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

ETI NOAH IV

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 -

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

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 -

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

ETI NOAH IV

Belfort B5-780

NADP Fall 2005 NOS
Attachment 2
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?

How to proceed with replacement?

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?

Vaisala VRG 101 with MAWS 100

Vaisala VRG 101

Raingage Comparison (August – September 2005)

<table>
<thead>
<tr>
<th>Date</th>
<th>NWS Stick</th>
<th>Vaisala</th>
<th>NOAA IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/19/2005</td>
<td>0.938</td>
<td>0.989</td>
<td>0.98</td>
</tr>
<tr>
<td>8/20/2005</td>
<td>0.459</td>
<td>0.465</td>
<td>0.46</td>
</tr>
<tr>
<td>8/22/2005</td>
<td>0.004</td>
<td>0.000</td>
<td>0.00</td>
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<tr>
<td>8/25/2005</td>
<td>0.028</td>
<td>0.025</td>
<td>0.02</td>
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<tr>
<td>9/14/2005</td>
<td>0.389</td>
<td>0.396</td>
<td>0.39</td>
</tr>
<tr>
<td>9/16/2005</td>
<td>1.694</td>
<td>1.715</td>
<td>1.71</td>
</tr>
<tr>
<td>9/19/2005</td>
<td>0.548</td>
<td>0.528</td>
<td>0.25</td>
</tr>
<tr>
<td>9/20/2005</td>
<td>0.432</td>
<td>0.458</td>
<td>0.44</td>
</tr>
</tbody>
</table>

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

Tighter Lid seal
New bearings (less play)
Operation Lights (inside)

Adjustable Bucket Hts.
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)
  - $200 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 soon

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

MDN Sites Summer 2005
• Recent Start (~6 months)
• Pending Start (~6 months)

NV02 NV99
OK15

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

MDN Sites In Mexico
• HD01: Huejutla de los Reyes, Hidalgo, Mexico
• OA02: Puerto Angel, Oaxaca, Mexico

Experimental Sites
• AL-EXP Birmingham – 12/22/04
• FL-EXP Pensacola – 2/08/05
• Puerto Rico – 04/02/05 (Above/Below Canopy)

Puerto Rico Experimental Site

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
**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

**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

**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

**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

**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)

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

- NCON
- MDN ACM #1
- MDN ACM #2
- MICB
- MDN ACM #3
- Belfort #1
- Belfort #2

- 3 MDN ACMS
- 1 NCON
- 1 MICB
- 2 Belfort Rain Gauges
- Stick Gauge
- Gas Phase Hg (7 Day)
- Particulate Phase Hg (7 Day)
- All Collectors Data Logged

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

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

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)

LADEQ MDN Singe Rain Events

<table>
<thead>
<tr>
<th>Site</th>
<th>Event Date</th>
<th>In. Rain</th>
<th>Hg Conc.</th>
<th>Hg Deposition</th>
<th>% Annual Dep</th>
<th>% Annual Precip</th>
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<tbody>
<tr>
<td>LA28</td>
<td>5/18/2004</td>
<td>8.94 in</td>
<td>10.70 ng/L</td>
<td>2430.0 ng/m²</td>
<td>9.3%</td>
<td>11.8%</td>
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<tr>
<td>LA23</td>
<td>5/18/2004</td>
<td>8.01 in</td>
<td>8.80 ng/L</td>
<td>1820.6 ng/m²</td>
<td>10.4%</td>
<td>13.4%</td>
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<tr>
<td>LA10</td>
<td>5/18/2004</td>
<td>5.56 in</td>
<td>11.60 ng/L</td>
<td>1490.6 ng/m²</td>
<td>7.1%</td>
<td>8.5%</td>
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<tr>
<td>LA05</td>
<td>5/18/2004</td>
<td>8.26 in</td>
<td>13.00 ng/L</td>
<td>2730.0 ng/m²</td>
<td>13.5%</td>
<td>11.9%</td>
</tr>
</tbody>
</table>
LADEQ MDN Single Rain Events

<table>
<thead>
<tr>
<th>Site</th>
<th>End Date</th>
<th>In. Rain</th>
<th>Hg Conc.</th>
<th>Hg Deposition</th>
<th>% Annual Dep</th>
<th>% Annual Precip Vol.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA05</td>
<td>5/10/2004</td>
<td>9.28 in</td>
<td>11.39 ng/L</td>
<td>2753.9 ng/m²</td>
<td>13.9%</td>
<td>12%</td>
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<tr>
<td>LA05</td>
<td>6/22/2004</td>
<td>3.62 in</td>
<td>11.39 ng/L</td>
<td>1222.3 ng/m²</td>
<td>6.2%</td>
<td>5%</td>
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<td>LA05</td>
<td>6/29/2004</td>
<td>6.05 in</td>
<td>8.46 ng/L</td>
<td>1291.1 ng/m²</td>
<td>6.6%</td>
<td>9%</td>
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<tr>
<td>LA05</td>
<td>7/11/2004</td>
<td>0.98 in</td>
<td>50.78 ng/L</td>
<td>1242.4 ng/m²</td>
<td>6.4%</td>
<td>1%</td>
</tr>
</tbody>
</table>

2004 Hurricane/Single Rain Event Opportunities

MDN Trace Metals Initiative

MDN Trace Metals Study Sites: 1997 - 2005

<table>
<thead>
<tr>
<th>Site</th>
<th>Dates</th>
<th>Metals</th>
<th>MDN Sponsor</th>
</tr>
</thead>
<tbody>
<tr>
<td>NH06</td>
<td>1997-2003</td>
<td>Au, Ag, Be, Cd, Cr, Cu, Mg, Na, Ni, Pb, Se, Te, V</td>
<td>Frontier [HAL]</td>
</tr>
<tr>
<td>NH03, NH02, NH01</td>
<td>1998-2003</td>
<td>MDN ACM Mod &amp; Trace Metal Sample Trains</td>
<td>EPA</td>
</tr>
<tr>
<td>CA02, CA03, CA04</td>
<td>1999-2003</td>
<td>Cu, Ni, Co, Ca</td>
<td>SD</td>
</tr>
<tr>
<td>IN05, IN04, IN03</td>
<td>2000-2001</td>
<td>As, Be, Cd, Cr, Hg, Mn, Na, Pb, Sn</td>
<td>Indiana USGS</td>
</tr>
<tr>
<td>PA05, PA04, PA03</td>
<td>2002-2003</td>
<td>As, Cd, Cr, Cu, Mn, Na, Pb, Se, Sn</td>
<td>PSU</td>
</tr>
<tr>
<td>PA01, PA02, PA01, PA04, PA08</td>
<td>2003-2003</td>
<td>As, Cd, Cr, Cu, Mn, Na, Pb, Se, Sn</td>
<td>PSU</td>
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<tr>
<td>MAER</td>
<td>2001-2005</td>
<td>As, Be, Cd, Cr, Cu, Mn, Na, Pb, Se, Sn</td>
<td>US EPA</td>
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<td>IL01</td>
<td>2000-2001</td>
<td>As, Be, Cd, Cr, Hg, Mn, Na, Pb, Sn, Te</td>
<td>Illinois USGS</td>
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<tr>
<td>VA02, VA01</td>
<td>2005</td>
<td>MDN ACM Mod &amp; Trace Metal Sample Trains</td>
<td>VA USGS</td>
</tr>
<tr>
<td>LA05, LA04, LA03, LA23</td>
<td>2005</td>
<td>As, Be, Cd, Cr, Cu, Mn, Na, Pb, Se, Sn, Te</td>
<td>LA DEQ</td>
</tr>
<tr>
<td>ME02</td>
<td>2002-2005</td>
<td>MDN ACM Mod &amp; Trace Metal Sample Trains</td>
<td>UCM</td>
</tr>
</tbody>
</table>

Trace Metals Production Method

- One Digestion And Analysis For All Metals
- Capable Of Measuring Se and As
- Reporting Limits 7-100 times lower than ICP-A/OES

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)
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)

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
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 (cont’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-P 0.02 NH4-P 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—we 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, Walker, others
Reports at technical session.

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

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

<table>
<thead>
<tr>
<th>Method</th>
<th>Average</th>
<th>Median</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sites using Federal Express</td>
<td>2.6</td>
<td>2.3</td>
<td>340</td>
</tr>
<tr>
<td>Sites using UPS</td>
<td>4.4</td>
<td>3.6</td>
<td>300</td>
</tr>
<tr>
<td>Sites using USPS (remote)</td>
<td>8.4</td>
<td>7.7</td>
<td>162</td>
</tr>
<tr>
<td>Time for all NTN sites in 2003</td>
<td>4.7</td>
<td>3.0</td>
<td>13,177</td>
</tr>
</tbody>
</table>

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
4-in-1 Shipping Protocol--update

A quick review:

WHY???
- Sites are charged extra shipping by UPS & Fed Exp for non-standard boxes (handles, straps & metal corners)
- ~$5.00 per mailer plus pick-up charges for weekly shipments
- Complaints from funding agencies at NADP meetings
- Security—homeland security for shipping may require 'sealed' shippers in future
- Need a model for new collector container shipping when new precipitation sampler comes on-line (if not a 3.5 gal bucket)

Black Cases are ~$75 each; ~$115,000 for mailer inventory at current costs

- CAL agreed to investigate ways to reduce shipping costs

Lab Operations

CAL sample processing for NADP in 2004
~ 1300 samples/month
~13,000 analyses/month

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<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td># of samples analyzed</td>
<td>10652</td>
<td>10663</td>
<td>10772</td>
<td>11753</td>
<td>12157</td>
<td>12560</td>
<td>13425</td>
<td>13700</td>
</tr>
<tr>
<td>% of samples</td>
<td>9.1%</td>
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</tbody>
</table>

4-in-1 Shipping Protocol--update

A quick review:

Lab Operations

- New ISWS building construction
  - will provide much needed shipping and receiving space in 2005
  - Disruptions in 2004-5
  - Temporary quarters until Oct. 2005?

4-in-1 Shipping Protocol--update

A quick review:

WHY???
- Sites are charged extra shipping by UPS & Fed Exp for non-standard boxes (handles, straps & metal corners)
- ~$5.00 per mailer plus pick-up charges for weekly shipments
- Complaints from funding agencies at NADP meetings
- Security—homeland security for shipping may require 'sealed' shippers in future
- Need a model for new collector container shipping when new precipitation sampler comes on-line (if not a 3.5 gal bucket)

Black Cases are ~$75 each; ~$115,000 for mailer inventory at current costs

- CAL agreed to investigate ways to reduce shipping costs
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, rain gauge 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

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
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/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
  - 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

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 $90 (ave ~ $45)

- Estimate of cost savings
  - saving per month per site
    - $25/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

Savings in mailing costs will be monitored
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

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 Co-located-Site Raingages FY06

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
**2005 MDN Programs**

- System Blank for entire MDN
  - Ship 22 samples every quarter
- Continuing MDN Interlaboratory-Comparison – 3 Labs, 4 samples/2 weeks
  - 3 Labs, 2 samples/month

**What's New?**

- Glass Bottles for System Blank
  - Breaking 1 or 2 bottles / 20 shipped
  - Reusable, 1-Liter Teflon
  - Eliminates bubble wrap, broken bottles

**What's New?**

- MDN Blind-Audit Pilot Program
  - Pilot runs July – Sept. 2005
  - 6 Sites co-located NTN and MDN
  - Dry week = blind audit sample
  - Lab-created rain gage charts

**What's New?**

- MDN Blind-Audit Pilot Program
  - To date, 4 of 6 samples submitted
  - Identify QA samples for HAL in October
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

N-CON TO BE REPLACED BY Y.E.S. COLLECTOR

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 5m 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.

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.
NADP Collectors at Altitudes Greater Than ~750 - 1,000 Meters Have at Least 20% Frozen Precipitation

Sites >1000m elevation: 62
Sites >1000m having shields: 23
Sites >1000m requiring shields: 38

Green dot = has wind shield
Red dot = needs wind shield
? = unsure

NADP Sites (NTN/MDN) at Elevation >1000m