

National Atmospheric Deposition Program
September 2005 Meeting
Jackson Hole, Wyoming

Network Operations Subcommittee (NOS) Agenda
(updated 9/23/2005)

10:15-2:50 Tuesday, Sept 27th

- 10:15-10:45 Welcome, agenda review, approval of Spring minutes and status of action items
Karen Harlin, NOS chair
- 10:45-11:00 Status of multi-site phase III trial of Yankee TPC-3000 NTN collector
Van Bowersox, NADP Program Coordinator
- 11:00-11:15 Updates on Ott-Pluvio modifications
Mark Nilles, USGS
- 11:15-11:45 Update on LODA mercury sampler redesign
David Gay, MDN Coordinator
- 11:45-12:00 Update on MDN dry network
Eric Prestbo, Frontier Geosciences
- 12:00-1:30 Lunch on your own
- 1:30-2:00 USGS external QA programs report
Greg Wetherbee, USGS
- 2:00-2:15 Siting criteria updates
Chris Lehmann, NADP QA Manager
- 2:15-2:30 NADP QA updates/issues
Chris Lehmann, QA Manager
- 2:30-3:00 Discussion, new items, NOS secretary, wrap-up
Karen Harlin, NOS Chair

Break

Executive Committee session begins at 3:10 pm

NADP Vision

- Remain a premier research support project
- Serve data and information needs of scientists and educators
- Support informed decisions on air quality issues related to precipitation chemistry
- Respond to emerging issues

➤ **Maintain an efficient measurement system**



→ Replacement ?

Belfort B5-780

Data logger acquires

Collector

10-sec: operating voltage
5-sec: status – open/close
Note – time to move from wet to dry status = 8-10 sec

Every 15 minutes

- (1) minimum operating voltage
- (2) number of cycles
- (3) duration collector open

- 672 lines of data per week -



ETI NOAH IV

Data logger acquires

Gage

10-sec:
operating voltage
temperature (logger)
optical sensor status
precipitation depth
cumulative depth

Every 15 minutes

- (1) minimum operating voltage
- (2) duration sensor 'says' rain
- (3) precipitation depth

- 672 lines of data per week -



ETI NOAH IV

Summary – 15 minutes

- 1 – precipitation depth
- 2 – duration collector open
- 3 – duration optics indicate precipitation is occurring
- 4 – number of collector cycles
- 5 – Vmin of collector & gage



ETI NOAH IV

Issues

- 1 – insect-related false positives
- 2 – power consumption at DC-solar sites
- 3 – SOPs
- 4 – repair/replacement procedures
- 5 – Prog Ofc prog



ETI NOAH IV

Data logger acquires

Collector

6-sec: status – open/close
Problem – 100,800 lines of data & logger capacity is 115,000 lines total ←

No channel for operating V

Q - How to determine Collector power?
 Q - How to reduce file size?



Ott Pluvio

Data logger acquires

Gage

15-min:
 operating voltage
 temperature (logger)
 precipitation depth
 cumulative depth ←

Problem : Each variable is A separate file.

Q – Should we require a programmable data logger? Campbell 10X?



Ott Pluvio



→ **How to proceed with replacement ?**

Belfort B5-780

Vaisala VRG 101



Vaisala VRG 101 with MAWS 100



Raingage Comparison (August – September 2005)

Date	NWS Stick	Vaisala	NOAH IV
8/19/2005	0.938	0.989	0.98
8/20/2005	0.459	0.465	0.46
8/22/2005	0.004	0.000	0.00
8/26/2005	0.028	0.025	0.02
9/14/2005	0.389	0.396	0.39
9/16/2005	1.694	1.715	1.71
9/19/2005	0.248	0.258	0.25
9/20/2005	0.452	0.458	0.44

Note: The Vaisala recorded three unidentified events totaling nearly three inches.

Collector Upgrade

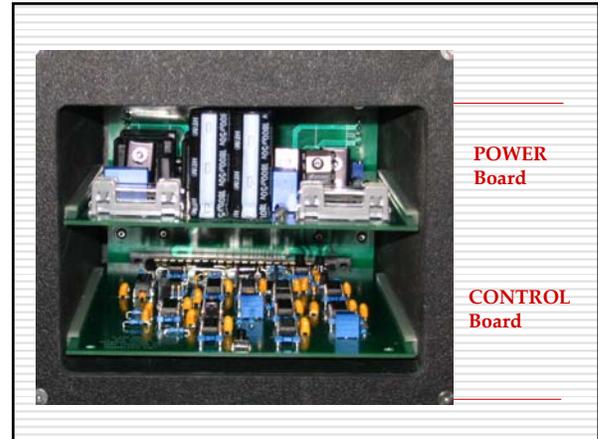
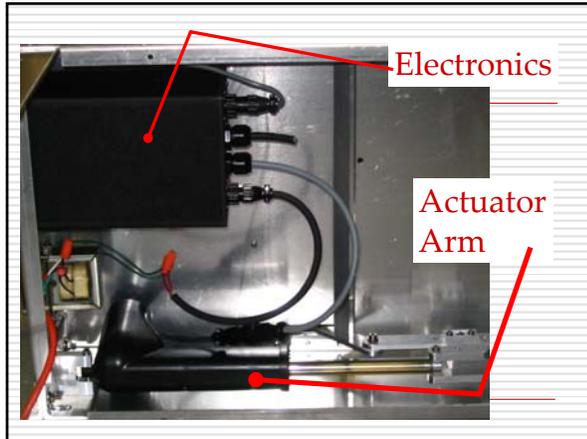


David Gay
Program Office
dgay@uiuc.edu

Fall 2005

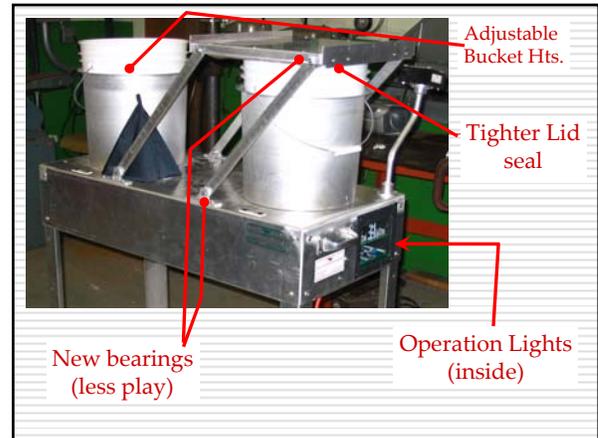
Where Are We?

- ❑ Sampler is Here.
 - Actuator arm ("screw jack" type)
 - ❑ Much more closing power
 - Two pullout boards
 - ❑ 1 for power supply
 - ❑ 1 for logic (Control)
 - ❑ Waterproof
 - Sensor Logic on board, not in sensor
 - ❑ Sensor body is now just a heater & thermistor



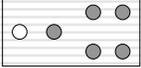
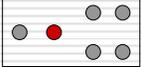
Where Are We?

- Tighter seal on the bucket (adjustable)
- Error Lights for the Operator/problem determination
- New bearings on arms/hinges (less play)
- Battery connector
- Connector for analog output (to Belfort)
- Can handle multiple depth buckets (NTN)
- Can Use 2nd Chimney on MDN version



Comes with Operation Lights



-  Heater On or Off
-  Motor going dry, or going to wet, or stopped
-  Combinations define problems with Motor, power, board and some sub-board circuits

Costs

- Sampler Cost = \$2300 (basic or NTN)
 - \$2200 under conditions
- Replacement "kit" is almost ready
 - Cost = \$1250
- A special retrofit kit in the works
 - No drilling required
 - 2 arm drive only
 - Hoping to be \$750

What's Left??

TESTING

- Just Beginning since it was late
- Plan:
 - Open it x times (every 5 minutes for a month)
 - In freezer, same
 - Put it out in Bondville/backyard for Dec, Jan
- Decision

- How should I proceed if sampler passes test?

Other Issues: BOOTS

- Original Boots
 - Expensive (\$12/each)
 - Don't work well under very cold conditions
- Replacement (see sampler)
 - "Gore-Tex" boots
 - PTFE over nylon
 - Does not get stiff in cold weather
 - 20 yrs on failure to UV
 - Try for another, inexpensive alternative
 - I want 2 dollar boots
- CAN WE USE THEM?

Mercury Deposition Network Hg Analytical Laboratory (HAL)

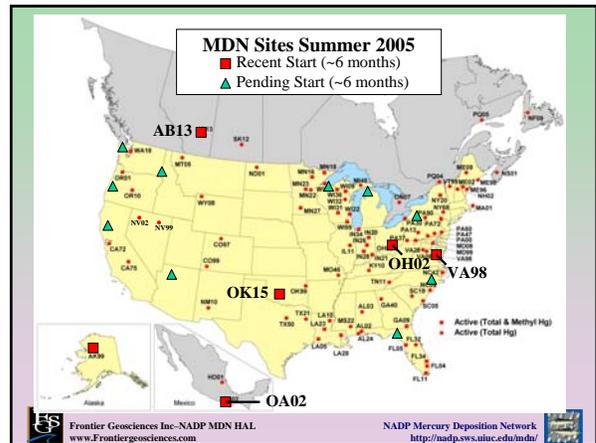
HAL Report Fall Technical Meeting

Robert C. Brunette
MDN HAL Director

Snow King Resort
Jackson Hole, Wyoming
September 27, 2005

Frontier Geosciences Inc-NADP MDN HAL
www.Frontiergeosciences.com

NADP Mercury Deposition Network
http://nadp.sws.uiuc.edu/mdn/



- ### Recent MDN Site Starts
- OA02 Puerto Angel – Official 09/21/04 (09/30/03)
 - AB13 ATCO Power – 09/28/04
 - VA98 Harcum – 12/17/04
 - OH02 Athens – Official 01/25/05 (05/04/04)
 - OK15 Cherokee-Newkirk – 03/01/05
- #### Experimental Sites
- AL-EXP Birmingham – 12/22/04
 - FL-EXP Pensacola – 2/08/05
 - Puerto Rico – 04/02/05 (Above/Below Canopy)
- Frontier Geosciences Inc-NADP MDN HAL
www.Frontiergeosciences.com
- NADP Mercury Deposition Network
http://nadp.sws.uiuc.edu/mdn/



- ### HAL Capacity And Preparation For Network Growth
- HAL Total Hg Wet Dep Samples To Date: ~ 30,000
 - HAL Methyl Hg Wet Dep Samples To Date: ~ 4,000
 - HAL Annual THg Analysis Load ~ 5000 Samples/Year
 - HAL Analytical Capacity – 1800 Sample/Month (21,000/Year)
 - Currently - 6.0 FTE Dedicated MDN HAL
 - 5 Additional Frontier Staff In Support Positions
 - > Data Review
 - > Trace Metals Analysis
 - > Quality Assurance
 - > Methyl Analysis
 - Purchased & Received Supplies To Support 10 New Sites
- Frontier Geosciences Inc-NADP MDN HAL
www.Frontiergeosciences.com
- NADP Mercury Deposition Network
http://nadp.sws.uiuc.edu/mdn/

MDN Total and Methyl Hg Data Delivery Schedule

MDN 2nd Quarter 2005 (Total and MMHg Data):

- Preliminary Data to Site Operators: July 14, 2005
- Preliminary Data to Site Sponsors: July 14, 2005
- End Of Sponsor Review Period: July 28, 2005
- HAL Transmit DB to PO: Aug 12, 2005

MDN 3rd Quarter 2005 (Total and MMHg Data):

- Preliminary Data to Site Operators: Oct 14, 2005
- Preliminary Data to Site Sponsors: Oct 14, 2005
- End Of Sponsor Review Period: Oct 28, 2005
- HAL Transmit DB to PO: Nov 12, 2005



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MDN HAL Staff Update

•Leaving HAL:

Nicholas McMillan, MDN Site Liaison

•New MDN Site Liaison

Doug Disney, Operations/Logistics Manager

•New Hire:

MDN Research Assistant – Dec 2005



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MDN HAL Data Base Update

• MMHg Data Base Merged W/Total Hg DB:

- > Incorporated Into MDN Total Hg DB – Q4: 2002
- > Quality Code System Incorporated – Q4: 2002
- > MMHg Data Follows All Aspects Of THg Data
- > MMHg Data Reported With Quarterly Total Hg Data

• Trace Metals Data Base – Completed June 2005

- > Integrated into MDN THg and MMHg DB
- > Follows All Aspects Of Total/Methyl Data
- > Data will start the quarterly report schedule



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HAL Data Base Updates

Duplicate Data Entry Of Lab Data Sheets

- Microsoft Access Lab Data Sheet Format
- Introduced At Halifax DMAS
- Utilizes Same Double Data Entry As MDN DB
- Implemented Total Hg Lab Data Sheet DDE: Jan 05
- Implemented MMHg Lab Data Sheet DDE: Mar 05



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MDN Document Review

• HAL Consolidated QAPP – Draft V2

- Draft V1 Spring/Summer 2005 (Gay/Lehman)
- 1996 NAPD/MDN QAPP (CSU)
- HAL QAPP
- HAL SOW

• MDN Site Operations Manual – Draft V2

- Draft V1 Spring/Summer 2005 (Gay/Lehman)

• HAL Annual QA Report – Draft V2

- Draft V1 Spring/Summer 2005 (Gay/Lehman)



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MDN Field QA Studies

➤ MDN Ground vs. FAMS - FL34 – Ended Nov 04

FAMS Tower Based Vs. Ground Based MDN ACM

➤ MDN Collocated ACM Study – WI08

➤ MDN Collocated ACM/MICB – WI31

➤ MDN Collocated ACM/MICB/NCONN - VT99

➤ MDN Collocated ACM/MICB/NCONN– WA18



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HAL/PO Collocated Intercomparison NOAA Sand Point, Washington (WA18)

- 3 MDN ACMS
- 1 NCON
- 1 MICB
- 2 Belfort Rain Gauge

- Stick Gauge
- Gas Phase Hg (7 Day)
- Particulate Phase Hg (7 Day)
- All Collectors Data Logged

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USGS/MDN External Audit Program

- **External Laboratory PE Sample Program**
 - Single Blind
 - Implemented Nov/Dec 2003
- **External System Blank Program**
 - Single Blind
 - Implemented Nov/Dec 2003
- **External Double Blind Pilot Program**
 - True Double Blind Introduction To HAL
 - Simulated RG Charts
 - Dry Weeks - Samples Come Directly From MDN Sites

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MDN HAL 2003 Audit – Progress Report

- **95% of HAL Audit Items “Resolved”**
- **5% are “In Progress”**
 - Draft/Revised HAL MDN QAPP – V2 PO Review
 - Draft/Revised MDN Inst. Manual – V2 PO Review
 - Revised Annual QA Report – V2 PO Review
 - HAL DB User Manual – 11/05
 - Description Of HAL IT Procedures – 11/05

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HAL 2005 Site Operator Training Course

- 2nd Annual HAL Training Course
- October 12-13, 2005
- 15 Site Operators To Attend
- 1 Day Classroom + 1 Day Field Instruction
- Course Held @ NOAA-NRC (WA18)

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12 Event Based Samples - Katrina

Hurricane Katrina Base Map Index Page
Louisiana, Mississippi, & Alabama
August 2005
All imagery provided by NOAA

Click boxes to zoom in and view image footprints

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LADEQ MDN Singe Rain Events

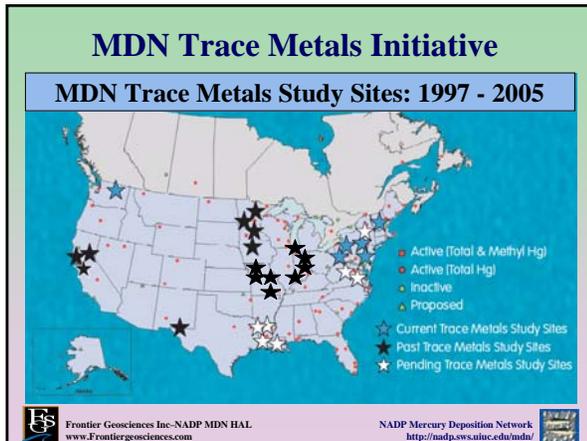
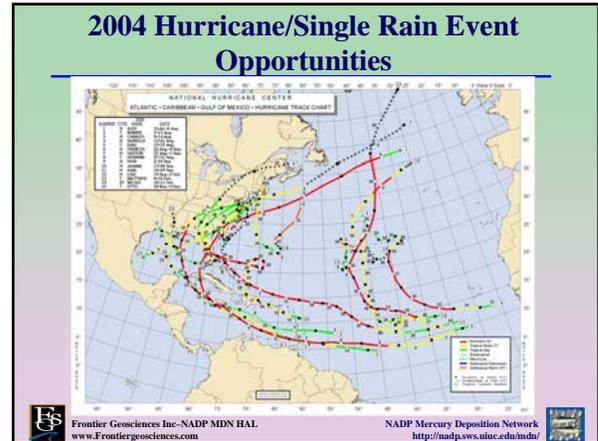
Site	End Date	In. Rain	Hg Conc.	Hg Deposition	% Annual Dep	% Annual Precip vol
LA05	5/18/2004	8.28 in	13.00 ng/L	2733.9 ng/m2	13.9%	11.9%
LA10	5/18/2004	5.06 in	11.60 ng/L	1490.6 ng/m2	7.1%	8.5%
LA23	5/18/2004	9.01 in	8.00 ng/L	1829.6 ng/m2	10.4%	13.4%
LA28	5/18/2004	8.94 in	10.70 ng/L	2430.0 ng/m2	9.3%	11.8%

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LADEQ MDN Single Rain Events

Site	End Date	In. Rain	Hg Conc.	Hg Deposition	% Annual Dep	% Annual Precip Vol.
LA05	5/4/2004	3.54 in	15.50 ng/L	1393.4 ng/m ²	7.1%	5.1%
LA05	5/18/2004	8.28 in	13.00 ng/L	2733.9 ng/m ²	13.9%	12%
LA05	6/22/2004	3.62 in	13.30 ng/L	1222.3 ng/m ²	6.2%	5%
LA05	6/29/2004	6.05 in	8.40 ng/L	1291.1 ng/m ²	6.6%	9%
LA05	7/13/2004	0.98 in	50.70 ng/L	1262.4 ng/m ²	6.4%	1%
					40.1%	32.3%



Trace Metals Studies

MDN Site ID	Dates	Metals	MDN Sponsor
WA18	1997-2005	As, Ag, Be, Cd, Cr, Cu, Mg, Mn, Ni, Pb, Se, Ti, V,	Frontier (HAL)
MN16, MN18, MN23, MN27	1999-2000	MDN ACM Mod & Trace Metal Sample Trains	MPCA
CA72, SJ02, MZ03	1999-2000	Cr, Ni, Cu, Cd	SFEI
IN20, IN21, IN28	2000-2001	As, Be, Cd, Cr, Mg, Mn, Ni, Pb, Se	Indiana USGS
PA13, PA30	2001-2003	As, Cd, Cr, Cu, Mn, Ni, Pb, Se, Zn	PSU
PA13, PA30, PA60, PA90	2003-2005	As, Cd, Cr, Cu, Mn, Ni, Pb, Se, Zn	PSU
ME96	2001-2005	As, Be, Cd, Cr, Cu, Ni, Pb, Se, Zn	US EPA
IL11	2000-2001	As, Be, Cd, Cr, Cu, Ni, Pb, Se, Zn	ISWS
VA08, VA28	2005	MDN ACM Mod & Trace Metal Sample Trains	VA USGS
LA05, LA10, LA23, LA28	2005	As, Be, Cd, Cr, Cu, Ni, Pb, Se, Zn	LA DEQ
NM10	2002-2003	MDN ACM Mod & Trace Metal Sample Trains	UNM

Trace Metals Production Method

Element	HAL (Frontier) - Trace Metals MDL and Reporting Limits (RL)				Per Sample Conc. Range Measured in Wetwater	Typical Industry MDL and RL			
	GF-AAS (Pb/Cd)	HA-AFS (Pb/Cd)	ICP-AES (Pb/Cd)	ICP-OES (Pb/Cd)		ICP-AES (Pb/Cd)	ICP-AES (Pb/Cd)	ICP-AES (Pb/Cd)	HAL RL
Cd	50	10	1	1	10-530	300	5	200	20 x lower
Cu	350	18	4	10	10-254	3000	43	320	10 x lower
Pb	-	23	16	30	10-2468	400	140	380	10 x lower
Hg	-	7000	383	500	-	14430	497	20000	40 x lower
Mn	-	47	13	20	10-8270	400	50	500	25 x lower
Ni	-	990	7	10	10-528	2100	74	300	13 x lower
Pb	250	15	7	10	10-1429	1400	100	3000	100 x lower
Se	-	100	15	30	10-459	6700	44	300	10 x lower
V	-	40	16	30	-	400	29	200	7 x lower
Zn	100	25	10	100	10-5414	2300	1629	4000	40 x lower
Cu	-	1	1	20	10-340	300	8	300	10 x lower
As	-	33	10	1	-	1800	218	500	17 x lower

- ### HAL Posters At Conference
- Trace Metals In Wet Deposition
 - MDN Field Equipment Intercomparison
 - Measuring Hg Emissions – US EPA 324

Central Analytical Laboratory (CAL) Report September 2005



Site Operations

of Sites
NTN: 256 active sites (includes 3 collocated sites 03AZ, 98WI, 99VT)
First decline since 1996 (down 2 sites since Sept 2004)
New: W110 (Potawatomi) 6/7/2005
Closed: CA95 (Death Valley) 5/31/2005
GA98 (Skidaway) 5/24/2005
AIRMoN: 8 active sites

Samples
1200+ samples/month
site supplies (~300 of each item/week)

Protocol changes
NTN: 1st year with no field chemistry (ended 1-1-2005)
revised site protocols
new FORFs
revised training course
increased time for field equipment training, VOM included
sites continuing field chemistry have requested solutions
~12 sent SOPs for preparation
cost established for 1 year supply for those who want to purchase (2 sites to date)




Site Operations (cont)

2006 CALENDAR
will be mailed to sites Oct. 2005

4 in 1 Shipping Protocol Change Status
100% of NTN sites converted to this protocol in August 2005
(4 months ahead of schedule)
added CAL address to FORF and bottle bag
cost savings to all sites
cost impact for CAL: rough est +\$20 K saved on UPS shipping/yr
cost of boxes, tape, etc. -\$11 K per year
net savings \$ 9 K
additional costs: first raises in 3 years will consume savings.

CAL Site Liaison
Scott's last day 9/30/2005
Matt Layden new hire on August 8, 2005



Lab Operations

Equipment updates
On-track for updating aging equipment, ensure backup instruments available, and provide for research capability
New ICs (sulfate, nitrate, chloride) on-line in 2005



Next critical need:

- New bucket, lid, bottle washer next major purchase in 2005-6
- Facility redesign cost for sample supply washer in 2005

Archive samples NTN 1998 and AIRMoN 2001 have been approved and distributed to researchers. Details reported later.

New ISWS building construction – still continuing
Will provide much needed shipping and receiving space in 2005
Disruptions in 2004-5
Temporary quarters until Feb. 2006

QA/QC

CAL QA report status
2002 – completed and in review, to be released fall 2005
2003 & 2004 combined report--revised/reformatted, by end of year

New protocols for blanks
Weighing 5 buckets and lids each day to check tare weights
Blank data for supplies-- weekly review with corrective action taken immediately. Avoids systematic errors, identifies patterns early, removes unsuitable supplies from sample stream.

QC review: data is reviewed monthly for anomalies in the data set. This includes negative values outside the statistical probability as well as large concentration values with no contamination recorded.

MDLs: new procedure to compute periodic MDLs using the unfiltered internal blind QC sample which approximates the 10th percentile concentration of NTN data.
sample is blind to the analysts
sample goes through the laboratory like any precipitation sample
new MDLs using this method were established using 2004 data.

QA/QC (con't)

Old (mg/L)		New (mg/L) using 2004 QC data	
Ca	0.009	Ca	0.002 ↓
Mg	0.003	Mg	0.001 ↓
Na	0.003	Na	0.003
K	0.003	K	0.001 ↓
NH4	0.02	NH4	0.005 ↓
Ortho-P	0.009	Ortho-P	0.006 ↓
Cl	0.005	Cl	0.008 ↑
NO3	0.010	NO3	0.009 ↓
SO4	0.010	SO4	0.013 ↑

Monitoring MDLs quarterly for changes
in 2005 to date: most +/- 1 ppb variation
noted an increase in IC (NO3, SO4) since began acquiring
data pooled for 4 ICs—will continue to monitor

Data Management Operations

Data transfer to PO

NTN lagging; transferred data through April 2005
back on schedule by end of 2005
AIRMoN on schedule –through; transferred data through June 2005

Monthly site preliminary data reports for NTN

changes required due to elimination of field chemistry
updated Notes and Errors & removed field chemistry data
redesigned report to accommodate a 1-page format

LIMS

new FORF entry format -- substantial data entry and data review
programming changes due to elimination of field chemistry
bar-coded site ID in use for sample log-in which now communicates
with bar-coding at sample receiving.

Research

Total Nitrogen—continuing 4th year
available to researchers for additional cost (\$50 but may be reduced)
.....See Poster at Wed. session.....

pH electrode evaluation—continuing
most promising: Hamilton epoxy-body double pore electrode

Biological agents of interest (Asian Soybean Rust)—nearing end of 6-month study

The World Meteorological Organization/Global Atmospheric Watch (WMO/GAW)
Interlaboratory comparison study—continuing
96 laboratories in 48 countries
CAL prepares 100 sample sets of three samples each
2nd set due to be mailed Oct 2005

Perchlorate in precipitation—collaborative effort with Texas State University
.....See Poster at Wed. session.....

Trace metals—continuing
evaluating field audit samples for differences in bucket and bottle for trace metals at
low levels. Acidic solutions leach metals from plastic buckets. Full report at a later
date.

Isotopes in precipitation—Kendall, Welker, others
.....Reports at technical session.....



The End

Organic and total nitrogen in NADP precipitation samples

CAL measures inorganic nitrogen (as nitrate and ammonium) in precipitation

Interest in Total nitrogen & organic nitrogen

Methods involve a Total N analysis minus inorganic N = organic nitrogen
Preliminary work was presented at Fall 2002 meeting

NTN Chesapeake Bay 2002-2003 samples are being split with Dr. Mark
Castro (Univ. Maryland, Center for Environmental Science Appalachian
Laboratory at Frostbury, MD) to compare data between the two laboratories.

Continuing to run TN as time allows—Fall 2003 will present additional data



Days in transit with 4-in-1 small box
(based on **date off** to **date received** at CAL)

Sites using Federal Express
ave=2.6; median=2.3
n=340

- Sites using UPS
ave=4.4; median=3.6
n=300
- Sites using USPS (remote locations HI, VI, PR, AK)
ave=8.4; median=7.7
n=162
- Time for all NTN sites in 2003
ave=4.7; median=3.0; SD=3.5
n=13,177

Projected site shipping cost savings

- Current system, Black mailers shipped weekly
 - Weight ~ 12-14 lbs shipped 4 times/mo
 - Sites paying \$52 to \$80/mo (ave **\$61**)
- 4-in-1 protocol
 - Supplies shipped monthly (Weight ~ 14 lbs full)
 - Sample shipped weekly (Weight < 3 lbs)
 - Monthly cost est. for 1 large box and 4 small boxes shipped to CAL
 - \$37 to \$60 (ave ~ **\$45**)
- Estimate of cost savings
 - saving per month per site
 - \$35/mo with 2nd day Fed Exp
 - \$15 with 3rd day Fed Exp
 - \$5 to \$20 with UPS or USPS
 - Note: UPS oversize charge applies
 - **Average ~ \$16 to \$17 per month (~\$200/year) per site**

Network Issues

- CAL cost to implement??
- What is the cost per month per site
 - Black mailer
 - » assume 5 year life ~ \$1.25 per month per site
 - 4-in-1 protocol
 - » assume 3 shipments/box
 - » cost for mailers/tape/other supplies ~ \$6.00 per month per site
 - » supply costs higher per sample
 - 4-5 times more than black mailers
- Benefits???
- Sites save on substantially on shipping charges and report minor or no problems in trials to date.
- CAL savings ?????? Need to monitor
\$15,000/year increased supply costs in boxes, tape, misc. labels, etc.
Savings in mailing costs will be monitored

Now What?

- CAL is continuing to fine tune the protocol and improve the durability of the shipping containers
- CAL will continue to add sites to the 4-in-1 shipping protocol at a rate of 10+ per month throughout 2004 and 2005
- Protocol will be fully implemented at all NTN sites by end of 2005

Now What?

- CAL is continuing to fine tune the protocol and improve the durability of the shipping containers
- CAL will continue to add sites to the 4-in-1 shipping protocol at a rate of 10+ per month throughout 2004 and 2005
- Protocol will be fully implemented at all NTN sites by end of 2005

4-in-1 Shipping Protocol--update

A quick review:

WHAT??

Establish a trial for shipment sampling supplies to sites from CAL on a monthly schedule

Procedure will allow for a weekly return of 1-Liter sample bottle, raingage chart, and FORF from site to CAL

Procedure will allow for the monthly return of dirty sampling supplies from sites to CAL

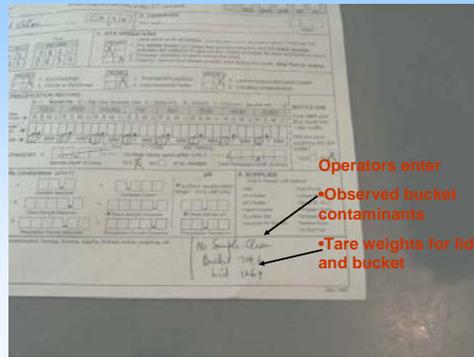
What goes out each month



What comes in each week



FORF changes



What comes in each month



Days in transit with 4-in-1 small box (based on date off to date received at CAL)

Sites using Federal Express

ave=2.6; median=2.3

n=340

• Sites using UPS

ave=4.4; median=3.6

n=300

• Sites using USPS (remote locations HI, VI, PR, AK)

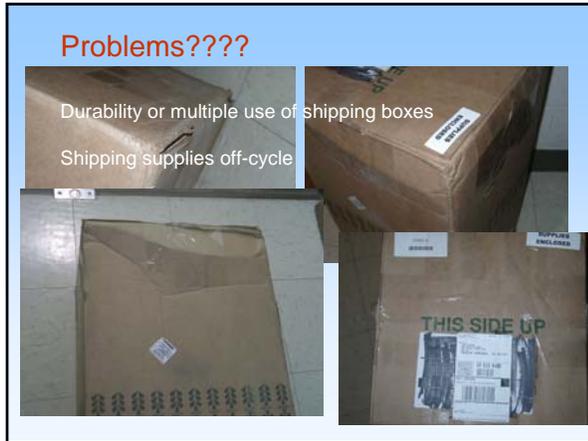
ave=8.4; median=7.7

n=162

• Time for all NTN sites in 2003

ave=4.7; median=3.0; SD=3.5

n=13,177



Projected site shipping cost savings

- Current system, Black mailers shipped weekly
 - Weight ~ 12-14 lbs shipped 4 times/mo
 - Sites paying \$52 to \$80/mo (ave **\$61**)
- 4-in-1 protocol
 - Supplies shipped monthly (Weight ~ 14 lbs full)
 - Sample shipped weekly (Weight < 3 lbs)
 - Monthly cost est. for 1 large box and 4 small boxes shipped to CAL
 - \$37 to \$60 (ave ~ **\$45**)
- Estimate of cost savings
 - saving per month per site
 - \$35/mo with 2nd day Fed Exp
 - \$15 with 3rd day Fed Exp
 - \$5 to \$20 with UPS or USPS
 - Note: UPS oversize charge applies
 - **Average ~ \$16 to \$17 per month (~\$200/year) per site**

Network Issues

- CAL cost to implement??

What is the cost per month per site

- Black mailer
 - » assume 5 year life ~ \$1.25 per month per site
- 4-in-1 protocol
 - » assume 3 shipments/box
 - » cost for mailers/tape/other supplies ~ \$6.00 per month per site
 - » supply costs higher per sample
 - ~4-5 times more than black mailers

– Benefits???

- Sites save on substantially on shipping charges and report minor or no problems in trials to date.
- CAL savings ?????? Need to monitor
 - \$15,000/year increased supply costs in boxes, tape, misc. labels, etc.
 - Savings in mailing costs will be monitored

Now What?

- CAL is continuing to fine tune the protocol and improve the durability of the shipping containers
- CAL will continue to add sites to the 4-in-1 shipping protocol at a rate of 10+ per month throughout 2004 and 2005
- Protocol will be fully implemented at all NTN sites by end of 2005

NATIONAL TRENDS NETWORK FIELD OBSERVER REPORT FORM (FORF)

bar code

POST OFFICE USE ONLY

1. SITE Name: _____

2. OBSERVER Filter name: _____

3. BUCKET ON/OFF: _____

4. SITE OPERATIONS: _____

5. SAMPLE CONDITION: _____

6. BUCKET SAMPLE WEIGHT: _____

7. PRECIPITATION RECORD: _____

8. SAMPLE REMOVAL: _____

9. SUPPLIES: _____

10. REMARKS: _____

USGS External Quality Assurance Fall 2005 Update

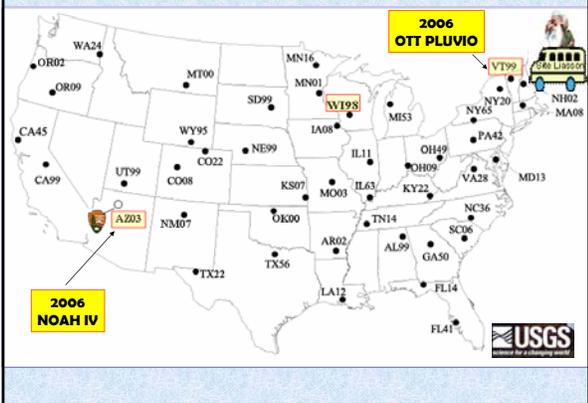


2005 NTN Programs

- Field Audit for entire NTN
 - Ship 130 samples every 6 months
- Continuing NTN Interlaboratory-Comparison – 8 Labs, 4 samples/2 weeks
- Continuing long-term co-located-sampler program at AZ03, WI98, VT99



New Co-located-Site Raingages FY06



What's New for 2004-05?

- Updated website
http://bqs.usgs.gov/precip/project_overview/index.htm
- MS Access database
- New laboratory and offices

USGS/BQS/ Greg Wetherbee
DFC, B95, Entr E3
Denver, CO 80225



New Home for USGS QA



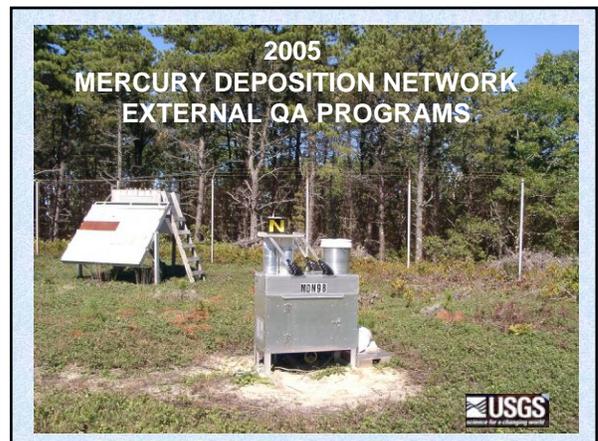
Our New Neighbors





Reports

- Data interpretation and reporting through 2003 published
- NTN Programs and Procedures OFR published
- 2004 External QA Report in review
- Environmental Pollution No. 135 published



PUBLICATIONS IN REVISION

“The Field Audit Site Operator Training,”
USGS Open File Report – VIDEO

“Estimated Variability of NADP/MDN
Measurements Using Collocated
Samplers”

- Journal article



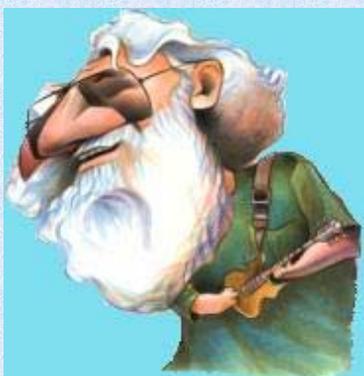
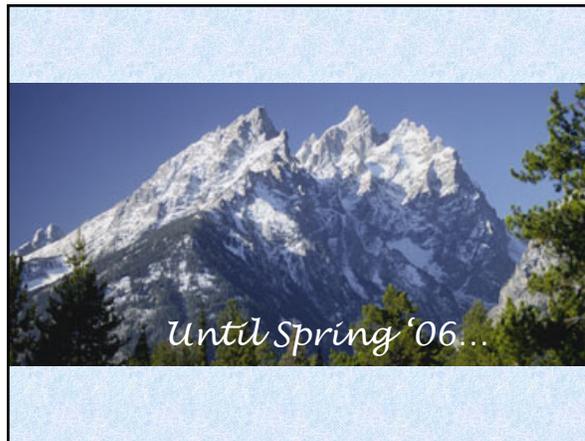
Candidate Programs for FY06

1. Blind Audits for CAL and HAL.
2. Evaporation Study at Arvada Site, CO

Sample Evap=
f (Pan Evap, Air Temp, Wind Speed, etc.)
3. Testing Yankee Env. Systems
Collector at Arvada Site, CO



Arvada Site, Colorado



Best Wishes, Scotty!

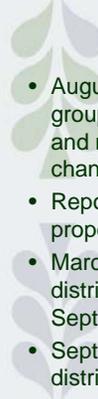


NADP Siting Criteria

Final ad-hoc committee report

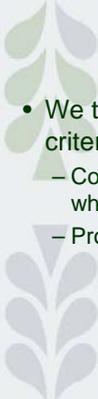
Chris Lehmann (chair), Gary Stensland, Bob Larson,
Greg Wetherbee, Preston Lewis, Rick Artz,
Martin Risch, Scott Dossett

NADP Network Operations Subcommittee
Fall 2005



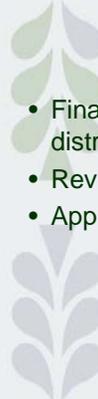
Some History....

- August 2001: "NOS chair will appoint an ad-hoc group to ... review the siting criteria specifics and make recommendations on any needed changes to these specifications."
- Reports given at ~7 meetings outlining status of proposed revisions.
- March 2004: Revised draft of siting criteria distributed to NOS, discussed further in September 2004 & April 2005.
- September 2005: Final draft of siting criteria distributed to NOS



Our Approach

- We took a "fresh look" at original siting criteria (1978) and revisions thereafter.
 - Considered "old" criteria, and incorporated where appropriate
 - Provided additional detail and specifications



Today's Discussion

- Finalized set of criteria has been distributed
- Review, comment, revise as necessary
- Approve (?)



Summary of Changes

1. **Specific NTN, MDN & AIRMoN Criteria.** Criteria specific to NTN, MDN, and AIRMoN stations are defined. Criteria formerly covered only the NADP/NTN.
2. **Reference Number.** Each criterion is provided a reference number.
3. **Site Classification.** The site classification scheme prepared by DMAS has been included so that specific criteria can be defined for Urban, Suburban, Rural and Isolated sites.
4. **Rules and Guidelines.** Criteria are divided into rules and guidelines. Siting criteria rules are required of all new and existing sites. Guidelines are recommended, but not required, of all sites.
5. **Regional Requirements.** A guideline to specify 20km separation from industrial operations that may unduly influence deposition is proposed. The existing criteria specified 20km from upwind sources and 10km from downwind sources. A separation criterion from population centers has been removed as this is covered by the site classification.



Summary of Changes (2)

6. **Mobile Source Proximity.** Specifications have been provided to classify road types (access roads, other roads, highway/interstate) and traffic levels for waterways and airports.
7. **Animal Operations.** Specifications have been provided to classify a "large" animal operation, and this criterion only applies to NTN and AIRMoN sites.
8. **Combustion Sources.** A new criterion for MDN sites specifying proximity to stationary combustion sources is proposed.
9. **Parking Lots.** Specifications have been provided to define a parking lot.
10. **Metal Working.** A new criterion for MDN sites specifying proximity to metal fabrication and welding operations is proposed.

Summary of Changes (3)

11. **Rooftop Sampling.** Criteria for rooftop sampling in Urban areas are proposed.
12. **Raingage Placement.** Criterion now allows raingage placement on same platform as Collector, even if the 30cm vertical tolerance between orifices is not met.
13. **Object 5-m Proximity.** Firms up practice of allowing 1/2m allowance in measuring distance to objects (i.e., 4.5m vs. 5m). Also clarified minimum 5cm dimension of objects in violation (to allow fence posts.)
14. **Vegetation Height.** Firms up practice of vegetation control only within 5m of collector and raingage (formerly required maintenance at entire 30m site).
15. **Proximity to Residential Structures.** Vague criterion of prohibiting residential structures "within the 30o cone of the mean wind direction" removed.

Summary of Changes (4)

16. **Cultivated Fields and Pasture Land.** Sets same separation requirement (20m) for both cultivated fields and pasture land. Proximity to cultivated fields had been 30m.
17. **Fences.** Criterion specifies separation to fences from collector and raingage. Maintains 5m separation to collector (minimizes splash), but allows 2m separation from raingage (where splash is not of concern.)
18. **Wind Shields.** Adds specification that sites over 1000m in elevation be equipped with a wind shield.
19. **Remedial Actions.** Remedial actions for new and existing sites are outlined.

The diagram illustrates the NADP Siting Criteria Rules (Required at all sites) and Guidelines (Recommended at all sites). It features a central collector and raingage with concentric circles representing various exclusion zones. Key rules include: no residential buildings within 50m of raingage; no objects greater than 1.5m in height within 10m of collector; no public roads, waterways, or general aviation airports within 100m; no parking lots, storage areas, or metal working at MDN sites; no external roads or highways within 100m; no industrial operations within 50m; and no residential operations within 20m. A table on the right lists collection classes from 1 to 12. Additional rules cover vehicle limits, site construction, and vegetation management.

Feedback Received

Dave MacTavish (CAPMoN):

- Consider a minor change to D. On-Site Criteria, 1. Rule, g
- Ban all treated wood at all sites not just MDN.
- Formulations for commercially pressure treated wood are always changing. At one time they had high levels of SO₄= (some manufacturers may still have SO₄= in their formulations).
- None of us know what we may be asked to measure in the future or what program may want to collocate at a NADP site.

Feedback Received (2)

Dave Maxwell, NPS:

- My only comment is that it is up to the sponsoring agency to follow up on Site Systems and Performance Surveys to make corrections.
- Which sites would require wind shield?
- Is there a recommended vendor for wind shields?
- I like the idea of the NOS Chair, NOS Vice -Chair, and QA Manager having the authority to approve or disapprove proposed NADP sites that do not meet the NADP siting criteria and guidelines... Is this being implemented after being passed at the Spring NADP meeting?

Feedback Received (3)

Rick Artz, NOAA

- Tie wind shield requirement to wind profile, not elevation

Scott Dossett, CAL

- Consider alternatives to Alter shield.

