Wisconsin State Laboratory of Hygiene
EHD NADP PO GENOP 003
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National Trends Network
Site Operations Manual



National Atmospheric Deposition Program

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Document Change History

Version	Description	Effective Date
OB3	Updated abbreviations list. Updated contact information. Updated outdated forms and figures.	10/30/2026
OB2	Scheduled review and updated terminology.	08/2024
OB1	Updated for OnBase format and versioning.	01/2022
3.0	Updated contact information to Wisconsin State Laboratory of Hygiene.	05/2019
2.4	Updated Tables 1, 3, 7, and 8. Added new Table 6. Updated Training information. Updated protocol for lid seal replacement. Updated FAQ to include information for field laboratory balance. Updated FAQ to include statement about Thies sensor with ACM collector, special studies, and SC115 flash drive. Updated FAQ to clarify procedure for handling frozen precipitation samples.	01/2017
2.3	Major revision from 1999 document.	03/2015

Abbreviations

AIRMoN	Atmospheric Integrated Research Monitoring Network *(no longer operating)*
AMNet	Atmospheric Mercury Network
AMoN	Ammonia Monitoring Network
CAL	Central Analytical Laboratory *(no longer used)*
FOF	Field Observer Form
FORF	Field Observer Report Form
HAL	Mercury (Hg) Analytical Laboratory *(no longer used)*
MDN	Mercury Deposition Network
MLN	Mercury Litterfall Network
MOF	Mercury Observer Form
NADP	National Atmospheric Deposition Program
NAL	NADP Analytical Laboratory
NED	Network Equipment Depot
NOS	Network Operations Subcommittee
NTN	National Trends Network
PDA	Personal Digital Assistant
PFN	PFAS – NTN Subnetwork
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
WSLH	Wisconsin State Laboratory of Hygiene

Introduction

The National Trends Network (NTN) is the largest, long-term network for precipitation chemistry across the United States. It originated in 1977 as a State Agricultural Experiment Stations (SAES) project.

Each site in the network is configured with an automated precipitation collector and a rain gauge. Weekly composite samples are collected every Tuesday morning. Site operators follow standard operating procedures to ensure data comparability and representativeness throughout the network. All samples are shipped to the NADP Analytical Laboratory (NAL) at the Wisconsin State Laboratory of Hygiene in Madison, Wisconsin for analysis. Provided sufficient volume is available, samples are analyzed for free acidity (H^+ as pH), conductance, calcium (Ca^{2+}), magnesium (Mg^{2+}), sodium (Na^+), potassium (K^+), sulfate (SO_4^{2-}), nitrate (NO_3^-), chloride (Cl^-), and ammonium (NH_4^+).

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 NTN 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 (EPA) and U.S. Geological Survey (USGS) administer external QA programs as further checks of the network and its operation.

Site Selection and Site Re-location

Sites in the NADP networks are selected to quantify wet 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. Siting criteria are presented in detail in the *NADP Site Selection and Installation Manual*. That document is available on the NADP website (http://nadp.slh.wisc.edu).

Should a site need to re-locate, the site sponsor should contact the NADP Program Office (PO) 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 the NTN network. 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 Support contact for the network. Contact information for each of the manufacturers, Site Support, and for the NADP PO is included in the Contact List section of this document.

Table 1. NADP Approved Equipment for use in the NTN

Equipment	Manufacturer	Model Number
Precipitation collector	Aerochem Metrics, Inc.[1]	301
Precipitation collector	Loda Electronics Company[1]	2001
Precipitation collector	N-CON Systems	ADS 00-120
Rain gauge	ETI Instrument Systems, Inc.	NOAH IV
Rain gauge	OTT Hydromet	OTT NADP Pluvio
Rain gauge	OTT Hydromet	OTT Pluvio^2
Rain gauge	OTT Hydromet	OTT Pluvio^2 – L
Rain gauge	OTT Hydromet	OTT Pluvio^2 – S
Rain gauge	Various	Remote Monitoring Module
Wind screen	NovaLynx	260-952 (Alter-Type), or equivalent

[1] Company no longer in business.

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 NTN 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, chemistry, utilities, 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, weekly activities associated with operation of the site may take approximately one hour to complete.

In order to maintain uniformity throughout the network, the wet deposition sample should be processed every 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 194 hours (8 days and 2 hours) after the sample bucket was deployed. Such samples are considered valid samples. Samples that exceed 194 hours in duration are invalidated. Sample durations less than 7 days are considered valid. If a sample is collected early, the Site Operator

should pay particular attention to the time that the subsequent sample is deployed. The 194 hour limit for valid sample duration may be exceeded inadvertently.

Table 2. Responsibilities of the Site Supervisor.

Activity	Frequency
Ensure conformance with NTN procedures	As needed
Ensure conformance with NTN 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 and equipment	Weekly*
Verify sensor operation	Weekly*
Collect and process sample	Weekly*
Collect and process rain gauge data	Weekly*
Complete FORF	Weekly*
Ship sample and FORF to the NAL	Weekly*
Maintain/stir anti-freeze solution in rain gauge	Weekly*, when winterized
Clean and empty dry side bucket	Weekly*, if present
Replace dry side bucket	Annually, or as needed, if present
Clean collector surfaces	Weekly*
Clean and inspect collector lid seal	Weekly*
Verify equipment is secure and level	Monthly
Replace collector lid seal	As needed
Troubleshoot equipment	As needed
Repair and maintain equipment	As needed
Replace/upgrade equipment	As needed
Winterize/Summerize equipment	Annually (location dependent)
Participate in Field QA Programs	Once every 2 years
Participate in External Site Performance and Systems Survey	Once every 3-4 years

* Every Tuesday morning.

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.

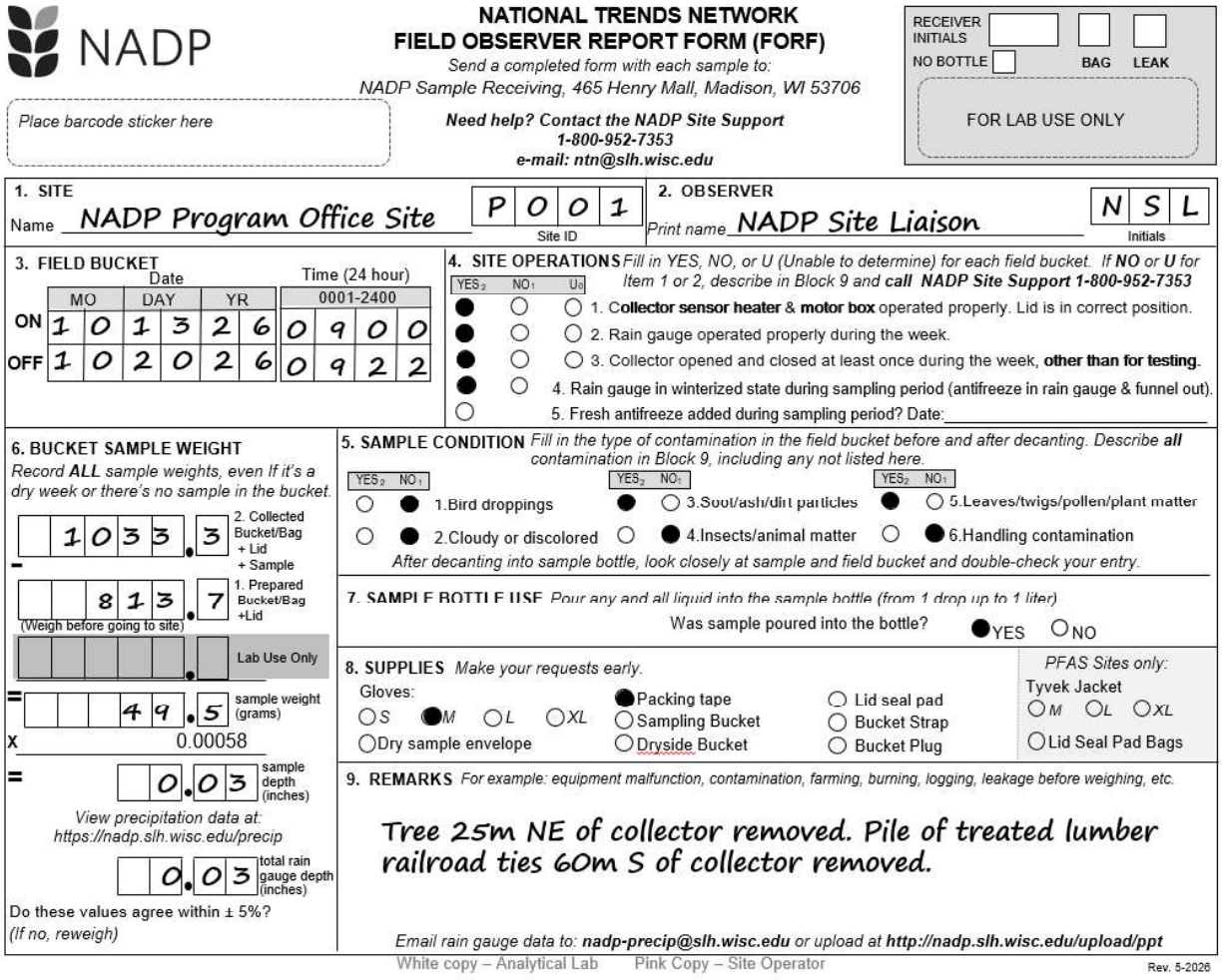
Weekly Activities

As indicated in Table 3, some activities associated with the operation of an NTN site must be performed on a weekly basis. As previously discussed, sample duration greater than 194 hours (8 days and 2 hours) will invalidate the sample. Completion of the weekly tasks on a regular schedule is essential. Detailed instructions for many of the weekly activities are included in separate Standard Operating Procedure (SOP) documents and video instruction materials detailing these same activities can be accessed from the NADP website.

When the wet-side bucket contains frozen precipitation, the sample may be weighed, but it should be allowed to melt completely before decanting the sample into the NADP sample bottle. "Clean" snow/ice will melt slower than snow/ice which contains higher concentrations of chemicals. The sample should be allowed to melt in the sealed bucket (i.e., bucket lid in place and secure), at room temperature. Placing the wet-side bucket on a radiator to melt the sample quicker may cause some chemicals in the sample to volatilize, and may melt the bucket.

Field Observer Report Form

When processing the weekly precipitation sample, an NTN Field Observer Report Form (FORF) must be completed. Figure 1 illustrates that form. The Site Operator, i.e., the person processing the sample, should complete Blocks 1-9 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 FORF, and the sample, to the NAL.



NADP

NATIONAL TRENDS NETWORK
FIELD OBSERVER REPORT FORM (FORF)
Send a completed form with each sample to:
NADP Sample Receiving, 465 Henry Mall, Madison, WI 53706

Need help? Contact the NADP Site Support
1-800-952-7353
e-mail: ntn@slh.wisc.edu

RECEIVER INITIALS | NO BOTTLE | BAG | LEAK
FOR LAB USE ONLY

Place barcode sticker here

1. SITE — Name: NADP Program Office Site — Site ID: P001
2. OBSERVER — Print name: NADP Site Liaison — Initials: NSL

3. FIELD BUCKET

	Date MO	DAY	YR	Time (24 hour) 0001-2400
ON	10	13	26	0900
OFF	10	20	26	0922

4. SITE OPERATIONS *Fill in YES, NO, or U (Unable to determine) for each field bucket. If **NO** or **U** for Item 1 or 2, describe in Block 9 and **call NADP Site Support 1-800-952-7353***

YES	NO	U	
●	○	○	1. **Collector sensor heater** & **motor box** operated properly. Lid is in correct position.
●	○	○	2. Rain gauge operated properly during the week.
●	○	○	3. Collector opened and closed at least once during the week, **other than for testing**.
●	○		4. Rain gauge in winterized state during sampling period (antifreeze in rain gauge & funnel out).
○			5. Fresh antifreeze added during sampling period? Date:

6. BUCKET SAMPLE WEIGHT
*Record **ALL** sample weights, even if it's a dry week or there's no sample in the bucket.*

	1033.3	2. Collected Bucket/Bag + Lid + Sample
−	813.7	1. Prepared Bucket/Bag +Lid (Weigh before going to site)
		Lab Use Only
=	49.5	sample weight (grams)
X	0.00058	
=	0.03	sample depth (inches)

View precipitation data at: https://nadp.slh.wisc.edu/precip

0.03 total rain gauge depth (inches)

Do these values agree within ± 5%? *(If no, reweigh)*

5. SAMPLE CONDITION *Fill in the type of contamination in the field bucket before and after decanting. Describe **all** contamination in Block 9, including any not listed here.*

YES	NO		YES	NO		YES	NO	
○	●	1.Bird droppings	●	○	3.Soot/ash/dirt particles	●	○	5.Leaves/twigs/pollen/plant matter
○	●	2.Cloudy or discolored	○	●	4.Insects/animal matter	○	●	6.Handling contamination

After decanting into sample bottle, look closely at sample and field bucket and double-check your entry.

7. SAMPLE BOTTLE USE *Pour any and all liquid into the sample bottle (from 1 drop up to 1 liter)*
Was sample poured into the bottle? ●YES ○NO

8. SUPPLIES *Make your requests early.*
Gloves: ○S ●M ○L ○XL
○Dry sample envelope
●Packing tape ○Sampling Bucket ○Dryside Bucket
○Lid seal pad ○Bucket Strap ○Bucket Plug
PFAS Sites only: Tyvek Jacket ○M ○L ○XL ○Lid Seal Pad Bags

9. REMARKS *For example: equipment malfunction, contamination, farming, burning, logging, leakage before weighing, etc.*

Tree 25m NE of collector removed. Pile of treated lumber railroad ties 60m S of collector removed.

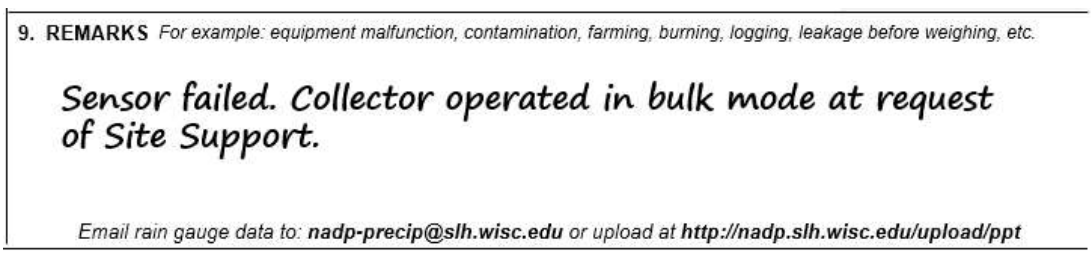
*Email rain gauge data to: **nadp-precip@slh.wisc.edu** or upload at **http://nadp.slh.wisc.edu/upload/ppt***

White copy – Analytical Lab Pink Copy – Site Operator Rev. 5-2026

Figure 1. Example of a Completed NTN Field Observer Report Form**.**

Non-standard Operation

In some instances it is necessary to place the equipment in a non-standard operating mode. Site Support contact will decide when this is necessary. Bulk sampling is one example of non-standard equipment operation. In this mode the wet-side bucket is exposed continuously during the sample period. Site Support may request bulk sampling when the sensor or the collector motorbox fail. This should be noted in Block 9 of the FORF.



9. REMARKS *For example: equipment malfunction, contamination, farming, burning, logging, leakage before weighing, etc.*

Sensor failed. Collector operated in bulk mode at request of Site Support.

*Email rain gauge data to: **nadp-precip@slh.wisc.edu** or upload at **http://nadp.slh.wisc.edu/upload/ppt***

Figure 2. FORF Block 9 indicating bulk sampling.

An undefined sample results when the wet-side bucket is exposed during dry weather for more than 6 hours. This may occur when the sensor fails to heat, or when the collector motorbox malfunctions or fails. Both bulk mode samples and undefined samples will be flagged as invalid during data review. It is likely that the chemistry of these samples was impacted by dry deposition.

Field Chemistry

Field chemistry is no longer part of the standard procedure for the NTN. In some instances the site may wish to retain a portion of the precipitation sample for their own use. NADP PO approval must be obtained before a site retains a portion of the precipitation sample for their own use.

Other Activities

Some activities associated with the operation of an NTN site are performed less frequently than the weekly activities that were discussed earlier in this document. Instructions for completing these activities (e.g., lid seal replacement, sensor replacement, motorbox replacement) are documented in SOPs and are available from the NADP website (http://nadp.slh.wisc.edu). It is recommended that the Site Operator verify that the equipment is secure and level on the first Tuesday of each month.

Prior to the onset of winter, those sites which typically experience temperatures below freezing should be winterized. Refer to equipment specific SOPs for winterizing the site. The NAL will send a reminder with instructions for winterizing the site as part of its monthly mailing for data. Winterization includes adding anti-freeze (e.g., ethylene glycol or propylene glycol) to the precipitation gauge. Additional equipment specific activities are noted in Table 4. Samples that include snow (S), mixed (M), or unknown (U) precipitation types will be invalidated if the site has not been winterized.

Table 4. Equipment-specific winterization activities.

Equipment	Activity	Frequency
Rain gauge	Empty weighing chamber and add 2 quarts of antifreeze	When site is first winterized
Rain gauge	Maintain/stir anti-freeze mixture	Weekly when winterized
Battery (DC powered sites)	Service battery fluid	When site is first winterized
Battery (DC powered sites)	Load test	When site is first winterized

When the anti-freeze mixture becomes dilute, it will lose its effectiveness and the mixture may freeze in the weighing chamber. This may cause the weighing chamber to crack. To prevent this from occurring, the weighing chamber should be emptied and fresh anti-freeze added to it. A transfer pump (available from the NED) should be used to empty the weighing chamber. The rain gauge should be inspected weekly to ensure this does not become a problem. Anti-freeze is toxic to wildlife and should be disposed of properly. RV/camper anti-freeze (propylene glycol) is more environmentally friendly and may be a better option for use.

When the temperature at a site will remain above 40^{o}F consistently, those sites that have been "winterized" should be "summerized." Refer to equipment specific SOPs for summerizing the site. The PO will send a reminder with instructions for summerizing the site as part of its monthly mailing for data. Activities associated with "summerization" are listed in Table 5.

Table 5. Equipment-specific summerization activities

Equipment	Activity	Frequency
Rain gauge	Dispose of anti-freeze mixture according to proper disposal guidelines	When site is first summerized
Battery (DC powered sites)	Service battery fluid	When site is first summerized
Battery (DC powered sites)	Load test	When site is first summerized

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 NTN are available. Training materials are available on the NADP website (http://nadp.slh.wisc.edu/siteops).

Troubleshooting

SOPs are available from the NADP website (http://nadp.slh.wisc.edu/siteops) to help troubleshoot problems associated with the operation of the wet-deposition monitoring equipment. Documents are available for the two approved collectors, and for the rain gauges.

Field Quality Assurance Program

The USGS sponsors an external QA program for sites in the NTN. The purpose of this program is to measure the effects of field exposure and sample handling on sample chemistry. Participating sites are asked to process and submit one QA sample during the course of a year. The field QA sample is processed during a dry week, and is submitted to the NAL. Results from the program are available at http://bqs.usgs.gov/. Contact information for this program is available in the Contact List section of this document.

The collocated equipment program is another QA program sponsored by the USGS. This program allows a site to operate pairs of collectors and/or pairs of rain gauges. The equipment pairs may be the same make and model, different models from the same manufacturer, or different models from different manufacturers. This program is used to assess the overall error in NTN measurements, and for testing equipment for network use. Site Operators may be asked to participate in a collocated equipment program for a period of a year or more.

Site Performance and Systems Survey

The U.S. EPA sponsors an external, independent survey of sites in the NADP networks. Each site in the NTN is 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:

- verify the operation and calibration of field equipment
- 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

As part of the site survey, the site operator will be asked to perform a sample change. This will impact the sample duration of both the current sample and the subsequent sample. As discussed in the *Site Operations* section of this document, the site operator should ensure that the 194 hour limit for valid samples is not exceeded inadvertently.

A report will be sent to the Site Operator, the Site Supervisor, the EPA Project Officer, NADP PO, and the NADP QA Manager following completion of the survey. The report will provide

findings from the survey including: a list of supplies to be ordered, items to be repaired, and conditions of the site relative to the approved siting criteria. Contact information for this program is available in the Contact List section of this document.

NADP Website

The NADP website can be accessed at http://nadp.slh.wisc.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. Figure 3 illustrates one of the data products, a deposition isopleth map. Site Operators and Site Supervisors are encouraged to use the website.

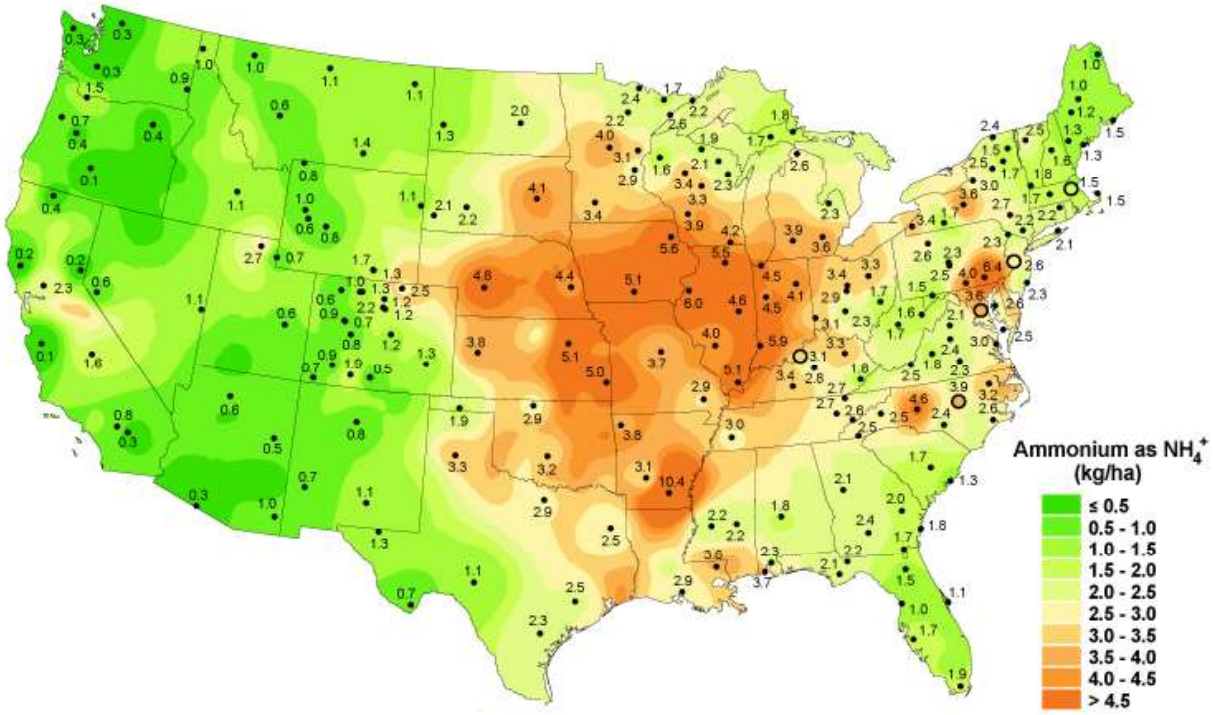


Figure 3. Ammonium wet deposition isopleth map for 2009.

Frequently Asked Questions

A balance is needed for the field laboratory. Does NADP supply the balance, and if not, what should we purchase?

Unfortunately, NADP does not supply a balance for the field laboratory. It is the responsibility of the site. Similarly, NADP does not require a particular manufacturer or model of balance. That said, the balance should meet the following minimum specifications:

Minimum range: 0 to 8,000g
Minimum readability: 0.5g

Table 6 lists instruments that meet these requirements.

Table 6. Balances that meet minimum requirements for use at an NTN field laboratory.

Manufacturer*	Model Number	Range	Readability
Adam Equipment	CKT-16	0 to 16,000 g	0.5 g

* Use of a trade or manufacturer's name does not constitute an endorsement by the University of Wisconsin, the Wisconsin State Laboratory of Hygiene, the National Atmospheric Deposition Program, or project sponsors.

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 to be submitted to the NADP Program Office for possible acceptance in the network. Contact the NADP PO for additional information.

We would like to conduct a special study at our NADP site. The study might use NADP equipment. What should we do?

Please contact the NADP PO before proceeding. All special studies at NADP sites require network approval. This is particularly true if NADP equipment (e.g., the dry-side bucket) will be used in the study.

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 NADP PO. The PO 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 "National Trends Network Site Operations Manual"), and the "NADP Site Selection and Installation Manual." Both documents are available on the NADP website. On-line training videos for the NTN are available. Training materials are available on the NADP website (http://nadp.slh.wisc.edu/siteops).

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 NADP PO 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 NADP PO. The final "Date Off" for samples will need to be documented. The PO will discuss the fate of equipment and supplies. Site closure must be done in collaboration with the funding agency.

It is Tuesday morning and it is raining (or snowing). Should I change the sample in the rain (snow)?

It is best to change the sample after the precipitation has stopped. If this is not possible, and if it is safe to collect the sample, then the sample may be collected during the precipitation event. Use caution so as to prevent bodily harm, and possible sample contamination from clothing, an umbrella, etc. Indicate in Block 9 of the FORF that the sample was collected during a precipitation event.

Next Tuesday is a holiday. No one will be available to collect the sample. What should I do?

When personnel are otherwise unavailable to collect a sample on Tuesday, the network allows the sample to be collected early, or up to 194 hours (8 days and 2 hours) after the sample bucket is deployed and still be a valid sample. If the sample is collected early, the operator should pay particular attention to the time that the subsequent sample is deployed. That sample will be invalidated if, inadvertently, it is deployed longer than 194 hours.

How do I process a sample that contains snow and/or ice?

When the wet-side bucket contains snow and/or ice, the sample should be allowed to melt completely before decanting the sample into the NADP sample bottle. "Clean" snow/ice will melt slower than snow/ice which contains higher concentrations of chemicals. The snow and/or ice should be allowed to melt in the sealed bucket (i.e., bucket lid in place and secure), at room temperature. Do <u>not</u> place the wet-side bucket on a radiator to melt the sample quicker. This may cause some chemicals in the sample to volatilize, and may melt the bucket.

There are leaves, insects, and/or bird droppings in the sample. How should I process the sample?

Note the presence of these items in Block 5 of the FORF. When decanting the sample into the 1L sample bottle, try to decant only the liquid sample. Any remaining sample and the leaves, insects, and/or bird droppings may be disposed of once the sample for analysis has been decanted.

A portion of the sample spilled in the field when collecting the wet-side bucket from the collector. What should I do?

Note this in Block 9 of the FORF. As the sample mass has not been determined, this will impact the information in Blocks 6 of the FORF. It may also impact sample chemistry.

Do not return the spilled sample (e.g., snow) to the wet-side bucket. Doing so will invalidate the sample.

A portion of the sample spilled when decanting the sample into the 1L NADP sample bottle. What should I do?

Wipe up the spilled sample. Spilled sample should never be returned to the wet-side bucket or to the 1L sample bottle. Doing so will invalidate that sample.

How long should I keep my pink copies of the field observer report form (FORF)?

Retain the site copies on site for 2 years after submission of samples.

The dry-side bucket contains a significant volume of water (or snow). What should I do?

Indicate this in Block 9 of the FORF. If the precipitation gauge indicates precipitation during the week it is likely that the collector malfunctioned. Verify proper operation of the sensor and the collector motorbox. If necessary, call Site Support for assistance troubleshooting the problem. If equipment malfunction or failure is determined, answer NO to question 1 in Block 4 of the FORF. Contact Site Support to order replacement parts.

How frequently should I change the dry-side bucket?

Annually, or as needed. The first Tuesday in July is suggested as a possible date to change the dry-side bucket. The dry-side bucket should be cleaned each week.

Where do I get a new dry-side bucket?

Contact Site Support for a replacement dry side bucket. Or note it in Block 8 on the FORF.

I used my last clean sample bag last week. May I reuse a used sample bag for use this week?

No. Only clean sample bags received from the NAL may be used. Strict testing is used to ensure the cleanliness of these sample bags. Contact Site Support to request additional supplies.

Why do I need to use gloves when putting the lid on the wet-side bucket in the field?

Precipitation samples have very low ion concentrations. A single drop of sweat, or a fingerprint inside the bucket or the lid will invalidate the sample for sodium, chloride, ammonium, and possibly other ions. Disposable gloves should be used when handling the lid or the wet-side bucket with sample bag.

How do I verify the operation of the grid-type sensor?

When the ambient temperature is below 40^{o}F, the grid sensor should heat and be warm to the touch. Place the side of one's little finger on the grid to verify whether the sensor is heating.

A few drops of water on the sensor grid should trigger the sensor, causing the sensor to heat, and the collector to open. Blow on the sensor grid to dry it. This should cause the collector to close.

If any of these conditions is not met, the sensor may need to be replaced. Consult Site Support for guidance.

Which grid sensor should I use with my NTN Aerochem Metrics collector?

The NTN requires a 7-grid sensor when a grid-type sensor is used with the collector.

Can I use an optical sensor with my NTN Aeochem Metrics collector?

Though a version of the Thies optical sensor can be used with an Aerochem Metrics collector, the default sensor remains a 7-grid sensor. For more information on using a Thies sensor on the Aerochem contact Site Support.

Does the precipitation gauge at my site need a wind shield?

Sites that receive more than 20% of their annual precipitation as snow must install an Alter-type shield on their precipitation gauge. Sites at an altitude of 1,000 meters or more are encouraged to install a wind shield on their precipitation gauge.

How high above the top of the precipitation gauge should the Alter-type wind shield be installed?

The pivot axis for the leaves of the Alter-type shield should be at the same height as the orifice to the precipitation gauge.

Ice on the collector arms is a problem at my site. We replace several motorboxes on the collector each winter. What can we do?

Replacement bushings for the collector arms may be requested from Site Support. The replacement bushings are made of Delrin, a synthetic material with a low coefficient of friction. Additionally, a snow roof can be installed on the collector lid.

How often should I submit data from the electronic rain gauge?

Data from the electronic rain gauge should be submitted weekly. Ideally, this should be the same day that the sample is collected from the field. In most cases this would be on a Tuesday. In the case of a dry week, the same day that the dry sample field form is mailed or emailed to the laboratory.

To whom should I submit data from the electronic rain gauge?

Data files for the electronic rain gauge should be uploaded to the following site:
http://nadp.slh.wisc.edu/upload/ppt/
Alternatively, the data files may be emailed to:
nadp-precip@slh.wisc.edu

I use an Android and LoggerLink to download the rain gauge data and I keep getting a timeout error or data downloaded with errors message?

An upgraded Bluetooth adapter power cable may be required, contact Site Support for more information.

Can an iPhone/iPad be used to collect data from the electronic rain gauge?

Yes, a Wi-Fi adapter is required. Contact Site Support for more information.

Is the SC115 flash drive compatible with a MacBook?

Yes. Ensure "External disks" is selected under Finder Preferences if the SC115 does not appear.

How do I download data from the electronic rain gauge?

This will depend on the method used to download the data, consult the website https://nadp.slh.wisc.edu/siteops/data-download/.

I cannot connect to the electronic rain gauge with the PDA/Android. What should I do?

Verify that Bluetooth is turned on for both the PDA/Android and the electronic rain gauge. If this does not resolve the problem, power cycle the PDA by depressing the power button on the top right side of the PDA.

My PDA/Android is broken. What should I do?

Verify that the battery in the PDA/Android is charged. If the problem persists, contact Site Support.

Can any PDA/Android be used to collect data from the electronic rain gauge?

Though most PDAs could be used to communicate with the electronic rain gauge, software provided by NADP is required. Any Android can be used that has the Campbell Scientific LoggerLink installed from the Google Play Store.

Contact Lists

Table 7. NADP contact information.

NADP Personnel		
Contact	**Phone Number**	**email address**
AMNet Site Support	800-952-7353	amnet@slh.wisc.edu
AMoN Site Support		amon@slh.wisc.edu
MDN Site Support		mdn@slh.wisc.edu
MLN Site Support		mln@slh.wisc.edu
NTN Site Support		ntn@slh.wisc.edu
PFN Site Support		pfn@slh.wisc.edu
Network Equipment Depot		ned@slh.wisc.edu
Site Performance and Systems Survey Program		nadp@slh.wisc.edu
USGS External Quality Assurance Program	518-285-5681	ndeyette@usgs.gov
NADP Coordinator/Principal Investigator	(608) 263-9162	Sarah.Benish@slh.wisc.edu
NADP Assistant Coordinator	(608) 265-2449	Nichole.Miller@slh.wisc.edu
Program Operations Supervisor	(608) 224-4336	Ella.Osby@slh.wisc.edu

Table 8. Active manufacturer contact information for NADP NTN approved equipment.

NADP Equipment Manufacturers		
Manufacturer	**Phone Number**	**URL**
ETI Instrument Systems, Inc.	970-484-9393	http://etisensors.com
OTT Hydromet	800-949-3766	http://www.ott.com/en-us/
N-CON Systems Company, Inc.	800-932-6266	http://www.n-con.com
NovaLynx Corporation	530-823-7185	http://novalynx.com

Appendix: References

National Atmospheric Deposition Program (NADP). 2022. *NADP Site Selection and Installation Manual*. Wisconsin State Laboratory of Hygiene, Madison, WI

National Atmospheric Deposition Program (NADP). 2021. *NADP Site Information Worksheet*. Wisconsin State Laboratory of Hygiene, Madison, WI