

**Costs and Benefits of Network Participation**

**Atmospheric Mercury Network (AMNet)  
National Atmospheric Deposition Network**

**September, 2010**

## Network Introduction

The NADP has accepted the AMNet as a fourth network to monitor the atmospheric concentrations of speciated mercury fractions, and to support dry deposition estimates, emission regulatory assessments, model evaluation, and long-term trends. Monitoring and analysis of elemental, gaseous oxidized and particulate Mercury fractions would use a 2.5-micrometer impactor and KCl-coated annular denuder (for ionic mercury), thermally-desorbed particulate filter (for particulate-bound mercury), and gold traps (for elemental mercury). Analysis uses cold vapor atomic fluorescence spectroscopy (CVAFS).

There are three major goals for the AMNet:

- determine the status and trends in concentrations of atmospheric mercury fractions (reactive gaseous, particulate-bound, and elemental) in select locations;
- offer high-quality measurements to estimate dry and total deposition of atmospheric mercury to aquatic ecosystems and other areas of interest on the local, regional, and global scale; and
- provide data for atmospheric mercury model development, validation, and improvement.

NADP's primary network responsibility is to assure that the network data are accessible, quality assured, and comparable. Specifically, NADP will:

- coordinate the network through the established, transparent, collaborative NADP process;
- produce sampling and analysis standard operating procedures;
- produce quality assurance procedures and auditing services to provide confidence and consistency in network data;
- provide data management and validation; and
- provide multi-station data in a forum that supports mercury research, modeling efforts, and informed policy decisions.

Currently 20 AMNet sites are operating using standard procedures, with over 55 site years of quality-assured, mercury speciation data posted on the NADP website (<http://nadp.sws.uiuc.edu/amn/>, password protected).

## Services Provided By the Network

### 1. Standard Operating Procedures

Standard Operating procedures for the speciating Tekran system are available now for use in the network. These procedures were produced in agreement from expert scientists from the mercury field. These include operating procedures, daily, weekly, monthly and annual instrument checks, replacement part schedules, etc. These will continue to be improved over time.

### 2. Site Liaison Support for Operation

The site liaison will be available to help with all problems and question. Our Liaison has 16 years experience with Tekran instruments, and can help with many problems that an Operator will likely face.

AM Net Site Liaison  
Mark L. Olson  
608.335.4232  
[mlolson@illinois.edu](mailto:mlolson@illinois.edu)

### 3. Data QA Services

The network will provide an automated review of all data, with resulting data flags, and division of data into valid and invalid groups, and summarization into hourly tables. This primary and secondary-level QA of the data will be done daily (w/ internet connectivity) or as data is provided to NADP. This data set will be made freely available to the sites following normal NADP procedures.

### 4. Review of Site Data

Data will be reviewed manually by the network site liaison. The Liaison will be receiving data and reviewing data daily, provide an experienced review of both site operations, and a review of the automated QA procedures. Further, instrument operation statistics will be generated and reviewed by the network, provided back to the site, and used to ensure appropriate instrument operation. The quality assurance procedures for the mercury fractions are detector calibration, contamination prevention, air flow calibration, leak checking, temperature control and ensuring the CVAFS detector is maintained and operates within acceptable limits.

## 5. Annual Site Visit

The Site Liaison will travel to as many Network sites as possible during the operating year to provide on-site review of your operation, including:

- a. Check siting and operator information (our records only), to include site operator contact information, instrument S/N, position, etc.;
- b. Temperature checks ;
- c. Independent Flow checks;
- d. Independent Calibration;
- e. Independent perm-source checks/calibration;
- f. Perform ambient air and inlet injections;
- g. Onsite training of operators, and review of network Standard Operating Procedures;
- h. Other maintenance issues, including checking diaphragm pump & brushes, zero air canisters & DFU filters, replace tubing, adjust lamp voltage, Time synched to GPS;
- i. Perform instrument upgrades;
  - o Such as the 2537 external digital volt meter
  - o Etc.

There are also benefits for modelers and modeling with the AMNet data, which include: 1) providing estimates of dry deposition for your site and region, 2) offering the opportunity to be included in collaborative research papers and 3) to fulfill the AMNet mission and thereby help the sites justify continued operation and funding requests.

Currently, the NADP is considering providing both a spare parts replacement warehouse, and an equipment loaner program. A final decision has not yet been made, but these services are potentially also available.

Additionally, provisions for onsite operator training are also being formulated, as well as special training classes.

## Costs of Participation

**Annual Cost:**                      **\$6,000 / site year**

Pays for the costs within the \$170,000/year budget, which include:

- 1) Computer Programming
  - a) Data reduction and quality assurance program
  - b) Field-site *daily report* of instrument operating conditions and data quality
  - c) Final website data publishing (data tables and graphics)
  
- 2) Site Liaison Activities
  - a) Site Support Services
    - i) Includes phone access, on-demand site help with operation, expert review of instrument operation, help with daily instrument diagnostics, etc.
  - b) Site visitation
    - i) travel expenses to network sites, including flights, hotels, equipment shipment, parts needed, etc.
  - c) QA experiments, tests, improvements
  - d) SOP development, including improvements, etc.
  
- 3) Program Office Activities
  - a) Coordination and oversight
    - i) Data Management SOP
    - ii) Field Site SOP
    - iii) Quality Assurance Plan
  - b) Outreach
  - c) Meeting participation

**COOPERATIVE AGREEMENT**  
**NATIONAL ATMOSPHERIC DEPOSITION PROGRAM**

This Cooperative Agreement is between THE BOARD OF TRUSTEES OF THE UNIVERSITY OF ILLINOIS ("UNIVERSITY") on behalf of the National Atmospheric Deposition Program at the Illinois State Water Survey ("PROGRAM OFFICE"), and \_\_\_\_\_, with its principal place of business at \_\_\_\_\_ ("COOPERATOR") for the monitoring site(s) known as \_\_\_\_\_.

**1. PROGRAM/NETWORK DESCRIPTIONS**

1.1. THE [NATIONAL ATMOSPHERIC DEPOSITION PROGRAM](#) (NADP). The NADP is a National Research Support Project supported by the U.S. Department of Agriculture – National Institute of Food & Agriculture under a cooperative agreement with the UNIVERSITY. The NADP provides data and information in support of research on the exposure of natural and cultural resources to atmospheric chemical deposition. Support for this cooperative research program comes from federal, state, and local government agencies; Native American organizations; State Agricultural Experiment Stations; universities; and non-governmental organizations. The PROGRAM OFFICE coordinates the four NADP networks:

1.2. NATIONAL TRENDS NETWORK (NTN). The NTN provides data on the amounts, trends, and geographic distributions of the deposition of acids, nutrients, and base cations in precipitation. NTN sites collect weekly samples that are sent to the NADP Central Analytical Laboratory (CAL) for measurement of acidity (as pH), solution conductivity, sulfate, chloride, nitrate, orthophosphate, ammonium, calcium, magnesium, sodium and potassium.

1.3. MERCURY DEPOSITION NETWORK (MDN). The MDN provides data on the amounts, trends, and geographic distributions of the deposition of mercury by precipitation. MDN sites collect weekly or daily samples. MDN samples are sent to the NADP Mercury Analytical Laboratory for measurement of total mercury. Methyl mercury measurements are an option.

1.4. THE ATMOSPHERIC INTEGRATED RESEARCH MONITORING NETWORK (AIRMoN). The AIRMoN provides data for verifying computer simulations of atmospheric deposition, examining pollutant source and deposition relationships. AIRMoN sites collect samples daily when precipitation occurs and send samples to the NADP CAL, which makes the same measurements as for NTN samples.

1.5 ATMOSPHERIC MERCURY NETWORK (AMNET) NETWORK. The AMNet provides data on the concentrations of three mercury fractions in air samples collected at sites.

**2. PROGRAM INCOME**

Financial support provided by COOPERATOR under this Agreement constitutes "program income" as defined in the Uniform Administrative Requirements for Grants and Agreements with Institutions of Higher Education, Hospitals and Other Non-Profit Organizations, 7 C.F.R. §3019.24. All program income received under this Agreement supports PROGRAM OFFICE coordination, provision of chemical analysis and data validation, equipment repair, maintenance of quality assurance program, and management of NADP database and Web site (<http://nadp.sws.uiuc.edu>). Depending on the network and measurement option, this Web site provides access to weekly and daily precipitation chemistry data; monthly, seasonal and annual precipitation-weighted mean concentrations; annual and seasonal wet deposition amounts; daily precipitation amounts; color maps of precipitation concentrations and wet deposition amounts; atmospheric mercury concentrations; descriptive site information; annual reports and brochures; and operations manuals and quality assurance information.

**3. TERM/TERMINATION**

The term of this Agreement begins on \_\_\_\_\_ and ends on \_\_\_\_\_, for a total of \_\_\_\_\_ sampling periods. Either party may terminate this Agreement by providing 30 days prior written notice to the other party. In the event of early termination, UNIVERSITY will refund to COOPERATOR that portion of payment corresponding to the number of sampling periods remaining as of the termination date.

**4. COOPERATOR OBLIGATIONS**

4.1. SUBMISSION OF SAMPLES/DATA. COOPERATOR will follow NADP standard sampling procedures, and failure to submit samples according to NADP timelines will not reduce COOPERATOR payment obligations.

4.2. COOPERATOR FUNDING. COOPERATOR will pay UNIVERSITY the sum of \$\_\_\_\_\_ in order to cooperate in the following network for the term described in Section 3: NTN MDN AIRMoN  
 AMNet.

4.3. PAYMENT OPTION. COOPERATOR will make timely payments to UNIVERSITY within 30 days of receiving an invoice from UNIVERSITY as follows:  quarterly  other: \_\_\_\_\_

4.4. FEDERAL FUNDS. If the U.S. government is the source of any of the funds paid by COOPERATOR under this Agreement, then COOPERATOR represents the following:

Percent of federal funds: \_\_\_\_\_%      CFDA #: \_\_\_\_\_

Federal agency providing funds: \_\_\_\_\_

Are the funds subject to audit?  Yes  No

Audit standards:  OMB Circular A-133  Other (attach pertinent information)

**5. GENERAL**

5.1. PAYMENT INSTRUMENTS/AMENDMENTS. UNIVERSITY will accept purchase orders or other similar payment instruments issued by COOPERATOR under this Agreement for payment purposes only, and no such instruments will be construed to modify or to form a part of this Agreement. No modification of this Agreement will be effective except by specific written amendment signed by each party's authorized representative. This Agreement embodies the entire understanding of UNIVERSITY and COOPERATOR regarding the subject matter and will supersede all previous or contemporaneous communications, either verbal or written, between UNIVERSITY and COOPERATOR relating to this Agreement.

5.2. NADP DATA POLICY. PROGRAM OFFICE is responsible for managing the information presented in the NADP database and on the NADP Website, <http://nadp.sws.uiuc.edu>. Information presented on the NADP Website is in the public domain, except for those images and graphics created by third parties and used by permission. NADP Data and Information Use Conditions are posted online at <http://nadp.isws.illinois.edu/nadp/useConditions.aspx>.

**THE BOARD OF TRUSTEES  
OF THE UNIVERSITY OF ILLINOIS**

**COOPERATOR**

By: \_\_\_\_\_  
Walter K. Knorr, Comptroller

By: \_\_\_\_\_

Attest: \_\_\_\_\_  
Michele M. Thompson, Secretary

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

Illinois State Water Survey

By: \_\_\_\_\_  
David Gay, NADP Coordinator

By: \_\_\_\_\_  
Jacque Dalzell, Assistant Director for Administration