

National Atmospheric Deposition Program (IR-7)
Technical Committee Meeting
Champaign, Illinois
October 25-27, 1988

Minutes

Tuesday, October 25, 1988

Opening -

Chairman Wayne Banwart convened the opening session of the 1988 NADP (IR-7) Technical Committee Meeting in Champaign, Illinois, and welcomed the group to Illinois. Participants were asked to introduce and identify themselves. An attendance list is attached.

Wayne presented "10 Years of Progress." On November 16 and 17, 1978, a meeting of the Technical Committee of NC-141, the first one with the project in operational mode, was held in Champaign, Illinois. The minutes of that meeting reflect the following highlights.

- Currently 30 operational sites, with an additional 15 scheduled to become active in the near future.
- Keith Huston commented that "SAES budgets were level but inflation was going up."
- Network became fully operational October 1 with initiation of work by CAL, and the first 60 samples have been analyzed.
- Bernie Malo discussed the quality assurance role of USGS, and stated that they would not become involved in visiting each individual site.
- The subcommittees met during the afternoon and discussed:
 - 1) matters concerned with field sampling and operation of the CAL;
 - 2) matters of data handling, management, and analysis; and
 - 3) planning for effects research.
- Subcommittee Summaries:
 - Subcommittees 1 and 2 —
Concerned primarily with sample handling protocol and dealt with a lengthy list of questions and answers, too lengthy to be included in the minutes.
 - Subcommittees 3 and 4 —
Suggested a "temporary" approach to data handling due to current lack of funds and recommended the following data handling procedures for initial program phases:
 - 1) CAL should return data to sites for review, and any identified problems should be reported to NREL (Program Coordinator's Office).
 - 2) Data from CAL should be transferred in computer-compatible format, and complete data sets should be made available. Estimated there may be a six-month lag, at least initially, before the complete set is available.
 - 3) No solution concerning long-term data analysis and management procedures was reached.
 - Subcommittee 5 —
Suggested urgency in putting together a report with respect to future effects work.

Coordination Office Report -

Jim Gibson presented the Coordinator's report.

1. Leave of Absence. Jim will be on leave for one year, beginning November 1. He will be working with EPA at Research Triangle Park, North Carolina.
2. The official number of active sites is 198.
3. Publications. Data is finally meeting the six-month lag time which was discussed in 1978. Data through April 1988 is now available, and all 1987 data has been published. A revised site operations manual has also been published.
4. Changes in staff at the Coordination Office.
 - A. Carol Simmons will be Acting Coordinator in Jim's absence.
 - B. Sharren Sund, who is already employed part-time in NREL, will be assisting Carol while Jim is away.
 - C. Have hired a person to be involved with site activities. Sarah Klahn is the new site liaison in the Coordination Office.

Jim showed slides depicting the network map as it was in 1978, the current map, a breakdown of current agency support, and a statement from the NAPAP review.

"The monitoring program and its resultant data set, that is being constructed, is perhaps the most significant, long-term, continuous and comprehensive sampling and analysis program to be undertaken in the environmental sciences."

Nominating Committee -

Wayne Banwart reminded the audience that NADP (IR-7) follows a policy of rotation of officers, and the Technical Committee will be electing a secretary to start through the chairs. Bob Heil, Keith Huston, Paul Kapinos and John Robertson have been asked to serve as a nominating committee to select a candidate for this position.

Site Operator Awards -

The NADP Technical Committee recognizes and appreciates the long-term commitments from many of the site operators. Certificates are awarded to those operators with five years of continuous service who have attended the operator training at CAL. This year's recipients are listed below.

Five-Year Certificate Awards			
<u>Operator</u>	<u>CAL Code</u>	<u>Site Name</u>	<u>Supervisor</u>
Lou Brenan	IN34	Indiana Dunes	Lou Brenan
Michael J. Newell	MD13	Wye	Russell Brinsfield
Sam Giacopelli	OR02	Alea Guard Ranger Station	Dixon L. Landers
	OR97	Hyslop Farm	

A new award was developed for this year as the program now has a number of operators who have served continuously for ten years and have participated in the CAL training. A plaque to recognize and honor these individuals was designed and presentations of individual plaques were made to site supervisors or other representatives present at the meeting. Ten-year awards are shown below.

<u>Operator</u>	<u>CAL Code</u>	Ten-Year Plaque Awards <u>Site Name</u>	<u>Supervisor</u>
John Melin	GA41	Georgia Station	Jerry Walker
Bill Dunn	MI53	Wellston	Elon S. 'Sandy' Verry
Arthur E. Elling	MN16	Marcell Experimental Forest	Elon S. 'Sandy' Verry
Julia Skinner	NC03	Lewiston	Cari Sasser
David Saf	PA29	Kane Experimental Forest	David Marquis

Meeting Agendas -

Steve Lindberg, Vice Chairman, discussed the meeting agenda. A shorter format was developed for this year's meeting. The meeting will last 2 1/2 days, which allows time for a special symposium. Two field trips are also scheduled - 1) a tour of the NADP Central Analytical Laboratory, and 2) a trip to the University of Illinois power plant with the new SO₂ scrubber. A brief overview of planned agendas for each subcommittee was presented.

Invited Speakers -

- Dr. Michael Unsworth, University of Nottingham -
"Atmospheric deposition research in the United Kingdom"
- Dr. R. L. Linthurst, Environmental Protection Agency -
"EPA's proposed Environmental Monitoring and Assessment Program"
- Dr. Ann Bartuska, USFS -
"Air pollution in Poland"

Contributed Papers on Dry Deposition .

- "Large-particle cation dry deposition fluxes from NADP dry bucket data" -
D. Gatz, Illinois State Water Survey.
- "Progress towards developing and deploying the dry deposition system recommended by NADP in 1982" - B.B. Hicks
and T. P. Meyers, NOAA/ARL.

Poster Introductions and Presentations -

(Abstracts are available by writing Linda Bandhauer in the NADP/NTN Coordination Office)

- "Comparison of organic and inorganic contributions to weekly and event precipitation samples" - S. Bachman
- "A comparison of the chemistry of cloud water and precipitation" - J. Rothert and B. Demir
- "Comparison of the response of red spruce to Al in soil and solution culture" - J. M. Kelly
- "Overview of NOAA air parcel trajectory models and application to precipitation chemistry data" - R Artz
- "Deposition gradients of atmospheric aluminum on oak forest canopies" - R. Albright and
G. Aubertin
- "Comparison of heavy metal deposition by rain filtrate and particulate material at a semi-urban and a rural site" - K.
Steele, P. Thasan and E. R. Lawson
- "Bias in the analytical results reported by the National Atmospheric Deposition Program and the National Trends
Network" - R. See, T. Willoughby and L. Schroder
- "Comparison of Louisiana field data and NADP laboratory data" - L. M. West and S. E. Feagley

- “Long term changes in night time oxidant at one site in the northeast ozone corridor “ - A. VanArsdale
“The effects of acid rain on pollen development” - L. Craker
“The NADP/NTN Site Visitation Program. Results from the second round of visits” - C. Eaton
“Preliminary results of the NADP/NTN-CAPMon Intercomparison Study” - R. J. Vet, A. Sirois, and D. Lamb
“The National Park Service Ozone and Fine Particle Monitoring Network” - M. Scruggs
“Can the total atmospheric deposition of sulfur be inferred from throughfall?: Results from the EPRI Integrated Forest Study” - S. E. Lindberg
“Illustration of Voyager data exploration software” (demonstration) - R. Husar

Wednesday, October 26, 1988

Contributed Papers on Atmospheric Chemistry and Forest Effects -

- “NESCAUM Regional Particle Monitoring Network” - R. Poirot, Vermont Air Pollution Control
“Some characteristics of forest vegetation and acidic deposition in the Appalachian Watershed” -
S. Tajchman, West Virginia University

Invited Speakers -

- Dr. R. Harriss, NASA Langley Research Laboratory -
“The role of tropical forests in global tropospheric chemistry”
Dr. K. Nodop Norwegian Institute for Air Research -
“Air and precipitation quality and trends in Europe. Results of the EMEP Network”
Dr. W. Heck, USDA -
“Assessment of crop losses from ozone - NCLAN: A case study”

Thursday, October 27, 1988

Contributed Papers on Evaluating NADP Screening -

- “NADP/NTN sample invalidation procedures: An overview” - C. Simmons, Colorado State University
“Comparisons of flagged and unflagged NADP data - what are the effects of CAL screening procedures” -
V. Bowersox, Illinois State Water Survey
“Evaluation of NADP data screening procedures: Effects of data completeness criteria on rain chemistry statistics” -
J. Lynch, The Pennsylvania State University

Business Meeting -

Wayne Banwart called the final session of the 1988 NADP (IR-7) Technical Committee Meeting to order.

Poster -

Dick Semonin commented that the Illinois State Water Survey has benefitted greatly in their role as Central Analytical Laboratory for NADP, and they have chosen to recognize sites as their statement in honor of the meeting being held in Champaign. A poster was designed which displays every initial ever seen on a field form - ~1,200 names. It also includes a list of leaders which was developed from past Executive Committee listings. One of the posters will be sent to everyone attending the meeting and each site will receive a copy.

Announcements and Miscellaneous -

Gary Stensland announced that a special symposium, "The Spatial Analysis of Wet-Deposition Data," is being held in conjunction with the Technical Committee Meeting. The first session will begin at 2 p.m. today.

Several lighthearted awards were presented to participants, and thanks were expressed to the CAL for the poster.

Subcommittee Reports -

Network Operations -

Gerald Aubertin, Chairman, asked Cary Eaton to report on the interim subcommittee meeting in April.

1. Merged former subcommittees No. 1 (Network Site Criteria and Standards) and No. 2 (Methods Development and Quality Assurance) into one subcommittee and changed the name of the subcommittee to Network Operations.
2. Accepted the charges and responsibilities developed for the new subcommittee.
3. Reports from standing committees:
 - A. CAL
 - B. USGS External Audit Program
 - C. Coordination Office
 - D. Site Visitation Program
 - E. Operator Training
4. Reports from special committees:
 - A. Subcommittee Charges and Responsibilities
 - B. Training Film
 - C. Status of NPS Data
 - D. pH Bias
 - E. Sample validation procedures
 - F. "C" coded sample results will be included in blind audit reports

Discussions at the current meetings included the following topics.

1. CAL Report.
 - A. An administrative audit was conducted, and CAL was found to be efficient, well staffed, and well-run.
 - B. 1986 Lab QA report is being published and the '87 report is near completion.
 - C. Three training sessions were held over the past year with 71 operators and/or supervisors attending.
 - D. Data publication is up to date, with a 6-month data turnaround.
2. Training film.
3. External Audit Program
 - A. Intersite comparison
 - B. Blind audit program.
 - C. Interlaboratory comparison
 - D. Collocated sampler study.

4. Coordination Office Report.
 - A. Data continues to be available; publication of reports is on schedule.
 - B. Currently 198 active sites in the network.
 - C. Receiving increased data requests.
 - D. COED working well, and they are filling numerous requests (75 motor boxes in the past year).
5. Site Visitation Program. Improvements have been noted, and it is felt they are linked strongly to COED replacement parts and the pH electrode replacement plan.
6. QA Steering Committee reported on progress of the revised QA Plan.
7. Implementation of the Remedial Action Plan.
8. Mark Peden discussed assessment of the blind audit program, and reported that the program is doing well.
Recommendation: *That "C" coded information be included in the blind audit reports.*
9. NPS will provide funding to CAL to analyze the data from EMSI.
10. Great deal of interest in future directions of NADP.
11. 1988-89 officers are:
 - Chairman - Scott Dossett
 - Vice Chairman - Cary Eaton
 - Secretary - Randy See

MOTION: That the subcommittee report be approved. Seconded and carried.

Data Management and Analysis -

Van Bowersox reported that the subcommittee met twice.

1. Status of NPS/EMSI data.
 - A. EMSI data (March-September, 1987) did not report a "method detection limit" (MDL), which is reported when a value is small. EMSI simply reported whatever the instrument said, resulting in some positive and some negative. CAL uses MDL.
Recommendation: So that the data in the NPS/EMSI set are available in a format comparable to the CAL format, it is recommended that the QA Coordinator request data from EMSI so that a MDL can be identified.
MOTION: That the recommendation be accepted; seconded and carried.
 - B. NPS has provided funding for CAL to enter these data into the NADP/NTN data management system, to screen the data, then to report the final screened data to Coordination Office.
This project is to be completed 6 months after the date received by CAL.
2. Decision was made at April meeting to change the temporal distribution plots in the annual data summaries. Following much discussion of alternatives, the subcommittee agreed on the following recommendation.
Recommendation: *That the format used in the 1987 Annual Data Summary for pH, SO, NO₃⁻, NH₄⁺, H⁺, Mg²⁺, Ca²⁺, and precipitation weighted average values continue to be used for each site-month of data where completeness criteria were met, and the Coordination Office should continue to evaluate the current completeness criteria.*
MOTION: For acceptance of this recommendation; seconded and carried.
3. Doug Sisterson proposed a change in the Remedial Action Plan that would involve the Data Subcommittee, as well as the Network Operations and Effects Subcommittees, in the decision gathering process.
Recommendation: *That the Data Management and Analysis, Network Operations, and Effects Research subcommittees would provide input as to the technical or scientific ramifications of a violation of network protocol to the QA Steering Committee. The role of the data subcommittee would be technical and advisory and the Steering Committee would be the decision-making forum as to what action were warranted.*
Technical Committee decision on this recommendation was deferred until report from the QA Steering Committee.
4. Currently there must be valid samples for ~75% of summary period (39 of 52 weeks of year) for site-year of

data to be included in the annual summary report.

Recommendation: *Samples where gage (or bucket, if gage not available) depth <.02" would be considered valid by default for purposes of evaluating the data under Completeness Criteria No.1. This does not mean that such data would be used in chemistry calculations; time period only would be considered valid. This will be a retroactive change, and the Coordination Office is to recalculate all data under this new criteria.*

MOTION: That the recommendation be accepted. Seconded and carried.

Dave Bigelow questioned if changes should be made to reflect these recalculations in the ADS data base. As it stands, they will be reflected only in the Coordination Office data. It was suggested that a letter be sent to ADS stating the recalculations have been made and let them decide.

5. Drafted and accepted 14 subcommittee charges and responsibilities for inclusion in the revised Quality Assurance Plan.
6. Election of officers for 1988-89.

Chairman - Warren Knapp
Vice Chairman - Jim Lynch

The subcommittee report was approved as presented.

Effects Research -

Denis DuBay reported that the subcommittee discussed two basic topics.

1. Effects research funding. Developed resource priorities for funding for the next year's cycle. A list will be sent to Jack Barnes. The priorities are (not in priority order, but an indication of priority areas):
 - A. Integrated stress
 - B. Exposure dynamics
 - C. Mechanism of pollutant damage
2. Discussion of broadening the scope of NADP to include monitoring of other pollutants which, from an effects research viewpoint, is very important. A partial, but not all-inclusive, list includes ozone, nitrogen oxides, metals, semi-sensitive organic materials (SOCs), volatile organic compounds (VOCs), CO₂, and UVb radiation.

There were discussions of how NADP might accomplish this expanded monitoring, recommendations on the breadth and extent of initial monitoring, methodology involved, whether there is instrumentation available, and a rough estimate of costs, based on breadth and instrumentation required. The subcommittee will develop statements reflecting questions such as these for each pollutant, and individuals connected with existing efforts or who have knowledge in these areas will be asked to assist.

It was suggested that an indication of how much time and money will be involved is needed. and that a Tuesday-to-Tuesday routine be maintained where possible. Development of the list and supporting statements for each pollutant will stimulate thinking about a direction for NADP. The intent is to go to the agencies that will be considering further support for NADP.

3. Officers for the coming year are:

Chairman - Alan VanArsdale
Vice Chairman - Walt Heck

Resolution -

Doug Sisterson was asked to present relevant discussions from the Executive Committee meeting. The Executive Committee feels it is important that a unified approach be developed to keep the network operating, and a resolution has been developed to express what they recommend to the Technical Committee. .

Resolution

“Whereas the United States needs a permanent, high quality network to quantify the continuing changes that our society makes in the chemical composition of our atmosphere and to understand the effects of these changes, and

Whereas the National Atmospheric Deposition Program (NADP/NTN) has established one of the most significant, long-term, continuous and comprehensive sampling and analysis programs in the environmental sciences, and

Whereas the governance of NADP/NTN has been a successful model of a uniquely democratic, “scientist driven,” and “bottom-up” organization,

Be it resolved that the full Technical Committee of the NADP/NTN finds it imperative that scientists and administrators work diligently to insure a mechanism is in place to extend the tenure of the invaluable efforts in acidic deposition monitoring expended over the past 12 years into the immediate future and beyond 1992. NADP/NTN recognizes the need to broaden our activities to include other important atmospheric constituents relating to effects. The Technical Committee of the NADP is anxious to assist in the development of plans for the future.

Further, the Technical Committee charges the Executive Committee of NADP to draft appropriate letters to agency administrators reflecting the tenor of the above resolution.”

Steve Lindberg elaborated on the intent of the resolution. It is designed to:

1. Define a need.
2. Provide framework for Executive Committee to use to address needs on national issues.
3. Reflect cooperation and show that IR-7 and other ag agencies are ready to respond to new effects-related issues.
4. Provide frame work for the Executive Committee to develop letters and identify agencies and people to whom letters should be targeted.

There was discussion of the text of the resolution. The Executive Committee will refine the resolution and draft letters, specifically aimed at identified agencies, within the next few weeks. They will develop a need for national monitoring, and show what NADP is and how it fulfills that need.

MOTION: That the resolution (in principle) be adopted. Seconded and carried.

MOTION: That the Effects Subcommittee report be accepted as presented. Seconded and carried.

Quality Assurance Steering Committee -

Don Bogen reported that the committee held an interim meeting in April. Major topic for that meeting was the status of QA plan revisions. The steering committee met twice at this meeting. Items discussed included:

1. Report from the management review of the Coordination Office and CAL in August. Members of the review team were Jack Barnes, Bernie Malo and Paul Kapinos. A written report was presented to the committee. Operations at CAL and the Coordination Office were in good stead, with only a few recommendations.
2. Revision of QA Plan. There are four parts to the plan; three parts are in good shape and revisions have been made. The section on field studies hasn't been addressed. Cary Eaton and Scott Dossett will write this section, with review in the spring. There will also be a fifth chapter on assessment and quality of the network itself. Scheduled agenda for completion of the plan is to have the final product available for the 1989 meeting.
3. Remedial Action Plan (RAP). Consists of two parts.

A. Discussions by the committee regarding noncompliance by a particular site. One individual has been charged to communicate with this site to hopefully achieve compliance.

B. Plan developed by Sisterson which attempts to implant policy statements in the Remedial Action Plan, addressing what should be done when sites are in noncompliance. An *ad hoc* committee comprised of Doug Sisterson, Bernie Malo and Jerry Aubertin has been established to prioritize violations and review action taken. Their report will be available for consideration by the committee in February and will go to the Executive Committee for discussion in the spring. Hopefully, it will be presented at the fall 1989 meeting.

4. Eight quality assurance reports have been published within the past year - two from CAL, four from USGS, and two from Research Triangle Institute (the site visitation team).

MOTION: That the Quality Assurance Steering Committee report be accepted as presented. Seconded and carried.

Operator Training Film -

Paul Kapinos reported that for a number of years efforts have been made to develop a film for use by backup or new operators until such time as official training could be accomplished. USGS has issued a contract to Illinois State Water Survey to prepare a shooting script. A contract was also let to the U.S. Military Academy to tape and edit the film. A committee comprised of Doug Sisterson, Dave Bigelow, Scott Dossett, Maj. Marovitz from West Point, and Paul reviewed the script. All "pr" was cut from the beginning, retaining only mention of the program and the value of the operators from field operations to field lab operations, resulting in a film which runs close to an hour. This will be strictly a training film. The script will be reviewed a second time on November 14, with the final version available Thanksgiving week, and filming to be done at West Point the week of November 28 or December 12. Approximately 250 copies will be produced, providing a copy which can be viewed on a standard home video machine for each site.

Wayne Banwart expressed thanks to all subcommittee members for their work.

Election of Officers -

The nominating committee reported that they selected Bill McFee as a candidate for Secretary. The floor was opened for additional nominations. None were received, and following motion to close the nominations. William W. McFee was unanimously elected Secretary of the NADP (IR-7) Technical Committee. Officers for 1988-89 are:

Chairman - Steven E. Lindberg, Oak Ridge National Laboratory
Vice Chairman. - Douglas L. Sisterson, Argonne National Laboratory
Secretary - William W. McFee, Purdue University

(A complete listing of 1988-89 Executive Committee members is attached.)

1989 Meeting -

Alan VanArsdale informed the group that the immediate Boston area is not feasible due to costs. Two alternative options have been explored — Provincetown, Massachusetts, on the tip of Cape Cod, and a conference center in Durham, New Hampshire. Both options were described for the group.

MOTION: That Provincetown be chosen as the location for the 1989 Technical Committee Meeting. Seconded and carried. The 1989 meeting will be held the week beginning October 23, in Provincetown, Massachusetts.

1990s Meetings -

Paul Kapinos suggested that Austin, Texas, be considered for the 1990 meeting, based on several recommendations made to him. The USGS district office will help with the logistics of planning the meeting. Jim Lynch volunteered to host a meeting at Penn State.

MOTION: That Austin, Texas, be the location for the 1990 meeting and that the 1991 meeting be held at Penn State. Seconded and carried.

Closing -

Wayne Banwart expressed special thanks to the Illinois State Water Survey CAL for hosting the meeting and for the excellent tour at CAL, as well as to Steve Hilberg for his assistance in making arrangements, and handling things locally. Thanks were also expressed to Steve Lindberg and Denis DuBay for planning and putting together the program. Additional thanks went to the agency advisors for their contributions, to Carol Simmons who will be Acting Coordinator for the coming year, and to Linda Bandhauer of the Coordination Office for her efforts.

A second resolution was presented to the Technical Committee for their approval.

Resolution

“Whereas Dr. Keith Huston is an outstanding scientist, administrator, and leader in national agricultural policy, and

Whereas he profoundly influenced the organization and early direction of the National Atmospheric Deposition Program, North Central Project 141, and

Whereas he was instrumental in the designation of NADP as an Interregional Project (IR-7) and in the creation and continuation of the Special Grants Program in CSRS for support of effects research, and

Whereas he has given sound advice and unwavering support to the organization since its inception in 1977 and plans to retire before we assemble again,

Be it resolved that we, the Technical Committee of IR-7, express our gratitude and appreciation to Keith for his numerous contributions to NADP, for the friendship he extended to each of us, and for his furtherance of understanding of atmospheric science and its relationships to aquatic and terrestrial systems.

We wish him every success in his future endeavors.”

The resolution was approved with a standing ovation.

The “nongavel” was passed to Steve Lindberg, incoming Chairman of the Technical Committee. A final, humorous award was presented to Gary Stensland. and thanks were expressed to the outgoing Chairman, Wayne Banwart. Steve closed the meeting with a few comments regarding what he believes should be the critical charges of the second decade of NADP. They are:

1. Challenge facing EPA.
2. Consideration of the European perspective.
3. Global scale.
4. Enlarging of atmospheric constituents.
5. Preparation of formal interpretive study.
6. Working together to insure continuation of NADP over the next decade.

The 1988 Technical Committee Meeting was adjourned.

Participant List

<u>Name</u>	<u>Affiliation</u>
Ray Albright	Southern Illinois University
William Alsop	MA Department of Environmental Quality Eng
Tom Armentano	Butler University
Richard Artz	NOAA/Air Resources Laboratory
G. M. Aubertin	Southern Illinois University
Sue Bachman	Illinois State Water Survey
Linda Bandhauer	NADP/NTN Coordination Office
Wayne Banwart	University of Illinois
W. Richard Barchet	Battelle, Pacific Northwest Laboratory
John 'Jack' M. Barnes	USDA Cooperative State Research Service
Ann Bartuska	North Carolina State University
Berne Bennett	U.S. Environmental Protection Agency
David Bigelow	NADP/NTN Coordination Office
Donald Bogen	U.S. Department of Energy/EML
Van Bowersox	Illinois State Water Survey
Boris Chevone	Virginia Tech
Richard Cline	U.S. Forest Service
Lyle Craker	University of Massachusetts
Brigita Demir	Illinois State Water Survey
A. Scott Denning	National Park Service
Dieter Deumling	Environment and Forestry Systems
Scotty Dossett	Illinois State Water Survey
Kathy Douglas	Illinois State Water Survey
Denis DuBay	North Carolina State University
Greg Dzurisin	Illinois State Water Survey
Cary Eaton	Research Triangle Institute
Herb Feely	U.S. Department of Energy/EML
Joel Frisch	U.S. Geological Survey
David Gardner	University of Minnesota
Donald Gatz	Illinois State Water Survey
Armand Gaudenzi	Atmospheric Environment Service
James Gibson	NADP/NTN Coordinator
Richard Grant	Purdue University
Robert Harriss	University of New Hampshire
Walter Heck	USDA/ARS
Robert Heil	Colorado State University
Rudolf Husar	Washington University
Keith Huston	North Central Association of SAES Directors
Kenni James	Illinois State Water Survey
Paul Kapinos	U.S. Geological Survey

Michael Kelly	Tennessee Valley Authority
Edward Klappenbach	U.S. Environmental Protection Agency
Warren Knapp	Cornell University
John Kush	Auburn University
Dennis Lamb	Penn State University
Barbara Levinson	U.S. Environmental Protection Agency
Steven Lindberg	Oak Ridge National Laboratory
Richard Linthorst	U.S. Environmental Protection Agency
James Lynch	Penn State University
Bernard Malo	U.S. Geological Survey
C. Wayne Martin	Hubbard Brook Experiment Station
William McFee	Purdue University
Tilden Meyers	NOAA/Air Resources Laboratory
Andrea Morden-Moore	Illinois State Water Survey
Dale Nichols	USDA Forest Service
Katrin Nodop	Norwegian Institute for Air Research
William Parkhurst	Tennessee Valley Authority
Mark Peden	Illinois State Water Survey
Jack Pickering	U.S. Geological Survey
Richard Poirot	Vermont Department of Environmental Conservation
Dudley Raynal	SUNY, Syracuse
Neville Reid	Ontario Ministry of Environment
Al Riebau	Bureau of Land Management
John Robertson	U.S. Military Academy
Bruce Rodger	Wisconsin Department of Natural Resources
Jackie Sauer	Illinois State Water Survey
LeRoy Schroder	U.S. Geological Survey
Mark Scruggs	National Park Service-AIR
Randolph See	U.S. Geological Survey
Richard Semonin	Illinois State Water Survey
David Shriner	Oak Ridge National Laboratory
Cheryl Silcox	U.S. Geological Survey
Carol Simmons	NADP/NTN Coordination Office
Douglas Sisterson	Argonne National Laboratory
Loretta Skowron	Illinois State Water Survey
Luther Smith	NSI Technology Services Corporation
Michael Snider	Illinois State Water Survey
Kenneth Steele	University of Arkansas
Gary Stensland	Illinois State Water Survey
M. Ali Tabatabai	Iowa State University
Stanley Tajchman	West Virginia University
Jerome Thomas	USDA Forest Service
Michael Unsworth	University of Nottingham
Miguel Valdes	Southern Illinois University

Alan VanArsdale
Bob VandeKopple
Shashi Verma
Elon 'Sandy' Verry
Robert Vet
Lois West
Tim Willoughby
Toiva Ylärinta
Eugene Ziegler

MA Dept of Environmental Quality Engineering
University of Michigan
University of Nebraska
USDA Forest Service
Atmospheric Environment Service
Louisiana State University
U.S. Geological Survey
Agricultural Research Center of Finland
University of Illinois