mechanisms of action, including receptor binding, enzyme inhibition, etc., for vertebrate and invertebrate species.
- (5) Development of animal models of endocrine disruptor-induced human diseases, including reductions in sperm counts and increased incidences of infertility, testicular cancer, hypospadias, endometriosis, breast cancer, thyroid cancer, and prostate cancer.
- (6) Studies to define the “baseline” endocrine status in wildlife populations and their laboratory surrogates.
- (7) Studies on the role of hormones in sexual differentiation and reproductive development of non-mammalian species and the effects of endocrine disruptors on this process.
- (8) Identification and validation of measurement endpoints, *in vivo* and *in vitro* screening methods, and other bioassays indicative of the effects of endocrine disruptors at the level of populations and communities.
- (9) Studies of sites/systems with problems that are known or strongly suspected to be related to endocrine disruptors.

We particularly seek studies that examine endocrine disruptor-related effects in wildlife populations, as well as studies which include significant attention to issues related to the types, levels, sources, and fates of endocrine-disrupting chemicals in the

environment. Additional information regarding research needs on endocrine disruptors may be found in the following references:

Ankley, G.T., et al. (1996), Development of a research strategy for assessing the ecological risk of endocrine disruptors. Rev. Toxicol. Series B - Environmental Toxicology, in press.

Kavlock, R.J., et al. (1996), Research needs for the risk assessment of health and environmental effects of endocrine disruptors: a report of the USEPA sponsored workshop, Environmental Health Perspectives 104 (Supplement 4):715-740.

**Funding:** About \$3 million is expected to be available in fiscal year 1997 for awards in this program area. The projected award range is \$100,000 to \$200,000/year for up to 3 years.

## ► 5. *Ambient Air Quality*

Certain widespread air pollutants, such as fine particulate matter, ozone, and air toxics, continue to pose serious public health risks for susceptible members of the U.S. population and risks to sensitive ecosystems. The Clean Air Act (CAA) requires that EPA establish and periodically review and revise, as appropriate, criteria and National Ambient Air Quality Standards (NAAQS) for pollutants such as particulate matter and ozone. The Act also requires the preparation of State Implementation Plans which describe control strategies that State and local authorities will employ to bring nonattainment areas into compliance with NAAQS.

In addition, the CAA requires control of toxic air pollutant emissions from point and area sources. The Act prescribes a phased approach to regulate both major point sources and area sources of air toxics. The control program for major sources is a technology-based control program that mandates the use of Maximum Achievable Control Technology (MACT) for major sources emitting one or more of 189 listed hazardous air pollutants (HAPs). A strategy for controlling the 30 most hazardous toxic pollutants in urban areas is also mandated as is an assessment of residual risks in urban areas, which remain after control of these 30.

*The EPA seeks applications for research aimed at generating new knowledge in these three major areas: fine particulate matter, tropospheric ozone, and air toxics.*

### **5A. Tropospheric Ozone and Fine Particulate Matter**

Tropospheric ozone research is being coordinated through the North American Research Strategy for Tropospheric Ozone (NARSTO), a public/private sector cooperative 10-year research effort to both improve the technical understanding of the tropospheric ozone issue and support future evaluations and adjustments to attainment strategies. The EPA/ORD contribution to the NARSTO program emphasizes the areas of atmospheric chemistry and modeling, ambient measurement methods, and emissions research.

A similar cooperative multi-year research effort for fine particulate matter is also emerging. Much of the needed research for tropospheric ozone and fine particulate matter overlaps. Exploration of the most important unknowns in tropospheric ozone chemistry emphasizes atmospheric oxidation reactions which also play an important role in aerosol formation. Modeling the transport and fate of both ozone and particulates relies on similar meteorological processes and the same computational frameworks. Precursor nitrogen oxide emissions and ambient nitrate measurements are also important to both.

*Research is needed in the following areas:*

### ***Atmospheric Chemistry***

- (1) Laboratory smog chamber studies of oxidant and aerosol production from irradiated hydrocarbon (HC)/NO<sub>x</sub>/SO<sub>2</sub>/NH<sub>3</sub> mixtures, including the production of organic nitrates from HC/NO<sub>x</sub> mixtures.
- (2) Theoretical and laboratory investigations of the chemical heterogeneous reactions involved in atmospheric ozone and fine particulate matter formation.
- (3) Theoretical and laboratory investigations of the partitioning of semi-volatile compounds between the gas and aerosol phases.
- (4) Laboratory studies of the fine particulates formed during reactions of OH radicals with higher molecular weight alkenes and biogenic and aromatic VOCs.
- (5) Computational atmospheric chemistry investigations of hydrocarbons important in photochemical oxidant formation.

### ***Modeling Research***

- (1) Development and diagnostic evaluation of emissions-based modeling which focuses on interactions of urban and point source plumes with the surrounding regional atmosphere in the formation, transport, and fate of ozone and/or fine particulates, using coding approaches compatible with EPA's Models-3 framework.
- (2) Monitoring and observations-based approaches to investigate photochemical ozone and fine particulate problems and to develop and evaluate emissions control strategies, including methods for analysis and interpretation of data from the PAMS (Photochemical Assessment Monitoring Station) network.
- (3) Developing models for fine particulate matter which relate ambient air quality models, and/or measurements at a central point, with personal exposures.
- (4) Describing the interaction of boundary layer turbulence, vertical mixing, and cloud processes with atmospheric chemistry.

### ***Ambient Measurement and Analysis Methods***

- (1) Development and evaluation of a real-time instrument for determining the size-dependent chemical composition of atmospheric particulate matter, including its fine and coarse, biochemical, biogenic, volatile, insoluble, and aqueous fractions.
- (2) Developing new, more sensitive techniques for ambient measurement on short time scales of chemically-significant, stable and unstable trace gases and substances participating in the photochemistry of ozone and/or the formation of fine particulate aerosols.
- (3) Developing instrument methods and innovative data analysis techniques useful in meeting the PAMS objectives for cost-effectiveness and accurate monitoring.

### ***Emissions***

- (1) Developing algorithms for emissions inventories consistent with ambient observations, and source apportionment techniques for important ozone precursors and/or fine particle contributors.
- (2) Developing methods and procedures for estimating condensible organic compound, fugative dust, and ammonia emissions.
- (3) Developing improved VOC monitoring techniques and receptor modeling techniques as a check on VOC inventories.
- (4) Developing new methods to improve transportation models used to estimate mobile source spatial and temporal activity patterns.
- (5) Developing measurement techniques for sampling fine particle emissions from diesel engines with minimal deposition in sampling probe.
- (6) Developing new analytical techniques to measure nonpolar, oxygenated biogenic volatile organic compound emissions from trees and other vegetation.

**Funding:** Approximately \$5 million is expected to be available in FY 97 for awards in this program. Proposals in the \$100,000 to \$200,000/year range are encouraged. Duration of awards may be up to 3 years.

### **5B. Special Opportunity in Tropospheric Ozone**

Through its NARSTO experience, EPA can see clear advantages of synergy and economy in using an integrated research approach in dealing with the two problems of tropospheric ozone and fine particulate matter in terms of scientific issues in

atmospheric chemistry and modeling, measurement methods, and emissions. Therefore, in addition to individual-investigator proposals on the separate topics of tropospheric ozone and fine particulate matter, EPA is also encouraging multiple investigator proposals for regional approaches to these issues and will make one or two awards to address them on a regional basis. Potential applicants are encouraged to submit proposals, preferably through a coordinating center, which include the equivalent of several individual applications. In effect, EPA will support one or two regional consortia at the level of approximately \$1 million per year, not to exceed a three year project period.

Potential applicants for this **special opportunity ONLY** should submit a pre-proposal following the instructions in section K of the application instructions. NCERQA will follow a two step process for this competition only in which pre-proposals are peer reviewed and the most meritorious applicants are invited to submit full proposals for final peer and programmatic review.

### **5C. Urban Air Toxics**

The Clean Air Act (CAA) Amendments of 1990 require EPA to develop an “Area Source Program” that includes both a national strategy and a research program. The mandated research program is intended to provide the scientific basis for development of a comprehensive national strategy to control emissions of hazardous air pollutants (HAPs) from area sources. The research program is to include “ambient monitoring,” “analysis to characterize the sources ... and the contribution that such sources make to public health risks,” and “consideration of atmospheric transformation and other factors which can elevate public health risks.” The human health effects to be considered under the research program include carcinogenicity, mutagenicity, teratogenicity, neurotoxicity, reproductive dysfunction, and other acute and chronic effects of urban air pollutants. The national strategy must “identify not less than 30” HAPs that “present the greatest threat to public health in the largest number of urban areas.” The strategy is to be fully implemented by the year 2000 and must provide guidelines for controlling the area source emissions of the 30 or more identified HAPs, while simultaneously ensuring the reduction of at least 75% in the “incidence of cancer attributable to exposure to hazardous air pollutants.”

*A discussion of research needs for this area of interest is included in the EPA report “Urban Area Source Research Program: A Status Report on Preliminary Research” (EPA 600-R-95/027). Some of the critical research questions are highlighted below:*

- (1) What direct observational evidence (i.e., epidemiologic data) is there to link health effects with ambient levels of exposure to HAPs? Such research should focus on HAPs for which little information now exists and should use a multidisciplinary approach to address both exposure and the resultant human health effects. Opportunities to leverage observational data from community-based studies already in place should be exploited.

- (2) What is the impact of mixtures of urban air pollutants on public health? Urban air pollution is a “soup” of chemicals; the chemicals come from many sources, are modified by atmospheric transformation, and may exhibit a variety of health effects. The risks posed by individual and mixtures of such toxic pollutants need to be characterized.
- (3) Are there subpopulations that may be at increased risk from HAPs, due to higher exposures, or exposure to complex mixtures of pollutants? What is the distribution of human exposures to the various HAPs, both for susceptible subpopulations and the general public? By what route, and how effectively, do the HAPs reach humans?
- (4) What are the most significant sources of toxic pollutants of concern in urban areas? How can the most critical sources be identified and their contribution to exposures and risk be quantified?
- (5) How can monitoring and modeling (including emissions modeling, dispersion modeling, source apportionment modeling, and human exposure modeling) best be linked to estimate exposure and risk? How can the distribution of human exposures best be estimated for populations living and working near to identified point sources?

Funding: About \$2 million is expected to be available in FY 97 for awards in this program. Proposals in the \$50,000 to \$200,000/year range are encouraged. Duration of awards may be up to three years.

## ► 6. *Health Effects and Exposures to Particulate Matter and Associated Air Pollutants*

Air pollution in the United States is regulated under the authority of the Clean Air Act to protect public health and welfare. Recently, EPA’s Clean Air Scientific Advisory Committee reviewed and reached consensus that there is increasing scientific confidence, based on numerous epidemiological studies, that particulate matter (PM) is associated with increased morbidity and mortality and these effects occur at exposure levels below the current standards. Significant uncertainties remain, however, about the biological mechanisms that could cause increased mortality or morbidity from PM exposures and about the nature of human exposures. The question of biological plausibility, i.e., “How could PM be causing these effects?” has received much less study. Animal toxicology studies have reproduced at higher concentrations the effects reported in humans: mortality, asthma-like effects, and increased infection-related morbidity. While several hypotheses regarding possible mechanisms underlying recently reported PM effects have been proposed, little research has been conducted to evaluate these hypotheses and to explore issues of dose-response and exposure scenarios.



The lack of understanding about biological mechanisms that could explain (a) the observed effects; (b) the reported independence of effects from particle composition; and (c) the lack of an obvious threshold for effects (i.e., the effects observed at very low exposures) underscores the critical need for research on mechanisms of PM toxicity. In addition the lack of research as to whether, and to what extent, the effects attributed to PM exposures are modified by other commonly occurring pollutants such as SO<sub>2</sub> and ozone, leads to uncertainties in interpretation of epidemiological studies.

In addition, there are important scientific uncertainties regarding PM exposures. Uncertainties regarding exposure assessment (e.g., particle concentration, size, chemical speciation, spatial and temporal variability, and copollutants) for important subpopulations (e.g., children, the elderly, individuals with pre-existing disease) are critically important since they affect interpretation of the epidemiological studies on which PM risk estimates are based. Understanding regional and temporal variability in particle characteristics (e.g., Western versus Eastern U.S.) and toxicity (e.g., coarse natural fugitive dust particles versus fine combustion-derived particles) may also lead to more effective risk management.

*Research is needed in the following areas:*

- (1) Investigation of causal mechanisms of PM toxicity. New clinical, epidemiological, toxicological, and *in vitro* research is needed for pulmonary, cardiovascular, and immunological effects (or other effects) in normal and sensitive subpopulations to better understand causal mechanisms by which PM, alone and/or in combination with other air pollutants, may cause health effects at levels below the current standard.
- (2) Studies using intermediate biological endpoints (i.e., which might relate to morbidity) hypothesized to be important to a causal mechanism(s) are needed to simultaneously test mechanism hypotheses and be indicative of dose-response relationships for PM toxicity. Research is needed on coarse, fine, and ultrafine particles.
- (3) Research to reduce uncertainties in exposure assessment for PM and associated copollutants. Research is needed to improve the characterization of individual and population exposures to PM (concentration, size, composition, fine mode versus coarse mode, etc.) and copollutants, including relationships between personal exposure to ambient PM, indoor PM, and total PM, and to allow new epidemiological studies to better define relationships between exposure to PM and other atmospheric constituents and adverse health effects.
- (4) Research is needed on the composition of little understood components of PM such as organic compounds (non-volatile and semi-volatile), primary biological materials, and species dissolved in liquid particles. Characterization of the spatial, temporal, and indoor/outdoor patterns of species such as NH<sub>4</sub>NO<sub>3</sub> and

parameters such as particle number is included. New or improved instruments or techniques may be required for these studies also.

**Funding:** Approximately \$2 million is expected to be available in FY 97 for awards in this program. Proposals in the \$50,000 to \$200,000/year range are encouraged. Duration of awards may be up to three years.

## ► 7. *Drinking Water*

The Safe Drinking Water Act requires that public water supplies be disinfected and that the EPA set standards and establish processes for treatment and distribution of disinfected water to ensure that no significant risks to human health occur. Scientific evidence suggests that exposure to chemical byproducts formed during the disinfection process may be associated with adverse health effects. Reducing the amount of disinfectant or altering the disinfection process may decrease byproduct formation; however, these practices may increase the potential for microbial contamination. EPA's current challenge is to balance the health risks caused by exposure to microbial pathogens with the health risks caused by exposure to disinfection byproducts.

*This section of the solicitation invites research grant applications in two areas of special interest to its mission: Microbial Pathogens in Drinking Water Systems and Drinking Water Disinfection Byproducts (DBPs).*

### **7A. Microbial Pathogens in Drinking Water Systems**

The incidence of waterborne disease in the U.S. is highly uncertain. While the health effects caused by drinking water pathogens are generally known, limited information is available on the doses and conditions that produce effects. Limited information is also available on alternative disinfection methods for pathogens resistant to the conventional chlorine-based disinfection methods. Research is needed in the following areas:

- (1) In many cases, the causative agents for waterborne disease outbreaks have not been identified. Emerging pathogens, such as *Cyclospora* and *Helicobacter pylori*, could play a role in many of these outbreaks. Efficient methods for measuring the incidence and viability of pathogens in water are needed to assist in identifying the causative agents in future outbreaks. For example, research is needed to develop and field test a practical method for determining the viability and occurrence of *Cyclospora* in drinking water. Research is needed to determine *Helicobacter* occurrence patterns in raw water via the development and field testing of a suitable recovery and culture assay method. Innovative proposals for methods development for other emerging pathogens

are also encouraged. These methods should be useful for dose-response and exposure estimates for risk assessment.

- (2) Research is needed to develop an understanding of the risks associated with exposure to primary waterborne pathogens (e.g., *Giardia*, *Cryptosporidium*, and *enteric viruses*) and to emerging pathogens (e.g., *Cyclospora*, *Mycobacteria*, *Helicobacter pylori*, microsporidia, caliciviruses, adenovirus 40/41, and coxsackievirus B) as a function of such susceptibility factors as age (e.g., children), nutrition, protective immunity, and behavioral patterns.
- (3) The safety of drinking water is compromised by pathogenic microorganisms resistant to standard disinfection methods. Research is required on the efficacy of ultraviolet radiation (pulsed and continuous) as a disinfectant in drinking water from various groundwater and surface water sources, including those that may pose limitations. In addition, research is needed on the optimal ultraviolet light wavelengths for inactivating specific species. Also needed is a better understanding of why pulsed UV light has a more destructive impact on cyst viability than continuous UV light.

## 7B. Drinking Water Disinfection Byproducts

Public water systems disinfect drinking water with chlorine or alternate disinfectants. While chlorine reduces microbial risk, the use of chlorine creates new potential risks from disinfection byproducts formed during the water treatment process. Research is needed to improve methods for estimating human exposures (via the oral, inhalation, and dermal routes) to the byproducts of different disinfection treatments. For the inhalation and dermal routes, research is especially needed on haloacetic acids, haloacetonitriles, haloketones, and aldehydes. Proposals should address research on biochemical markers of human exposure and/or the development and validation of models of human exposure to DBPs.

*It is recognized that there are many other problems in assuring a safe drinking water supply to the public which this solicitation cannot address. EPA anticipates additional solicitations in the future which will focus on some of these.*

**Funding:** Approximately \$3 million is expected to be available in fiscal year 1997 for awards in this program area. The projected award range is \$75,000 to \$200,000/year with a duration of 2 or 3 years.

## ► 8. Contaminated Sediments

The EPA National Sediment Quality Survey (EPA 823-D-96-002, July 1996) recently analyzed the existing data on sediment quality to identify the national extent and severity of sediment contamination. Based on existing data bases, 75 percent of sediments sampled have a probability of an adverse human health or aquatic life

effect. The study reported that 26 percent of the 21,000 freshwater and estuarine sampling stations throughout the United States were characterized as having sediment chemistry and toxicology with potential aquatic life or human health effects, while another 49 percent was categorized with intermediate probability of adverse effects.

The question for researchers is, “What are the extent, severity, and human health and ecological consequences of contaminated sediments?” In its study on relative risk, EPA’s Science Advisory Board cited the problem of input of toxics to surface waters, to which contaminated sediments would contribute, as a moderate source of risk. EPA’s Contaminated Sediment Management Strategy (EPA 823-R-94-001, August 1994) highlights ecological impacts and human health concerns expressed through the 1200 fish consumption advisories that were issued in the last year by various state agencies, in which potential consumers are warned of unsafe levels of toxic chemicals in fish and shellfish.

A major issue is the reliability of the risk characterization of contaminated sediments which supports proposed management action decisions. If assessment endpoints have not been demonstrated to reflect ecosystem conditions, expenditures of large amounts of funds for remedial activities may not be justified. EPA seeks research applications for conducting field validations of sediment quality criteria, validations of test methods, and validation of models for determining and assessing ecological effects of contaminated sediments.

### ***Field Validation of Sediment Quality Criteria***

Sediment quality criteria based on equilibrium partitioning make specific predictions of concentrations in sediments below which no effects should be seen and above which effects may be seen. The two chemical classes for which sediment quality criteria have been proposed are non-ionic organic chemicals and the cationic metals, cadmium, copper, nickel, lead, and zinc. A mixture model has been proposed for PAHs and metals. Studies of criteria levels for chemical groups need to be conducted to determine the degree of protection provided. It should be possible to examine field sites and to address multiple chemicals to determine if methods to predict total toxicity can be related to aquatic system communities.

Measures of ecological effects which are needed include *in situ* sediment toxicity, disruption of benthic communities, and elevated body burdens in organisms. Chemical measurements in pore water may be a useful determination. For metals, seasonal variations may be important since acid volatile sulfide levels are known to vary seasonally. The concern is that sediments would exhibit toxicity during the period of low acid volatile sulfides. Also, flux to overlying water could violate water quality criteria. The comparison of ecological effects to calculated sediment quality criteria will require the collection of additional chemical and flux data to provide interpretive information.

### ***Field Validation of Chronic Toxicity Tests***

With most laboratory tests the question of lab-to-field extrapolation becomes a major issue. Toxicity assessment methods for contaminated sediments have been proposed by EPA for acute toxicity, and, within a short time, chronic test methods will be made available. Field studies should be done to obtain data sets from toxicity tests and population studies obtained on the same spatial and time scales. Studies are needed especially to relate chronic toxicity tests for benthos-associated organisms to populations in the marine and freshwater environments.

Funding: Approximately \$2 million is expected to be available in FY 97 for awards in this program. Proposals in the \$100,000 to \$150,000/year range are encouraged. Duration of awards may be up to 3 years.

## ► Eligibility

Academic and not-for-profit institutions located in the U.S., and state or local governments are eligible under all existing authorizations. Profit-making firms and other federal agencies are not eligible to receive assistance from EPA under this program.

Federal employees may cooperate or collaborate with eligible applicants within the limits imposed by applicable legislation and regulations. However, federal agencies, national laboratories funded by federal agencies (FFRDCs), and federal employees are not eligible to receive funding through this program and may not serve in a principal leadership role on a grant. An exception may occur when the principal investigator's institution subcontracts to a federal agency to purchase unique supplies or services unavailable in the private sector. Examples are purchase of satellite data, census data tapes, chemical reference standards, unique analyses not available elsewhere, etc. A written justification for such federal involvement must be included in the application, along with an assurance from the federal agency which commits it to supply the specified service.

Potential applicants who are uncertain of their eligibility should contact Dr. Robert E. Menzer in NCERQA, phone (202) 260-5779, EMail: [menzer.robert@epamail.epa.gov](mailto:menzer.robert@epamail.epa.gov)

## ► Standard Instructions for Submitting an Application

This section contains a set of special instructions related to how applicants should apply for an NCERQA grant under the appropriate solicitation. Proposed projects must be for research designed to advance the state of knowledge in the research areas described in this solicitation.

## ► Sorting Codes

In order to facilitate proper assignment and review of applications, each applicant is asked to identify the topic area in which their application is to be considered. It is the responsibility of the applicant to correctly identify the proper sorting code. Failure to do so will result in an inappropriate peer review assignment. At various places within the application, applicants will be asked to identify this topic area by using the appropriate Sorting Code. The Sorting Codes correspond to the topic areas within the solicitation. The Sorting Codes and application deadlines for this solicitation are shown below:

TOPIC AREA	SORTING CODE	DUE DATE
<b>Exploratory Research</b>		
environmental biology	97-NCERQA-1A	January 15, 1997
environmental chemistry	97-NCERQA-1B	January 15, 1997
physics	97-NCERQA-1C	January 15, 1997
human health	97-NCERQA-1D	January 15, 1997
social science	97-NCERQA-1E	January 15, 1997
environmental engineering	97-NCERQA-1F	January 15, 1997
<b>Ecosystem Indicators</b>	97-NCERQA-2	January 22, 1997
<b>Issues in Human Health Risk Assessment</b>		
The Human Health Effects of Complex Exposure Patterns	97-NCERQA-3A	February 15, 1997
Variability in Human Responses to Environmental Agents	97-NCERQA-3B	February 15, 1997
Consumer Right-to-Know	97-NCERQA-3C	February 15, 1997
<b>Endocrine Disruptors</b>	97-NCERQA-4	February 15, 1997
<b>Ambient Air Quality</b>		
Tropospheric Ozone and Fine Particulates	97-NCERQA-5A	February 15, 1997
Special Opportunity Pre-proposals	97-NCERQA-5B	January 15, 1997
Urban Air Toxics	97-NCERQA-5C	February 15, 1997
<b>Health Effects of Particulate Matter</b>	97-NCERQA-6	February 15, 1997
<b>Drinking Water</b>		
Microbial Pathogens	97-NCERQA-7A	February 15, 1997
Disinfection Byproducts	97-NCERQA-7B	February 15, 1997
<b>Contaminated Sediments</b>	97-NCERQA-8	February 15, 1997

The Sorting Code must be placed at the top of the abstract (as shown in the abstract format), in Box 10 of Standard Form 424 (as described in the section on SF424), and should also be included in the address on the package that is sent to EPA (see the section on how to apply).

# ► The Application

The initial application is made through the submission of the materials described below. It is essential that the application contain all the information requested and be submitted in the formats described. If it is not, the application may be rejected on administrative grounds. If an application is considered for award, (i.e., after external peer review and internal review) additional forms and other information will be requested by the Project Officer. The application should not be bound or stapled in any way. *The Application contains the following:*

► **A. Standard Form 424:** The applicant must complete Standard Form 424 (see attached form and instructions). This form will act as a cover sheet for the application and should be its first page. Instructions for completion of the SF424 are included with the form. The form must contain the original signature of an authorized representative of the applying institution. Please note that both the Principal Investigator and an administrative contact should be identified in Section 5 of the SF424.

► **B. Key Contacts:** The applicant must complete the Key Contacts Form (attached) as the second page of the submitted application.

► **C. Abstract:** The abstract is a very important document. Prior to attending the peer review panel meetings, some of the panelists may read only the abstract. Therefore, it is critical that the abstract accurately describe the research being proposed and convey all the essential elements of the research. Also, in the event of an award, the abstracts will form the basis for an Annual Report of awards made under this program. The abstract should include the following information:

The abstract *MUST* be limited to one page. See attached example.

**1. Sorting Code:** Use the correct code that corresponds to the appropriate RFA topic. (Be sure to substitute the appropriate code for the “X” in 97-NCERQA-X).

**2. Title:** Use the exact title as it appears in the rest of the application.

**3. Investigators:** List the names and affiliations of each investigator who will significantly contribute to the project. Start with the Principal Investigator.

**4. Project Summary:** This should summarize: (a) the objectives of the study (including any hypotheses that will be tested), (b) the experimental approach to be used (which should give an accurate description of the project as described in the proposal), (c) the expected results of the project and how it addresses the research needs identified in the solicitation, and (d) the estimated improvement in risk assessment or risk management that will result from successful completion of the work proposed.



- **D. Project Description:** This description must not exceed fifteen (15) consecutively numbered (center bottom), 8.5x11 inch pages of single-spaced standard 12-point type with 1 inch margins. The description must provide the following information:
- 1. Objectives:** List the objectives of the proposed research and the hypotheses being tested during the project and briefly state why the intended research is important. This section can also include any background or introductory information that would help explain the objectives of the study (one to two pages recommended).
  - 2. Approach:** Outline the methods, approaches, and techniques that you intend to employ in meeting the objective stated above (five to 10 pages recommended).
  - 3. Expected Results or Benefits:** Describe the results you expect to achieve during the project and the benefits of success as they relate to the topic under which the proposal was submitted. This section should also discuss the utility of the research project proposed for addressing the environmental problems described in the solicitation (one to two pages recommended).
  - 4. General Project Information:** Discuss other information relevant to the potential success of the project. This should include facilities, personnel, project schedules, proposed management, interactions with other institutions, etc. (one to two pages recommended).
  - 5. Important Attachments:** Appendices and/or other information may be included but must remain within the 15-page limit. References are in addition to the 15 pages.
- **E. Resumes:** The resumes of all principal investigators and important co-workers should be presented. Resumes must not exceed two consecutively numbered (bottom center), 8.5x 11 inch pages of single-spaced standard 12-point type with 1 inch margins for each individual.
- **F. Current and Pending Support:** The applicant must identify any current and pending financial resources that are intended to support research related to that included in the proposal or which would consume the time of principal investigators. This should be done by completing the appropriate form (see attachment) for each investigator and other senior personnel involved in the proposal. Failure to provide this information may delay consideration of your proposal.
- **G. Budget:** The applicant must present a detailed, itemized budget for the entire project. This budget must be in the format provided (see attachment) and not

exceed two consecutively numbered (bottom center), 8.5x11 inch pages with 1 inch margins. Please note that institutional cost sharing is not required and, therefore, does not have to be included in the budget table. If desired, a brief statement concerning cost sharing can be added to the budget justification.

► **H. Budget Justification:** This section should describe the basis for calculating the *personnel, fringe benefits, travel, equipment, supplies, contractual support, and other* costs identified in the itemized budget and explain the basis for their calculation (special attention should be given to explaining the travel, equipment, and other categories). This should also include an explanation of how the indirect costs were calculated. This justification should not exceed two consecutively numbered (bottom center), 8.5x11 inch pages of single-spaced standard 12-point type with 1 inch margins.

► **I. Quality Assurance Narrative Statement:** For awards that involve environmentally related measurements or data generation, a quality system that complies with the requirements of ANSI/ASQC E4, “Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs,” must be in place. This statement should not exceed two consecutively numbered, 8.5x11 inch pages of single-spaced standard 12-point type with 1 inch margins. This is in addition to the 15 pages permitted for the Project Description. The Quality Assurance Narrative Statement should, for each item listed below, either present the required information or provide a justification as to why the item does not apply to the proposed research.

1. The data collection activities to be performed or hypothesis to be tested (reference may be made to the specific page and paragraph number in the application where this information may be found); acceptance criteria for data quality (precision, accuracy, representativeness, completeness, comparability).
2. The study design including sample type and location requirements and any statistical analyses that were used to estimate the types and numbers of samples required.
3. The procedures for the handling and custody of samples, including sample identification, preservation, transportation, and storage.
4. The methods that will be used to analyze samples collected, including a description of the sampling and/or analytical instruments required.
5. The procedures that will be used in the calibration and performance evaluation of the sampling and analytical methods used during the project.
6. The procedures for data reduction and reporting, including description of statistical analyses to be used.

7. The intended use of the data as they relate to the study objectives or hypotheses.
8. The quantitative and or qualitative procedures that will be used to evaluate the success of the project.
9. Any plans for peer or other reviews of the study design or analytical methods prior to data collection.

ANSI/ASQC E4, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs" is available for purchase from the American Society for Quality Control, phone 1-800-248-1946, item T55. Only in exceptional circumstances should it be necessary to consult this document.

- ▶ **J. Postcard:** The Applicant must include with the application a self-addressed, stamped 3x5 inch post card. This will be used to acknowledge receipt of the application and to transmit other important information to the applicant.
  
- ▶ **K. Pre-proposal Procedure for the *Special Opportunity in Tropospheric Ozone*:** In this one area only EPA is inviting pre-proposals from potential applicants. These pre-proposals will be programmatically and peer reviewed, and EPA will invite applicants to submit a final proposal based on the review results. Decisions on the final awards will be based on the results of a subsequent peer and programmatic review of the final proposal similar to that described for the other components of this program. To facilitate consideration of final proposals, potential applicants should submit pre-proposals in the format described below. The pre-proposal must not exceed eight pages in total and must contain the following information:
  1. *Administrative information, including on the first page:*
    - a. Sorting code: use 97-NCERQA-6B
    - b. Exact title
    - c. Investigators: list the names and affiliations of each investigator who will significantly contribute to the study. Start with the principal investigator. Provide the address, telephone number, and EMail address of the principal investigator and the administrative contact person.
  2. Project description: this section should not exceed five pages and should cover in an abbreviated fashion the five areas described in paragraph D above.
  3. Budget: present on one page a budget which estimates the cost of the project in the major categories (personnel, supplies, equipment, contractual support, and indirect costs).

Other information normally requested in a full proposal will be requested as part of the final proposal after the initial round of peer review. Full proposals will also be accepted from investigators who do not submit pre-proposals.

# ► Review and Selection

All grant applications are initially reviewed by EPA to determine their legal and administrative acceptability. Acceptable applications are then reviewed by an appropriate technical peer review group. This review is designed to evaluate each proposal according to its scientific merit. In general, each review group is composed of non-EPA scientists, engineers, social scientists, and/or economists who are experts in their respective disciplines and are proficient in the technical areas they are reviewing. The reviewers use the following criteria to help them in their reviews:

1. The originality and creativity of the proposed research, the potential contribution the proposed research could make to advance scientific knowledge in the environmental area, the appropriateness and adequacy of the research methods proposed, and the appropriateness and adequacy of the Quality Assurance Narrative Statement
2. The qualifications of the principal investigator(s) and other staff, including knowledge of pertinent literature, experience, and publication records as well as the probability that the proposed research will be successfully completed
3. The availability and/or adequacy of the facilities and equipment proposed for the project
4. The responsiveness of the proposal to the research needs set forth in the solicitation
5. Although budget information is not used by the reviewers as the basis for their evaluation of scientific merit, the reviewers are asked to provide their view on the appropriateness and/or adequacy of the proposed budget and its implications for the potential success of the proposed research. Input on requested equipment is of particular interest.

Applications that receive scores of excellent and very good from the peer reviewers are subjected to a programmatic review within EPA, the object being to assure a balanced research portfolio for the Agency. Scientists from the ORD Laboratories and EPA Program and Regional Offices review these applications in relation to program priorities and their complementarity to the ORD intramural program and recommend selections to NCERQA.

A summary statement of the scientific review of the panel will be provided to each applicant. Funding decisions are the sole responsibility of EPA. Grants are selected on the basis of technical merit, relevancy to the research priorities outlined, program balance, and budget.

## ► **How to Apply**

The original and ten (10) copies of the fully developed application and five (5) additional copies of the abstract (15 in all), must be received by NCERQA no later than 4:00 P.M. EST on the closing date assigned to the topic area appropriate to the application (see Sorting Codes section):

The application and abstract must be prepared in accordance with these instructions. Informal, incomplete, or unsigned proposals will not be considered. The application should not be bound or stapled in any way. The original and copies of the application should be secured with paper or binder clips. Completed applications should be sent via regular or express mail to:

**U.S. Environmental Protection Agency**  
**Peer Review Research Division (8703)**  
**Sorting Code: 97-NCERQA-X** (replace the "X" with the appropriate code)  
**Room 2411**  
**401 M Street, SW**  
**Washington DC 20460**  
*Phone: (202) 260-0563 (for express mail applications)*

The sorting code must be identified in the address (as shown above). Please do not use the code 97-NCERQA-X. Proposals submitted with this sorting code will be returned to the applicant.

## ► **Guidelines, Limitations, and Additional Requirements**

Proposals must be submitted to only one topic area, using a single sorting code. Proposals submitted to more than one RFA topic will be assigned to the topic designated on the first version received or to the first sorting code designated on the application. If you wish to submit more than one application, you must ensure that the research proposed is significantly different from that in any other that has been submitted to this solicitation or from any other grant you are currently receiving from EPA or any other federal government agency.

Projects which contain subcontracts constituting more than 40% of the total direct cost of the grant for each year in which the subcontract is awarded will be subject to special review and may require additional justification.

Researchers will be expected to budget for and participate in an annual All-Investigators Meeting with EPA scientists and other grantees to report on research activities and to discuss issues of mutual interest.

## ► **Proprietary Information**

By submitting an application in response to this solicitation, the applicant grants EPA permission to share the application with technical reviewers both within and outside of the Agency. Applications containing proprietary or other types of confidential information will be returned to the applicant without review.

## ► **Funding Mechanism**

The funding mechanism for all awards issued under this solicitation will consist of grants from EPA and depends on the availability of funds. In accordance with Public Law 95-224, the primary purpose of a grant is to accomplish a public purpose of support or stimulation authorized by Federal statute rather than acquisition for the direct benefit of the Agency. In issuing a grant agreement, EPA anticipates that there will be no substantial EPA involvement in the design, implementation, or conduct of the research funded by the grant. However, EPA will monitor research progress, based in part on annual reports provided by awardees.

## ► **Contacts**

Additional general information on the grants program, forms used for applications, etc., may be obtained by exploring our Web page at [http:// www.epa.gov/ncerqa](http://www.epa.gov/ncerqa) EPA does not intend to make mass-mailings of this announcement. Information not available on the Internet may be obtained by contacting:

**U.S. Environmental Protection Agency  
National Center for Environmental Research  
and Quality Assurance (8703)  
401 M Street, SW  
Washington DC 20460  
Phone: 1-800-490-9194**

A contact person has been identified below for each topic within the RFA. These individuals will usually be the Project Officers for the grants funded under a particular topic. They will respond to inquires regarding the solicitation and can respond to any technical questions related to your application.

### **Exploratory Research**

- Clyde Bishop 202-260-5727  
bishop.clyde@epamail.epa.gov

### **Ecosystem Indicators**

- Barbara Levinson 202-260-5983  
levinson.barbara@epamail.epa.gov

## **Issues in Human Health Risk Assessment**

- Chris Saint 202-260-1093  
saint.chris@epamail.epa.gov

## **Endocrine Disruptors**

- David Reese 202-260-7342  
reese.david@epamail.epa.gov

## **Ambient Air Quality**

- Deran Pashayan 202-260-2606  
pashayan.deran@epamail.epa.gov

## **Health Effects and Exposures to Particulate Matter and Associated Air Pollutants**

- Deran Pashayan 202-260-2606  
pashayan.deran@epamail.epa.gov

## **Drinking Water**

- Sheila Rosenthal 202-260-7334  
rosenthal.sheila@epamail.epa.gov

## **Contaminated Sediments**

- David Reese 202-260-7342  
reese.david@epamail.epa.gov





## INSTRUCTIONS FOR THE SF 424

This is a standard form used by applicants as a required facesheet for preapplications and applications submitted for Federal Assistance. It will be used by Federal agencies to obtain applicant certification that States which have established a review and comment procedure in response to Executive Order 12372 and have selected the program to be included in their process, have been given an opportunity to review the applicant's submission.

- | Item: | Entry:   | Item: | Entry:  |
|-------|--|-------|---|
| 1.    | Self-explanatory.  | 12.   | List only the largest political entities affected (e.g., State, counties, cities.)  |
| 2.    | Date application submitted to Federal agency (or State, if applicable) & applicant's control number (if applicable).   | 13.   | Self-explanatory.   |
| 3.    | State use only (if applicable).  | 14.   | List the applicant's Congressional Districts and any District(s) affected by the program or project.  |
| 4.    | If this application is to continue or revise an existing award, enter present Federal identifier number. If for a new project, leave blank.  | 15.   | Amount requested or to be contributed during the first funding/budget period by each contributor. Value of in-kind contributions should be included on appropriate lines as applicable. If the action will result in a dollar change to an existing award, include <i>only</i> the amount of the change. For decreases, enclose the amounts in parentheses. If both basic and supplemental amounts are included, show breakdown on an attached sheet. For multiple program funding, use totals and show breakdown using same categories as item 15. |
| 5.    | Legal name of applicant, name of primary organizational unit which will undertake the assistance activity, complete address of the applicant, and name and telephone number of the person to contact on matters related to this application.   | 16.   | Applicants should contact the State Single Point of Contact (SPOC) for Federal Executive Order 12372 to determine whether the application is subject to the State intergovernmental review process.   |
| 6.    | Enter Employer Identification Number (EIN) as assigned by the Internal Revenue Service.  | 17.   | This question applies to the applicant organization, not the person who signs as the authorized representative. Categories of debt include delinquent audit allowances, loans and taxes.  |
| 7.    | Enter the appropriate letter in the space provided.  | 18.   | To be signed by the authorized representative of the applicant. A copy of the governing body's authorization for you to sign this application as official representative must be on file in the applicant's office. (Certain Federal agencies may require that this authorization be submitted as part of the application.)   |
| 8.    | Check appropriate box and enter appropriate letter(s) in the space(s) provided:<br><br>— "New" means a new assistance award.<br><br>— "Continuation" means an extension for an additional funding/budget period for a project with a projected completion date.<br><br>— "Revision" means any change in the Federal Government's financial obligation or contingent liability from an existing obligation. |       |   |
| 9.    | Name of Federal agency from which assistance is being requested with this application.   |       |   |
| 10.   | Use the Catalog of Federal Domestic Assistance number and title of the program under which assistance is required.   |       |   |
| 11.   | Enter a brief descriptive title of the project. If more than one program is involved, you should append an explanation on a separate sheet. If appropriate (e.g., construction or real property projects), attach a map showing project location. For preapplications, use a separate sheet to provide a summary description of this project.  |       |   |

## KEY CONTACTS FORM

**Authorized Representative:** *Original awards and amendments will be sent to this individual for review and acceptance, unless otherwise indicated.*

Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Complete Address: \_\_\_\_\_  
\_\_\_\_\_  
Phone Number: \_\_\_\_\_

**Payee:** *Individual authorized to accept payments.*

Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Complete Address: \_\_\_\_\_  
\_\_\_\_\_  
Phone Number: \_\_\_\_\_

**Administrative Contact:** *Individual from Sponsored Programs Office to contact concerning administrative matters (i.e., indirect cost rate computation, rebudgeting requests etc.)*

Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Complete Address: \_\_\_\_\_  
\_\_\_\_\_  
Phone Number: \_\_\_\_\_  
FAX Number: \_\_\_\_\_  
E-Mail Number: \_\_\_\_\_

**Principal Investigator:** *Individual responsible for the technical completion of the proposed work.*

Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Complete Address: \_\_\_\_\_  
\_\_\_\_\_  
Phone Number: \_\_\_\_\_  
FAX Number: \_\_\_\_\_  
E-Mail Number: \_\_\_\_\_

## Itemized Budget for ORD Grant Applications (*Example Format*)

CATEGORIES	YEAR ONE	YEAR TWO	YEAR THREE	TOTAL PROJECT
a. Personnel Principal Investigator Co-PI Research Scientists Postdoctoral Scientists Other Personnel				
<b>TOTAL PERSONNEL COSTS</b>				
b. Fringe Benefits _____ % of _____				
c. Travel Trip 1 Trip 1 Trip 1 ...etc.				
<b>TOTAL TRAVEL COSTS</b>				
d. Equipment Item 1 Item 2 Item 3 ...etc.				
<b>TOTAL EQUIPMENT COSTS</b>				
e. Supplies Item 1 Item 2 Item 3 ...etc.				
<b>TOTAL SUPPLY COSTS</b>				
f. Contracts 1 2 3 ...etc.				
<b>TOTAL CONTRACTUAL COSTS</b>				
g. Other Item 1 Item 2 Item 3 ...etc.				
<b>TOTAL OTHER COSTS</b>				
h. TOTAL DIRECT COSTS (sum of a-g)				
i. Indirect Costs/Charges _____ % of _____ (base)				
j. TOTAL PROJECT COSTS (sum of i & j)				
k. TOTAL REQUESTED FROM EPA				

SAMPLE

## Abstract Format (*Example Format*)

**1. Sorting Code:**

**2. Title:**

**3. Investigators:**

**4. Project Summary:**

**a. Objectives/Hypotheses:**

**b. Approach:**

**SAMPLE**

**c. Epected Results:**

