United States
Environmental Protection
Agency

Office of Research and
Development
Washington DC 20460

EPA/600/F-97/013
September 1997
www.epa.gov/ncerqa

EPA

1998 EPA SCIENCE TO ACHIEVE RESULTS (STAR) RESEARCH GRANTS

Announcement of Opportunity

- Ecological Indicators
- Drinking Water
- Air Pollution Chemistry and Physics
- Urban Air Toxics
- Health Effects and Exposures to Particulate Matter and Associated Air Pollutants

Opening Date: September 26, 1997

SEE INDIVIDUAL TOPICS FOR APPLICATION SUBMISSION CLOSING DATES

NATIONAL CENTER FOR ENVIRONMENTAL RESEARCH AND QUALITY ASSURANCE

The United States Environmental Protection Agency
Office of Research and Development
National Center for Environmental Research and Quality Assurance

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Opening Date: September 26, 1997.....Closing Dates: See Sorting Codes section for each grant topic

Introduction

In this announcement 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. Ecological Indicators
2. Drinking Water
3. Air Pollution Chemistry and Physics
4. Urban Air Toxics
5. Health Effects and Exposures to Particulate Matter and Associated Air Pollutants

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 Science to Achieve Results STAR Program). 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 several of the programmatic areas which are a part of the EPA 1998 solicitation. Additional program topic areas and 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 initiatives. 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 reduction of risks to human health and ecosystems and on the reduction of uncertainty associated with risk assessment. 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. Ecological Indicators

Background

The quality of human existence depends on interacting biotic and abiotic resources within spatially and temporally dynamic ecosystems. Activities associated with expanding human populations alter these complex interactions and threaten ecosystem integrity and sustainability. Broadly interpreted, integrity refers to the degree to which an ecosystem demonstrates a balanced, resilient community of organisms with biological diversity, species composition, structural redundancy, and functional processes comparable to that of natural habitats in the same region. Sustainability simply refers to the ability of an ecosystem to maintain ecological integrity over time.

A major responsibility of the Environmental Protection Agency (EPA) is to assess and prevent adverse impacts of human activities on ecosystems. Monitoring programs, such as EPA’s Environmental Monitoring and Assessment Program (EMAP), provide a means

to detect existing and potential threats to ecosystem integrity. Yet, monitoring all components and interactions of an ecosystem is impractical, so certain variables must be used as indicators of ecosystem condition. In this context, an ecological indicator is a measure or index of measures that can be used to describe the condition of an ecosystem or one of it's critical components or processes. The indicator may be related to, or derived from, measurements of variables that provide quantitative information on ecological structure and function. The indicator must be responsive to anthropogenic stressors and clearly linked to important societal values for the targeted resources. Ecological indicators may be used to address specific environmental values, characterize ecosystem integrity and sustainability, or identify sources of stress.

This RFA is part of EMAP research and, as such, emphasizes the need for indicators useful in monitoring ecosystem integrity and sustainability which will ultimately result in improved information for risk assessments. Previous ecological indicator research has largely concentrated on indicators within a single resource type (i.e., wetlands, estuaries, lakes, streams, or forests) often at a single spatial scale and using a single sampling design. Research proposed in response to this solicitation should result in the development of indicators that (1) integrate between or among resource types, (2) incorporate multiple levels of biological organization (gene, organism, population, community, landscapes), and (3) address multiple spatial scales (local, watershed, regional, national, global). Indicators may be single field or remotely sensed measurements, indices or model outputs that quantify biological conditions relative to integrity and sustainability, and/or quantify stressors to which the biota are exposed. Obviously, the resources, level of organization, spatial scale and type of indicator must be appropriate for the question (or environmental value) being addressed.

Different indicators employ a variety of measurements (e.g., organismal health, nutrient fluxes, population abundance, community diversity), each developed within the context of a particular discipline (pathology, limnology, ecology, etc.). Scientific advances in two disciplines, molecular genetics and landscape characterization, have provided incentive to further apply the tools of these disciplines to ecological indicator development. Thus, these areas are emphasized in this RFA as described in the Objectives and Priorities section. Interest in these disciplines is as follows:

Molecular genetics. Techniques in molecular biology have been developed that potentially allow measurement of genetic diversity, both as an interspecies and an intraspecies variable. The former may be applied as a community measure of biological diversity (an important characteristic of ecological integrity), whereas the latter may indicate the ability of a population to adapt to future environmental stresses. Thus, the identification and development of sensitive (molecular and cellular) indicators for monitoring and assessing changes in genetic diversity in response to environmental stressors is emphasized. Likely areas for research include, but are not limited to, multiple locus and single locus techniques to discriminate sources of genetic change in populations, development of indices of genetic instability, and evaluation of genetic heterozygosity of biota to determine

vulnerability to extinction resulting from land use pattern changes. Unique molecular techniques and approaches for the study of genetic diversity that characterize genetic diversity in relation to ecosystem integrity and sustainability or evaluate different approaches for discriminating changes in genetic diversity are of interest. Although measured at the suborganismal level, it is necessary that the interpretation of genetic indicators be clearly relevant to ecosystem integrity or sustainability.

Landscape Characterization. Spatial distributions of physical, biological, or cultural features across a geographic area can now be reasonably documented over a wide range of scales with remotely sensed data using geographic information systems. Changes in the distribution of human populations and ecological resources can dramatically alter fundamental ecological processes (e.g., flow of water, nutrients, energy, or biota) that influence ecosystem integrity and sustainability. Current needs include landscape indicators that are relatively scale independent (for conducting cross-scale landscape assessments), landscape indicators that quantify and characterize the geographic extent of key landscape attributes as they relate to a range of environmental values such as water quality, quality of the watershed, stream biological condition and habitat suitability, landscape indicators that are linked with hydrological and ecological process models (to evaluate risks to sustainability of environmental values over decades), and landscape indicators that link socio-economic models of future human use changes with key landscape structural and functional changes.

Although these disciplinary approaches offer broad opportunities for research, this emphasis is not intended to exclude other approaches that meet the objectives of the solicitation. All approaches will be considered in the priority described below.

Objectives and Priorities

The overriding objective of this RFA is to stimulate the development and evaluation of measurements, indices, and models that serve as indicators for improved monitoring and assessment of ecological integrity and sustainability for EMAP and other monitoring efforts. Research is solicited that leads to the development of indicators that characterize and quantify the integrity and sustainabilty of ecosystems. Research priorities, beginning with the highest, are described below:

1) The development of landscape characterization indicators that incorporate multiple resources and spatial scales. Indicators that are useful at regional and broader scales are emphasized over those intended primarily for local use.

2) The development of indicators *that span multiple resource types* (e.g., forests, streams, wetlands, estuaries, rangelands). Any indicator that incorporates or integrates multiple scales and multiple levels of biological organization within the context of spanning multiple resources is also emphasized.

3) The development of indicators within a single resource type (e.g. forests, streams, wetlands, estuaries, rangelands) that link different levels of biological organization or multiple spatial scales. The opportunity to apply cellular and molecular genetics techniques to address genetic diversity in conjunction with other levels of biological organization and multiple spatial scales is emphasized.

Proposal Evaluation and Selection

Research on indicators that are not applicable to ecological integrity and sustainability is not solicited in this RFA. Although indicators that employ measurements at any level of biological organization (including subcellular) are acceptable, the indicators must be directed toward an ecological interpretation. Each application must clearly identify and establish the linkage between the environmental value at risk, the assessment endpoint, and the proposed indicator. Furthermore, each proposal must clearly demonstrate a functional relationship of the indicator with anthropogenic stressors and the resource at risk.

Funding: Approximately $8 million is expected to be awarded in fiscal year 1998 in this program area, depending on the availability of funds. The projected award range is $100,000 to $300,000/year with a duration of 2 or 3 years.

2. Drinking Water

The Safe Drinking Water Act mandates that EPA identify and regulate drinking water contaminants, which may have any adverse health effects, and which are known or anticipated to occur in public water systems. EPA regulations addressing requirements of the Act require disinfection of surface water and certain groundwater supplies. 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. EPA is also required under the Safe Drinking Water Act to publish a list of contaminants, which may be subject to regulation. Research is needed on some of these emerging contaminants.

This section of the solicitation invites research grant applications in three areas of special interest: (E1) Microbial Pathogens, (E2) Disinfection Byproducts, and (E3) Emerging Contaminants from the Contaminant Candidate List.

E1. Microbial Pathogens

The incidence of waterborne disease in the U.S. is highly uncertain. While information on the health effects caused by many known drinking water pathogens is generally

available, limited information exists on the prevalence of disease-causing microorganisms in drinking water and the doses and conditions that produce effects. This solicitation focuses on the development of new analytical methods to detect pathogens in water, research on biofilms to improve our understanding of conditions in the distribution system that might favor pathogen survival/growth, and research on host susceptibility to assist with microbial risk assessment. Improved methods will make it feasible to develop data on waterborne occurrence of pathogens. Future research on dose-response or treatment studies for specific pathogens can be prioritized based on their prevalence in drinking water and associated risks.

Research is needed in the following areas:

- At present little is known about the occurrence of certain emerging pathogens in the source waters of the United States. It is possible that some of these emerging pathogens may have been the cause of some of the waterborne disease outbreaks for which no etiologic agent has been identified. Analytical methods to detect these pathogens in source water are either not available or not very useful. Practical analytical methods are needed to assist in quantifying the occurrence and viability of these organisms in source water and to identify the cause of waterborne disease outbreaks in drinking water supplies. Factors to be considered in the usefulness of analytical methods research for these organisms include sensitivity and specificity of the method, the ability of the method to quantify the organism in environmental samples, cost of the method, time and skills needed for analysis, and accuracy and precision of the method. Listed in order of priority are the pathogens for which development and field testing of analytical methods is needed: (1) caliciviruses, (2) adenoviruses 40, 41, and 1-39, (3) microsporidia (septata and enterocytozoon), (4) hepatitis A virus (HAV), (5) *Mycobacterium avium intracellulare* (MAC), (6) *Helicobacter pylori,* (7) *Legionella pneumophila,* (8) *Toxoplasma gondii.*

- Research is needed to establish approaches for determining the general impact of susceptibility factors (e.g., age, pregnancy, nutrition, protective immunity, pre-existing diseases, and behavioral patterns) on infectious disease incidence associated with exposure to primary waterborne pathogens and to emerging pathogens (e.g., adenoviruses, *Acanthamoeba, Aeromonas hydrophila,* echoviruses, *Mycobacteria, Helicobacter pylori, Isospora,* etc.). Research is also needed to help explain the cellular, humoral or organ specific factors that are different in the more susceptible populations compared to the healthy population.

- The role of biofilms in protecting pathogens from disinfectant residuals, and in some cases enhancing their ability to amplify within the distribution system, is not well-characterized. Research is needed to determine whether biofilms protect and/or promote the growth of such indigenous opportunistic pathogens as *Acanthamoeba, Aeromonas, and Mycobacteria.* Research is also needed to define the relative roles of the ecology of distribution systems and the ecology of plumbing systems, showerheads, cooling towers, and overhead misters in promoting survival and growth of various opportunistic pathogens.

E2. 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.

Ozonation Byproducts:

Ozonation followed by a secondary disinfectant is a potential treatment option for water utilities to control microbial pathogens and chlorinated byproduct formation. However, the reaction of ozone with natural organic matter is not entirely understood. Research is needed to identify and quantify byproducts of these disinfectant combinations as a function of source water quality (e.g., pH, Br^-, precursor levels) and different drinking water treatment conditions (e.g. precursor removal, disinfectant concentration). The scope of DBP analysis may either be broad or targeted (e.g., on potentially harmful DBPs in mutagenic fractions). Studies should also evaluate the formation and stability of ozonation byproducts.

Chloramination Byproducts:

The use of chloramines as a secondary disinfectant is a potential treatment option to control chlorinated byproduct formation. However, the reaction of chloramines with natural organic matter is not entirely understood. Research is needed to identify and quantify byproducts of disinfectant combinations involving chloramines as a function of source water quality (e.g., pH, Br^-, precursor concentration) and different drinking water treatment conditions (e.g., precursor removal, disinfectant concentrations). Studies should also evaluate the formation and stability of these byproducts.

Byproduct Formation and Stability:

The formation and stability of trihalomethanes and haloacetic acids is currently understood and/or under investigation. Research is needed in the study of other disinfection byproducts (e.g., for ozonation: bromate, aldehydes; for chlorination: chloropicrin, haloacetonitriles; for chloramination: organic chloramines, cyanogen chloride). The formation and stability work should concentrate on conditions such as time, temperature, pH, Br-, natural organic matter nature, and natural organic matter concentration.

Treatment Techniques for Removing DBP Precursors:

There is a great deal of research underway that addresses granular activated carbon and enhanced coagulation as treatment techniques for removing disinfection byproduct precursors. Research is needed on other processes that are more cost-effective for removing a large percentage of disinfection byproduct precursors (>50%). A matrix of different waters should be used to demonstrate the applicability of the technology on a national scale. Cost effectiveness for both small and large treatment systems should be a

part of the study, particularly in comparing granular activated carbon to membrane treatment technologies.

DBP Modeling:

Modeling DBP formation is important for predicting the impact of treatment changes and potential regulatory scenarios. Considerable research has been done on trihalomethane prediction. Research is needed in the development of models for other DBPs (e.g., haloacetic acids, haloacetonitriles, bromate, and aldehydes). Models are needed for chlorination as well as alternative disinfectants. Model development should encompass a wide variety of water quality parameters (e.g., Br^-, pH, precursor levels) and treatment conditions (e.g., precursor removal, disinfectant concentrations).

Human Exposure:

To effectively evaluate the risks associated with the DBPs and to establish adequately protective health-based criteria, and subsequent regulatory standards, total exposure to each chemical needs to be considered. Research is needed to identify the uses of these chemicals in the food industry (either direct or indirect applications), uses that may result in the presence of these chemicals in air, and uses that may result in dermal contact. Assessments of dietary ingestion exposures, inhalation exposures, and dermal exposures for the general population are important in order to understand their contribution to overall exposure, thus providing for a comprehensive risk characterization and enabling the establishment of protective health criteria. Identification and characterization of the most highly exposed and chemically susceptible subpopulations is also needed.

E3. Emerging Contaminants from the Contaminant Candidate List

The Safe Drinking Water Act (SDWA) Amendments of 1996 require EPA to publish a list of contaminants which, at the time of publication, are not subject to any proposed or promulgated national primary drinking water regulation (NPDWR), that are known or anticipated to occur in public water systems and which may require regulations under the SDWA [section 1412(b)(1)]. The 1996 Amendments specify that EPA must publish the first list of contaminants ("Contaminant Candidate List," or CCL) not later than 18 months after the date of enactment, i.e., by February 1998, and every five years thereafter.

The Amendments also specify that the CCL must be published after consultation with the scientific community and after notice and opportunity for public comment. In a Federal Register notice expected to be published in September or October 1997, EPA will announce the draft Contaminant Candidate List, provide background on how it was developed, and seek comment on various aspects of developing the final Contaminant Candidate List. It is possible that based on comments and data received during the comment period, the draft CCL could differ from the final CCL which is to be published by February 1998.

Once completed, the CCL will be the source of priority contaminants for drinking water research, monitoring, guidance development, and for determining which contaminants need to be selected for drinking water regulation. In the CCL notice EPA will indicate which contaminants need additional occurrence data, additional health effects data, and both health effects and occurrence data. Examples of the health effects research needed for chemical contaminants included on the draft list are:

- Aluminum, vanadium, 2,6-bis(1,1 dimethylethyl)-2,5-cyclohexadiene-1,4-dione, DCPA mono-acid metabolite; DCPA di-acid metabolite; and organo-tins. Research is needed to fill current information gaps with respect to the critical human health effects of these contaminants at levels that are likely to occur in drinking water and how these contaminants might cause their adverse effects (i.e., mode of action). In formulating research plans, investigators will need to evaluate the strength of existing research and identify what research is needed. For aluminum, for example, a significant amount of health effects data exist in Canada. EPA will need to determine what additional data are needed. For the organo-tins, EPA is interested in knowing the extent of potential contamination of PVC pipe associated with drinking water distribution systems and the health effects associated with these compounds at these concentrations.

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 $4.0 million is expected to be available in fiscal year 1998 for awards in this program area. However, awards are subject to the availability of funds. The projected award range is $250,000 to $500,000 with a duration of 2 or 3 years.

3. Air Pollution Chemistry and Physics

Widespread air pollutants, such as fine particulate matter and ozone 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 most recent review cycle led to the July 1997 revision of the NAAQS for both 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.

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 and will be closely aligned with NARSTO. Many of the research needs for tropospheric ozone and fine particulate matter are closely related. Exploration of the most important unknowns in tropospheric ozone chemistry emphasizes atmospheric oxidation reactions which also play an important role in aerosol (particle) 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 concentrations are also important to both. Long range transport is being shown to make critical contributions to excessive concentrations of ozone and fine particulate matter, existing models are inadequate for describing this transport in many key areas.

The EPA seeks applications for research aimed at generating new knowledge in the areas of fine particulate matter and tropospheric ozone. When applicable, investigators are encouraged to use and evaluate existing bases in conducting their research.

Research is needed in the following areas:

Atmospheric Chemistry

(1) Laboratory smog chamber studies of oxidant and aerosol production from irradiated hydrocarbon (HC)/NO_x/SO_2/NH_3 mixtures, including the production of organic nitrates from HC/NO_x mixtures.

(2) Theoretical and laboratory investigations of the chemical by heterogeneous reactions involved in atmospheric ozone and fine particulate matter formation over the full range of meteorological conditions experienced in the ambient environment.

(3) Theoretical and laboratory investigations of the partitioning of semi-volatile compounds between the gas and aerosol phases.

Modeling Research

(1) Development and diagnostic evaluation of emissions-based models which focus 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 techniques for discriminating between emissions control strategy preferences addressing photochemical ozone and fine particulate problems, including methods for analysis and interpretation of data from the

PAMS (Photochemical Assessment Monitoring Station) network and soon-to-be-established national fine particle network.

(3) Developing models for fine particulate matter which relate ambient air quality models and/or measurements at a central point with personal exposures to ambient PM.

(4) Describing the interaction of boundary layer turbulence, vertical mixing, and cloud processes with atmospheric chemistry.

(5) Development and application of advanced sensitivity and uncertainty analysis methods to test emissions, meteorological, chemical, and/or transport modeling of photochemical ozone and fine particles.

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 comparison of emission inventories and ambient observations (intended as a check on the accuracy of the inventory) and source apportionment techniques for important ozone precursors and/or fine particle contributors.

(2) Developing methods and measurements for: condensible organic compounds from diesel engines; fugitive dust (including its size distribution by individual particle counting), and ammonia emissions from sources such as wastewater treatment and farm impoundment lagoons.

(3) Development of new methods to improve transportation models used to estimate mobile source spatial and temporal activity patterns.

(4) Developing new analytical techniques to measure polar and nonpolar, oxygenated biogenic volatile organic compound emissions from trees and other vegetation.

(5) Developing multiphase (gas & particle) receptor modeling techniques to incorporate VOCs, nitrogen species, sulfur species, and metals to examine primary and secondary particle sources.

(6) Developing improved source profile data for VOCs, PM-fine, and semivolatile organics to support source apportionment modeling.

Funding: Subject to the availability of funds, approximately $3 million is expected to be awarded in FY 98 in this program. Proposals in the $50,000 to $200,000/year range are encouraged. Duration of awards may be up to 3 years.

4. Urban Air Toxics

Toxic chemicals found in the air may pose serious public health risks. There is, however, considerable uncertainty surrounding the potential health effects, both cancer and non-cancer, associated with air toxics emissions from stationary sources (major point and area) and mobile sources. Mobile sources account for approximately one third of air toxics emissions, major sources account for another third, and area sources for the remainder. The Clean Air Act (CAA) requires a phased approach to control toxic air pollutant emissions from both point and area sources. A technology-based control program is mandated which uses Maximum Achievable Control Technology (MACT) for major point sources emitting one or more of 189 listed hazardous air pollutants (HAPs). A comprehensive national strategy to control emissions of hazardous air pollutants from area sources in urban areas is also mandated. The strategy must control 90% or more of the emissions of the 30 most hazardous toxic pollutants in urban areas.

With much of the MACT program underway, research emphasis has turned to urban air toxics, including area sources and mobile sources. The 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 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 CAA requires the national strategy to "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 a reduction of at least 75% in the "incidence of cancer attributable to exposure to hazardous air pollutants."

Title II of the CAA requires standards for air toxics emitted from mobile sources by 2000. Additional research is needed to determine the health effects, exposures, risks, and controls associated with mobile source pollution.

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). EPA invites applications addressing the critical research questions 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 multi-disciplinary 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 approaches could be used to identify the most toxic HAPs and HAPs mixtures in the urban air? 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 identified point sources? What is the relationship of ambient monitoring to personal exposure? What atmospheric transformations occur that alter the toxicity of HAPs?

(6) How can current dose-response assessment methods (e.g., single point NOAEL, Benchmark, categorical regression, Bayesian) be improved or supplemented to further reduce the use of defaults and reduce uncertainty in both cancer and noncancer (chronic and acute exposures) health effects assessments?

Funding: About $2 million will be awarded in FY 98 in this program, subject to the availability of funds. Proposals in the $50,000 to $200,000/year range are encouraged. Duration of awards may be up to three years.

5. *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 standards. In July 1997, EPA published new National Ambient Air Quality Standards for PM to provide increased protection against a wide range of PM-related health effects.

Many epidemiological studies have demonstrated statistically significant increases in mortality and morbidity associated with short term increases in PM levels in urban areas. Few studies are available regarding links between long-term exposure to PM and life shortening and other long-term health effects. Studies are needed to assess the health effects associated with long-term exposures to PM, as well as linkages between health effects and personal exposures to physical-chemical subclasses of PM.

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, 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:

Chronic Epidemiology

Epidemiologic studies are needed that investigate associations between long term exposure to PM (and other air pollutants) and adverse health effects, including time of life lost, chronic illness, and conditions that increase susceptibility to air pollutants.

Of special interest are studies that will produce more information from existing cohorts, make use of populations or cohorts that are being (or have been) studied for factors other than air pollution, advance our understanding of the relative public health burdens of long-term and short-term exposure to ambient PM (and other air pollutants), or investigate lifestyle or exposure factors that differ among communities and which might influence health outcomes.

Mechanisms of PM Toxicity

Research is needed 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 current ambient levels. Research is also needed to examine chronic effects of PM exposure and the relationship between acute and chronic biological responses. 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. Priority will be placed on research investigating associations between PM composition components (e.g., organic constituents, acidity, nitrates) and PM size components (e.g., ultrafine, fine or accumulation mode, and coarse particles including bioaerosols) and response pathways and potency, and on studies exploring the existence and nature of responses at environmentally-relevant doses of PM.

Exposure Error

Studies are also solicited that will provide information on the magnitude and variability of the errors in the assessment of exposure due to the following: (a) measurement error in the mass of fine mode and coarse mode particles as determined through measurement of particle size distribution including the effect of intentional dehumidification; (b) errors in total mass and mass of ammonium nitrate and semi-volatile organic compounds due to loss of such semi-volatile species during sampling and equilibration of filter samples; (c) exposure error introduced by failing to account for spatial variation across a community(i.e., the use of a concentration measurement at one point in a city to represent the community average); and (d) the use of such a community average (based on one or several monitors) to represent the average personal exposure to ambient pollution of individuals in the community. This will require differentiation of (1) outdoor concentration, (2) concentrations of outdoor pollutants that have infiltrated indoors, and (3) concentrations of indoor-generated pollutants.

Funding: Subject to the availability of funds, approximately $2 million is expected to be awarded in this program in FY 98. Proposals in the $50,000 to $200,000/year range are encouraged. Duration of awards may be up to three 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 submit applications to this program and may not serve in a principal leadership role on a grant. Under exceptional circumstances the principal investigator's institution may subcontract to a federal agency or FFRDC 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 or instrumentation 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) 564-6849, Email: 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
Ecological Indicators	98-NCERQA-D1	February 26, 1998
Drinking Water		
Microbial Pathogens	98-NCERQA-E1	February 26, 1998
Disinfection Byproducts	98-NCERQA-E2	February 26, 1998
Emerging Contaminants from the Contaminant Candidate list	98-NCERQA-E3	February 26, 1998
Air Pollution Chemistry and Physics	98-NCERQA-F1	January 29, 1998
Urban Air Toxics	98-NCERQA-G1	February 12, 1998
Health Effects of Particulate Matter and Associated Air Pollutants	98-NCERQA-K1	January 29, 1998

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 must not exceed one 8.5 x 11 inch page of single-spaced standard 12-point type with 1 inch margins. The abstract should include the following information, as indicated in the example format provided:

1. **Sorting Code:** Use the correct code that corresponds to the appropriate RFA topic. (Be sure to substitute the appropriate code for the "**XX**" in 98-NCERQA-**XX**).

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) a brief description of the improvement **in risk assessment or risk management** that will result from successful completion of the work proposed.

5. Supplemental Keywords: A list of suggested keywords is provided for your use. Do not duplicate terms already used in the text of the abstract.

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, the benefits of success as they relate to the topic under which the proposal was submitted, and the potential recipients of these benefits. 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 cited 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), 8.5x11-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 in the example (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 any project involving data collection or processing, conducting surveys, environmental measurements, and/or modeling, provide a statement on how quality processes or products will be assured. 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. 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.

1. The 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); criteria for determining the acceptability of data quality in terms of 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 for physical samples or similar information for studies using survey and interview techniques.

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 or data 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 a description of statistical analyses to be used and of any computer models to be designed or utilized, and associated verification and validation techniques.

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.

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 mail to:

U.S. Environmental Protection Agency
Peer Review Division (8703R)
Sorting Code: 98-NCERQA-XX (replace the "XX" with the appropriate code)
401 M Street, SW
Washington DC 20460

For express mail applications, the following address must be used:

U. S. Environmental Protection Agency
Peer Review Division (8703R)
Sorting Code: 98-NCERQA-XX (replace the "XX" with the appropriate code)
1300 Pennsylvania Avenue, NW
Room B-10105
Washington, DC 20004
Phone: (202) 564-6939 (for express mail applications)

The sorting code must be identified in the address (as shown above). Please do not fail to replace the "XX" in 98-NCERQA-XX with the appropriate code.

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.

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 appropriateness and adequacy of the research methods proposed, and the appropriateness and adequacy of the Quality Assurance Narrative Statement. Is the research approach practical and technically defensible, and can the project be performed within the proposed time period? Will the research contribute to scientific knowledge in the topic area of the solicitation? Is the proposal well-prepared with supportive information that is self-explanatory and understandable?

2. The qualifications of the principal investigator(s) and other key personnel, including research training, demonstrated knowledge of pertinent literature, experience, and publication records. Will all key personnel contribute a significant time commitment to the project?

3. The availability and/or adequacy of the facilities and equipment proposed for the project. Are there any deficiencies that may interfere with the successful completion of the research?

4. The responsiveness of the proposal to the research needs identified for the topic area. Does the proposal adequately address all of the objectives specified for this topic area?

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 sufficient scientific quality based on the peer review 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 make recommendations to NCERQA.

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

Applications selected for funding will require additional certifications, possibly a revised budget, and responses to any comments or suggestions offered by the peer reviewers. Project officers will contact principal investigators to obtain these materials.

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**>. 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 (8703R)
401 M Street, SW
Washington DC 20460

Phone: 1-800-490-9194

In addition, 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.

Ecological Indicators

Barbara Levinson 202-564-6911
levinson.barbara@epamail.epa.gov

Drinking Water

William Stelz 202-564-6834
stelz.william@epamail.epa.gov

Air Pollution Chemistry and Physics

Deran Pashayan 202-564-6913
pashayan.deran@epamail.epa.gov

Urban Air Toxics

Deran Pashayan 202-564-6913
pashayan.deran@epamail.epa.gov

Health Effects and Exposures to Particulate Matter and Associated Air Pollutants

Deran Pashayan 202-564-6913
pashayan.deran@epamail.epa.gov

OMB Approval No. 0348-0043

APPLICATION FOR FEDERAL ASSISTANCE

2. DATE SUBMITTED	Applicant Identifier
3. DATE RECEIVED BY STATE	State Applicant Identifier
4. DATE RECEIVED BY FEDERAL AGENCY	Federal Identifier

1. TYPE OF SUBMISSION

Application	*Preapplication*
☐ Construction	☐ Construction
☐ Non-Construction	☐ Non-Construction

5. APPLICANT INFORMATION — IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? ☐ YES ☐ NO IF YES, LIST ACRONYM(S)

Legal Name:

Organizational Unit:

Address ***(give city, county, state, and zip code)***:

Name and telephone and E-mail number of the person to be contacted on matters involving this application ***(give area code)***

PI:

ADMIN. CONTACT:

6. EMPLOYER IDENTIFICATION NUMBER (EIN):

☐☐ – ☐☐☐☐☐☐☐

7. TYPE OF APPLICANT: ***(enter appropriate letter in box)*** ☐

A. State
B. County
C. Municipal
D. Township
E. Interstate
F. Intermunicipal
G. Special District
H. Independent School Dist.
I. State Controlled Institution of Higher Learning
J. Private University
K. Indian Tribe
L. Individual
M. Profit Organization
N. Other (Specify) _____

8. TYPE OF APPLICATION:

☐ New ☐ Continuation ☐ Revision

If Revision, enter appropriate letter(s) in box(es): ☐ ☐

A. Increase Award B. Decrease Award C. Increase Duration
D. Decrease Duration Other ***(specify):***

_____

9. NAME OF FEDERAL AGENCY:

U.S. Environmental Protection Agency - ORD - NCERQA

10. CATALOG OF FEDERAL DOMESTIC ASSISTANCE NUMBER: 6 6 • 5 0 0

TITLE: **98-NCERQA -** _ _ _

11. DESCRIPTIVE TITLE OF APPLICANT'S PROJECT:

12. AREAS AFFECTED BY PROJECT ***(cities, counties, states, etc.):***

13. PROPOSED PROJECT:		14. CONGRESSIONAL DISTRICTS OF:	
Start Date	Ending Date	a. Applicant	b. Project

15. ESTIMATED TOTAL PROJECT FUNDING:		
a. Federal	$	.00
b. Applicant	$	.00
c. State	$	.00
d. Local	$	.00
e. Other	$	.00
f. Program Income	$	.00
g. TOTAL	$	.00

16. IS APPLICATION SUBJECT TO REVIEW BY STATE EXECUTIVE ORDER 12372 PROCESS?

a. YES. THIS PREAPPLICATION/APPLICATION WAS MADE AVAILABLE TO THE STATE EXECUTIVE ORDER 12372 PROCESS FOR REVIEW ON:

DATE _____

b. NO. ☐ PROGRAM IS NOT COVERED BY E.O. 12372

☐ OR PROGRAM HAS NOT BEEN SELECTED BY STATE FOR REVIEW

17. IS THE APPLICANT DELINQUENT ON ANY FEDERAL DEBT?

☐ Yes If "Yes," attach an explanation. ☐ No

18. TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL DATA IN THIS APPLICATION/PREAPPLICATION ARE TRUE AND CORRECT. THE DOCUMENT HAS BEEN DULY AUTHORIZED BY THE GOVERNING BODY OF THE APPLICANT AND THE APPLICANT WILL COMPLY WITH THE ATTACHED ASSURANCES IF THE ASSISTANCE IS AWARDED.

a. Typed Name of Authorized Representative	b. Title	c. Telephone number
d. Signature of Authorized Representative		e. Date Signed

Previous Editions Not Usable
Prescribed by OMB Circular A-102

Standard For 424 (REV 4-88)

Authorized for Local Reproduction

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:

1. Self-explanatory.

2. Date application submitted to Federal agency (or State, if applicable) & applicant's control number (if applicable).

3. State use only (if applicable).

4. If this application is to continue or revise an existing award, enter present Federal identifier number. If for a new project, leave blank.

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.

6. Enter Employer Identification Number (EIN) as assigned by the Internal Revenue Service.

7. Enter the appropriate letter in the space provided.

8. Check appropriate box and enter appropriate letter(s) in the space(s) provided:

   — "New" means a new assistance award.

   — "Continuation" means an extension for an additional funding/budget period for a project with a projected completion date.

   — "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 me 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.

Item: Entry:

12. List only the largest political entities affected (e.g., State, counties, cities.)

13. Self-explanatory.

14. List the applicant's Congressional Districts and any District(s) affected by the program or project.

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 *only* 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.

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.

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.

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.

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: _____

EPA STAR Grant Abstract *(Example Format)*

Sorting Code: *98-NCERQA-XX (use the correct code that corresponds to the appropriate RFA topic)*
Title: *Use the exact title as it appears in the rest of the application.*
Investigators: *List the names and affiliations of each investigator who will significantly contribute to the project. Start with the Principal Investigator.*
Institution: *Name of university or other applicant.*
Project Period: *October 1, 1998--September 30, 2000, for example.*
Research Category: *Enter your research topic name.*

Project Summary:

Objectives/Hypothesis: *include a short statement on the context of the proposed research in relation to other environmental research in the particular area of work*

Approach: *outline the methods, approaches, and techniques you intend to employ in meeting the objectives*

Expected Results:

including a brief description of the
Improvements in Risk Assessment or Risk Management
that will be realized if the expected results are achieved

Supplemental Keywords: *see attached suggestions. Do not duplicate terms used in the text of the abstract.*

SUGGESTED KEYWORDS

Media: (media, air, ambient air, atmosphere, ozone, water, drinking water, watersheds, groundwater, land, soil, sediments, acid deposition, global climate, indoor air, mobile sources, CASTNET, stratospheric ozone, tropospheric, marine, estuary, precipitation, leachate, adsorption, absorption, chemical transport)

Risk Assessment: (exposure, risk, risk assessment, effects, health effects, ecological effects, human health, bioavailability, metabolism, vulnerability, sensitive populations, dose-response, carcinogen, teratogen, mutagen, animal, mammalian, organism, cellular, population, enzymes, infants, children, elderly, stressor, age, race, diet, metabolism, genetic pre-disposition, genetic polymorphisms, sex, ethnic groups, susceptibility, cumulative effects)

Chemicals, toxics, toxic substances: (chemicals, toxics, particulates, ODS, VOC, CFC, PAH, PNA, PCB, dioxin, metals, heavy metals, solvents, oxidants, nitrogen oxides, sulfates, organics, DNAPL, NAPL, pathogens, viruses, bacteria, acid rain, effluent, discharge, dissolved solids, intermediates)

Ecosystem Protection: (ecosystem, indicators, restoration, regionalization, scaling, terrestrial, aquatic, habitat, integrated assessment)

Risk Management: pollution prevention (green chemistry, life-cycle analysis, alternatives, sustainable development, clean technologies, innovative technology, renewable, waste reduction, waste minimization, environmentally conscious manufacturing); treatment (remediation, bioremediation, cleanup, incineration, disinfection, oxidation, restoration)

Public Policy: (public policy, decision making, community-based, cost-benefit, conjoint analysis, observation, non-market valuation, contingent valuation, survey, psychological, preferences, public good, Bayesian, socio-economic, willingness-to-pay, compensation, conservation, environmental assets, sociological)

Scientific Disciplines: (environmental chemistry, marine science, biology, physics, engineering, social science, ecology, hydrology, geology, histology, epidemiology, genetics, pathology, mathematics, limnology, entomology, zoology)

Methods/Techniques: (EMAP, modeling, monitoring, analytical, surveys, measurement methods, general circulation models, climate models, satellite, landsat, remote sensing)

Geographic Areas: (Northeast, central, Northwest, Chesapeake Bay, Great Lakes, Midwest, Mid-Atlantic, states: {use both full name and two letter abbreviation}, EPA Regions 1 through 10)

Sectors: (agriculture, business, transportation, industry {petroleum, electronics, printing, etc}:{identify 4 digit SIC codes}, service industry, food processing, etc)

Current and Pending Support

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.

Investigator:	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ Transfer of Support
Project/Proposal Title:

Source of Support:
Total Award Amount: $ Total Award Period Covered:
Location of Project:
Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ Transfer of Support
Project/Proposal Title:

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Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ Transfer of Support
Project/Proposal Title:

Source of Support:
Total Award Amount: $ Total Award Period Covered:
Location of Project:
Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.

Itemized Budget for EPA STAR 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				
TOTAL PERSONNEL COSTS				
b. Fringe Benefits _____% of _____				
c. Travel Trip 1 Trip 1 Trip 1 ...etc.				
TOTAL TRAVEL COSTS				
d. Equipment Item 1 Item 2 Item 3 ...etc.				
TOTAL EQUIPMENT COSTS				
e. Supplies Item 1 Item 2 Item 3 ...etc.				
TOTAL SUPPLY COSTS				
f. Contracts 1 2 3 ...etc.				
TOTAL CONTRACTUAL COSTS				
g. Other Item 1 Item 2 Item 3 ...etc.				
TOTAL OTHER COSTS				
h. TOTAL DIRECT COSTS (sum of a-g)				
i. Indirect Costs/Charges _____% of _____ (base)				
j. TOTAL PROJECT COSTS (sum of h & i)				
k. TOTAL REQUESTED FROM EPA				

DO NOT USE THIS FORM -- Example 0nly --