

Network Operations Sub-Committee (NOS) Meeting

Ft. Lauderdale, Florida

April 15-16, 2014

Day 1: April 15, 2014 Start time 13:36

- **Motion to approve minutes** from Fall 2013 meeting moved by Eric Hebert, seconded by Mark Olson. **Minutes approved.**

- SOPs For Approval (Mark Rhodes)
 - AMoN – 2
 - MDN – 7
 - NTN – Operator Aids (provided by Dennis Jackson)
 - Rain gauge collection bucket repair
 - Equipment replacement/Spare protocol
 - MeHg explanatory note (to be discussed Wed AM)
 - Electronic Belfort data download – new initiative/test equipment

Motion: Move to approve all SOPs and make available on-line

Moved by Greg Wetherbee, seconded by David Maxwell

Motion Passed.

- AMoN Status (Melissa Puchalski)
 - 66 monitoring sites; including Canyonlands NP, Puerto Rico (1 site), Canada (3 sites)
 - 2013 Annual NH₃ concentrations
 - UT01 Logan – highest concentration
 - Annual trends; 2012 increased due to wildfire and higher temperature influence
 - Seasonal/annual trends
 - EEMS independent audit program; 8 sites in 2013
 - Ongoing/Future
 - CASTNet inter-comparison, journal article
 - AWMA 2014 – Lehmann
 - EPA review of secondary NAAQS (Nox/Sox)
 - Spatial variability study
 - MARGA/AMoN Beltsville, MD inter-comparison 2 instruments
 - Duke Forest MARGA deposition study
 - Reactive N analyzer at Beltsville
 - QA Passive Sampler Accuracy
 - Triplicate denuders at Bondville
 - Precision – triplicates to 5% of Network
 - DQI = median precision <= 20%
 - Travel Blanks
 - One every 4th sample period
 - No longer used for data validation
 - 2013 17% above 0.2 mg/L

- AMoN Travel Blanks (Mark Rhodes)
 - Median creeping upwards
 - Discovered Teflon liner in jar cap
 - Tested to see if ammonia sticks to it
 - Sampler body with core inside jar – treated same as a travel blank
 - Just stuck on core in jar
 - Cleaned cap liners with Decon 90, and H₃PO₄ followed by Decon
 - Teflon Cap Liner Study
 - Thinking the cap liner is source of problem
 - Decon has a whole line of cleaners; Chris L. will investigate other options.
 - How much of an improvement is yet to be determined
 - Sigma-Aldrich couplers (undergoing testing at the Bondville site)
 - Switch to SA coupler for Radiello body
 - Loss deployment if current coupler is lost or fails
 - Doesn't affect variability
 - Performs better than existing coupler

- Site Survey Report (Eric Hebert)
 - 2013
 - 118 locations
 - 143 collectors
 - 118 primary rain gauges (14 belforts)
 - plots of As found/As left accuracy for Belfort/E-Gauge; inactive/active sensor temp
 - interesting things at sites; wiring/power; yellow jackets/battery boxes/dry side buckets
 - maintenance items for e-gauges
 - e-gauges are aging
 - 12V battery lifespan on e-gauge – 3 years?
 - Issues
 - Bucket handling
 - Gloves
 - Training
 - Webinars
 - FORF and SOP
 - Suggestions
 - N-CON maintenance
 - Approved MDN configurations
 - Dual chimney – removed funnel and have altered to create flat (splash surface)

- USGS External Quality Assurance Report FY2013 (Greg Wetherbee)
 - Co-location 2 Colorado Sites
 - N-CON higher concentrations than ACM due to opening sooner
 - 2011-13 results of co-located sites
 - Inter-laboratory comparison results

- CAL/ECST/CIES/AMEC – perform well
- CAL high performance; consistent
- Field Audit Program
- 2013 HAL inter-lab results
 - slight negative to slight positive bias in Hg concentration difference
- system blanks
- HAL continued high performance
- Irrigation issues
 - CA88 moved collector from 2ft from irrigation source to now 30 ft from (different) irrigation source
- AMNet 2013 Progress Report (Mark Olson)
 - 21 Sites
 - MD08/OH02 back on-line
 - Added GEM to AK03 – 1st National Park Service site
 - 2013
 - 15 sites- 23 instrument audits
 - ME97 installation
 - 2014
 - 5 sites
 - AK03 installation
 - new support/funding
 - SUNY ESF/NYSDEC (NY20)
 - LADCO (OH02/OH52/WI07)
 - NPS (AK03)
 - MD DNR (MD08)
 - OK99 funding through 2014
 - Data Availability
 - All 2013 is available except 5 sites (AL19/GA40/FL96/OH52/TW01)
 - Data transfer from sites continues to be a problem
 - AMNet Improvements
 - WI07 co-location continues
 - QA dB upgrade
 - Improve data upload times
 - Summer intern
 - AMNet Documents
 - 2012 QA Report approved
 - 2011 awaiting approval
 - 2008-10 under review
 - International
 - Mt Lulin, Taiwan
 - Hanoi ,Vietnam – install/training
 - What's Next?
 - Validate 2014 data – Olson and summer intern

- Site visits (7)
 - Expansion into Asia
 - Continue co-location experiments
 - Tekran (E.Prestbo) has agreed to loan instrument for webinar training
- Mercury Litterfall Status Report (Marty Risch)
 - Overview
 - Fee based monitoring initiative
 - 5 year transition program partially supported by USGS
 - Benefits
 - Low cost Hg dry deposition
 - Enhances AMNet
 - Supplements Hg wet deposition
 - Hg in Litterfall
 - Most new Hg added to floor is from litterfall
 - Network operation
 - \$2600 per site to Program Office by site sponsor
 - passive collectors
 - autumn samples analyzed at USGS Hg Research Lab
 - Definitions of litterfall
 - Annual litterfall Hg Dry deposition
 - $\text{Hg concentration samples (ng/g)} \times \text{sample mass (g)} = \text{Hg mass/area}$
 - 13 sites in 2013
 - Observations
 - 2012; 1.7ug/m² (MN18) to 17.2 ug/m² (IN34)
 - good comparison between litterfall Hg deposition in 2012 and earlier years at 8 sites
 - Future Activities
 - Litterfall archive 5 years
 - Hg isotope analysis as a source tracking tool
 - Data in support of Hg Total Deposition
 - Estimates from TDEP
 - Equipment Testing Update (Mark Rhodes)
 - N-CON Power study
 - AC standard – baseline; DC inverter setup; DC with no inverter – Thies in freezer
 - Grid sensor only heats when triggered – rain monitor, lower power usage
 - N-CON bucket collector, AC power usage
 - Rate of power usage decreased when changed from 24 VAC to 24VDC relay

Sensor Study

- Added 2 Thies grid rain monitor sensor
- Jan-Mar 2014
- Draft report on website
- Conclusions to date

- Thies perform similar to one another
- True whether same settings; different settings for Thies sensor
- Optical vs grid; heater vs no heater
- Time to close optical vs grid
- Thies and CAPMoN sensors most trouble free, though CAPMoN sensor susceptible to bird droppings
- Electronic Belfort Rain Gauge
 - Rain gauge study at IL11
 - Pluvio/Pluvio2 very close
 - Belfort doesn't provide filtering algorithm
 - Just outputs numbers
 - With filtering can approximate pluvio data
 - At MD99 not as good matching up to NADP gauge
- MDN Evaporation Tests
 - Need to come to some conclusion

Day 2: April 16, 2014 Start time 08:30

- Methyl Mercury (Mark Rhodes)
 - Status from Fall Meeting
 - Submitted several questions to HAL
 - composite sample – if volume too low – don't take anything from it
 - assigning QR codes to MeHg data
 - concentrations below minimum limit (the mass dilemma)
 - where are we now
 - recommend 2 datasets
 - default: "<RL" (reporting limit)
 - by request: unfiltered data
 - QR assigned as lowest composite MDN QR
 - If MDN=C then Composite=C
 - Data pre-Nov 2002 to be evaluated - QR=C or request more data from HAL to evaluate
 - Explanatory notes for MeHg data

Motion: To accept protocol as described to move the data to the website

Moved by Mark Olson, seconded by Eric Prestbo

Motion Passed

- NTN Sample Analytical Priority – Low Volume – (Chris Lehman)
 - Same presentation as the Fall Meeting
 - Lose 4% if change in protocol to run complete suite
 - Wet dilute – 50 ml sufficient volume for full analysis
 - Trace samples could go directly to FIA
 - Leave Wet Dilute alone, Focus on T samples, Extend WD Study?

Motion: The 2014 CAL Review Team will discuss with the CAL in June and come up with a proposal for the Fall Meeting.

Moved by Greg Wetherbee, seconded by Melissa Puchalski

Motion passed.

- Stickgauge Precipitation Report (Greg Wetherbee)
 - issue raised by Elizabeth Boyer
 - State has a problem justifying different precipitation values at collocated monitoring sites
 - MDN/NTN co-located sites
 - Precip depth from gauge
 - Sample depth from bucket/collector
 - PA puts oil in gauge to minimize evaporation – weekly reading
 - compare stick gauge/e-gauge
 - 2 separate datasets used for the study
 - MDN/NTN e-gauge/Stick gauge – Jan 2009-Oct 2013
 - 4 sites in PA
 - Weekly stickgauge reading reportedly spiked with oil
 - substitute precip data – okay
 - if no stick gauge at site; alternate gauge- backup gauge
 - ≤ 10 km use as substitute precipitation depth
 - ≤ 30 m to use as backup gauge
 - NTN or MDN sample depth
 - Precip type
 - MDN better for rain
 - NTN better for snow
 - looked at all combined
 - rain only/snow only/mixed frozen/liquid – sample depth parameter
 - pick maximum of two sample depths
 - whichever collector is catching more
 - one value for subpnt

Motion: In the absence of a backup rain gauge the maximum sample depth should be used as substitute precipitation depth

Moved by Greg Wetherbee, seconded by Eric Hebert

Discussion

- Bob Larson – Why make stick gauge as preferred backup, just an approved backup
- Sample change times may vary
- Time limit on when you can substitute one sample depth for another
- Time limit on ON/OFF times – 3 hrs?

Motion withdrawn.

- Visual Guide to Detection Levels (Brooke Conner)
 - Various DQO's for detection
 - 1. Report as low as possible
 - 2. Minimize false positive

- 3. Minimize false negative
 - 4. Minimize both
 - 5. Sample specific detection levels
- Limit of Detection
 - Not smallest concentration that can be measured
 - Concentration at which we can decide presence or absence
 - Point where we can just distinguish a signal from background
- instrument detection limit
 - just above the noise
- Problems with IDL
- Detection decision level
- EPA MDL has some issues
- EPA MDL has been criticized for not capturing enough variability
- Sample specific detection levels
- Sample volume differences
- Reporting levels
- What do you report when an analyte is not detected
 - <MDL, <PQL ND <LOQ
- MDN Evaporation Study (Jason Karlstrom)
 - MDN Evaporation Study
 - Refer to 2013 Fall Meeting NOS minutes
 - Continue study at HAL with ACM collectors with spiked samples
 - No fan
 - Increased temperature to 100+ F (to determine whether the sample is compromised)
 - Will use N-CON heaters in ACM collector to raise temperature inside the collector
 - Will have data to report in the fall
- Dryfall Collection (Chris Lehmann)
 - Dr Gerilynn Soreghan – University of OK
 - Passive marble trap – marbles in cake pan
 - Use the dry bucket side of collector

Motion: That the research group of Dr Lynn Soreghan of the University of Oklahoma be allowed to deploy a dust collector in the dry side bucket at PR20 for approximately 1 year, with the final sampling protocol to be agreed upon by the chair of NOS, the QA Manager and the CAL Director. Deployment at additional sites may be approved by the voting members of the Executive Committee.

Moved by Chris Lehmann, seconded by Jason Karlstrom.

Discussion:

- We have been down this road before [R.Artz]
- Tacit approval of sampling method by agreeing
- Too much on the operator's plate [M.Nilles]
- Justification of method [R.Artz]

Motion Opposed – Motion not approved.

- OR09 Silver Lake NTN Sensor Modifications to Improve Solar Power Site Reliability (Mark Nilles)
 - 2x100Watt solar panels; 3 x 100 amphr batteries
 - Sun saver 20amp 12 V charge controller
 - Solar Challenges
 - Past 3 years site failed to make the map
 - N-CON sensor heater runs constantly
 - N-CON + Ott Pluvio + inverter; 400-500 Watt hours per day (12 VDC)
 - N-CON without inverter uses >2/3 the power
 - N-CON heating sensor consumes over ½ the power
 - Reduce power demand for sensor
 - RH Moisture/frost sensor
 - Turn sensor heater off when RH is below threshold
 - Reduces high power draw from heater
 - Circuitry only affects power to heater not collector or sensor
 - ~\$100 parts
 - Sensor modification control box
 - Ability to bypass the moisture sensor
 - Conclusion
 - Moderately successful
 - Power consumption to power storage
 - Extreme cold in December (-33°F) did not hinder operation
 - Government shutdown, new operator, aging batteries confounded 2012/13 to 2013/14 comparison
 - Chris Lehmann – suggest a group to research good design tool for solar solution
 - No standard design

Motion: OR09 be allowed to continue in this modified mode pending further additional testing at other sites to come up with a suitable standard modification.

Moved by Mark Nilles, seconded by Dennis Jackson.

Motion passed.

- NTN Bag Sampling (Mark Rhodes)
 - Not getting buckets clean enough, potential for loss of N species.
 - Bag study report posted last week.

Motion: Bag sampling is accepted as an approved NTN/AIRMoN sampling protocol.

Caveat#1: Sites are not required to switch to bag sampling,

Caveat#2: Samples that were collected prior to approval of the bag sampling protocol are accepted as NTN samples.

Moved by Mark Rhodes, seconded by Eric Hebert.

Discussion:

- [R.Artz] Might be useful to ship bags back rather than transfer to bottles
- [C.Lehmann] bags trap snow differently, low volume sampling, changes bucket orifice
- bucket 50%/bag 55% catch efficiency
- [G.Lear] Strived to improve catch efficiency – this is the right step

Motion passed.

- CAPMoN Equipment Update (Richard Tanabe)

- N-CON NTN 24VDC Conversion
- MIC C300 24VDC Conversion
- Why is CAPMoN going off-grid
 - Ability to move from concept to reality much faster
 - Short term precipitation sampling in areas with no power
 - Installation of site infrastructure is becoming more demanding and time consuming
- Flat Valley, SK
 - 6 305W PV panels; 32 – 6V deep cycle batteries
 - autonomy for 10-12 days
- Sensor arm/grid development
 - 3 grid sensor arms for both C300 and N-CON NTN (direct plug-in to replace Thies)
- Sequential Precipitation samplers under evaluation
 - Eigenbrodt (9 bottle) and Digitel (32 bottle)
 - Wood Buffalo NP – daily requirement but only weekly visits
- Next Steps
 - Add CAPMoN 3 grid prototype to PO sensor study
 - Continue development of sensor arms
 - Field testing of sequential samplers
 - Continue 3rd generation solar array development
- Dave MacTavish will retire on April 23, 2014, he passed along the following message to NOS
 - “ After 37 years with the Federal Government I am retiring. I have been attending NADP meetings for more than 27 of those years and have been fortunate enough to have had the opportunity to meet and work with the people who have made NADP and especially NOS such a success. It has been a fantastic learning opportunity, which I have enjoyed much more than I let on. NOS discussions, decisions and the process of making those decisions have impacted how CAPMoN has grown and matured. I will especially miss the riveting QA/QC presentations both laboratory and field (I expect only Greg, Chris and Mark know I’m being serious). I expect to see bigger and better things from NADP in the future. Thanks for putting up with me.”

Motion to adjourn

Moved by Chris Rogers, seconded by Mark Rhodes

Meeting adjourned.