

The National Atmospheric Deposition Program (NRSP-3)
Technical Committee Meeting
October 22 - 24, 1996, Williamsburg, Virginia
Minutes
Tuesday, October 22, 1996

Opening, Introductions and Welcome —

The opening session of the 1996 NADP (NRSP-3) Technical Meeting was convened at 8:30 a.m. on Tuesday, October 22, in Williamsburg, Va, by Rich Grant, Chair. Rich commented on changes which have occurred over the past year. One major change is that Richard Flagler was removed as Program Coordinator, and Gary Lear is currently serving as Acting Coordinator.

Meeting attendees were asked to introduce themselves (list at end of minutes).

Stan Coloff provided an overview of the meeting agenda. He listed the five top reasons for attending the meeting.

5. The taverns at Williamsburg.
4. The outlet shopping mall.
3. The Anheuser Busch Brewery tour.
2. Iowa beat Penn State.
1. Paul Kapinos' retirement grin.

Three technical sessions are scheduled for the meeting: 1) Trends in Precipitation Chemistry — A Regulatory Assessment of the Effects of the Clean Air Act, Phase I, Title IV; 2) Monitoring Terrestrial and Aquatic Response and Materials Effects; and 3) Mercury in the Environment, featuring 20 and 30 minute presentations.

The scheduled field trip which was to include visits to both VIMS and NASA Langley has been revised to visit only NASA Langley. Arrangements could not be worked out for the visit to VIMS. The NASA Langley tour will be an overview of their research activities and will include presentations on the Earth Observing System (EOS) Global Atmospheric Modeling Investigation, the solid laser lab, and the Atmospheric Sciences Division's LIDAR.

Reports —

Administrative Advisors —

AES —

Lee Sommers, Administrative Advisor for the Western Region, reported that one of the things discussed at the Executive Committee meeting was the proposed 8% fee which will be assessed by CSREES against agency pass-through dollars and its impact on the federal partnership. Dagmar Cronn and Lee Sommers will draft a letter to USDA asking that the policy be reconsidered and that CSREES understand the implications of the fee on the total program.

Jack Barnes commented on the agencies' responses and reactions to the proposed fee.

Lee then noted that this is the final year for the current NRSP, and that Jim Lynch has done an excellent job of developing a proposal. It will be sent to the states for consideration at the regional meetings. Three of the four regions must approve renewal for implementation on October 1, 1997.

Lee answered questions regarding the Agriculture structure since dissolution of the Committee of Nine. There are research committees in each of the four AES regions (North Central, Northeastern, Southern and Western) and renewal of an NRSP must be approved by three of those regions.

CSREES —

Jack Barnes commented that something critical in the review process is the "So what?" question: why should NRSP-3 be continued? and haven't all the questions been answered? The renewal proposal must stress the importance of the data base and its integrity. Jack asked that the group think about products and other output from the program in future years. What are the international implications for the continuity of the data base? He also noted that final approval of the renewal will be made by CSREES.

USGS —

Paul Kapinos reported that he is turning the reins of the Acid Rain Program over to Mark Nilles. Paul has been involved with the program for 15 years. Mark will handle the day-to-day activities and Joel Frisch will continue as the agency contact in Washington.

Mark Nilles reported that his first assignment was the redesign of Watershed—what NADP is all about, with what synergies. There is currently no money in the hydrologic benchmark network.

Coordination Office —

Gary Lear commented that it has been a difficult year in the Coordination Office. He reported on the following topics.

- Stability of funding.
- Other Personnel changes.
 - Linda Bandhauer resigned from NADP, effective June 1, 1996.
 - Sandy Pletschet resigned her full-time position as Site Liaison to work part time for the Quality Assurance Program, then subsequently resigned completely.
 - The Coordination Office will be hiring a new Administrative Assistant, a Quality Assurance Manager, a programmer, and a data technician over the next few months.
- The office has been processing data and handling data requests.
- Sites.
 - The network lost four sites and gained four sites. Minnesota will also be bringing in several sites.
 - Intercomparison sites were discussed in the Network Operations Subcommittee (NOS).
 - Uncertain sites are those funded by EPA and BRD.
- Annual Data Summary. The 1995 Annual Data Summary was to have been to the printer last week, but because of an unexpected glitch, it was delayed until next week.
- Data requests have increased significantly but have not taken too heavy a toll. The NADP web page is very popular. New data products with maps produced with ARC Info are available and much interest is being generated on the part of the agencies.
- The Quality Assurance Program is going slowly since there is no QA Manager. EPA has funded the program through June, 1998. They have also been very generous in supporting new initiatives. The QA plan is currently being revised
- Rewrite of the Site Operation Manual has begun. Scott Dossett and Susan Smith are handling that rewrite.
- Goals for the coming year.
 - A big need is seen on the part of the staff for being more efficient and more automated with routine procedures and processing of data.
 - Also will be using the web.
 - Will be redesigning the web page to make it more attractive and more functional for getting data.
 - Bob Gilpin will be involved with linking our web page site to other sites.
 - Improving documentation of the network.
 - Responding to the declining interest in NADP by getting the word out that we have the data that researchers need.
 - There is a need at CSU to establish a partnership and collaboration.

CAL—

Kenni James reported.

- pH Electrode Update. Seventy-nine electrodes have been replaced since 4/1/96, averaging 11 per month. The Broadley James electrodes have an approximate 2-year lifetime.

- QA Reports. The 1994 report has been published. The 1995 report is awaiting a few computer summaries and internal review. It will be available for external review by January 1.
- Training Course. A site operator's training course was held September 17, 18 and 19 at CAL with 26 operators (23 NADP/NTN, 1 AIRMoN, 2 NADP/NTN/AIRMoN) and 1 representative from the Coordination Office attending.
- Personnel. Pat Dodson, employed in sample processing at CAL since 1979, retired August 30. Her position has been filled by Pam Scales.
- Interlaboratory Comparison Update. The Canadian National Research Institute Rain and Soft Waters Study FP69 just left the lab. The samples were not relevant to NADP as most pHs were in excess of 6.
- Archival Samples. Dr. Steven Leavitt, University of Arizona, requested and received additional archived samples from NVO5 and AZO3 from the end of 1993 through June and April 1995. The ultimate goal of the project is to calibrate the relationship between environmental water and plant cellulose as a potential proxy for climate variables such as temperature and the seasonality of precipitation.
- pH 4.9 Check Solution. All NADP sites are now measuring the pH 4.9 solution.
- Annual Lid Seal Replacement. Lid seals were changed at all sites on June 23, 1996. Last years seals performed satisfactorily.
- ARS/ACM Motor Box Comparison. Data collection continued with Phases II and III, and data indicate near equivalent performance from the "new" manufactured box.
- National Geographic Kid's Network.
 - The CAL evaluation of pH meters and electrodes was accepted by National Geographic.
 - CAL staff provided input to chapters on acid rain for the Kid's Network and reviewed final chapters for accuracy and usability.
 - Starting in January, information will be made available to teachers for inclusion in their curriculum next fall.

Subcommittee Reports —

NOS —

Kenni James outlined the planned subcommittee agenda.

AIRMoN —

Jane Rothert reported.

- Detailed the blind samples procedures.
- Three month turnaround from sample collection to data at CSU.
- Have begun discarding samples.
- Starting mid-year (last spring), AIRMoN received CAPMoN raingages for an intercomparison. Now all but one site has both a Belfort and a CAPMoN.
- It was decided at the Executive Committee meeting in May that most AIRMoN details had been resolved, and the AIRMoN subcommittee was folded into NOS. A working group will consider separate issues, as needed.

Data Management Subcommittee —

Mary Ann Allan commented that the subcommittee is concerned with data quality issues and analysis of the data. The subcommittee met Monday morning and in their next meeting will discuss outward-facing issues.

- Annual data summary and map product status.
- A decision regarding what should be done with the informational brochure.
- Briefing on the MDN.
- Discussion of future data product needs; what NADP should be developing.

Environmental Effects Subcommittee –

Dan Orr noted that the Environmental Effects Subcommittee is involved with assessments of NADP data. The MDN was developed as a result. Last year the subcommittee discussed organics, and this year they will consider the importance of nitrogen deposition. Specifically:

- The increase of nitrogen deposition.
- The role of nitrogen in the NOX/VOCs management plan.
- Evaluate effectiveness of the Clean Air Act.
- Look at current and related work.
- Data application and interpretation.

Mercury Deposition Network –

Molly Welker reported that MDN started with three pilot sites, then moved to 13 sites as a transition network. MDN was accepted as a subnetwork at the 1995 Technical Meeting, and coordination and contracting was moved to the Coordination Office in January, 1996. Steve Vermette, Sandy Verry, and Steve Lindberg serve as advocates and advisors. There are now 17 active sites, with several more pending. The goal for data is to have it in a preliminary form by the end of 1996, with final data by spring of 1997.

Mercury is currently a hot topic, and there have been a number of mercury conferences. Molly, Steve Vermette and Joe Tokos have attended several over the past year. Molly detailed those meetings.

An MDN business meeting will be held Tuesday evening, and Molly invited all interested individuals to participate.

Special Recognition —

Site Operator Awards –

Rich Grant stated that recognition is paid to site operators who have long-term records of 15, 10 and 5 years of service and who have attended the CAL Site Operator Training. He read the following list of those receiving awards for 1996.

| Fifteen-Year Plaques | | | |
|------------------------|-------------------------------|-----------------------|-----------------------|
| CAL Code | Site Name | Site Operator | Site Supervisor |
| MI09 | Douglas Lake | Robert VandeKopple | Jim Teeri |
| NJ99 | Washington Crossing | Kathy McCullough | Katy McCullough |
| Ten-Year Plaques | | | |
| CAN4 | Sutton | Louis Veilleux | Daniel Dube |
| IL11 | Bondville | Mike Snider | Gary Rolfe |
| IL18 | Shabbona | Dave Lindgren | Gary Rolfe |
| NE99 | North Platte Ag. Exp. Station | Jim Goeke | Glenn Engle |
| NY65 | Jasper | Clarence Klingensmith | Clarence Klingensmith |
| VT01 | Bennington | Dan Taylor | Richard Poirot |
| Five-Year Certificates | | | |
| CO22 | Pawnee | Mark Lindquist | Susan Smith |
| IL78 | Monmouth | Roland Caulkins | Eric Adee |

| Five-Year Certificates | | | |
|------------------------|-----------------|----------------|------------------|
| MT97 | Lost Trail Pass | Chuck Oppegard | Robert Hammer |
| ND11 | Woodworth | Gayle Cook | Russell Harkness |
| OHo49 | Caldwell | Mike Franko | Lowell Trimble |
| WY06 | Pinedale | Sallie Otteman | Al Riebau |

A round of applause was given to the operators and their supervisors.

Dave Bigelow —

Rich Grant recognized the many contributions of Dave Bigelow as the original data manger and then Quality Assurance Manager and noted that without the quality of the data, there would not be the acclaim for the NADP data. Dave resigned from NADP in March and moved to a full-time position with the UV-B Program. A plaque in appreciation of dedicated service was presented to Dave Bigelow and accepted by Gary Lear in Dave's absence.

Linda Bandhauer —

Recognition was paid to Linda Bandhauer for her assistance to program officers, leaders, and participants over the past 17 years. Linda will be retiring the end of June, 1997, and has moved to a full-time position in the UV-B Program office until that time. She was presented with a plaque and a corsage.

Paul Kapinos—

Accolades and roasting were extended to Paul Kapinos for 15 years of leadership and service to the Program. Paul retired from USGS in early October. He was also presented with a plaque.

Nominating Committee and Close –

Rich announced that had asked Van Bowersox, Jim Lynch and Mark Nilles to select a candidate for Technical Committee Secretary. Following established procedure, this individual will rotate through the offices to Chair.

The opening session was adjourned for subcommittee meetings.

Technical Session A; Trends in Precipitation Chemistry – A Regulatory Assessment of the Effects of the Clean Air Act, Phase I, Title IV –

The first technical session, chaired by Jim Lynch, was convened at 1:00 p.m. with presentations as follows.

- NAPAP Report to Congress–Update – Michael Uhart
- Integrating the Nation's Environmental Monitoring Networks – Michael Ruggerio
- Electric Utilities: Emission Reduction and Deposition – Mary Ann Allan for Jeffrey West
- Emissions Reductions Under the Acid Rain Control Program – Rona Birnbaum
- Effects of the 1990 Amendments to the Clean Air Act, Title IV, On Precipitation Chemistry in the Eastern United States – Jim Lynch
- A Comparison of 1994 and 1995 AIRMoN Precipitation Chemistry Measurements Using Hysplit Trajectories – Barbara Stunder
- NADP vs MAP3S + AIRMoN Weekly and Annual Data Comparisons – Tom Butler
- Time Trends in Canadian Air, Precipitation, and Wet Deposition Data – Don McKay
- Moving Beyond Acid Rain to a "One" Atmosphere Perspective – Robin Dennis

Poster Presentations --

Following brief introductions by the authors, posters on the following topics were displayed.

A New Motor Unit for the NADP/NTN Wet/Dry Collector (Comparison of Aerochem Metrics and Air Resource Specialists Motor Units) Scotty Dossett

The Fractional Portion of Crop Nutrient Requirements Provided by Precipitation in North Carolina in 1992—
Can Furness

Education Materials and Activities for Secondary and Elementary Teachers Using NADP/NTN Data
Developed by the Nebraska Earth Science Education Network (NESEN) Mark Mesarch

Regional Patterns of Nitrogen in Winter Precipitation Along the Rockies: A Comparison of Snowpack
Sampling and NADP Estimates Mark Nilles for Kathy Tonnesson

National Atmospheric Deposition Program/Mercury Deposition Network: QAIQC ProtoQ~ Molly Welker

Wednesday, October 23, 1996

Technical Session B: Monitoring Terrestrial and Aquatic Response and Materials Effects —

Session Chair Gary Stensland convened Technical Session B for the following presentations.

Atmospheric Nitrogen: What Is It and What Does It Do? —James Galloway

Nitrogen Deposition in the U.S. Fish and Wildlife Service Coastal Areas — Ellen Porter

Isotopic Characteristics of Precipitation Collected by the NADP Network: Applications to Ecological,
Hydrologic and Geological Studies — Jeff Welker

Atmospheric Concentrations and Distributions of Polycyclic Aromatic Hydrocarbons in the Southern
Chesapeake Bay Region — Rebecca Dickhut

Observations on the Accuracy of the NOAA Multi-layer Deposition Velocity Model: A Field Study-Model
Comparison — Peter Finkelstein

Geochemical Interpretations of Rainfall-runoff Data for Marble and Copper — Richard Livingston

Federal Highway Administration Materials Testing Program — Use of NADP/NTN Data — J. Peter Ault

Field Trip --

The technical session was adjourned so attendees could participate in the field trip to the Atmospheric Sciences Division, NASA Langley, Langley, Virginia.

Thursday, October 24, 1996

Technical Session C: Mercury in the Environment --

The final technical session was convened by Molly Welker, session chair. The following presentations were made.

Overview of NADP/Mercury Deposition Network — Steve Vermette

Hydrologic Transport of Total Hg Through a Forested Upland/Peatland Watershed — Sandy Verry

On the scientific Utility and Import of the MDN: Correlation Between MDN Total-Mercury and NADP Major-Ion
Data — Joseph Tokos

Mercury Deposition to a Chesapeake Bay Watershed — Robert Mason

New Capabilities for the Mercury Deposition Network: Determination of Atmospheric Gaseous Hg(II) at the $\mu\text{g}/\text{m}^3$ Level — Joe Tokos for Nick Bloom

Final Business Session —

The closing session of the 1996 Technical Meeting was convened at 1:30 p.m. by Rich Grant. Two agenda items from the noon Executive Committee meeting were reported.

- Proposed letters to CSREES regarding assessment of an 8% fee on monies passing through the Cooperative Agreement. A letter protesting the fee has been drafted and will be sent by the Administrative Advisors. A second letter will be written on behalf of the Executive Committee.
- The need for additional NADP cooperation with the Natural Resource Ecology Laboratory at Colorado State University. This will be accomplished through support of a graduate student.

Subcommittee Reports —

Network Operations —

Kenni James reported on subcommittee discussions.

- Equipment replacement/repairs. The *ad hoc* committee of Scott Dossett, Joel Fnsch, John Gordon, and Susan Smith will continue their efforts to locate and catalog the location of most parts. USGS ordered 10 sensors and event recorders.
- There are collocated samplers at FL14 and 0R09.
- ARS/ACM motor box comparison. Scott Dossett, Mark Nilles and Susan Smith will look at collocated data and report at the spring meeting.
- Revisions to QA Plan for remedial action.
 - Deviations will be called to the attention of NOS by the site liaisons.
 - The CO Site Liaison will try to resolve chronic violations for 6 months, then report them to NOS and note the violations in the database.
 - Accept pending exceptions and document in the database.
 - Changing conditions will be reported and noted.
 - A data product to advise of deviations will be developed and presented to the DMAS for consideration and approval.
- The Site Operation Manual directory and suggested equipment page revisions were approved.
- Charged Scotty Dossett and Susan Smith with revising the Site Operation Manual by fall, 1997.
- The pH 4.9 check solution is being measured satisfactorily.
- USGS is instituting a field blank pilot study at 9 sites.
- NOS minutes will be placed on the NADP web page.
- A CAL/CO Common Tracking Database is in process and initial testing has begun.
- TX10 was granted a 6-month exemption from field chemistry.
- The AIRMoN subcommittee has been incorporated into NOS. Jane Rothert will be the official AIRMoN representative.
- 1996-97 officers are:
 - Chair — John Gordon
 - Vice Chair — Scotty Dossett
 - Secretary — Susan Smith

MOTION that the report be accepted was made, seconded and carried.

Data Management and Analysis Subcommittee –

Mary Ann Allan reported. The subcommittee covered a quantity of items.

- Dissolution of the Quality Assurance Steering Committee. DMAS was asked to look at the ramifications of dissolving the QA Steering Committee. DMAS will track the handling of siting violations and the remedial action plan. They will coordinate with NOS.
- QA Data Information Questionnaire. The subcommittee agreed the questionnaire was worthwhile and attempts to obtain the information should continue. The task will be assigned to the new QA Manager. Partial completion by early 1997 is a goal.
- Disposal of two-year old FORFs and raingage charts. The subcommittee approved disposal of FORFs stored at the coordination office after they are two years old. An alternate home for the raingage charts will be sought within the NADP community. CAL has also offered to take the charts and make them available through the Illinois State Water Survey.
- pH 4.9 check solution. A period from December through March was allowed for sites to change to the 4.9 check solution. All sites are now using the 4.9 solution.
- Status of common CO/CAL tracking database. A PC has been dedicated at CAL as a file server which can be accessed by both the CAL and the CO, using standard query language. Questions remaining to be answered are capability, use and need. Scotty Dossett and Susan Smith will continue to work toward implementing and using the common tracking system.
- Bucket/Bottle Advisory Revision. A working group of Van Bowersox, Mary Ann Allan and Gary Lear will revise the Bucket/Bottle Advisory for review at the spring meeting. The Advisory will reference adjustment algorithms and possible bias over time. There are no plans to adjust data at the CO or on the Web.
- Trend Plots on the Web. The working group of Van Bowersox, Bob Gilpin, John Gordon, and Susan Smith will continue work on these plots. The first focus is on site temporal displays. There is interest in seeing geographic trends.
- AIRM0N in the Annual Data Summary. DMAS approved the order of priority for deposition calculation: stick gage > Belfort > sample volume. Decisions regarding completeness criteria and field validity codes have been deferred to the spring meeting.
- MAP3S data. The MAP3S data will be available on the AIRMoN NOAA web page. There will be a link from the NADP web page.
- NADP "map product." This document was strongly endorsed, but the subcommittee felt it needed a different name. It was also suggested that a picture of the sampler be included.
- "Inside Rain" brochure. DMAS will review the brochure by year end and seek input from others as to its possible benefit and use as an educational tool.
- MDN report. The subcommittee considered options for handling data generated during the initial and transitional stages of MDN. No decision was made. The HAL will report acid charge/blank-corrected data to the CO.
- DMAS meeting minutes will be posted on the NADP web page along with other NADP minutes.
- Officers for 1996-97.

Chair — Luther Smith
Vice Chair — Bob Gilpin
Secretary -- Joe Tokos

Action Items —.

MOTION that FORFs be discarded after two years' storage in the CO was made, seconded and carried.

MOTION to approve order of priority of deposition calculation for AIRMON data was moved and seconded. Following discussion, question was called and motion carried.

Discussion Item —

It was suggested that the educational brochure ("Inside Rain") be placed on a fast track for completion. The agency representatives agreed that it would be most advantageous such a brochure available. Mark Nilles noted that this is a very important issue and that his budget would absorb the cost of printing if necessary. He would also try to provide labor for changes after review. Stan Coloff and Mary Ann Allan will review the brochure and attempt to have a final version ready in mid-February. The importance of the brochure being done was stressed repeatedly.

The map portion will be available and distributed for review with the goal of having a version to distribute for January or February. Further discussion regarding the review process and the potential audience ensued. It was suggested that it be prepared for a general audience. Gary Lear asked that there be a plan regarding the changes so that he have some direction. Gary also noted that he needs substantive rewriting assistance rather than just general comments.

Environmental Effects —

Dan Orr, Chair, reported that subcommittee discussions focused on promotion of NADP nitrogen deposition data for assessment and evaluation applications.

- Applications:
 - Effectiveness of NO_x emission reduction requirements of CAAA. NO_x and NH₄⁴ deposition is increasing and has not been affected by Phase 1 reductions.
 - NO_x management. Industry is looking for guidance on emissions and regulators need numbers for permit evaluation.
 - Nitrogen saturation is occurring in certain terrestrial and estuarine ecosystems. This exacerbates water quality and habitat destruction; e.g. Chesapeake Bay, eastern and Gulf coast wildlife refuges (sea grass beds), western high-elevation surface waters.
 - Agriculture and Precision Farming. Atmospheric N data could be supplied to farm advisory boards to prevent over-application of N, optimize application rates, improve timing of application, and improve plant uptake estimates.
- Information Gaps:
 - Organic N.
 - Deposition velocities.
 - NH₄⁴ volatilization.
- Recommendation:
 - Consider incorporating this information into the NRSP-3 proposal.
- Motion to the Technical Committee. There was no motion because such a motion is difficult to word. It was suggested that the nitrogen data be included on the NADP web page.
- 1996-97 Officers.

Chair — Ellen Porter
Vice Chair — John Sherwell

Gary Lear suggested a one-page informational sheet on the importance of nitrogen to agriculture; i.e., this is the relevance and these are the kinds of documents with which we can supply you. The sheet would probably be one page of text and a half page of graphics.

Mercury Deposition Network —

Steve Vermette reported that the mercury subcommittee met Tuesday evening and had much to discuss.

- In January, 1997, eleven sites will have a complete year of data.
- Considered how to calculate deposition and decided to use collector volume.
- How to report the mercury data.
- MDN has been approached regarding having more than one laboratory. The subcommittee decided to stick with one lab. It was felt that because of site liaison activities, it was important to follow the NADP model.
- Precipitation Sensor. Aerochem Metrics has two different designs—a 7-grid sensor and an 11-grid sensor. The impact on COED of dealing with two different grids was discussed.

MOTION that MDN adopt the 11-grid sensor was made and seconded. Following discussion, the motion was amended that the CO would maintain an inventory of 11-grid sensors. Amendment and motion carried.

Nominating Committee —

Van Bowersox reported that the nominating committee had selected Dennis Lamb as candidate for NADP Technical Committee Secretary for 1996-97.

MOTION that Dennis Lamb be unanimously elected secretary was made, seconded and carried.

Technical Committee Officers for 1996-97 are:

Chair — Stan Coloff
 Vice Chair — Steve Vermette
 Secretary — Dennis Lamb

The 1996-97 Executive Committee List is attached for reference.

1997 Technical Meeting —

Steve Vermette voiced his ideas regarding location for the next technical meeting. He made three suggestions:

1. Elicottville Resort, New York. This location offers wine tours and proximity to Buffalo. Themes for the meeting would be N deposition and mercury.
2. Minnesota or Wisconsin. Would be a good location because of the mercury interest.
3. Seattle, Washington. The mercury lab at Frontier Geosciences would be highlighted.

It was generally agreed that a location somewhere in the Midwest would be best. A final decision will be made in early 1997.

Closing —

Rich Grant passed the gavel to incoming Chair Stan Coloff who officially adjourned the 1996 Technical Meeting.

National Atmospheric Deposition Program (NRSP-3)
Technical Committee Meeting
October 21-24, 1996—Williamsburg, VA

Attendance List

Mary Ann Allan
EPRI

Richard Artz
NOAA - ARL

Peter Ault
Ocean City Research

Linda Bandhauer
NADP/NTN Coordination Office

Jack Barnes
USDA CSREES

Ralph Baumgardner
US EPA

Rona Birnbaum
US EPA

Tamara Blett
USDA Forest Service

Van Bowersox
Illinois State Water Survey - CAL

Tom Butler
Cornell University

Richard Cline
USDA Forest Service

Stan Coloff
USGS - BRD

Wayne Cornelius
NC Division of Air Quality

Dagmar Cronn
Maine Agricultural & Forest Experiment Station

Scott Dossett
Illinois State Water Survey - CAL

Rebecca Dickhut
College of William and Mary

Cary Eaton
Research Triangle Institute

Guy Fenech
Environment Canada

Peter Finkelstein
US EPA

Joel Frisch
USGS

Cari Furiness
NC State University

James Galloway
University of Virginia

Bob Gilpin
NADP/NTN Coordination Office

John Gordon
USGS

Richard Grant
Purdue University

Paulette Homant
USGS

Kenny James
Illinois State Water Survey - CAL

Paul Kapinos
USGS - retired

Dennis Lamb
Penn State University

Gary Lear
NADP/NTN Coordination Office

Richard Livingston
Federal Highway Administration

James Lynch
Penn State University

Robert Mason
University of Maryland

Lee Maull
Dynamac Corporation

Donald McKay
Environment Canada

Mark Mesarch
University of Nebraska-Lincoln

Daniel Nickolie
WI Department of Natural Resources

Mark Nilles
USGS

Dan Orr
Ontario Ministry of Environment and Energy

John Robertson
US Military Academy

Michael Ruggiero
USGS-BRD

John Sherwell
MD Department of Natural Resources

Susan Smith
NADP/NTN Coordination Office

Gary Stensland
Illinois State Water Survey

Joseph Tokos
Frontier Geosciences, Inc - HAL

Michael Uhart
National Acid Precipitation Assessment Program

Elon (Sandy) Verry
USDA - Forest Service

Molly Welker
NADP/NTN Coordination Office

Ellen Porter
US Fish & Wildlife Service

Jane Rothert
Illinois State Water Survey - CAL

Dan Salkovitz
VA Department of Environmental Quality

Luther Smith
Man Tech Environmental Technology

Lee Sommers
Colorado Agricultural Experiment Station

Barbara Stunder
NOAA - ARL

Donald Torsello
PA Department of Environmental Protection

Stephen Vermette
Buffalo State College

Jeff Welker
University of Wyoming

Jeffrey West
MARSTO - Northeast