

Ammonia Monitoring Network Site Operations Manual



For information about the National Atmospheric Deposition Program (NADP) contact:

NADP Program Office
Illinois State Water Survey
University of Illinois at Urbana-Champaign
2204 Griffith Drive
Champaign, Illinois 61820-7495

URL: <http://nadp.isws.illinois.edu>

e-mail: nadp@isws.illinois.edu

phone: 217-333-7871

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Abbreviations

AIRMoN	Atmospheric Integrated Research Monitoring Network
AMNet	Atmospheric Mercury Network
AMoN	Ammonia Monitoring Network
CAL	Central Analytical Laboratory
CASTNET	Clean Air Status and Trends Network
FOF	Field Observer Form
FORF	Field Observer Report Form
HAL	Mercury (Hg) Analytical Laboratory
MDN	Mercury Deposition Network
MOF	Mercury Observer Form
NADP	National Atmospheric Deposition Program
NED	Network Equipment Depot
NTN	National Trends Network
PDA	Personal Digital Assistant
PO	Program Office
QA	Quality Assurance
QC	Quality Control
SAES	State Agricultural Experiment Stations
SOP	Standard Operating Procedures
U.S. EPA	United States Environmental Protection Agency
USGS	United States Geological Survey

Introduction

The Ammonia Monitoring Network (AMoN) became an official network within the National Atmospheric Deposition Program (NADP) in the fall of 2010. A goal of this network is to establish a consistent, long-term record of atmospheric ammonia concentrations across North America.

Following review of the data for completeness and accuracy, data are made available on the National Atmospheric Deposition Program (NADP) website. Data are flagged for equipment failure, sample mishandling, and contamination. A map indicating active and inactive AMoN sites is available on the NADP website, as is the complete data record for each site in the network.

Quality Assurance/Quality Control (QA/QC) activities ensure integrity throughout the network. The U.S. Environmental Protection Agency (US EPA) administers an external QA program as additional oversight of the network and its operation.

NADP Site Selection and Site Re-location

Sites are selected to quantify concentration and deposition in major physiographic, agricultural, aquatic, and forested areas within states, regions, and ecoregions. Sites are located away from urban areas and point sources of pollution, e.g., coal-fired power plants and large animal operations. Siting criteria are presented in detail in the *NADP Site Selection and Installation Manual*. That document is available on the NADP website (<http://nadp.isws.illinois.edu>).

Should a site need to re-locate, the site sponsor should contact the Site Liaison to ensure that the new location meets NADP siting criteria. Additional information regarding site re-location is available in the *NADP Site Selection and Installation Manual*.

Approved Equipment

Table 1 lists the equipment that has been approved by the NADP for use in AMoN. Periodically, equipment is tested and evaluated for inclusion in the network. Additional information on the procedures for evaluating and approving new equipment is available on the NADP website. The NADP website should be consulted for the most current list of approved equipment. Questions regarding the list of approved equipment may be directed to the Site Liaison for the network. Contact information for each of the manufacturers, and for the site liaisons is included in the Contact List section of this document.

Table 1. NADP Approved Equipment. for use in the AMoN

Equipment	Manufacturer	Model Number
passive sampler for light sensitive compounds	Radiello	120-1

Site Operation

Four entities have direct responsibility for the operation of a monitoring site: the Site Sponsor, the Funding Agency, the Site Operator, and the Site Supervisor. The individuals in these roles are responsible for the operation of the site in accordance with standard AMoN procedures and criteria.

The Site Sponsor may provide in-kind services for the operation of the monitoring site. This may include: site location, site facilities, and/or a site operator. The Funding Agency provides funds for the operation of a site. This may include: equipment, personnel, sample analysis, shipping, and other expenses related to operation of the site. In some cases, the Site Sponsor and the Funding Agency are the same.

Tables 2 and 3 indicate the responsibilities of the Site Supervisor and the Site Operator, respectively, and the frequency of those activities.

It is recommended that each site identify a Backup Operator. The Backup Operator performs Site Operator duties when the Primary Operator is not available.

Excluding travel to and from the site, bi-weekly activities associated with operation of the site may take approximately 30 minutes to complete.

In order to maintain uniformity throughout the network, the sampler should be processed every other Tuesday morning as close to 9:00am as possible. Inclement weather and the availability of personnel during holidays may prohibit the sample from being processed on this schedule. To account for such instances, the network allows samples to be processed early, or up to 360 hours (15 days) after the sampler was deployed. Samples are not invalidated based on sample time, whether short or long (exceeding 360 hours). However, the quality rating code of samples that exceed 360 hours in duration is downgraded. If a sample is collected early, the Site Operator should pay particular attention to the time that the subsequent sampler is deployed.

Table 2. Responsibilities of the Site Supervisor.

Activity	Frequency
Ensure conformance with AMoN procedures	As needed
Ensure conformance with AMoN siting criteria	As needed
Review site data	Monthly
Review data reports and summaries	Annually
Arrange for resources to correct problems	As needed

Table 3. Responsibilities of the Site Operator.

Activity	Frequency
Inspect site	Bi-weekly*
Inspect and clean AMoN shelter	Bi-weekly*
Collect and process sampler	Bi-weekly*
Deploy new sampler	Bi-weekly*
Complete AMoN Field Form	Bi-weekly*
Ship sampler and field form to the CAL	Bi-weekly*
Replace/upgrade equipment	As needed
Participate in External Site Performance and Systems Survey	Once every 3-4 years

* Every other Tuesday morning, according to the AMoN deployment schedule.

This document does not address safety issues that may result from the operation and maintenance of a monitoring site. It is the responsibility of the site operator and the site supervisor to determine regulatory requirements, and establish appropriate safety protocols.

Bi-weekly Activities

As indicated in Table 3, some activities associated with the operation of an AMoN site must be performed bi-weekly. The schedule for completing these tasks is defined for the network as a whole, and is provided by the Central Analytical Laboratory (CAL). Detailed instructions for these activities are included in the Standard Operating Procedure (SOP) titled *AMoN Sampler Change-out*. That document is available from the NADP website. On-line video instruction materials detailing these same activities are in production.

Field Report Form

When processing the sampler, an AMoN field form should be completed. Figure 1 illustrates that form. The Site Operator, i.e., the person processing the sample, should complete Blocks 1-7 on the form. Incomplete forms require additional resources to process, and require a phone call to the Site Operator to gather the missing information. It is recommended that the Site Operator verify that the form is complete and that the information is legible before sending the form, and the sampler, to the CAL.

		AMMONIA MONITORING NETWORK (AMoN) Send Completed Form with Each Sample Set to: Central Analytical Laboratory 2204 Griffith Drive Dock B, Champaign, IL 61820		Place sample ID label here																													
1. SITE Name <u>Program Office Site 01</u>		ID <u>P O 0 1</u>		2. OBSERVER Print name <u>N.S. Liaison</u>																													
3. SAMPLE START AND END Date <table border="1"> <tr> <th>MO</th> <th>DAY</th> <th>YR</th> </tr> <tr> <td>01</td> <td>15</td> <td>12</td> </tr> </table> Time <table border="1"> <tr> <th colspan="4">0001-2400</th> </tr> <tr> <td>09</td> <td>05</td> <td></td> <td></td> </tr> </table>		MO	DAY	YR	01	15	12	0001-2400				09	05			4. SITE CONDITIONS Please check any and all conditions that apply. Comment on any other site conditions in Block 7. <table border="1"> <tr> <th>YES</th> <th>NO</th> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>		YES	NO	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. METEOROLOGICAL OBSERVATIONS Check if present during period: <table border="0"> <tr> <td><input type="checkbox"/> Dew</td> <td><input checked="" type="checkbox"/> Frost</td> </tr> <tr> <td><input checked="" type="checkbox"/> Snow</td> <td><input type="checkbox"/> Fog</td> </tr> <tr> <td><input type="checkbox"/> Rain</td> <td></td> </tr> </table>		<input type="checkbox"/> Dew	<input checked="" type="checkbox"/> Frost	<input checked="" type="checkbox"/> Snow	<input type="checkbox"/> Fog	<input type="checkbox"/> Rain	
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Place sample set ID label here		White Copy: Return to CAL Blue Copy: Retain for Your Records Rev. 5/13																															

Figure 1. Example of a completed AMoN field form.

Non-standard Operation

In some instances it is necessary to operate in a non-standard mode (e.g., extended duration sampling). This should be noted in Block 7 **Remarks** of the AMoN field form.

7. REMARKS For example: equipment malfunction, contamination, farming, burning 3 week sampling period. Site inaccessible at time of scheduled change-out. Questions? Call the CAL at 1-800-952-7353 or E-mail amon@isws.illinois.edu
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Figure 2. FORF Block 10 indicating extended sampling period.

Field Chemistry

Field chemistry is not part of the standard procedures for the AMoN.

Other Activities

Some activities associated with the operation of an AMoN site are performed less frequently than the bi-weekly activities that were discussed earlier in this document. For example, the CAL may provide triplicate samplers for deployment during a sampling period. Deployment of triplicate samplers occurs on a random basis.

Training

In addition to this manual, it is recommended that those responsible for the operation of a site read the document *NADP Site Selection and Installation Manual*. That document describes the NADP siting criteria and is available from the NADP website. On-line training videos for the AMoN are in production. These materials will be available on the NADP website.

Troubleshooting

AMoN uses passive samplers. As there are neither mechanical nor electrical parts, troubleshooting should not be required.

Field Quality Assurance Program

Two types of QC samples: travel blanks, and triplicate samplers, provide field QA within AMoN.

Travel blanks are shipped with the passive samplers on a random basis. Travel blanks remain sealed in their glass bottle throughout shipment to the site, deployment at the site, and shipment back to the CAL.

Triplicate samplers are shipped to AMoN sites on a random basis. They help assess the precision of the sampling protocol.

Site Performance and Systems Survey

The U.S. EPA sponsors an external, independent survey of sites in the NADP networks. AMoN sites that are collocated with either an NADP wet-deposition site or a Clean Air Status and Trends Network (CASTNET) site are surveyed once every 3-4 years by an independent survey team. The survey team will contact the site approximately one month prior to their visit to schedule the survey.

Weather permitting, the survey team will:

- document site information
- document compliance with siting criteria
- photograph the site
- verify conformance with NADP procedures
- answer operator questions

- assist with minor repairs and maintenance

Contact information for the Site Performance and Systems Survey program is available in the Contact List section of this document.

Sites that are not collocated with an NADP wet-deposition site or a CASTNET site are not surveyed by the external review team. In such cases, the site operator is encouraged to submit photos (i.e., each of the cardinal directions, and an overview photo) of the site to the CAL for review.

NADP Website

The NADP website can be accessed at <http://nadp.isws.illinois.edu>. The website contains the complete data archive for each site in the network, documents relating to the operation of the network, documentation from the site surveys, and a range of data products. Site Operators and Site Supervisors are encouraged to use the website.

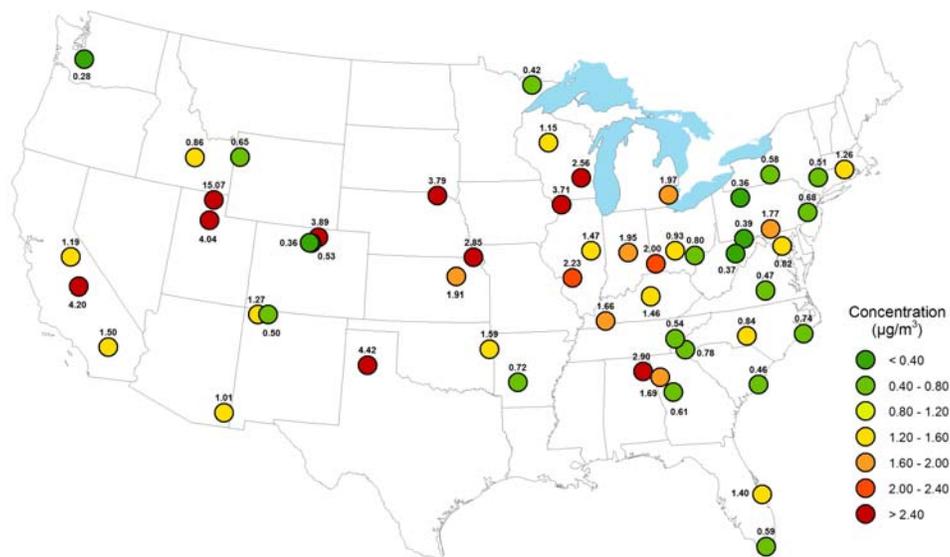


Figure 3. AMoN map from 2012 Annual Summary report.

Frequently Asked Questions

We would like to start a new site in the network. What do we need to do?

The “NADP Site Selection and Installation Manual” and the “Site Installation Worksheet” are two documents that will help with this process. Both documents are available from the NADP website. Once complete, the “Site Installation Worksheet,” with a sketch and photos of the proposed site, should be submitted to the NADP Program Office for evaluation and determination of acceptance into the network. Contact the AMoN Site Liaison for additional information.

A new operator will start next month and will assume primary responsibility for the site. What should we do?

First, we extend our thanks to the current site operator for all of their efforts operating and maintaining the site.

Next, contact the AMoN Site Liaison. The Site Liaison will need contact information for the new operator. If possible, provide overlap training for the new Site Operator. Provide a copy of this manual (the “Ammonia Monitoring Network Site Operations Manual”), and the “NADP Site Selection and Installation Manual.” Both documents are available on the NADP website. An on-line training video for the AMoN is in production. These materials will be available on the NADP website.

I need to re-locate my site. What do I need to do?

The “NADP Site Selection and Installation Manual” includes guidance for site re-location. This document is available on the NADP website. The AMoN Site Liaison can provide guidance as well. The “move” date for the site must be documented. The funding agency should be notified at the outset, and should be kept apprised as work progresses.

My site will be closing. What do I need to do?

Contact the AMoN Site Liaison. The final “Date Off” for samples will need to be documented. The AMoN Site Liaison will discuss the fate of equipment and supplies. Site closure must be done in collaboration with the funding agency.

The sampler is scheduled for change-out and it is raining (or snowing). Should I change the sampler in the rain (snow)?

It is best to change the sampler after the precipitation has stopped. If this is not possible, and if it is safe to collect the sampler, then the sampler may be collected during the precipitation event. Use caution so as to prevent bodily harm, and possible contamination of the sampler. Indicate in Block 7 of the AMoN field form that the sampler was collected during a precipitation event.

The next scheduled sampler change-out is a holiday. No one will be available to change-out the sampler. What should I do?

When personnel are otherwise unavailable to change-out a sampler on a scheduled date, the network allows the sample to be collected early, or up to 1 day late without impacting the sample’s quality rating. Samplers that are deployed longer than 360 hours are still valid, though their quality rating will be downgraded. If the sampler is collected early, the operator should pay particular attention to the time that the subsequent sampler is deployed. The quality rating of that sampler will be downgraded if, inadvertently, the sampler is deployed longer than 360 hours.

The passive sampler was on the ground, or fell to the ground when I visited the site for the scheduled change-out. What should I do?

*Include a note in Block 7 **Remarks** of the AMoN field form indicating what happened. If the sampler was on the ground for an unknown period of time (e.g, the sampler was*

found on the ground) then the sample will be invalidated. If the sampler fell to the ground when it was being deployed (or changed-out), and was picked up immediately, the sample will receive a handling code, but may still be valid.

I am scheduled to change-out the AMoN sampler tomorrow, and I have not received the new sampler. What should I do?

Contact the AMoN Site Liaison to verify when the sampler was shipped. The AMoN Site Liaison will decide whether a replacement sampler should be shipped. If possible, wait until the new sampler arrives before collecting the deployed sampler.

I received a travel blank. What should I do with it?

Leave the travel blank sealed in its glass bottle and store the shipping box as normal. Return the travel blank with the newly deployed sampler at the end of the sampling period.

I received 3 sampler bodies. What should I do?

This is the triplicate field QC sample. Deploy each of the 3 sampler bodies following the same protocol for deploying a single sampler body.

Contact Lists

Table 6. NADP contact information.

NADP Personnel		
Contact	Phone Number	email address
AIRMoN Site Liaison	800-952-7353	airmon@isws.illinois.edu
AMNet Site Liaison	608-335-4232	amnet@isws.illinois.edu
AMoN Site Liaison	800-952-7353	amon@isws.illinois.edu
MDN Site Liaison	877-622-6960	hal@eurofinsus.com
Network Equipment Depot, wet-deposition networks	217-244-1913	tleon@illinois.edu
Network Equipment Depot, AMNet	608-335-4232	amnet@isws.illinois.edu
Site Performance and Systems Survey Program	217-244-6413	rhodes1@illinois.edu

Table 7. Manufacturer contact information for NADP AMoN approved equipment.

NADP Equipment Manufacturers		
Manufacturer	Phone Number	URL
Radiello	provided by the CAL	

Appendix: References

NADP AMoN Operations Manual, 2015-03
Version 1.3

National Atmospheric Deposition Program (NADP). 2011a. *NADP Site Selection and Installation Manual*. Illinois State Water Survey, Champaign, IL

National Atmospheric Deposition Program (NADP). 2011b. *NADP Site Information Worksheet*. Illinois State Water Survey, Champaign, IL