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Project Summary

Quality Assurance Support for the National Atmospheric Deposition Program and National Trends Network Monitoring Activities: 1984-1987

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The full report is a summary of quality assurance activities in the NADP/NTN monitoring network between the years 1984-1987. The report presents the accomplishments and recommendations for the network.

The recognized accomplishments of the network are: implementation of a Quality Assurance Plan; expansion of the network data base; evaluation of the effectiveness of procedures, and intercomparison of data sets with other networks.

Recommendations emphasized expansion of the role of the network Quality Assurance Manager and extension of collocated sites with other networks.

The report incorporates six other NADP/NTN quality assurance reports and procedures which had been previously released by the Coordinator's office.

This Project Summary was developed by EPA's Environmental Monitoring Systems Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

The National Atmospheric Deposition Program (NADP) monitoring network began operation in July 1978. The network is comprised of local, state and federal agencies as well as private industry. The NADP additionally coordinates and manages the National Trends Network (NTN). Because the NTN had incorporated the majority of the current NADP sites and had adopted the operating procedures and protocols at the NADP network, the resulting cooperative effort became known, in 1983, as the NADP/NTN deposition monitoring network.

The NADP is unique in its structure and mode of operation because it represents hundreds of interested individuals and many agencies that cooperate voluntarily to operate monitoring sites and to pool data and research efforts under the aegis of the NADP. Committees made up of scientists from all the cooperating agencies oversee the various areas of network operations (siting, analysis, data management, and quality assurance) to ensure that data will be of the highest quality and be available for a wide variety of research needs.

Much of the network quality assurance documentation has been reported in the scientific literature, at professional and technical meetings, or in various agency reports. A comprehensive Quality Assurance (QA) Plan has been developed to cover all aspects of network operation.

The plan recommended the establishment of the position of a QA Manager.

Accomplishments

Initial efforts focused on gathering and completing documentation necessary to coordinate and evaluate existing and proposed quality assurance efforts in order that an evaluation of data quality might be made.

Implementation of the QA Plan started with a cataloging of quality assurance programs that were currently in use. Documentation for each of the programs in Table 1 was sought along with the standard operating procedures for the network. Some of the more important documents that were incorporated into the network standard operating procedures are listed in Table 2.

Expansion of the network data base incorporated information generated by the U.S. Environmental Protection Agency's Site Visitation Program, the U.S. Geological Survey's Intersite Comparison Program and the summary statistics containing the data completeness coding developed by NADP.

Four major reviews were undertaken to evaluate the effectiveness of the procedures used in the NADP/NTN monitoring effort and to identify areas where improvements could be made. These included two reviews of the implementation of the Acid Deposition System for Statistical Reporting (ADS), a systems audit of the U.S. Geological Survey's Intersite Comparison Program and External Quality Assurance Program, and a systems audit of the data management practices used within the NADP/NTN and ADS. Additionally, the central laboratory operations were reviewed.

Intercomparison data sets with other networks were accomplished. Some of these intercomparisons are listed in Table 3.

Recommendations

- An official depository of standar operating procedures should b maintained in the Quality Assuranc Manager's office.
- The Quality Assurance Manage should evaluate and documen network data quality and networ procedures through the publication c quality assurance reports.
- Sponsors should continue to suppor the Quality Assurance Manager' participation in auditing, documer reviews, and scientific meetings.
- Collocated station comparison between NADP/NTN and othe networks need to be expanded.
- A quality assurance program designe to estimate network precision and bia should be developed.
- The comparability of NADP/NTN dat to that of other networks should b established.

Table 1. NADP/NTN Monitoring Network Quality Assurance Activities and Their Sponsoring Agencies

Task No.	Task Name	Operating Agency*	Program Name
Field Site Operations:			
1.	*Quality Control of Field Operations*	*CAL*	*CAL Site Interactions*
2.	*Quality Assurance of Field Operations*	*CSU*	*Across Site Network Analysis*
3.	*Systems and Performance Audit of Field Operations*	*EPA (RTI)*	*NADP/NTN Site Visitation Program*
4.	*Quality Assurance of Site Chemical Analysis*	*USGS*	*Intersite Comparisons*
Laboratory Operations:			
5.	*Laboratory Quality Control*	*CAL*	*CAL QA program*
6.	*Laboratory Quality Assurance*	*CAL*	*Interlaboratory Comparisons*
7.	*Laboratory Systems Audit*	*NADP Subcommittee 2*	
Data Management:			
8.	*Quality Control of Site/Chemical Analysis Data through Data Management*	*CAL*	*Data Screening and Coding*
8.	*Quality Control of Site/Chemical Analysis Data through Data Management*	*CSU*	*Data Screening, Coding and Summary Reporting*
9.	*Quality Control of Data Management*	*PNL*	*Acid Deposition System (ADS) for Statistical Reporting*
10.	*Quality Assurance of Network Data Management*	*QA Steering Committee*	*Systems and Performance Audit of the Data Management Program*
Network Operations:			
11.	*Performance Audit of Field and Laboratory Chemical Analysis*	*USGS*	*Blind Audit Program*

Table 1. (Continued)

Task No.	Task Name	Operating Agency*	Program Name
12.	Laboratory Quality Assurance	USGS	Interlaboratory Comparisons
13.	Performance Audit of the Network	CSU	Network Intercomparison's with CANSAP/CAPMoN
14.	Special Studies which assess various components of Network performance	ALL	Published Scientific Research Results
15.	Systems Review of Deposition Monitoring Network	TASK GROUP 4	NAPAP Annual Review
15.	Systems Review of the Deposition Monitoring Network	QA Steering Committee	IR-7 Annual Review

*CAL—Central Analytical Laboratory, Illinois State Water Survey
CSU—Natural Resource Ecology Laboratory, Colorado State University
EPA—Environmental Monitoring Systems Laboratory, Environmental Protection Agency
PNL—Battelle's Pacific Northwest Laboratory
RTI—Research Triangle Institute, Research Triangle Park, NC
USGS—National Water Quality Laboratory, U.S. Geological Survey
Task Group 4—National Acid Precipitation Assessment Program (NAPAP)
QA Steering Committee—National Atmospheric Deposition Program

Table 2. *NADP/NTN Quality Assurance Related Publications*

No.	Type	Publication
Field Site Operations:		
1.	SOP	Semonin and Volchok, 1979. Site Selection and Certification, North Central Regional Project NC-141:Atmospheric Deposition (National Atmospheric Deposition Program).
2.	SOP	Bigelow, 1984. Instruction Manual: NADP/NTN Site Selection and Installation.
3.	SOP	Semonin and Volchok, 1978. Field Observer Instruction Manual, North Central Regional Project NC-141:Atmospheric Deposition (National Atmospheric Deposition Program).
4.	SOP	Bigelow, 1982. Instruction Manual: Site Operation.
5.	SOP	Dossett, 1984. Aerochem Metrics Precipitation Collector Maintenance Manual.
6.	SOP	Eaton and Tew, 1985. Work Plan for Quality Assurance Assistance to the National Atmospheric Deposition Program and the National Trends Network Deposition Monitoring Program.
7.	SOP	Stensland et al., 1983. NADP Quality Control Procedures for Wet Deposition Sample Collection and Field Measurements.
8.	Report	Stensland and Bowersox, 1982. Evaluation of Dry Wet-Side NADP Samples.
9.	Report	Schroder et al., 1985. Comparison of Daily and Weekly Precipitation Sampling Efficiencies Using Automatic Collectors.
10.	Report	Bigelow, 1986. Quality Assurance Report: NADP/NTN Deposition Monitoring; Field Operations.
11.	Report	Schroder and Brennan, 1985. Precision of the Measurement of pH and Specific Conductance at Naitonal Atmospheric Deposition Program Monitoring Sites, October 1981-November 1983.
12.	Report	Schroder and Brooks, 1987. Results of Intercomparison Studies for the Measurement of pH and Specific Conductance at National Atmospheric Deposition Program National Trends Network Monitoring Sites, October 1981-October 1985.
Laboratory Operations:		
13.	SOP	Peden et al., 1979. Precipitation Sample Handling, Analysis, and Storage.
14.	SOP	Peden et al., 1986. Methods for the Collection and Analysis of Precipitation.

Table 2. (Continued)

No.	Type	Publication
15.	Report/SOP	National Atmospheric Deposition Program, 1980. NADP Quality Assurance Report, Central Analytical Laboratory, January 1, 1979 to December 31, 1979.
16.	Report	Peden, 1983. Sampling, Analytical, and Quality Assurance Protocols for the National Atmospheric Deposition Program. Sampling and Analysis of Rain.
17.	Report	Lockard, 1987. Quality Assurance Report: NADP/NTN Deposition Monitoring, Laboratory Operations, Central Analytical Laboratory, 1978 through 1983.
Data Management:		
18.	SOP	Bowersox, 1985. Data Validation Procedures for Wet Deposition Samples at the Central Analytical Laboratory of the National Atmospheric Deposition Program.
19.	Report	Stensland and Bowersox, 1985. Quality Assurance in Acid Precipitation Monitoring Through the Use of Ion Balance Calculations.
Overall Program Quality Assurance:		
20.	SOP	Cowling et al., 1977. Plan of Research for NC-141 North Central Regional Project on Atmospheric Deposition: Chemcial Changes in Atmospheric Deposition and Effects on Agricultural and Forested Land and Surface Waters in the United States.
21.	SOP	Robertson and Wilson, 1985. Design of the National Trends Network for Monitoring the Chemistry of Atmospheric Precipitation.

Table 3. Co-location of NADP/NTN Sites with Other Networks

Site Name	Location	Network
Bondville	Illinois	MAP3S
Caribou	Maine	CANSAP
Charlottesville	Virginia	MAP3S
Clinton	Mississippi	UAPSP
Douglas Lake	Michigan	CANSAP
Finley	North Carolina	UAPSP
Fernberg	Minnesota	APIOS
Giles County	Tennessee	UAPSP
Glacier National Park—Fire Weather Station	Montana	CANSAP
Kejimkujik National Park	Nova Scotia	CANSAP
Lethbridge	Alberta	CANSAP
Mount Forest	Ontario	CANSAP
Mount Forest	Ontario	APIOS
Oxford	Ohio	MAP3S
Penn State	Pennsylvania	MAP3S
Sutton	Quebec	CaPMoN
Tanbark Flat	California	California-ARB
Underhill	Vermont	UAPSP
Walker Branch Watershed	Tennessee	MAP3S
Whiteface Mountain	New York	MAP3S

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The complete report, entitled "Quality Assurance Support for the National Atmospheric Deposition Program and National Trends Network Monitoring Activities: 1984-1987," (Order No. PB 88-174 438/AS; Cost: $32.95, subject to change) will be available only from:
National Technical Information Service
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