

# **REQUEST FOR PROPOSALS**

## **PAMS Assessment**

July 17, 2000

This document is a Request for Proposals (RFP) that prospective contractors should follow in their bid to aid the Northeast States for Coordinated Air Use Management (NESCAUM), and the Mid-Atlantic Regional Air Management Association (MARAMA) in the analysis and interpretation of Photochemical Assessment Monitoring Station (PAMS) data and in developing recommendations for improvements to PAMS operations and a revised PAMS network design for approval by the U.S. Environmental Protection Agency.

### **I. BACKGROUND**

NESCAUM is an interstate association of the air quality control divisions of the eight northeast states: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. MARAMA is a similar association that includes Allegheny County (Pennsylvania), Delaware, the District of Columbia, Maryland, New Jersey, North Carolina, Pennsylvania, Philadelphia, Virginia and West Virginia. NESCAUM and MARAMA share the major objective of assisting the Northeast and Mid-Atlantic States with assessing the data and optimizing the operations of Photochemical Assessment Monitoring Stations (PAMS) currently operated by these states.

The 1990 Amendments to the Clean Air Act provided for the establishment of PAMS sites in all ozone nonattainment areas designated as serious, severe, or extreme. The PAMS network is composed of four different types of sites corresponding to upwind locations relative to designated nonattainment areas (Type 1), locations representing maximum precursor concentrations in nonattainment areas (Type 2), locations of maximum ozone concentrations (Type 3) and locations further downwind (Type 4). This array of differing locations is intended to provide insight into ozone formation and transport mechanisms with the recognition that these are complex, non-linear

processes strongly dependant on ambient concentrations of precursor species as well as local emissions and meteorology.

Since establishing the PAMS network in the NESCAUM and MARAMA region in the 1990s, insufficient data and network analysis has been undertaken to evaluate the effectiveness of the network in achieving its intended objectives (i.e. providing information on effectiveness of control strategies, emissions tracking, trends and exposure). One recent analysis suggests that the PAMS program is not achieving its objectives on several fronts due to unresolved questions regarding data quality, operational issues, budgetary and manpower constraints<sup>1</sup>. Furthermore, EPA has recently indicated it would be receptive to well-supported proposals to redesign the PAMS network in the Northeast and Mid-Atlantic States so that it would more efficiently meet program objectives.

## **II. PROJECT GOALS**

The initial goal of this project is to analyze data from the existing PAMS network and possibly other sources in order to assess the usefulness of the current network and identify and evaluate potential cost-saving modifications to the network. This will involve a data validation effort of NESCAUM and MARAMA PAMS data and other useful sources of data. (Validation of some MARAMA PAMS data was completed during recent data analysis efforts, and 1995 PAMS data was validated under a NARSTO project. The current project is expected to utilize rather than duplicate those efforts.)

An equally important goal is to conduct more sophisticated analyses designed to identify specific recommendations for modifications (if any) to the regional PAMS network and associated data management and analysis applications that would improve the usefulness of the program. This must be done in cooperation with regional, state and EPA monitoring staff and should not result in expenditures which exceed the previously identified cost-savings.

A comprehensive assessment of the PAMS program must include analysis of: (1) the scope and nature of program goals as listed in Table 1; (2) whether the amount, type and quality of collected data are insufficient, sufficient or superfluous for achieving these goals; (3) other aspects of network design (e.g. number and location of sites, type of measurements, utility of measurements, consideration of additional measurements which might be incorporated and of any existing measurements which might be eliminated or modified); and (4) an assessment of the feasibility of proposed changes based on discussions with state PAMS monitoring personnel.

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<sup>1</sup> Demerjian, K. L., "A Review of National Monitoring Networks in North America," *Atmospheric Environment*, **34**, pg.1861-1884, 2000.

### **Table 1. Goals of the PAMS program to be considered<sup>2</sup>**

To help assess ozone control programs by:

- Identifying key constituents and parameters involved in photochemical ozone formation
- Tracking trends
- Characterizing transport
- Assisting in forecasting episodes
- Assisting in improving emissions inventories

To benefit other programs including:

- Helping to characterize ambient air toxics for exposure modeling and trend analyses
- Helping to characterize emissions and ambient concentrations of nitrogen species
- Providing data for evaluation of particulate matter (PM) and regional haze
- Enhancing special studies

A list of possible network changes and analyses that would aid in assessing the benefits of network changes has been developed and is included as Appendix A.

### **III. TASKS AND DELIVERABLES**

The contractor shall perform the following tasks and submit related deliverables: literature review; PAMS data retrieval, validation and organization; PAMS data report; evaluation of utility of network observations; and evaluation of options for program enhancement.

#### **Task 1 – Literature Review**

The contractor shall review PAMS-related scientific literature and government reports which pertain to:

- analysis of PAMS data in the NESCAUM and/or MARAMA regions,
- analysis of PAMS and PAMS-like data in other regions, and
- analysis of PAMS-like measurements in other research and field studies.

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<sup>2</sup> These goals are based on those in the draft executive summary of the March 8-10, 1999 STAPPA/ALAPCO PAMS workshop report.

The contractor shall provide a summary report based on this literature review, which includes:

- a) a comprehensive bibliography of the PAMS-related literature,
- b) summaries of selected key analysis reports which may provide insights into network modifications (such as strengths or weaknesses in data quality, QA and data management procedures, critical and non-critical species, sampling periods and averaging times, redundancy across sites, useful supplemental measurements, etc.).
- c) based on the literature review, recommendations concerning specific data management or analysis techniques that state/local agencies, NESCAUM or MARAMA, or EPA could routinely or periodically apply to PAMS data in order to meet the objectives of the PAMS program.

In completing this task, the contractor should use previous literature surveys to the extent available and relevant. For example, a recent ENVIRON report for MARAMA (posted on the MARAMA website) reviews several reports that have compared emissions data with PAMS data. In addition, EPA OAQPS (Barbara Parzygnat) is compiling information about studies using PAMS data.

The contractor shall provide a draft of this report, with emphasis on those findings which relate directly to potential modifications in network operations (subtasks a and b above), no later than December 1, 2000. A final report, which also includes recommendations on regional data management and analysis procedures (subtask c above), shall be provided no later than June 1, 2001. Contractor will provide at least five (5) hard copies and an electronic copy of all reports.

## **Task 2: PAMS Data Retrieval, Validation, and Organization**

The contractor will collect, validate<sup>3</sup> and organize PAMS data from all NESCAUM and MARAMA states into a common regional data repository, which should meet the following specifications:

- a) A database should be created which allows users access to the raw data (with quality control flags) and various aggregations and summary statistics regarding measurement values in the Northeast and Mid-Atlantic regions. These data should be accessible in a format

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<sup>3</sup> Both Level 1 and Level 3 Data Validation are desired, as defined in EPA's 1996 PAMS Data Analysis Workshop: Level 1 indicates observations have received quantitative and qualitative reviews for accuracy, completeness, and internal consistency. Final Audit reviews required. Level 3 involves continuing evaluation of the data as part of the data interpretation process. Creation of a public data base incorporating quality control flags is desired.

or formats which will allow easy importation to various data analysis platforms.

- b) NESCAUM and MARAMA would like this database to include all data from each PAMS site within the NESCAUM and MARAMA regions, including the limited set of PAMS-like data routinely collected by the North Carolina Department for the Environment and Natural Resources (DENR). Ideally, the regional database should include all PAMS data from all sites for the entire period of record (1994-1999). However, if inclusion of all regional data is considered unreasonably resource intensive in relation to completing Tasks 3-5 below, the contractor is encouraged to propose alternative options (such as inclusion of fewer years or fewer sites). Proposals should indicate what the contractor proposes as the scope of the database.
- c) The contractor shall provide documentation of the database and instructions that will allow state PAMS monitoring agencies to update the database with future years' PAMS data.

The contractor shall provide an electronic version of the final database generated in Task 1 (including any revisions resulting from Task 2 below). This database shall be delivered no later than June 1, 2001 in a format agreed to by the contract manager.

**Task 3: PAMS Data Report**

The contractor will prepare a draft data validation and summary report using the database created in Task 2. This report will provide basic statistical summaries of the measurements, evaluation of the quality and usefulness of measurements, and discussion of time-series plots or trends for each site. This should include but is not limited to:

- Monthly, seasonal, annual averages and percentiles of NO<sub>x</sub>, TNMOC and key species for each site. (species TBD with contractor)
- Day of week plots for key species (TBD with contractor)
- Diurnal plots for key species (TBD with contractor)
- Fingerprint plots for average and high O<sub>3</sub> days
- Assessment of data validity and/or suggested limitations for the use of the data from each site

Changes or additions to these analyses will be made under recommendation of contractor and approval of the contract manager.

The contractor shall provide a draft data/validation report which must be received by the contract manager no later than December 1, 2000. The

contractor shall deliver five (5) paper copies and an electronic version of this report.

This draft data/validation report will be distributed to the member states' monitoring staff for review. The states will then have a 30 day opportunity to submit appropriate revisions to the data used for the draft report. The states may or may not decide that data flagged by the contractor is invalid or requires revision. This decision will be up to each monitoring agency for its own data.

A final data report should document the procedures used to collect and assess the data and its validity, including the resubmission process, if needed. This report should include summary information on the nature and scope of data collected under Task 2 as well as any revisions which may have been incorporated due to state re-submission of data. This report must be received by the contract manager no later than June 1, 2001. The contractor shall deliver five (5) paper copies and an electronic version of this report.

**Task 4: Evaluation of Utility of Network Observations**

Using the literature review developed under Task 1 (subtask b) and the regional database developed under Task 2, the contractor shall (1) identify the minimum type and amount of observations in the NESCAUM and MARAMA regions required to satisfy the goals of the PAMS program; (2) evaluate and list measurements currently being made under the PAMS program which are exclusive of the minimum set and (3) assist the Project Management Team (members of NESCAUM and MARAMA) in developing recommendations for potential changes to the network. These changes will be geared toward reducing monitoring burdens where possible, with emphasis on any near-term changes that could be implemented in advance of the 2001 PAMS monitoring season (June-August). Each monitoring site, as well as the measurement methods, species, frequencies and durations should be listed in terms of its value and usefulness for air quality goals both in the PAMS program and as it benefits other air quality goals.

This task will result in a list of the minimum set of required observations and the relative value of any other measurements currently collected by the PAMS program. This task will also result in a set of draft recommendations that focus on the following question: How could the NESCAUM / MARAMA joint regional PAMS network be modified to operate more efficiently and meet the goals listed in Table 1? These items must be received by the contract manager no later than February 15, 2001.

This deadline is critical as sufficient time is needed for the regions and the EPA to review any suggested changes in the PAMS protocols in advance of the 2001 monitoring season. The contractor shall deliver five (5) paper copies and an electronic version of these draft recommendations.

**Task 5: Evaluation of Options for Program Enhancement**

The contractor shall assist the Project Management Team (members of NESCAUM and MARAMA) in (1) identifying a number of options for enhancing PAMS operations in the NESCAUM and MARAMA regions (see Appendix A), (2) conducting data analyses of the database developed under Task 2 of this contract in support of efforts to evaluate these options, and (3) helping to develop recommendations for long-term enhancements to the network.

This task will result in a set of recommendations that focus on the following question: How could the regional PAMS program be modified to enhance its usefulness in meeting the goals listed in Table 1 at stable funding levels? As this question implies, it is expected that any additional measurements or data analysis/management changes must be fiscally commensurate with resource savings identified in Task 4.

The contractor shall provide a final report at the conclusion of this task. This report should contain a summary of the project's accomplishments and results of analyses. The final report must be received by the contract manager no later than June 1, 2001. The contractor shall deliver five (5) paper copies and two electronic versions of this report, one of which must be in PDF format.

**IV. PROJECT MANAGEMENT**

1. The contract manager for this project will be Rich Poirot of the Vermont Department of Environmental Conservation.
2. The project management team will consist of the contract manager, the executive director of MARAMA, and Gary Kleiman of NESCAUM. The project management team will work in consultation with a Regional PAMS Steering Committee consisting of PAMS experts from the member states, and with Advisors from EPA Headquarters and Regional Offices and from academic institutions. The members of the Regional Steering Committee and Advisors are listed in Appendix B.
3. During the period of performance of this work assignment, the contractor shall immediately inform the contract manager by telephone of any

problems that may impede performance along with any corrective actions needed by the contractor, states, or EPA to solve the problem.

4. The contractor will present, at a site and time chosen by the NESCAUM and MARAMA Executive Directors, a briefing and review of all work performed under this work assignment.
5. The contractor shall deliver all reports specified above according to the schedule listed in Section III (See Appendix C). Reports shall be delivered to Gary Kleiman, NESCAUM, 129 Portland Street, Boston, MA 02114.

## **V. PROPOSAL SCHEDULE AND EVALUATION**

Proposals will be evaluated and the contractor(s) will be selected based upon the demonstrated understanding of the subject matter, the demonstrated experience of key personnel, the likelihood of successfully meeting project goals and specifications, administrative support capabilities, total cost, and the ability to meet the time schedule set by the Project Management Team. Cost will be an important consideration, but the choice of contractor(s) will not depend on cost alone.

Proposals should not exceed 20 pages and should be directed to Gary Kleiman, NESCAUM, 129 Portland Street, Boston, MA 02114 or may be submitted in electronic format to [gkleiman@nescaum.org](mailto:gkleiman@nescaum.org). Proposals must be received by 5:00 p.m., Friday, August 18<sup>th</sup>, 2000. Written questions regarding the clarity or scope of the RFP will be accepted until August 1<sup>st</sup>. Furthermore, by August 1<sup>st</sup>, it is recommended that all RFP recipients interested in submitting a proposal notify Gary Kleiman (NESCAUM) of their intentions. Such notification will accelerate the review process and allow responses to submitted questions to be distributed among all interested parties. Total cost of the contractual work must not exceed \$100,000, and proposals should include individual estimates of costs for each of the five tasks contained in this RFP. Estimated costs for Task 1-3 should not exceed \$50,000. Proposals should also indicate which electronic format is to be used for all electronic deliverables (Microsoft Access, PDF, Microsoft Word, etc.)

NOTE: NESCAUM and MARAMA reserve the right to distribute to other state, local and federal agencies at no cost, all deliverables developed under this work assignment. This includes, but is not limited to, all reports, program source code, and documentation. Furthermore, these materials cannot be copyrighted without permission from the Project Management Team, who also reserve the right to modify the deliverables.

## **Appendix A. Possible<sup>4</sup> Changes and Analyses for PAMS network**

### *What constituents/parameters to measure?*

1. Discontinue certain HC species
2. Discontinue HC at certain sites
3. Change averaging times of HC species (24hr/3hr/1hr)
4. Change HC collection schedule (daily/1 in X day/ or episodic collection)
5. Discontinue carbonyl species
6. Change carbonyl averaging times (24/3)
7. Change carbonyl monitoring schedule (daily/1 in 3 day/ or episodic collection)
8. TNMOC vs. TNMHC
9. Measure NOy
10. Improve NO/NO<sub>2</sub> measurements
11. Upper Air Meteorology for each nonattainment area
12. Wavelength Specific UV measurements
13. Other met parameters...

### *Possible Site Changes?*

14. Discontinue speciated HC at certain sites
15. Change locations of measured NOx
16. Identify optimal location for NOy measurements
17. Surface Met at Type 2 or all sites
18. Upper Air at Type 2 or all sites
19. Year-round measurements at some sites (and of what species or parameters?)
20. Discontinue certain sites/ revise site criteria

### *Data Management Issues*

21. Routine validation and analysis
22. Data Analysis function taken on by different state personnel, Regional Associations, EPA Regional Office, or National EPA

### *Questions for Possible Analysis*

23. Which parameters and sites help track transport?
24. Which parameters help forecast episodes?
25. Are speciated HC needed for testing inventories? Is TNMOC enough?
26. Which parameters and sites would help in modeling ozone formation and transport? In improving ozone models?
27. What toxics information is in current data?

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<sup>4</sup> Note: This list is provided as an example of possible network changes and is not intended to define or limit the kinds of contractor recommendations that may result from this project.

28. Can PAMS measurements give info. on effectiveness of 15% plans? NO<sub>x</sub> SIPs? 8hr standards?
29. How consistent are total hydrocarbon measurements? (e.g. TNMOC/TNMHC/PAMS HC)
30. Is any data relevant to PM/RH studies? Acid Deposition Studies?

## Appendix B. Regional PAMS Steering Committee and Advisors

### Facilitators:

Gary Kleiman	NESCAUM	gkleiman@nescaum.org	617-367-8540
Nancy Seidman	MA DEP	nancy.seidman@state.ma.us	617-556-1020
Rich Poirot	VT DEC	richpo@dec.anr.state.vt.us	802-241-3807
Susan Wierman	MARAMA	swierman@marama.org	410-467-0170

### Monitoring:

CT Alan Leston	CT DEP	alan.leston@po.state.ct.us	860-424-3513
DE John Stewart	DE DNREC	jstewart@state.de.us	302-323-4542
DC David Krask	DC DOH	djk@mail.environ.state.dc.us	202-645-6093
ME Andy Johnson	ME DEP	andy.johnson@state.me.us	207-287-7047
MA Tom McGrath	MA DEP	thomas.mcgrath@state.ma.us	617-727-9015 x.318
NH Paul Sanborn	NH DES	p_sanborn@des.state.nh.us	603-271-1384
NJ Charlie Pietarinen	NJ DEP	cpietarinen@dep.state.nj.us	609-292-0138
NY Gary Boynton	NY DEC	gaboynto@gw.dec.state.ny.us	518-457-7795
NC Tom Manuszak	NC DENR	tom_manuszak@ncair.net	919-715-0662
Philadelphia Fred Hauptman	DPH	fred.hauptman@phila.gov	215-685-1477
RI John Cucco	RI DOH	johnc@doh.state.ri.us	401-222-5557
VA Marshall Ervine	VA DEQ	wmervine@deq.state.va.us	804-230-2058

### Modeling and Data Analysis:

John Haus	MDE	jhaus@mde.state.md.us	410-631-3240
Praveen Amar	NESCAUM	pamar@nescaum.org	617-367-8540
Gopal Sistla	NY DEC	gsistla@air.dec.state.ny.us	518-457-0328
Jeff Underhill	NH DES	j_underhill@des.state.nh.us	603-271-1102

### Air Toxics:

Margaret Round	NESCAUM	mround@nescaum.org	617-367-8540
Barbara Morin	RI DOH	bmorin@dem.state.ri.us	401-222-2808 x.7012

### EPA OAQPS Advisors:

John Silvasi	EPA	silvasi.john@epa.gov	919-541-5666
Barbara Parzygnat	EPA	parzygnat.barbara@epa.gov	919-541-5474

### EPA Regional Advisors:

R1 Alan Van Arsdale	EPA Reg. I	vanarsdale.alan@epa.gov	781-860-4610
R1 Norm Beloin	EPA Reg. I	beloin.norm@epa.gov	781-860-4387
R1 Allen Oi	EPA Reg. I	oi.allen@epa.gov	781-860-4386
R2 Carol Bellizzi	EPA Reg. II	bellizzi.carol@epa.gov	212-637-3712
R3 Ted Erdman	EPA Reg. III	erdman.ted@epa.gov	215-814-2766

### Academic Advisors:

Ken Demerjian	ASRC	kld@asrc.cestm.albany.edu	518-437-8705
Bruce Dodderidge	UMD	dodderidge@umd.edu	301-405-7628

Phil Hopke

Clarkson

hopkep@clarkson.edu

315-268-3861

**Appendix C. Timeline for Proposed Contract**

# PAMS2001 Timeline

