NADP Interim Meeting
Boulder, Colorado
May 3-5, 1999

Network Operations Subcommittee (NOS) Meeting
May 4, 1999

♦ Introduction

Introduction by John Gordon. See Attachment #1 for NOS Agenda.

♦ Approval of Minutes

Minutes for October 1998, St. Petersburg, FL NOS meeting were approved with one minor change, surname spelling correction, Mark Losleben.

Motion #1: Accept minutes from 1998 Tampa fall meeting as corrected.
Joel Frisch moved, Rick Artz second, passed unanimously

♦ Program Office Report

Van Bowersox reported on the NADP Program Office. Staff needs include 2 GIS staff and the QA Manager position. The QA Manager will hopefully be hired this summer. NRSP-3 1998 Annual report was completed and sent to CSREES Multi-state Research Office in mid- March, see Attachment #2. Site Status as of April 30,1999: NTN-217, AIRMoN-10, MDN- 36. Eight Wisconsin sites will most likely be funded this fiscal year. Each site was sent a 1997 Seasonal and Annual Data Summary. The information will be available on the web. New funding partner the Bureau of Land Management was added to eight other federal agencies. The fall meeting is schedules for Sacramento, CA during the last week of October. Archival samples from 1993 will be thrown in the next 30 to 60 days. A professional writer has been hired to author the nutrient brochure. A draft will be shown to the Effects Committee for approval. Goal is to have the brochure out by August of 1999. Performance surveys by ATS have shown several tree violations. Possible need to add an additional classification scheme to whether or not they meet siting criteria. Web page development is presented on page 6 of the PO Report. Data will be available in a “water year” (October 1- Sept 30) by this fall.

♦ CAL Report

Karen Harlin reported on the CAL status. See Attachment #3 for full report. 11,000 samples are processed a year, 13,000 including AIRMoN. Dry Analysis ended fall of 1998. The 1996/1997 CAL QA report is available from Jane Rothert by request. Gelman filters were put into use in Jan. 1998 instead of the sodium biased Millipore. More staff is needed to help validate data.

♦ Mercury Deposition Network

Clyde Sweet reported on MDN status. A preservative problem was discovered with the mercury preservative, that certain amounts of sample could become a hazardous material. HAL has developed a new preservative that will exempt all samples from be hazardous materials. Six new sites and two closed, see Attachment #4. Site audits conducted by ATS will begin this summer, 1999. Five to ten audits will be done a year. The Program Office will carry out an audit of HAL in September of 1999, which will include facilities and data management activities. All MDN sites have dual pen recorders installed. New SOP to operators during the summer of 1999. The 1997 data will be put on the web shortly. The 1996 data report is being reviewed. Mercury collection and deposition maps for 1997 will be presented in NADP "map" brochure. Data lag from HAL will be worked out.

May 5, 1999

♦ USGS External QA Preliminary Report

John Gordon reported on the status of the External QA program. See Attachment #5 for summary slides of the results. John reviewed 1998 preliminary results from Field Blank program, Blind Audit Program, Interlaboratory Comparison Program, and Collocated Program.

In the interlaboratory comparison program, CAL was ranked #1 in terms of having the lowest median absolute difference on replicate samples for ammonium, calcium, chloride, magnesium, sulfate, and hydrogen ion. It was tied for first for potassium, second for sodium, fourth for specific conductance and tied for fifth for nitrate.

Preliminary field blank results showed small but statistically significant differences between the sample portion exposed to the bucket that had been in the field for one week and the control portion for all of the analytes except calcium and sulfate.

In contrast, the results of the blind audit program only showed a statistically significant difference between the bucket and bottle portions for hydrogen ion.

John displayed the median sample chemistry for each of the 1997-98 collocated sites and the median relative differences between the original and collocated sites in units of deposition and concentration. Deposition errors were generally larger, often by an additional 5 percent or more. Raingage measurements are used to calculate deposition values. The additional error observed in deposition values reflects the added variability added by the raingage measurements.

Laura Hult presented the Intersite Comparison Program results. Discussion ensued about Intersite results and that concern about poor performance from particular sites could possible be resolved sooner if the external auditors could meet with operator and work on the problems. Motion #2 resulted.

Motion #2: Persistent field measurement problems discovered by USGS Intersite Comparison results be passed on to external site auditors (ATS).
Amendment A: External site auditors (ATS) notify Scott of any site problems with intent of coordinating future site visits.
Mark Niles moved, Dennis Lamb second, passed unanimously

- **HAL Report**

Bob Brunette was not available to give report at this allotted time.

- **Site Visitation Program**

John Shimshock presented the scope of the ATS site audits, see attachment #6. Results are not included in this presentation.

- **Status of CASTNET incorporation into NADP**

Scott Dossett reported on the new CASTNet wet sites to NADP, see Attachment #7. Fifteen sites were added. All new sites are collocated with a CASTNet dry site. These sites did not have their siting validated before entering the network. All the site violations need to be categorized and resolved if possible. Most siting problems are the tall CASTNet towers, spacing between samplers, and overgrown vegetation. All equipment problems with the new sites have been resolved. The operators are doing well with collection and shipment but having problems with pH and conductivity measurements. Rain gages have a negative bias. QST, CASTNet site supervisor, will be conducting semi-annual dry audits and will work with Scott to address siting issues.

- **Revision to Subsampling Protocol**

Scott Dossett suggested a revision to the current subsampling protocol. He stated that the old protocol had problems such as at which point in sample collection is the subsample collected and actual amount of sample that can be taken. He suggests the following:

<300 grams	no subsampling
300 to 1100 grams	Can take over 100 g and leave at least 300 g
>1100 g	Do chemistry, fill bottle and then subsample

Discussion led to this motion:

Motion #3: NOS accept sub-sampling protocol as modified by Scott Dossett.
Changes are with minimum amounts needed by NADP lab and field parameters, 300 mL and descriptive wording added.
Amendment A, Gary Lear: 200 mL becomes the minimum needed by NADP instead of 300 mL.
Amendment B, Karen Harlin: Subsampling be indicated on field form and documentation added to protocol.

Special note that currently sub-sampling is allowed on case-by-case basis and this protocol does not change the policy.

Scott Dossett moved, John Gordon second, passed unanimously

More discussion about impact of new policy followed and led to this motion:

Motion #4: Follow up study by CAL is presented at fall meeting on the effects of 200 mL sub-sampling criteria on NADP sample volume adequateness.
Jane Rothert moved, Scott Dossett second, passed unanimously

- **Rain Gage Study Update**

Laura Hult reported on Phase I result of the rain gage study. See Attachment #8 showing statistical results. Phase I or bench test results overview:

Manufacturer	Gage	Technology	Comments
Belfort	3200	Vibrating-Force Transducer	Slightly negative bias above 1".
ETI	NOAH II	Pressure Transducer	Good agreement to 12".
Geonor	T-200	Vibrating-Wire Strain Gage	Slightly negative bias above 1".
OTT	PLUVIO	Electronic Weighing System	Good agreement to 8", negative bias above 8".

Phase II is the outdoor testing in Bay St. Louis, Mississippi. Gages set up on grid outside station. Most gages use external data loggers except for Olt Pluvio (has internal logger), Belfort and USGS stick gage. Phase II overview so far:

Manufacturer	Gage	Comment
Belfort	3200	Draws 126 mA/hour, needs AC.
ETI	NOAH II	Draws 15 mA/hour.
Geonor	T-200	Draws 121 mA/hour, needs AC but can be modified to take readings every 15 minutes to extend battery life.
OTT	PLUVIO	Draws 20 mA/hour.

Cost and data channels

Manufacturer	Gage	Data Channels	Approximate Cost
Belfort	3200	One hook-up	$5000 with external logger.
ETI	NOAH II	One hook-up	$5000 with external logger.
Geonor	T-200	One hook-up	$5000 with external logger.
OTT	PLUVIO	3 data channel hook-ups	$3500 includes logger, but needs external computer to download data.

Phase II statistical results will be presented next fall.

- **Network Growth Issue**

In light of the network growth, John Gordon wished to brainstorm about the future of the network and it's implications on resources. The following is a list of issues that will need to be addressed as the network grows.

1. ATS QA site audits- more sites means diminished site visit frequency
2. Laboratory analysis capacity
3. Equipment depot, i.e. service, time and money limits
4. External QA- more sites means diminished QA frequency
5. Siting- variances with different network coding schemes
6. Equipment- Aerochem Metrics, Inc. -what is their capacity? Scott D. stated that ISWS could have capacity with six months to produce an Aerochem with the proper staffing to support it.

Scott suggested to solve "dilution" of audit frequency ask the supporting agencies for more funding or redefine the QA criteria. How much QA is enough and are we getting what we are looking for?

Contingency Plan for Aerochem: Scott D. stated that a metal fabricator from private section could be located. Van should ask for money from budget committee to look into contingency plan for Aerochem.

Motion #5: NOS recommends that inclusion in the FY2000 Program Office budget an item to fund an Aerochem equivalent collector prototype be built.
Joel Frisch moved, Mark Peden second, passed unanimously

Growth for Laboratory-John G. thought that a contingency plan for growth should be in place by the CAL audit in September 1999. Rick thought it would be good to separate NTN and AIRMoN samples, separate lab, equipment, and personnel. The cost should be included in plan.

Motion #6: The Program Office is requested to present information to CAL audit team prior to 9/1/99 regarding ways to deal with laboratory capacity and function changes associated with network growth. Specifically including a strategy to separate AIRMoN and NTN analysis, and to address NTN and AIRMoN network growth ramifications.
Scott Dossett moved, Rick Artz seconded, passed with one opposing vote

- **External QA Issues**

Discussion then turned to specific External QA issues, lead by John G.
Currently the frequency is as follows:

A.	Collocated	In place for one year	2 sites
B.	Blind Audit	100 sites per year	3 sample sizes and 8 matrices
C.	Intersite	Twice a year at each site	
D.	Quarterly Field Blank	100 sites per year	3 samples sizes and 2 matrices
E.	Interlaboratory	Four labs participate	52 natural samples and 52 synthetic

Further discussion:

A. *Collocated sites*: There is concern whether or not a one-year precision is adequate. Scott suggested that three long-term sites could tell us more about precision. Collocated equipment is moved frequently and might not be the best representation of field equipment. To solve this, it was suggested to get a "fresh" Belfort from NED every year before deployment of collocated site. This lead to the following motion:

   Motion #7: NOS requests USGS to pursue a plan to change collocated sampler protocol to 2 stationary stations and 2 mobile stations instead of 2 mobile stations only.

   Scott Dossett moved, Dennis Lamb second, passes with one opposing vote

B. *Field Blank Program:* Scott asked why are there so many matrices and volumes? Could it be simplified to get more information on fewer combinations of volumes and matrices? USGS will address this issue at the fall meeting.

C. *Intersite Study:* Scott thought that the program worked well. More feed back between USGS and Program Office regarding problem sites is needed. Motion #2 addressed this issue.

- **CAL Audit Update**

John G. presented the CAL audit plan for this fall. See Attachment #9. Data Management Subcommittee wants to add another data person and Luther Smith was suggested. The audit will consist of site support, analysis, and data management within the context of a CAL audit. The audit will meet the USGS audit lab review requirement so only one audit will need to be conducted, saving money. Documentation and materials will be mailed by July 1, 1999. Performance samples will be included. Any input for specific items can be e-mailed to an audit team member. The audit is intended for CAL, not the Program Office. A written product will be provided to CAL following the audit. NTN and AIRMoN systems will both be audited.

- **Sodium Bias**

John G. presented the sodium blanks data since the protocol change (changing to Gelman filters). See Attachment #10, John's presentation. According to the statistical data the bias appears to have vanished since the Gelman filters were put into use.

Motion #8: Except final report on sodium bias hence the bias problem has been solved, (for now).

Joel Frisch moved, Scott Dossett second, passed unanimously

- **NOS Equipment Committee Report**

Equipment Committee was charged to look at network equipment and it's adequatecy for the future. Mark Nilles reported that the ad-hoc committee has issued an eight-page report, Statement of Needs, with a two-page summary. See Attachment #11 for details. Problems with current equipment are listed on Attachment #12, Mark's presentation. The committee developed a plan for a new deposition sampler and rain gage, see

attachment #11 and #12. Also a need identified was real-time data. The consensus statement from the committee is that the current equipment is becoming outdated and needs system wide refurbishment. Cost for refurbishing the network is substantial. The committee suggested that NADP ask for one time refurbishment funding for fiscal year 2001-2002. No cost estimate yet. Scott suggested that set up costs and manual modifications will take time and money. Specifications of samplers were listed, see Attachment #11.

Motion #9: NOS accepts and affirms presentation of concept of the need for new equipment (and technology) for the network.
Scott Dossett moved, Dennis Lamb, passed unanimously

Specifications approved by NOS for gage by November 1999. NOAA is putting Proposal for new collector in a RFP, condensed need for design. The Department of Commerce may give bidder $50,000 to $85,000 to design.

Motion #10: NOS endorses NOAA proposal and Rick Artz of NOAA will proceed with application to SBIR (Small Business Innovative Research) and the Dept. Of Commerce proposal for a next generation precipitation collector.
Scott Dossett moved, Dennis Lamb, passed unanimously

Specification discussion continues and leads to next motion:

Motion #11: NOS requests the Program Office to provide web site discussion area to post and discuss collector and gage specifications. Also announce by e-mail opening and closing of discussion area and call for a vote with date to be determined by NOS chair as advised by NOAA representative.
Amendment A: Collector and gage specifications posted by May 25, 1999.
Mark Nilles moved, Scott Dossett seconds, passed unanimously

- **NADP Siting Criteria**

Issue tabled for Joint Committee to discuss.

- **New National Park Service Sites**

Kristi Heuer from the NPS Air Resources Division discussed the proposal of seven new NADP sites. One of the sites, Hawaii Volcanoes NP, is the last of 14 PRIMENet (Park Research and Intensive Monitoring of Ecosystems Network) sites to get a wet deposition monitor. All PRIMENet sites currently monitor visibility, ozone, meteorology, ultraviolet radiation and wet and dry deposition. NADP is being added to the other six parks to complement existing CASTNet monitoring. These sites include Mount Ranier NP, Pinnacles NM, Voyageurs NP, Death Valley NP, Joshua Tree NP, and Lassen Volcanoes NP.

- **New AIRMoN Site**

Rick Artz relayed that a new AIRMoN site will be starting in West Virginia.

- **pH criteria for NADP Site Audits done by ATS**

John Shimshock presented the field laboratory challenges ATS conducts during an audit. The balance weights used are 821g, 1643g, 2465.8g, and 3288.3g pH challenge is 4.5 to 5.0 pH units. Specific conductance is 15-75 uS/cm. No accuracy goals were set when the scope of work. Goals are listed in Attachment #13.

Motion #12: NOS accepts accuracy goals for ATS field pH measurement challenges.
John Shimshock moved, Mark Niles second, passed unanimously

Motion #13: NOS accepts accuracy goals for ATS field conductance measurement challenges.
John Shimshock moved, Scott Dossett second, passed unanimously

The site audit schedule listed in the scope of work included the original 200 sites. Using this schedule, new sites wouldn't be audited. John proposed a new schedule that would audit all the sites every 2 years and 3 months beginning in year 2000.

Motion #14: NOS accepts ATS NTN audits schedule with two year time frame starting 1/1/2000 and maintains the audit schedule at 100 site audits per year. Additional sites to network will expand time between audits proportionately.
John Shimshock moved, Joel Frisch second, passed unanimously

John G. suggested that if NOS wants to keep the one every two year audit schedule and the current frequency of external audits, new money from site sponsors for additional audits otherwise audit dilution will continue. A growth plan should be in place. Scott suggested that new sites should be visited as soon as possible by ATS.

- **NOS Representation on the Executive Committee**

Scott had a concern about the lack of information for incoming chairs and the stoppage of information for past chairs. Voting privileges are not affected.

Motion #15: Executive Committee alias should include the NOS immediate past chair, current chair, and vice chair on mailing lists, e-mail lists, etc.
Joel Frisch moved, Jan Rothert second, passed with one opposing vote

- **NDAM Dioxin Program**

Scott presented an update on the EPA Dioxin Program. NADP is working with the EPA to select sites. Goal 15 more sites this year. Current status: Of the 15 notified in February of the possibility of NDAMN, 8 NTN sites are likely at this time, 3 are firm, NY65, OH09 and OH49.

- **WMO Interlaboratory collaboration**

Rick Artz presented a proposal that several WMO (World Meteorological Organization) laboratories be included in the Intercomparison Program. These labs have similar protocols, purposes and sampling methods of the current laboratory list. This would be a total of five labs in the Intercomparison Program.

Motion #16: NOS endorses the addition of two laboratories to the USGS Intercomparison Program (QST is discontinuing). The new laboratories are the Norwegian Institute for Air Research (NILU), precipitation chemistry coordination laboratory for the European Monitoring and Evaluation program (EMEP) and the Japanese Acid deposition and Oxidant Research Center (ADORC), precipitation chemistry coordination laboratory for the Acid Deposition monitoring Network in East Asia (EANET).
Rick Artz moved, Scott Dossett second, passed unanimously

- **HAL Update**

Bob Brunette presented the HAL, Frontier Geosciences, and MDN. 37 sites total, two shutting down, 4 pending in May, and 3 potential sites. Two sites moved because of siting.

Equipment: See Attachment #14
Dual Pen Event Recorder was implemented, 15 sites installed and 2 pending. Capillary tube, glass funnel and 2 liter bottle changes were implemented. Field preservative problems that classified the sample as a hazardous material. Bob proposed a solution of reducing HCl concentration to 0.1% and increase Chloride concentration to compensate.

Motion #17: NOS allows HAL to proceed with preservative experiment changing to new preservative scheme as proposed by HAL (lessen HCl to 0.1% and add KCl) to satisfy Dept. Of Transportation shipping requirements. A 10-day storage requirement instead of 7 day was added by NOS. HAL will report statistical results to NOS via e-mail and NOS will vote to accept or reject new preservative scheme via e-mail.
Bob Brunette moved, Scott Dossett seconds, passed unanimously

Frontier is conducting and AMC and MIC-B comparison at two sites and compare performance. Frontier participated in an Interlab audit with three labs that use the same methods. All three labs agree. The MDN doesn't have a Blind Audit Program and will talk to USGS about considering a plan. Data will be sent to Program Office every quarter in final form (?).

- **NEP and NERRS involvement**

Julie Thomas was not able to present

May 6, 1999

- **HAL Audit update**

Mark Peden reported on the HAL audit. The HAL Audit Team includes Mark Peden, Mary Ann Allen, David McTavish, Bob Burley, and Matt Landus. The audit will take place in August or September of 1999. HAL QA Manager has requested to be a by stander. HAL is to provide their SOP and Statement of Work prior to the audit the audit team. Clyde Sweet will be posting a more solidified plan to the NOS alias. Results will be presented at Fall meeting.

- **Shortening of Dryside bucket servicing**

History- When submitting the dryside buckets for analysis became optional the decision was made to perform all dryside bucket maintenance at ALL sites on the appointed Tuesday for those choosing to remain sampling the dryside. In this manner there should be minimum differences between the processing of the two classes of sites.

Current: Every 8th Tuesday. For 1999 the changes have been:1/5, 3/2, 4/27, 6/22, 8/17, 10/12, 12/7. Suggested changing protocol to the first Tuesday of each month

Motion #18: The NTN sites will change the dry side bucket and clean foam pad the every first Tuesday of the month starting January 4, 2000.
Scott Dossett moved, Mark Peden second, passed unanimously

- **Operator Manual Update**

Scott presented an update on the Operators Manual. The document is entirely electronic. Van has become a co-author to help write the Introduction and other sections. The document will be available in June, Sections 1-7 with no Appendices. Some will go out to site and fit into the three ring binders previously provided to sites. The manual contains a change in the field form, which removed the wet/dry option, box #3. An operator reviewing the new form. 500 manuals will be printed; half to sites and half distributed by request with appendices added. It will be posted on the web in black and white. Scott will notify NOS when document is ready.

- **Site Visit Presentation**

Presentation was not given due to lack of time. Results will be presented next fall.

- **Options for Dealing with the ATS Audits**

Presentation was not given due to lack of time. Results will be presented next fall.

- **Network Equipment Depot update**

Scott presented the inventory and request for equipment numbers. See Attachment #15.

Recent Improvements

-Essentially has achieved independence from ACM for all component repairs. As we experience different and more complex repairs more learning is ahead. For now we are comfortably able to independently repair the collectors.
-Driving motor units found at vendor (PITTMAN), ordered for trial and evaluated. Slightly different speed than standard ACM. Asking for equivalence motion here.
-Sources found for sensor heating pads, sensor enclosures and thermistors. Sensors being constructed from old parts have been evaluated and compared to new ACM units. Asking for equivalence motion here.
-Rain gage repair and field changeover changed to include attached event recorder. Change instructions still need to be modified.

Recent Problems

-Aerochem lid driving hardware. Attention must be paid to the bearings, bushings and other components making up the non-box drive assembly. This will require development.
-Cold testing of all rain gage clocks has stopped. It appeared that the chilling was causing some vapor trapping in the clocks and causing theme to malfunction.

Summary of Current Operation

No downtime due to lack of components. Not possible to tell if the frequency of repairs is decreasing due to component improvements.

Plans

Rebuild motor units with new drive motor pending NOS approval.
Continue sensor rebuild with new build-up pending NOS approval.
Formulate plan of action for lid driving hardware.

Drive Motor Comparison

Three units have been tested. The new Aerochem Metrics unit, the Standard Output Pittman (SOP) and the High Output Pittman (HIP). See Attachment #16 for testing results. Currently we have 12 motors which are not strong enough to consider returned to the field and 8 which have been sent out which were of marginal strength.

Motion #19: That CAL be allowed to use the HOP (High Output Motor) Pittman's motor as a replacement for the standard ACM design.
Amendment A: Mark Nilles: Opening time be measured before the motor box is deployed into the field.
Scott Dossett moved, Rick Artz second, passed unanimously

Motion #20: Don't deploy any motor boxes that exceed the 14-second opening time.
Amendment A: Provisionally accepted pending statistical analysis to reveal a more accurate opening time limit to be presented next fall.
Rick Artz moved, Mark Nilles second, passed unanimously

Sensor Comparison

Two units have been tested. The new Aerochem standard. And the "LODA" build-up. LODA build-up uses new machines housings, new sensor heater pad and rebuild ACM-equivalent circuitry. Thanks to USGS for purchase of the new sensors.
Temperature information (C)

	Range	Average
ACM	64.8-54.6	61.6
LODA	69-56.7	61.2

Motion #21: That the LODA build-up sensor and the ACM Standard be considered equivalent for use on NADP.
Amendment A: Look at sensor statistics and revisit via e-mail this summer and present at fall meeting.
Scott Dossett moved, Jane Rothert, passed unanimously

Rain gage Tower Replacement
Since the packing and shipping materials and the rebuild technique were completed last Fall. We have shipped 12 gages. An average of about 3 per month, this would put us on target for 36 per year. Goal-40. Sites receiving: AL10, AR02, FL05, KY03, ID15, IN34, NV00, NY10, OH17, PA29, TX10, WY06

Performance of the rebuild
So far the packing system is protecting the gage tower well. We have had no losses during transport and two problems (both solved by the site operator). In these case the turnover point of the gage had to be adjusted. Operators seem to be interpreting the change instructions well and for the most part returning the gage towers back to us in good shape.

Changes
Event recorders are pre-installed.

Future
How to provide easy to use and transport calibration media?

Snowroof design to be on next agenda.
ATS will use some sort of wind block to measure temperature ranges.