



NADP Operator Virtual Training:
Ammonia Monitoring Network
(AMoN)

Followed by ALPHA Passive
Ammonia Sampling

January 22, 2025



Outline



National Atmospheric Deposition Program

2025 Calendar

- Introduction
- Site Support
- Field Form
- Supplies/Supply Box
- Samplers
- Damaged Samplers
- Shipping
- Maintenance
- Site Surveys
- Q&A



NADP Acronyms

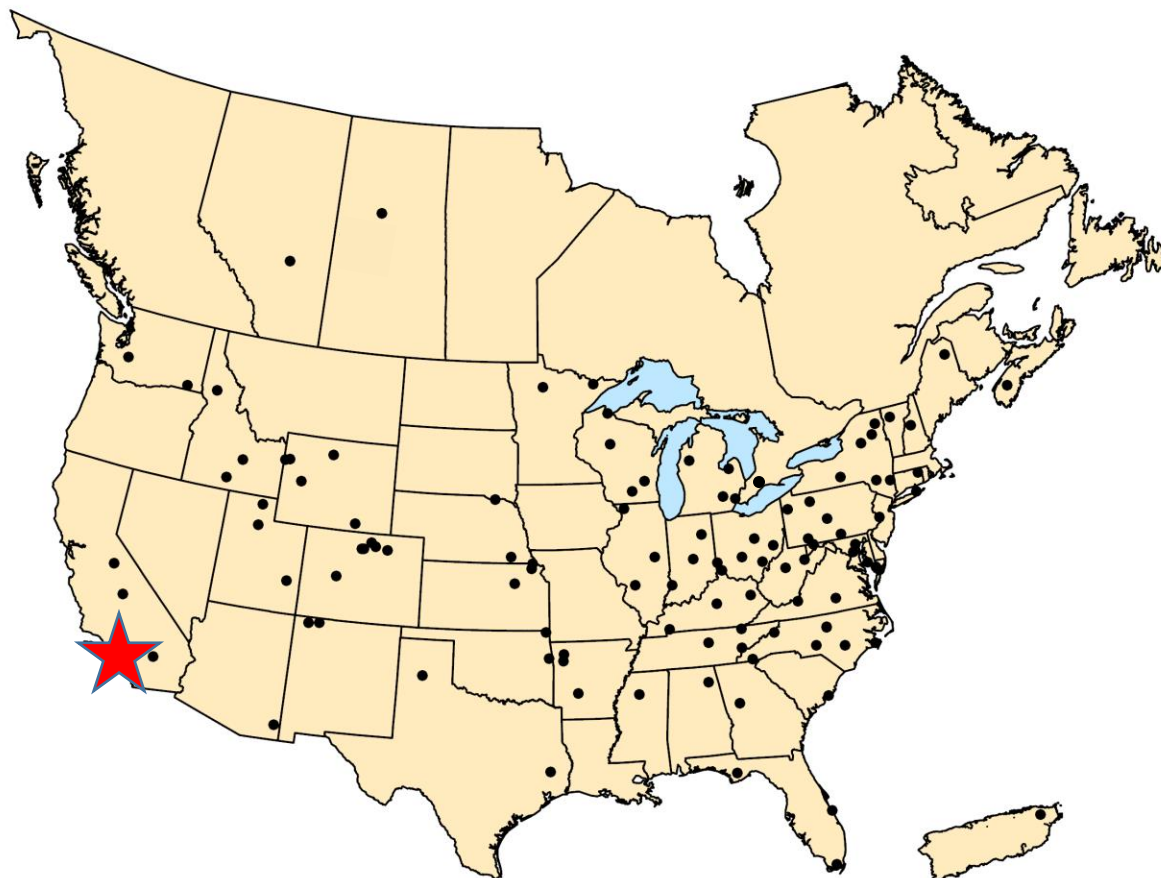
- WSLH – Wisconsin State Laboratory of Hygiene
- NADP – National Atmospheric Deposition Program
- **PO – Program Office**
- **NAL – NADP Analytical Lab**
- **AMoN – Ammonia Monitoring Network**
- NTN – National Trends Network
- MDN – Mercury Deposition Network
- MLN – Mercury Litterfall Network
- AMNet – Atmospheric Mercury Network



**WARNING
ACRONYMS
AHEAD**



Ammonia Monitoring Network (AMoN)



South Coast Air Quality Management District
10 new sites in Feb 2025

Puerto Rico

- Since 2010
- 92 sites
- only network providing a consistent, long-term record of ammonia gas concentrations across the United States





Site Support

- Toll-free number 1-800-952-7353
- Network email
 - amon@slh.wisc.edu
- Website: <http://nadp.slh.wisc.edu/siteops/#amon>

▼ AMON – AMMONIA MONITORING NETWORK

MANUALS AND SOPS

[AMoN Site Operations Manual](#)

[AMoN Field Hold Times](#)

Sample Change

[AMoN Sample Change](#)

[Field form](#)





Keep Us Updated



- If you are reassigned, move on, retiring and are training a new operator, let us know
- We need current operator contact information for follow up questions on samples, field forms, and equipment
- Messages go out to operators on the Google Groups mailing listserv
- We track start dates for operator recognition awards





AMoN Field Form



AMMONIA MONITORING NETWORK (AMoN)

Send Completed Form with Each Sample Set to:
NADP Sample Receiving
465 Henry Mall, Madison, WI 53706

1. SITE Name _____		<input type="text"/> <input type="text"/> <input type="text"/> ID	2. OBSERVER Print name _____		<input type="text"/> <input type="text"/> Initials
3. SAMPLE START AND END Date		4. SITE CONDITIONS Please check any and all conditions that apply. Comment on any other site conditions in Block 7.		5. Supplies (Circle if needed) Gloves Return shipping label	
ON		YES NO			
OFF		2 1			
MO DAY YR		0001-2400			
2 1		2 1			
2 1		2 1			
6. REMARKS For example: equipment malfunction, contamination, farming, burning					
LAB USE ONLY <input type="text"/>					
Questions? Call 1-800-952-7353 or E-mail amon@slh.wisc.edu					

White Copy: Return to NAL Blue Copy: Retain for Your Records

Rev. 11.2024

- Complete all Blocks.
- One included in every supply box.
- Travel blanks ~5/yr
- Duplicates ~3/yr

4. SITE CONDITIONS

Please check any and all conditions that apply.
Comment on any other site conditions in Block 7.

YES	NO
2	1
2	1
2	1

1. Significant smoke or fire
2. Fertilizer use nearby
3. Farm animal activity nearby



Matching P Codes

- The plastic bag containing the glass jar with the sampler(s) to be deployed, the field form, and the inside lid of the shipping box are labeled with matching bar code numbers (P code).
- The bar code labels should remain in place; do not remove them.
- If the numbers do not match, contact the NADP Site Liaison.

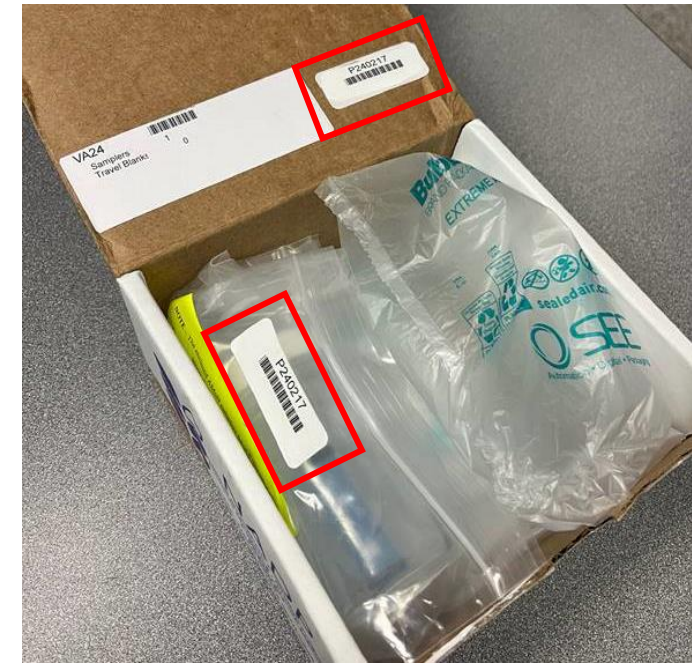
NADP
AMMONIA MONITORING NETWORK (AMON)
Send Completed Form with Glass Jar to:
NADP Site Liaison
605 Albany Road, Wallingford, VT 05785

1. SITE Name		2. OBSERVER Name			
3. SAMPLE START AND END Date		4. SITE CONDITIONS			
MO	DAY	YR	DATE	NO	NO
ON					
OFF					

5. REMARKS

P240217

USE USE





AMoN Field Form

- **Site conditions** – always complete
- **Remarks** – Broken samplers or jars should be reported to 1-800 number. If no samplers are available to deploy, call the 1-800, and leave the current sampler deployed.
- **Retention** – Keep blue copies of the last 2 years





NAL Supplies Provided



- Gloves (L)
- NAL sends 1 box/year
- Typically in May
- Block 5: Supplies on field form

5. Supplies

(Circle if needed)

Gloves

Return shipping label



Supply Box Contents



Duplicate Sampler Reminder





Single vs Duplicate vs Travel Blank

Field Quality Assurance (QA)

Single Sampler



Deploy sampler
for 2 week period

Duplicate Samplers



Deploy both
samplers for 2 week
period

Travel Blank

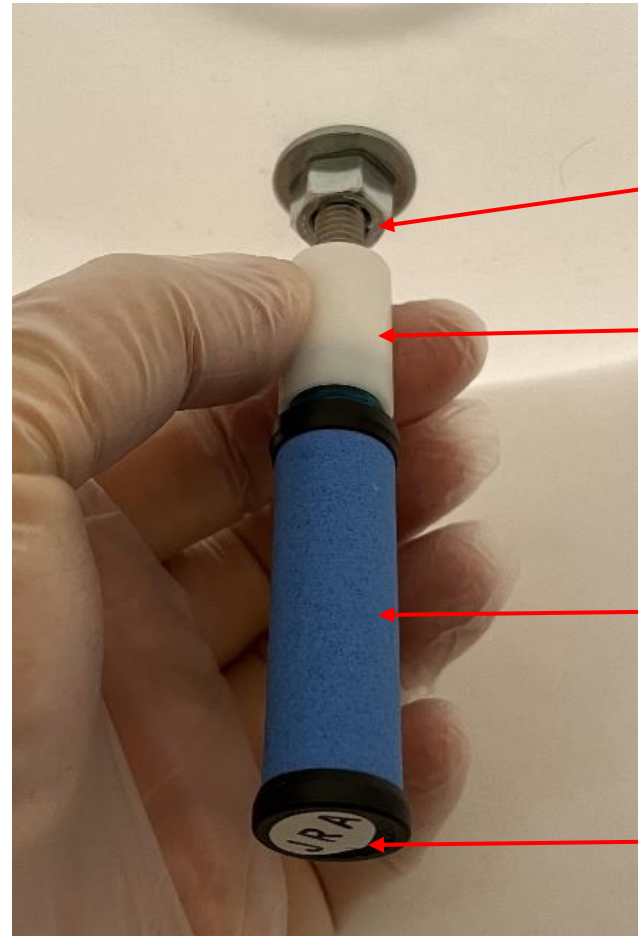
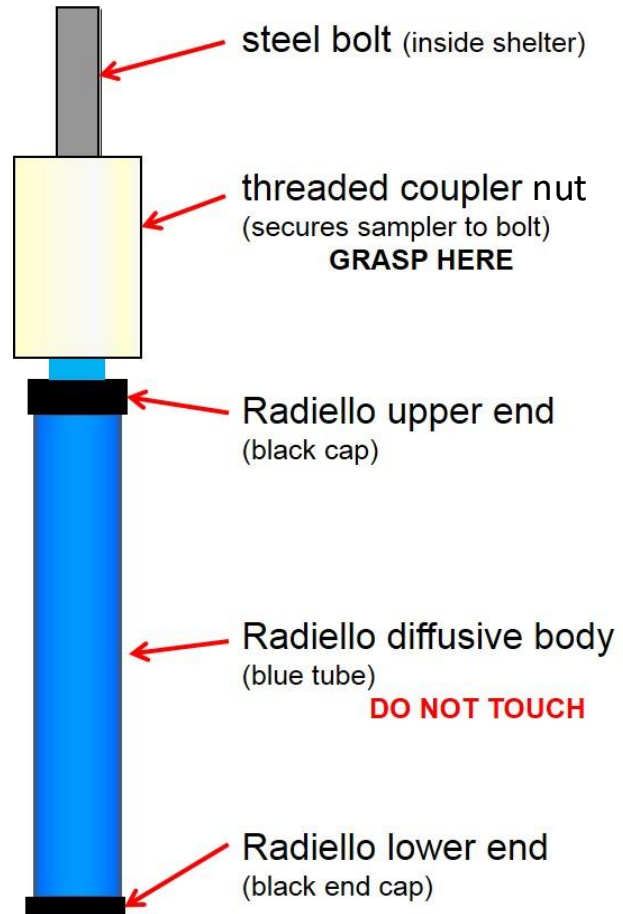


Do not remove from
bag, store in supply box
for 2 week period

*Leave filter paper in
the bag! Do not handle
or discard.*



AMoN Radiello Sampler Parts



Mounting bolt

Threaded coupler nut

Sampler body

3 character body ID



Damaged or Broken Samplers



Make note on field form if sampler was reassembled in the field with Body ID.

- These can be put back together in the field. Wear a clean pair of the gloves provided, and thread the white coupler nut back onto the body.
- In Fig. C, the white core cap can be placed back in the black opening with the narrow end down, then thread white coupler nut on.



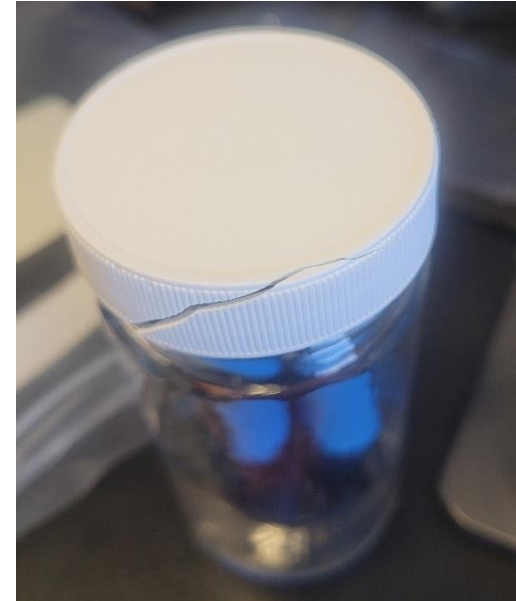
Damaged or Broken Samplers



- These are broken samplers. The blue body has physically detached from the upper and lower end caps.
- Call the 1-800-952-7353 number or email amon@slh.wisc.edu for a replacement.



Damaged or Broken Jars



- If the jar is broken/cracked or if the lid is cracked.
- Call the 1-800-952-7353 number or email amon@slh.wisc.edu for a replacement jar.



Shipping

NADP Sample Receiving
465 Henry Mall
Madison, Wisconsin 53706
USA



- Supply boxes are shipped the 2 weeks before the next deployment date
- Pre-paid return FedEx shipping label included
- Call the Site Liaison at 1-800-952-7353 or email amon@slh.wisc.edu if you haven't received a supply box or there is no return label in the box



Sample Field Deployment & Hold Times

Deployment Time = Sample "ON date/time" to sample "OFF date/time"

Field Hold Time = Sample "OFF date" to date received at lab

Network	Field Deployment Time Flagged	Field Hold Time Flagged Receipt
AMoN	>15 days = QR B (360 hours)	>30 days after off date = QR B
	>30 days = QR C (720 hours)	>60 days after off date = QR C

Quality Rating (QR) Code Definitions:

A – Valid data

B – Valid data with minor problems

C – Invalid data



Shelter Maintenance

- Inspect the AMoN shelter for cracks/holes. Contact the NADP Site Liaison if a new shelter is required.
- Wipe down shelter periodically with lab wipe/paper towel and with deionized (or distilled) water.
- Be certain to remove bird droppings from the surface of the AMoN shelter. Bird droppings are a possible contamination source.
- Avoid using cleaning agents, they may contain ammonia and should never be used.





Field QA: Site Survey - EEMS, Inc.



- Environmental Engineering & Measurement Services, Inc.
- EPA contractor – systems and performance audits
- Assess equipment, operator procedures, siting criteria
- Operator refresher training when required
- Only sites collocated NTN, MDN, and CASTNET sites
- AMoN only sites will be a virtual site survey using a Qualtrics survey





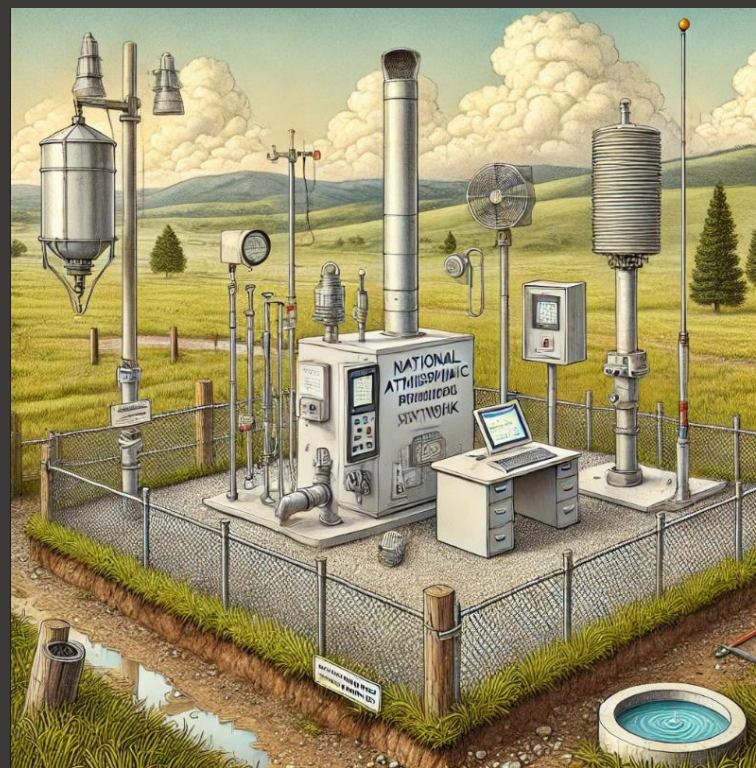
What We're Working On

- ALPHA[®] Ammonia passive sampler
- Co-located study at 10 existing AMoN sites since November 2024
- Why? Lower overall cost (sampler/lab time)
- Stay on after Q&A for ALPHA[®] Training





Questions & Answers



Asked ChatGPT to "Create a National Atmospheric Deposition Program Ammonia Monitoring Network sampling site"



ALPHA[®] Introduction

- Adapted Low-cost Passive High Absorption (ALPHA[®]) sampler
- Produced by the UK Centre for Ecology & Hydrology (UKCEH)
- In use for over 10 years in UK national ammonia monitoring network
- Plastic components of the ALPHA[®] samplers, and PTFE membranes can be cleaned and reused. More durable than current samplers.
- Principle of diffusion with an acid-coated filter which serves to capture the ammonia.





Study Objectives

- Assess sampler durability in the field
 - *Does the adhesive and Velcro hold up? Samplers deployed in different regions, varying weather conditions, and multiple seasons.*
- Assess sampler ease of use in the field
 - *Gather feedback from operators. Is it easier? Harder? Send surveys.*
- Compare passive sampler chemistries
 - *Verify our methods and is there a bias?*
- Assess anti-static bag for packaging
 - *Is there an increase in background NH₃? Assess with travel blanks.*



Installation

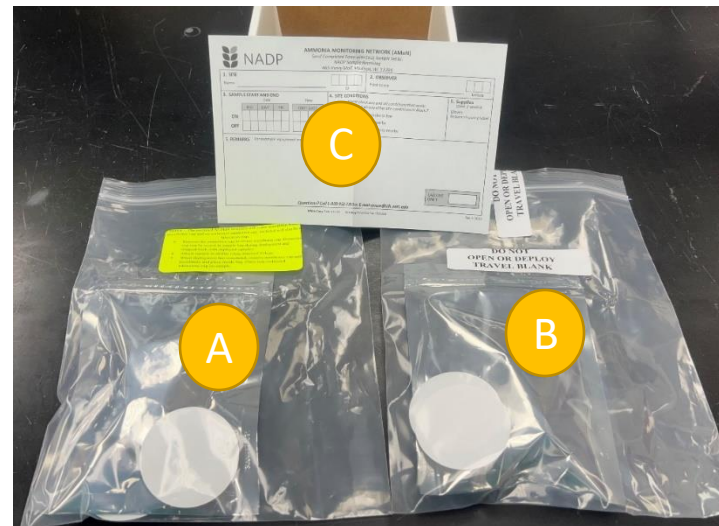
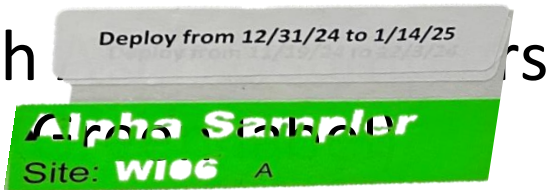
- Weld nuts thread on to the existing bolts in shelter.





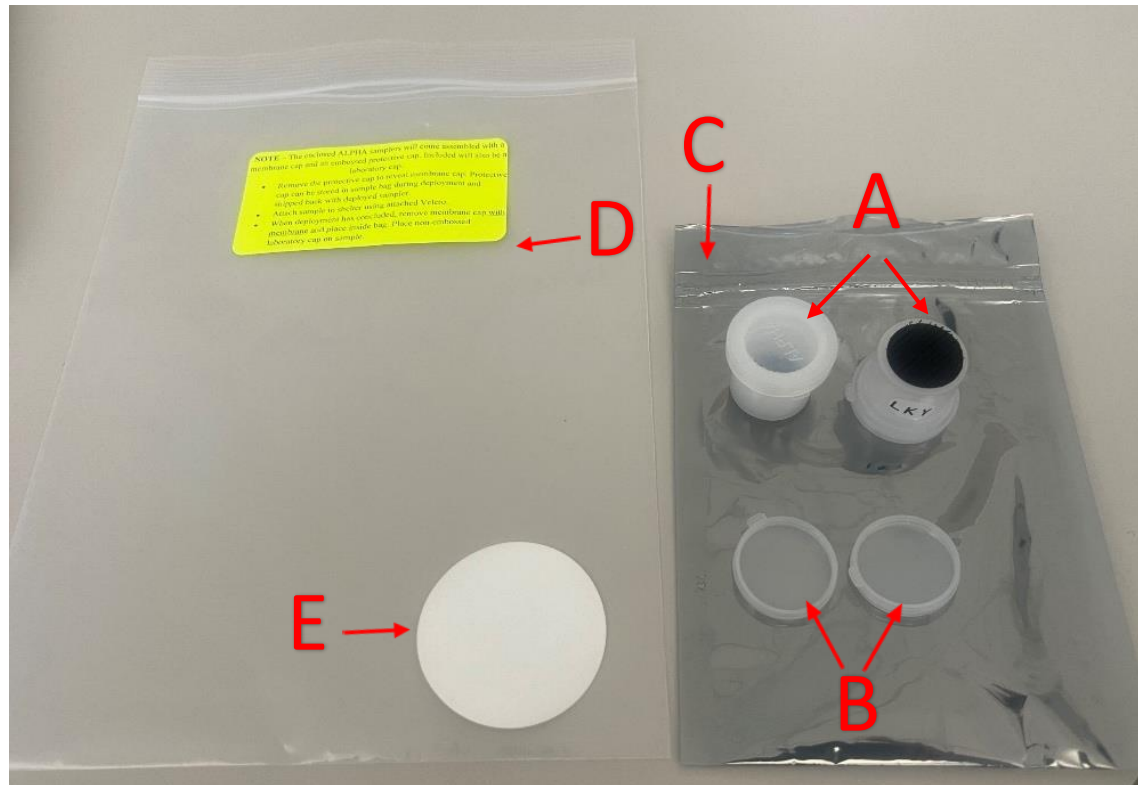
Supply Box

- A standard NADP box will arrive with **Alpha Samplers** and supplies.
- Clear Ziploc Bag (A)
 - 1 set of duplicate ALPHA samplers in anti-static bag
 - 2 laboratory caps
- Clear Ziploc Bag (B)
 - 1 travel blank (sealed with sticker) in anti-static bag
- Field Form (C)





Contents of Sampler Bag



- Duplicate ALPHA samplers (A) and laboratory caps (B) are inside an anti-static bag (C)
- Anti-static bag is inside of clear Ziploc bag (D) with citric acid filter (E)



Deployment Steps

- Wearing AMoN gloves provided, remove one of the ALPHA samplers from the bag.
- Remove the top protective cap (embossed with writing) to expose the PTFE membrane and place back in the bag **Do not touch the PTFE membrane**
- Holding the body, attach sampler to Velcro weld nut. Firmly press upwards to secure.
- Repeat for duplicate ALPHA sampler.
- Record Start Date/Time on field form Block 3.

PTFE Membrane

Protective cap





Collection/Retrieval Steps

- After 2-week sampling period, retrieve ALPHA samplers from shelter.
- Wearing gloves, pull each ALPHA sampler off the Velcro weld nut. Be sure to only touch the outside of the ALPHA body.
- Place the protective cap (embossed cap) back on the ALPHA bodies.
- Fill out block 3 on the field form with the “OFF” date/time, block 4 with the site conditions, and the Remarks block with any relevant observations.

Protective cap on
ALPHA body





Collection/Retrieval Steps

- In a dry location (precipitation will contaminate the sample). Place samplers in anti static bag if transported to dry location.
- Wearing gloves, remove protective cap (embossed with writing), and the membrane cap (cap with hole for PTFE membrane).
- **Do not touch the inner filter paper. This is the collection filter that contains ammonia and will be extracted back at the lab.**



ALPHA body with inner filter exposed



Membrane cap (cap with hole and PTFE membrane)



Cap Sampler for Shipping

- Cap samplers immediately with laboratory cap (extra cap sent with samplers, non-embossed and smaller). Ensure cap is secure.

Laboratory cap (non-embossed/smaller)



Sampler with laboratory cap on





Preparing shipment back to NAL

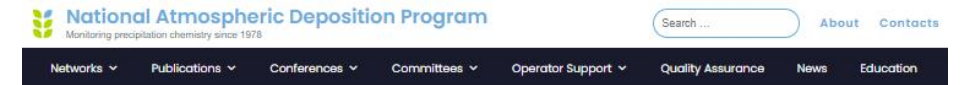
- Ensure the following is included back in anti-static bag:
 - 2 ALPHA samplers with laboratory caps on
 - 2 membrane caps **with** PTFE membrane included
 - 2 protective caps (embossed cap)
- Place the anti-static bag in the sealable plastic bag.
- Return all items to the supply box labeled ALPHA
- This includes 1 plastic bag with duplicate samplers and additional caps, 1 unopened plastic bag containing the travel blank, and the field form.
- Ship to NAL 465 Henry Mall, Madison, WI 53706





Additional Resources

- <https://nadp.slh.wisc.edu/alpha-passive-ammonia-study/>
- ALPHA Passive Ammonia Co-located Study
 - Introduction
 - Participants
 - Operator Support – SOPs, training video
 - Method Development
 - References



ALPHA Passive Ammonia Co-located Study

▼ INTRODUCTION

This study is part of the Ammonia Monitoring Network (AMoN) and involves a side-by-side evaluation of two passive samplers: the NADP-approved Radiello sampler and the ALPHA (Adaptive Low-cost Passive High Absorption) sampler, commonly used in the United Kingdom. The study began on November 19, 2024, across 10 AMoN sites in the United States and Canada. For a duration of nine months, duplicate Radiello and ALPHA samplers will be deployed at each site for two-week intervals.

The study aims to:

- Evaluate the field durability of the ALPHA sampler.
- Assess the ease of use of the ALPHA sampler in field conditions.
- Compare the chemical performance of the ALPHA and Radiello samplers.
- Assess the anti-static bag for packaging.



- ▶ [CO-LOCATED STUDY PARTICIPANTS](#)
- ▶ [OPERATOR SUPPORT](#)
- ▶ [METHOD DEVELOPMENT](#)
- ▶ [REFERENCES](#)



Questions & Answers



Asked ChatGPT to “create an image of an Adapted Low-cost Passive High Absorption passive ammonia sampler in a field”