



# NARSTO News

North American Research Strategy for Tropospheric Ozone Volume 2, Number 1; Winter/Spring 1998

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Think



Spring!

## Martha Krebs Keynotes NARSTO Science Meeting in West Palm Beach

Martha Krebs, Assistant Secretary of Energy and Director of DOE's Office of Energy Research, presented the Keynote address at NARSTO's November 1997 Science Meeting in West Palm Beach, Florida. In her speech Dr. Krebs stressed President Clinton's strong commitment to two environmental issues in particular: the new U.S. air-quality standards for ozone and particulate matter, and global climate change. While remarking that both issues pose substantial challenges she noted that, as a multinational public/private partnership, NARSTO is a prototype for the type of organization needed to deal with such complex and multifaceted environmental problems during future years.

Dr. Krebs also serves as Chair of the Federal CENR Subcommittee on Air Quality, and speaking in this capacity she voiced strong support for NARSTO's current ozone assessment activity. A complete text of Dr. Krebs' keynote presentation appears on pages 2 - 4.

The November Science Meeting's primary goal was to examine the Ozone Assessment's Critical Review Papers, as a major step in the Assessment's composite review process. As noted in previous **NARSTO News** issues, some twenty Critical Review Paper titles have been selected in an effort to cover the totality of tropospheric ozone science that is relevant to policy analysis and ozone management. When completed, these papers are expected to form much of the scientific basis for the formal Assessment Document, which is expected to be nearing completion by the end of this year. Currently the Critical Review Paper authors are processing individual and collective input from the meeting's attendees, along with feedback from earlier written reviews, in finalizing the manuscripts prior to their submission to **Atmospheric Environment** for journal publication.

## Synthesis Team Moves Ozone Assessment Ahead at Mexico City Workshop

Led by its co-chairmen Ken Demerjian and Bill Chameides, NARSTO's Synthesis Team met in Mexico City during early January to process input from the Critical Review Papers, finalize the NARSTO Assessment Document's outline, and continue writing the associated text. The current writing schedule calls for a complete rough draft of the document for internal Synthesis Team review by late March, followed by a final meeting in early April prior to preparing versions for internal review by the Executive Steering Committee and NARSTO's National Academy of Science Review Council.

## NARSTO's Moved

During late September NARSTO's Management Coordinator's Office moved from its original location in Kennewick, Washington to its new offices, directly across the Columbia River, in Pasco. Our new address and phone numbers are:



NARSTO Management Coordinator's Office  
60 Eagle Reach  
Pasco, Washington 99301

Phone 509/546-9542  
Fax 509/546-9522

Our e-mail addresses and Web URL will remain the same for the time-being, although it's likely that these may change soon as well.

And yes, we do have eagles on the reach. Please drop by for a visit any time that you have



## Text of Martha Krebs Keynote Address at NARSTO's November Science Meeting

Good morning. As my introduction indicates, I am here as an Assistant Secretary in the Department of Energy, Director of the Office of Energy Research, where I am responsible for one of the largest portfolios of basic research in the federal government. Part of that portfolio is one of the largest basic environmental science efforts to understand the health and environmental consequences of energy production and use. As such, I was a signatory to NARSTO's charter.

In Washington, we sometimes forget that there is a world outside the Washington area beltway. I know that many of you are not from the U.S. federal government, indeed, many of you are not from the United States. So before making more specific comments about NARSTO, I'd like to spend a few minutes addressing this administration's commitment to environmental issues of international importance.

The President has made two very public commitments this year that deal with broad-ranging environmental issues of national and international importance - his support of the new EPA regulations on ozone and particulate matter and his commitment to address the difficult challenges that are posed by the threats of global climate change. These two issues are not unrelated. Ozone, particulate matter, and global climate change all pose potential threats to the health and quality of life of the citizens of this world and pose long-lasting impacts on Earth's environment.

While there are differing opinions as to the strengths of these threats, there is no disagreement that science and technology are essential to both understanding the magnitudes of these impacts and possible responses to them. President Clinton understands that no magic wand will enable us to reduce carbon emissions to pre-1990 levels without harming the national - or, indeed, the international - economy unless there is an investment in the science and technology that will truly lead us to energy efficiency, pollution prevention, and sustainability. Indeed, as the United States heads towards the negotiations in Kyoto, the President has challenged the country - federal agencies and their academic and industrial partners - to do two things:

The NARSTO News is published biannually for the purpose of communicating NARSTO activities and progress to members of the extended NARSTO community. Persons wishing to comment on the newsletter or submit material for publication are invited to do so by contacting either Marilyn Stottlemeyer or Jake Hales in the NARSTO Management Coordinator's office, at the following address:

**NARSTO Management Coordinator's Office  
60 Eagle Reach  
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(1) to take advantage of the knowledge that we currently have and to maximize prompt reductions in carbon emissions, and

(2) to push the state-of-the-art in both science and technology to identify and use breakthroughs that will lead us to sustained improvements in quality of life - on all fronts, including that of the environmental life of our planet Earth.

NARSTO is a prototype for the type of partnership that will be needed as all nations on this planet face the challenge of global climate change. NARSTO is international, it is governmental, it is academic, and it is industrial. Just as the Intergovernmental Panel on Climate Change Report represents a consensus of the state-of-science of global climate change and serves to help governments develop their responses to rising levels of atmospheric greenhouse gases, so does the current NARSTO activity - the 1998 Ozone Assessment, the focus of this meeting - represent an essential process in helping governments respond to the risks posed by increasing levels of tropospheric ozone.

In addition to my role as Assistant Secretary of Energy and Director of Energy Research, I am also here as the Chair of the Air Quality Subcommittee of the Committee on Environment and Natural Resources. This committee is part of the President's National Science and Technology Council and it serves as one of the primary advising bodies to the President on environmental issues. The National Science and Technology Council advises the President on science and technology issues across agency boundaries. Its purpose is to:



- 1) Define clear, national goals for federal science and technology investments; and
- 2) Ensure that science, space, and technology policies and programs contribute effectively to the national goals.

The purpose of the Committee on Environmental and Natural Resources is to work on coordinating "historically decentralized research programs to address environmental issues in an integrated manner across agencies..." and to develop "effective responses to many environmental problems requir[ing] multidisciplinary, cross-agency, and policy-relevant research."

Results of NARSTO activity - with an immediate focus on the 1998 Ozone Assessment - are of direct interest and importance to the AQ subcommittee. I want to underscore that such state-of-understanding reports, based on community-wide viewpoints, are key input for informed policy decisions. I am pleased to play a part in opening this meeting.

NARSTO is a young organization - but it is recognized as an important asset to the three countries of the North American continent. NARSTO was founded to strengthen a fundamental and coordinated focus on the science of ozone pollution. This recognized the international aspects of the ozone issue, and it recognized that multiple sectors - governments, industry, and academia - had vital contributions to that research. The NARSTO endeavor is underway, and results are coming in.

The picture of ozone as a regional or even continental issue is clear, with implications on how abatement decisions must be joint in nature. Further, the role of biogenic emissions is clearly recognized as a factor in the decision process in many regions. NARSTO has helped coordinate recent large-scale field campaigns in the Southeast, Northwest, and the Southwest. Each of these is contributing important new understanding to the issue.

Particularly noteworthy are the "chemical dimensions" of the three studies: those of the broadly populated East, the highly concentrated area of Southern California, and the urban/rural mix of the South. Truly, if we can build a common understanding that embraces those dimensions, it will enhance confidence in our predictions, both from a scientific and a policy perspective. For example, results emerging from the Southern

field campaign, which was led by the Southern Oxidants Study, provide valuable new insights into the ozone issue. Although the analysis of this massive data set is ongoing, several important conclusions have been drawn that will profoundly affect our approach to air quality management. These include:

- Data collected from ground based monitoring stations and aircraft indicate that ozone production in the rural forested areas of the region is limited by nitrogen oxide emissions, which is in contrast to the hydrocarbon-limited urban areas.
- The photochemical oxidation of isoprene emitted from trees was found to dominate ozone formation in the rural areas of some regions, which underscores the finding above.
- Analysis of atmospheric hydrocarbon data indicates that carbon monoxide and methane make a significant contribution to ozone formation in regions where isoprene levels are depressed (i.e., in urban plumes, in less forested regions across the upper Midwest, and above the boundary layer). Neither of these species have been "major blips on the radar screens of air quality traffic controllers".

The NARSTO infrastructure has had tremendous success in reaching across national borders and across government and industrial sectors to coordinate research of broad interest within the atmospheric science community. Because of this success, NARSTO has been asked to consider expanding its charter beyond issues of tropospheric ozone and to coordinate another area of atmospheric research of broad interest - fine PM (particulate material).

This is a very timely request, since atmospheric scientists now recognize the important links between ozone and particulate matter and the need for a greater understanding of the interactive chemistry involved in their formation. For example, both ozone and PM have NO<sub>x</sub> and VOC precursors, compete for OH with other atmospheric substances, are transported over long distances, and often are emitted from the same sources.

DOE recently cosponsored with NARSTO a workshop to identify areas of intersection and  
*(Continued on Page 4)*



## Keynote . . . Continued

nonintersection between the PM and NARSTO research agendas and the potential role for NARSTO in coordinating PM research.

One of the results of the workshop was an acknowledgment of the need for better communication between the NARSTO community and the health science community. This is an issue that is of vital interest to all levels of government - international, national, state, and local - because it is the health (and environmental) implications of the phenomena we study that drives us all to take steps to improve air quality. I am delighted to learn that NARSTO is taking active steps to develop a working synergistic relationship with our colleagues on the health side of our common interests.

Although recent research results have implicated high, fine PM concentrations as a factor in increased mortality and morbidity in several urban areas, significant advances are needed to better understand the actual exposure of the public to fine PM, the causal, biological mechanisms of adverse effects, and the relative importance of key constituents of fine PM that are harmful to human health.

Fine PM research is important not only for reasons related to human health, but is relevant to issues related to visibility reduction, changes in the global radiation balance, and impacts on forests and agriculture.

Improvements are needed in existing measurement methods to improve the accuracy of mass measurements (i.e. accounting for volatility), to develop less expensive and labor intensive methods for accomplishing detailed speciation of the aerosol, for characterizing the size and number distributions and for documenting the formation and fate of secondary particles in the atmosphere.

These are all areas of research that the NARSTO community is very capable of carrying out. DOE for example is cosponsoring with Instituto Mexicano del Petroleo a study of fine PM pollution in the Mexico City environment. This study has one of the most complete data sets characterizing both gaseous species and fine particle composition at several sites throughout the valley with a large amount of wind profile and meteorological data. As a result it is likely to increase our common knowledge of the sources of precursors and formation of secondary particles in urban air.

To better understand what PM research activities are already being sponsored by NARSTO members, EPRI has begun the development of an inventory of research activities that are currently underway or are being planned by sponsoring organizations. The inventory will include research programs on emissions, processes, atmospheric concentrations and trend measurements, and related chemistry and meteorology.

This is a very exciting time for those of us in the atmospheric science community. We have the opportunity to move forward collaboratively to learn and understand better the enormous complexities of our environments, recognizing that ultimately we share the same Earth and must work together for its stewardship. I applaud you for your efforts on the NARSTO ozone assessment. I thank you for taking the time to address these issues. I encourage you to build on the success of NARSTO and broaden your horizons to include particulate matter. The science is exciting, the instrumental and computational capability available to pursue the science is at an unparalleled level; the need for understanding

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## Executive Assembly and Steering Committee Meeting Set for March 2 and 3.

The combined meeting of NARSTO's Executive Assembly and Executive Steering Committee is scheduled for March 2 and 3 at the White House Conference Center in Washington DC. Several important issues will be addressed at this meeting, including NARSTO's possible decision to expand its scientific purview into selected areas of fine-particle research.

At its January 1997 meeting the Executive Assembly discussed initial aspects of the fine-particle issue and tasked the Executive Steering Committee to prepare a white paper on the subject, to be used as background material for its decision process. That paper has been prepared and is being distributed to Assembly members in advance of the meeting, and a final decision is expected on that date.

Other issues to be considered by the Assembly include a new program on VOC reactivity research, a proposal for a joint Canadian/US modeling effort, and future comprehensive field efforts in Texas and California. This meeting is the second in a series of scheduled annual Assembly sessions.



## NARSTO Science Review Council Holds Initial Meeting in West Palm Beach

A final element in NARSTO's organization chart was completed at NARSTO's November science conference with the initial meeting of the Science Review Council. Serving a primary oversight and review function for NARSTO, the Council is coordinated by the National Academy of Sciences under financial support by the EPA. Ray Wassel is the NAS facilitator for the Council and Milton Russell will serve as Chairman.

At its initial meeting the Council reviewed NARSTO's organization and progress to date, and several Council members participated in the review and discussion of the Critical Review Papers for the Ozone Assessment. The Council's first order of business will be to provide a formal review of the Assessment Document's initial draft, which is expected sometime early this spring.

The Council plans a second meeting for early March. Its membership is listed immediately below.

### NARSTO/NAS Science Review Council

Milton Russell, Chair	Univ. of Tennessee
Humberto Bravo Alvarez	Mexico City Univ.
Charles Kolb	Aerodyne Research
Allan Legge	Univ. of Alberta
Shaw Liu	Georgia Tech
Jennifer Logan	Harvard
Gregory McRae	MIT
Jennie Moody	Univ. of Virginia

## SCOS97/NARSTO: Major Field Study Once Again "Improves" Air Quality

Ever since the link of photochemical smog was identified in 1952, scientists have been researching in the laboratory and the real world to better understand the nuances of the complex photochemical processes that occur in our atmosphere. Many of the exotic participants in the photochemical reactions cannot be routinely monitored and major field studies are occasionally conducted so that we may learn the details of the atmospheric processes and how we may need to change emissions in the future to attain healthful air for the residents of California.



Ironically, many of these field studies (which take years to plan) unintentionally occurred during years when air pollution levels were lower than normal. This pattern of "clean" air during field studies has led many pollution experts to quip "If you want to clean up the air, schedule a field study". However, much is learned from field studies and after incorporation into the planning process for controlling emissions, the air quality truly is improved.

A new field study--the 1997 Southern California Ozone Study (SCOS97)--conducted this past summer in coordination with the North American Research Strategy for Tropospheric Ozone (NARSTO), was also "plagued" by good meteorology when the smog season of 1997 (the cleanest season on record) produced only one Stage One ozone episode (1-hour concentration > 20 pphm)--in contrast to seven, 14, 23, 24, and 41 during the prior five years. The good dispersion of pollutants during this study (which included the effects of not one, not two, but three hurricanes in the study area) is generally credited to the well-publicized El Niño.

The goals of the seven-plus million-dollar SCOS97-NARSTO are to update and improve the existing aerometric and emission databases and model applications for representing urban-scale ozone episodes in southern California, and to quantify the contributions of ozone generated from emissions in one air basin to exceedances of the ambient air quality standards in neighboring air basins. Because of cost savings from substantial in-kind contributions and new measurement technologies, the cost for the SCOS97-NARSTO was about one-third to one-half that of previous air quality studies of this scope in California and the rest of North America.

The field study portion of SCOS97-NARSTO was designed to maximize the chances of capturing high ozone episodes and to fill in the "holes" in our knowledge uncovered by previous studies.

First, remote sensing methods were employed to continuously monitor meteorological conditions aloft throughout the study period of June 16 through October 15. Previous studies provided only limited characterization of meteorological conditions aloft (with balloons and aircraft deployed during periods forecast to have high ozone concentrations) and this severely hampered the analyses of data in this area of complex meteorology and topography. In SCOS97-NARSTO, a network of 34 remote sensing systems was established  
*(Continued on Page 6)*



## SCOS/NARSTO . . ., *Continued*

(the densest network of radar wind profilers and sodars ever assembled) to continuously monitor wind and temperature conditions aloft throughout and around the South Coast Air Basin. During periods when high ozone concentrations were forecast, additional measurements on conditions aloft were obtained by means of ozonesonde releases at seven sites, rawinsonde releases at ten sites, six aircraft, and two lidars; in all, over 1,000 balloons were released during the study. At over 20 surface monitoring sites and on three aircraft, volatile organic compounds were sampled. These additional measurements provide critical detailed information pertinent to running and validating air quality models.

Second, because previous modeling efforts underestimated the amount of ozone in the central basin where ozone concentrations tend to be highest, the El Monte Airport, near the center of the basin, was established as the hub site for enhanced monitoring. An ozone lidar and a radar wind profiling system (RWP) were operated nearly continuously during the intensive periods to identify the dynamics of ozone and meteorological conditions with height and time. These data were supplemented by measurements of ozone, oxides of nitrogen, temperature, humidity, and particles on up to nine aircraft spirals during daylight hours.

Third, previous studies demonstrated the complexity of air circulation offshore southern California and the importance of adequately characterizing the meteorological conditions and air quality there. Air quality and meteorological monitoring offshore were greatly enhanced for the SCOS97-NARSTO which included sites on San Clemente, San Nicolas, Santa Catalina, and Santa Rosa Islands as well as at eight new coastal locations; measurements of conditions aloft were taken at eight of the dozen sites. During intensive operational periods, an instrumented aircraft (making morning and afternoon flights) provided additional, detailed data on conditions in the southern California bight during over-water sampling in an elliptical path encompassing the islands. On occasion, a second aircraft mapped the distribution of ozone concentrations inside the northeast quarter of the ellipse by sampling over the ocean west and southwest of Santa Monica Bay.

Fourth, an important objective of SCOS97-

NARSTO was to understand why ozone levels are improving at a slower rate on weekends than weekdays, the so-called "weekend effect". For the first time anywhere, detailed information (over 300 megabytes of data a day) was collected on the operations of cars, trucks, airplanes, ships, and major point sources every day for four months. This data will be analyzed to determine the differences in pollutant emissions on weekdays and weekends. Also, day-specific biogenic hydrocarbon emissions inventories are being assembled for comparison with the anthropogenic emissions.

An aerosol component of the study collected detailed data on the size distribution of particles at ground level and aloft. Real-time measurements were also made of particles at some ground level sites. Size and composition information on over two million individual particles was collected during at least ten different types of fine particle episodes. Despite a shoestring budget, some of the most sophisticated solar radiation measurement devices in the world were brought to the study for collection of detailed data to evaluate the sensitivity of ozone formation to both the radiation absorption and scattering properties of particles. During another component of the study, releases of up to five different tracers were made to simulate emissions from shipping channels. This information will be used to compare how ship emissions from the current and proposed shipping lanes might impact air quality when they come on-shore.

The main goal of the field study was to perform intensive monitoring to better characterize five types of ozone episodes. The study was successful in capturing all of the episode types except one. However, this episode type did occur two weeks after the study officially ended while certain SCOS97-NARSTO monitoring resources were still operational.

Despite the cleanest air quality on record for the study area, the crack team of forecasters successfully predicted the days with the second (0.19 ppm) and third highest ozone concentrations (the day with the highest concentration of the year was not of interest because it occurred on July 3 after several days of forest fires and when traffic patterns were likely atypical due to the holiday weekend).

Although the monitoring phase of SCOS97-NARSTO is over, much work remains as the study



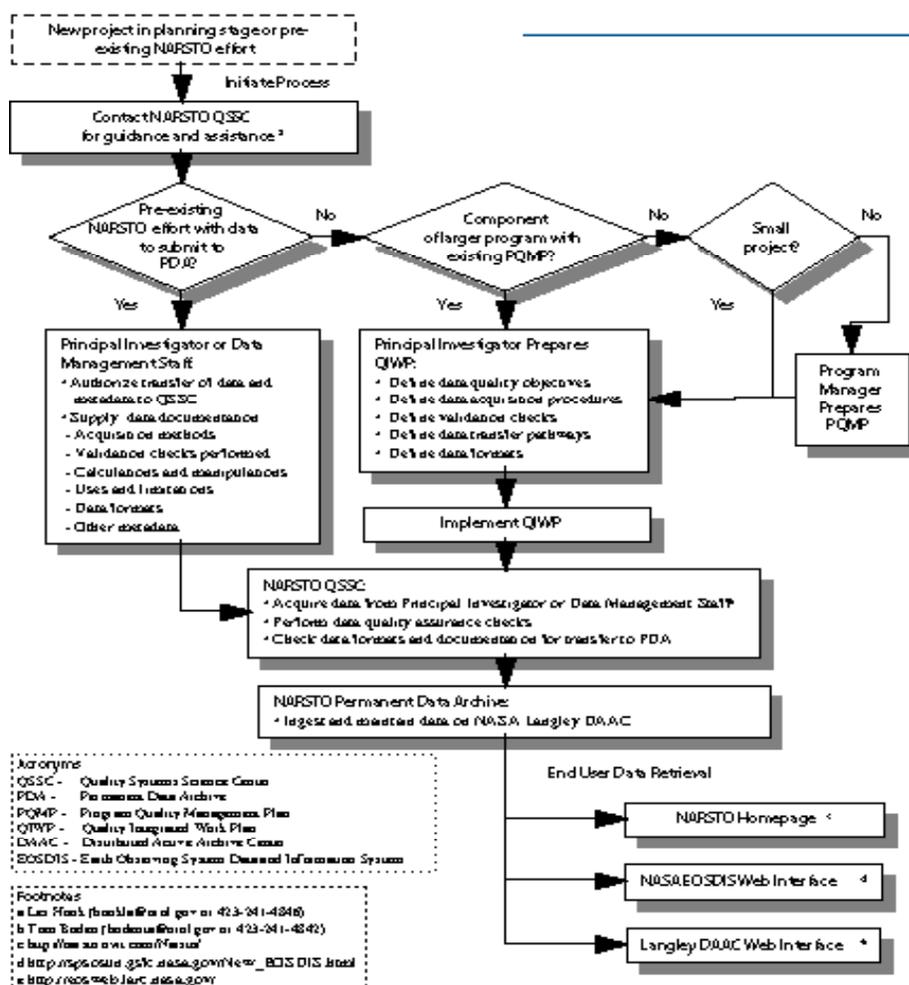
participants attempt to fully utilize the data collected and address the informational needs of the study sponsors. This study will provide the first detailed analyses of the causes contributing to violations of the new national 8-hour ozone and 24-hour PM2.5 standards. The data collected will be used in modeling and data analyses that will provide the most definitive answers yet to solving the persistent air quality problems in a complex region. The cooperation of the study sponsors (U.S. EPA, local air pollution control districts, U.S. Marine Corps, U.S. Navy, National Renewable Energy Laboratory, Coordinating Research Council, EPRI, Southern California Edison, and ARB) in integrating and "piggybacking" projects made it possible to leverage the available funds for maximum scientific benefit.

## Status Report: NARSTO Central Data Archive Now Operational

Under the proactive leadership of Ron Patterson's QS&DM Team and the Oak Ridge Technical staff, NARSTO's Central Data Archive has now reached a state where it is accepting field-campaign data for processing and ultimate archival in its NASA/EOSDIS repository. Access to the archive is documented in the NARSTO Data Management Handbook, which is currently available as a downloadable resource on the QS&DM Web page (<http://cdiac.esd.ornl.gov/programs/NARSTO/narsto.html>). The flow chart below provides a simplified overview of the procedure for entering/retrieving data into/from the archive. It also reflects NARSTO's recommended quality-integrated project-planning process.

Further information on the data archive can be obtained by consulting the home page noted above and/or contacting Les Hook (423/241-4846) or Tom Boden (423/241-4842).

*NARSTO News contribution by Leon Dolislager*





## NARSTO Measurement “One-Pagers” in Preparation

Ever thought about how nice it would be to have a simple, on-demand “first resource” to consult for state-of-the-science information on any given air-quality measurement? NARSTO is attempting to provide such a facility within its Quality Systems and Data Management function.

As currently envisioned, this system will reside on the NARSTO QS&DM Web page and will provide, for each ozone-relevant species,

- a short overview of available measurement methods;
- an advisory on associated interferences, pitfalls, and other salient aspects;
- a listing of associated intercomparisons, and indicators of expected precision and accuracy;
- a directory of literature sources for more detailed supporting information.

NARSTO intends this documentation to be brief and to serve as a signpost to in-depth literature resources. Indeed, the term “one-pager” has been applied extensively during conceptual development of the resource, although individual contributions now are expected to exceed one page in most circumstances.

This effort is being conducted jointly by NARSTO's QS&DM and Observations-Team functions. Meng-Dawn Chen is leading the Web-page layout at Oak Ridge and Co-Chairs Don Hastie and Fred Fehsenfeld are coordinating text material from the Observations Team.

During NARSTO's Science Meeting Meng-Dawn exhibited a prototype of the Web-based system, and received several favorable comments in response. Those interested in further information can contact Meng-Dawn directly at 423/241-5918.

## Announcement of Opportunity: EPA and BMI are Looking for a Few Good Instruments

Vendors of commercially available technologies for monitoring air and water are being invited by Battelle, a technology development organization headquartered in Columbus, Ohio,

to submit their technologies for verification of their performance.

Technologies selected for verification will be tested as part of the Advanced Monitoring Systems (AMS) pilot, which is being conducted by Battelle and is one of 12 pilots in the U.S. Environmental Protection Agency's (EPA) Environmental Technology Verification Program (ETV). ETV's objective is to substantially accelerate the entrance of new environmental technologies into the marketplace. Results from verification tests by the ETV pilots will provide developers and buyers of technology, consulting engineers, Federal and state regulators, and others with high-quality, third-party data on the performance of commercially ready technologies.

“EPA recognizes that while monitoring technologies may be commercially available, hurdles block the path to their deployment,” said Karen Riggs, Battelle pilot manager, “and the hurdles are often linked.”

She said that hurdles include reluctance on the part of regulators to approve a technology's use until convinced by credible data that the technology can meet performance objectives. Users of technologies may not buy a new technology until regulators approve its use. There may be no reciprocity among states so technologies may have to undergo multiple, expensive testing. Investors may not be willing to provide funding until the technology achieves some regulatory acceptance.

“Gaining acceptance of innovative commercial technologies is often repetitive and expensive,” Ms. Riggs explained, “and the result is slow or impeded deployment of monitoring systems with promise to protect our environment and health.”

EPA selected Battelle as its partner in the AMS pilot to verify advanced systems for monitoring air, water, and soil. Battelle is a not-for-profit, independent research organization that serves industry and government by developing, commercializing, and managing technology. Battelle has extensive experience in and facilities for independent verification testing.

Battelle will be assisted by stakeholder advisory committees. The committees include representatives of Federal and state regulatory groups, technology users, consulting engineering firms,



manufacturing and trade associations, health specialists, the financial/investment community, and environmental groups.

The committees will assist in identifying and prioritizing needed technologies, developing a request for technologies, and preparing screening criteria to evaluate the technologies submitted for verification. Generic test protocols for key technology categories will also be developed with stakeholder review.

For vendors and developers of monitoring technologies, the AMS pilot offers a number of benefits:

- Increased credibility due to independent, high-quality, and widely accepted performance data
- Access to expertise in developing, verifying, and applying environmental monitoring technologies
- Reduced number of verification studies needed for a particular technology to achieve acceptance by multiple states and localities
- Enhanced regulatory acceptance of environmental technologies
- A sound, science-based marketing tool
- Increased public and industry recognition due to the promotion of verification results
- Added confidence for investors, stockholders, and lenders.

"The range of the technologies that could be verified under the AMS pilot is deliberately broad," said Ms. Riggs. Monitoring technologies might address a variety of water and air matrices such as drinking water, wastewater, surface water, and groundwater, or ambient air, source emissions, and indoor air. Remote sensors, field monitors, or laboratory instrumentation could all be considered for verification.

"Our pilot hopes to focus on technologies that offer improved selectivity, sensitivity, accuracy, precision, time responsiveness, ease of use, reliability, cost effectiveness, or applicability, and would benefit from independent verification of these performance characteristics," said Ms. Riggs.

When each technology is verified in the AMS pilot, a verification statement co-authored by EPA and Battelle will be prepared and disseminated broadly. For manufacturers, users, and regulators

of such technologies, the verification test report will provide objective and credible data about how the technologies performed.

Battelle expects to issue a formal request for technologies in March 1998 for priority technology categories. Technology vendors will need to respond to this request to be considered for verification. Verification testing of the first air and water monitoring technologies is planned to begin in mid-1998. Vendors will be expected to pay user fees for verification testing. During the pilot phase, EPA funds may be available to partially support verification testing as an incentive to encourage vendor participation and to move the program towards privatization.

For more information about the AMS pilot and opportunities for technology verification, vendors should contact Helen Latham at Battelle, 505 King Avenue, Columbus, OH 43201, 614-424-4062, fax 614-424-5601, email [lathamh@battelle.org](mailto:lathamh@battelle.org). More information about the EPA's Environmental Technology Verification program can be found on the World Wide Web at <http://www.epa.gov/etv>.

## **International Aerosol Symposium to be Held in St. Petersburg**

Nick Belov, President of the Russian Aerosol Society, has requested that we announce the forthcoming International Aerosol Symposium, which will be held on July 6 - 9 in St. Petersburg. This is an open meeting with all interested scientists invited. Further information can be obtained by contacting Dr. Belov directly (phone 7-095-1474361; e-mail [BELOV@TEHNO.MMTEL.MSK.SU](mailto:BELOV@TEHNO.MMTEL.MSK.SU)).

## **EUROTRAC Symposium '98: Garmisch-Partenkirchen, March 23 - 27**

Beginning on March 23, EUROTRAC will conduct a five-day science meeting to present and review research progress by its constituent groups. All aspects of tropospheric ozone science will be covered, in addition to a number of additional subjects, including aerosols, atmosphere-biosphere interactions, and cloud chemistry. Substantial emphasis will be given to applications of science for policy analysis.

Additional information on EUROTRAC and the meeting can be obtained from the EUROTRAC Home Page, <<http://www.eurotrac.fhg.de>>.



## NARSTO Editorial: Simple Approaches in a Complicated World

Some time ago I read a singularly terse prescription for recruit survival in a marine boot camp:

1. If it moves, salute it.
2. If it doesn't, polish it.

Doesn't leave much room for creative thinking, does it? The thought of boot camp doesn't awaken fond sentiments in the hearts of most of us; still, the simplicity of this approach has some rather wistful appeal. Sometimes, when our lives get burdensome, it would seem nice if our real worlds were this uncomplicated.

Which gets us to the NARSTO Ozone Assessment.

The NARSTO Assessment is not uncomplicated. Ozone science has advanced considerably during the past decade; it continues to deal, however, with many issues that involve scientific uncertainty and even conflicting evidence.

The Assessment does not cross the "science/policy handoff zone." Its intent, rather, is to address policy-relevant scientific aspects of ozone behavior, and to convey this information to the policy community for its practical downstream use. Nevertheless, the economic and policy implications of our efforts are substantial. This is a significant undertaking; if it weren't, NARSTO would have no real reason to exist.

This complexity and significance will lead to some spirited debate, and some honest disagreement, as the Assessment moves forward to completion; and while NARSTO intends to strike a consensus in all areas where this is reasonably possible, it will not do so by sidestepping potentially controversial issues. That would be shirking the job we originally set out to accomplish. Moreover, such action would result in a bland and uninteresting product, of limited utility to our downstream clients, the policy community. Nothing would be worse than a tepid Assessment containing no substance. Consequently, NARSTO will strive to deal squarely with potentially controversial issues when they arise, spotlighting each facet from all vantage points, in the most objective manner possible.

So here, from a NARSTO perspective, is a straightforward prescription for addressing controversial issues as they emerge:

1. Level the playing field: address the issue squarely and objectively, soliciting input from all perspectives.
2. Define all sides of the issue clearly.
3. Describe evidence supporting all sides of the issue.
4. Describe its importance in the context of ozone-management strategy.
5. Describe potential pathways to achieve future resolution.

Not quite so simple as boot camp; but in NARSTO it's imperative that we apply our creative thinking, collectively, to the maximum extent possible. Our ultimate clients — the taxpayers, the rate payers, and the general public — deserve nothing less. We're looking forward to creating an Assessment that proceeds on this course. In accomplishing this we hope to provide the policy community with a singularly effective tool for optimizing future ozone-management practice.

*Jake Hales, NARSTO Management Coordina-*

