

Dear CASTNET Site Operator:

This message is your **CASTNET: Eye on Air Quality** newsbrief for Fall 2012  
(best viewed in HTML format in your e-mail reader)



## **NETWORK NEWS**

### **EEMS awarded independent auditor contract for CASTNET**

As we discussed in the last issue of Eye on Air Quality, audits are important elements of a properly operated air quality monitoring program. The CASTNET program contracts for quality audits to be performed at each station by someone independent of the CASTNET program (i.e., not the CASTNET contractors, AMEC and ARS). EPA recently announced that the contract to perform the annual ozone performance evaluation (PE) audits was awarded to the current audit contract holder, Environmental, Engineering & Measurement Services, Inc. (EEMS).

Systems audits look at the overall procedures and methods employed to measure, record, validate, and report data. A PE is a type of audit in which the quantitative data generated in a measurement system are obtained independently and compared with routinely obtained data to evaluate proficiency. These audits determine if a measurement program has appropriately documented procedures in place that are adequate to make quality measurements and whether those procedures are being followed. CASTNET sites receive a full site audit once every two years. A full site audit includes a systems audit and PEs of the flow, ozone, temperature, data acquisition system, and if present, meteorological instruments. However, the ozone system must be audited annually for it to comply with the requirements of Title 40 Code of Federal Regulations (CFR) Part 58. To maintain Part 58 compliance, EEMS has scheduled full site audits to alternate years with ozone system only PEs at each site.

Additionally, some stations may receive audits from state or local air quality agencies in place of or in addition to the contracted PEs. Please inform your contractor (AMEC or ARS) immediately when an auditor makes contact or upon discovery of a visit if no contact was made beforehand. You do not have to call us during the audit, but let us know soon after the audit that one was performed and promptly send along the audit results.

### **The Ammonia CASTNET Study and AMoN Ammonia Intercomparison**

AMEC conducted a reactive nitrogen inter-comparison study at five CASTNET sites over the period April 2010 through September 2011. This study was known as the Ammonia CASTNET Chemical Speciation Network (CSN) Study (ACCS). The goals of the ACCS were to assess the precision, accuracy, and bias of several different samplers. These samplers included:

- ◆ Passive ammonia samplers (Radiello) used by the National Atmospheric Deposition Program (NADP) Ammonia Monitoring Network (AMoN): These passive samplers measure ammonia concentrations at 2-week intervals as an average of results obtained from triplicate Radiello samplers. The passive samplers were analyzed by the NADP Central Analytical Laboratory (CAL) and reported in the AMoN database, which is accessible via the NADP Web page (<http://nadp.sws.uiuc.edu/AMoN/sites/data/>).
- ◆ The Met One Super Speciation Air Sampling System (SASS) mini-parallel plate denuder (MPPD) for ammonia: The Super SASS ammonia denuders were run for two 1-week periods every six weeks. The MPPDs were shipped to and analyzed by the AMEC CASTNET Laboratory.
- ◆ The Met One Super SASS ion canister: The Super SASS ion canisters were run for two 1-week periods every six weeks. The Super SASS ion canisters were shipped to the RTI International laboratory for analysis as part of the CSN contract.

- ◆ Duplicate annular denuder systems (ADS) as the reference method: The ADS (EPA modified Compendium Method I.O. 4.2) were run for two 1-week periods every six weeks. The ADS were shipped to and analyzed by the AMEC CASTNET laboratory.

Integrated concentrations for a 1-week sampling period were used for the comparisons. The concentrations from two consecutive 1-week samples were averaged to match the sample exposure for AMoN. Study sites were selected based upon location, predicted or known ammonia emissions sources, site operator capability, and collocation with AMoN sites.

### Sampling Sites

The following table lists the primary sites within CASTNET that were selected for this study along with the types of samplers deployed at each site.

<b>Site ID</b>	<b>Sampler Configuration</b>
CTH110, NY	AMoN passive sampler
PAL190, TX	Single denuder ("short") NH <sub>x</sub> only ADS
ARE128, PA	AMoN passive sampler
CHE185, OK	Single denuder ("long") NH <sub>x</sub> only ADS
ROM206, CO	Super SASS for ammonia
	Super SASS CSN ion module



PAL190, TX



ARE128, PA

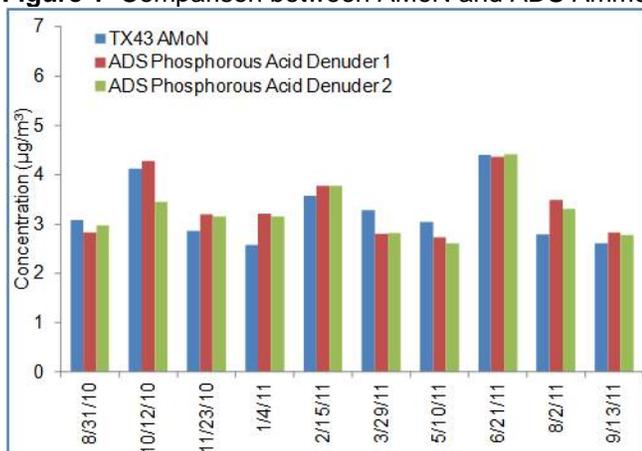
### Results

ACCS field sampling started during August 2010 and continued through September 2011. Results from the field sampling component of the study are presented in the following figures. The results were used to quantify the performance of the AMoN samplers and Super SASS MPPD.

In general, the AMoN passive sampler performed very well at all five sites compared with the ADS reference concentrations (Figures 1–3). Note that at ROM206/CO88, AMoN samples did not start until May 2011, and there are only 3 AMoN samples currently included for comparison at that site versus 10 for the other sites.

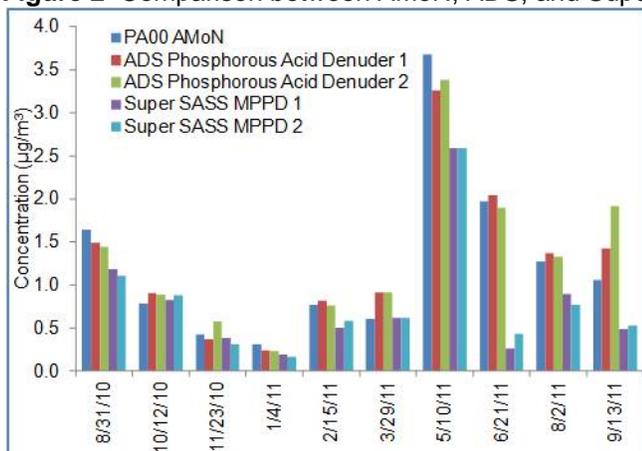
Super SASS MPPD samples consistently collected less ammonia than the reference ADS denuders (Figures 2 and 3). This was especially evident at the high elevation site, ROM206 (Figure 3).

**Figure 1** Comparison between AMoN and ADS Ammonia Concentrations at PAL190/TX43



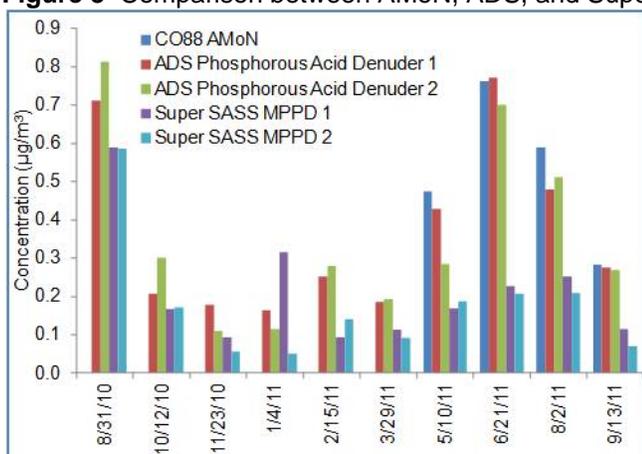
**Note:** TX43 is the AMoN site at PAL190, TX.

**Figure 2** Comparison between AMoN, ADS, and Super SASS MPPD Ammonia Concentrations at ARE128/PA00



**Note:** PA00 is the AMoN site at ARE128, PA.

**Figure 3** Comparison between AMoN, ADS, and Super SASS MPPD Ammonia Concentrations at ROM206/CO88



**Note:** CO88 is the AMoN site at ROM206, CO.



*To ensure valuable information is not lost, please **legibly** complete all sections of the SSRF. Please write on a hard surface to ensure all copies are legible. Include the site identification number, filter pack identification number, all dates, and other information, as well. Redundancy verifies accuracy and highlights problems.*

The SSRF serves as a chain of custody record for the filter pack. Chain of custody is important to CASTNET data collection because it ensures that data quality is not compromised due to faulty or inadequate documentation, shipping errors, and/or contamination during the sample transfer stage. Specifically, sample custody must be maintained to:

- a. Create an accurate record that traces sample handling from preparation of sample kits through computer storage of the data, and
- b. Ensure the maintenance of sample integrity through traceability of the materials that contact the sample.

*Please sign and date the chain of custody label to maintain the record of traceability. It is important to know who has handled the filter packs in case there are questions later.*

Site operators play an important role in ensuring the SSRF is correct. The chain of custody section on the SSRF that is included with a new, unexposed filter pack includes the site identification number, the filter pack identification number, the week the filter pack is scheduled to be installed on the tower, and the date of the start of sampling (“on date”). Prior to installing the filter pack on the tower, the site operator needs to verify that this information is correct. If any of the information is not correct, the data collected by the filter pack are compromised since the information on the SSRF has been logged into the CASTNET data management system. Dates, times, and identification numbers are linked.

*Please check that each filter pack is installed on the correct “Sampled” or “on date.” If filter packs are accidentally mixed up and run out of order, please make a note on the SSRF and tell AMEC or ARS during your Tuesday call.*

### **Believe it or Not**

As always, it’s all in the details. To have trouble-free sample changes and avoid losing pertinent data, please avoid a few of the common mistakes seen by the CASTNET laboratory:

- ◆ **Laboratory receipt of unexposed filter packs.** In these cases, more often than not, the exposed filter pack is put back on the tower for an additional week, and the new, unexposed filter pack is returned to the laboratory. Unfortunately, this mistake is not discovered until after the filters have been taken through the full analysis process. Before raising the flow tower, please check the filter pack identification label to verify that the “Sampled” date matches the current date.
- ◆ **Sites run out of filter packs.** Since the laboratory routinely ships filter packs to the sites about two weeks prior to the filter pack’s sampling date, how can anyone run out of filter packs? One way is if a filter pack is lost in transit. Sometimes filter packs are lost or temporarily misplaced after receipt. Please keep track of filter pack deliveries and alert ARS or AMEC on your Tuesday call if you did not receive an expected delivery, or if you feel you are running short. Another good way to ensure you don’t run out is to verify each Tuesday that you have at least three filter packs in your possession – the one just removed from the tower, the one just installed on the tower, and one still in the shipping tube ready to be installed the following week.
- ◆ **Filter packs sent to a wrong address.** This is similar to the preceding bullet, since if the filter packs go to the wrong place, the site will run out. This commonly happens when duties are transitioned to a backup operator or if the filter pack delivery destination closes for the holidays.
- ◆ **Wrong SSRF sent back with the filter pack.** Each SSRF is unique, and the information contained is specific to a certain date and filter pack. Please verify that the identification numbers on the filter pack and on the SSRF match.

- ◆ **Blank SSRF sent back with the filter pack.** Please legibly complete all fields on the SSRF, including a signature and date.

### Station Logbooks

Both ARS and AMEC provide station logbooks (electronic or hardcopy) to track who has been to the site and what was done. One way CASTNET maintains its reputation for producing quality data is through the ability to track each data point from data collection through final data validation. Site operators, calibrators, and others who visit the site need to log in. Visitors also need to describe their activities. Data validators sometimes use logbook entries to determine if data are valid. Knowing both the time and nature of activities that have taken place at a CASTNET station allows the data validators to make accurate decisions about data validity.

Entries to be recorded in the station logbook for both EPA and NPS sites should include any and all conditions that may affect the measurement process. NPS station operators should record information on the DataView laptop computer; EPA station operators should write **legibly** in the site narrative logbook.

- ◆ **Date and time of arrival and departure:** This is done automatically at NPS sites when logging in or out of the station computer. EPA site operators and calibrators will need to manually write this information in the logbook.
- ◆ **Conditions at the site upon arrival:** Include weather conditions, presence of dew or fog, etc. For example, “partly cloudy w/30% cloud cover. Hazy, with rain previous evening.”
- ◆ **Time, date, measurement affected, instrument affected, and activity performed:** Any activity that affects data collection needs to be documented in the logbook. This can include, but is not limited to, marking channels down when performing instrument checks or routine maintenance (e.g., flow, ozone, etc.); noticing damage or potential contamination caused by insects, rodents, birds, or other causes; replacing or repairing an instrument; or changing filters, desiccant, or analyzer tubing.
- ◆ **Site ID, site operator/technician/auditor name:** NPS DataView laptops are already configured for the correct site ID, and the system will track the visitor’s name upon entering it during login. Visitors to EPA stations need to legibly fill in the Project Location line with the site identification and also sign each entry. If your signature is not legible, please print your name above it.

#2012-07-03 08:04:39#	dyan	login	
#2012-07-03 08:08:17#	dyan	Manual log entry	Entered site for check, NDDN, IMPROVE, Ammonia IMPROVE and AMoN. Site visit for 2 IMPROVE stations scheduled today with Michael Truong from Crocker Nuclear Lab University of California Davis. Weather hazy, < 5% cirrus clouds on horizon, temp 21 degrees Celsius, winds calm, no current precip.
#2012-07-03 10:12:25#	dyan	Manual log entry	O3R8 alarm 7/2/12 4pm to 6pm hourly h flags values 77-78. Passed Ozone Multipoint Calibration test. Hyde Park fire contained, Estes Park fire out, but still hazy conditions.
#2012-07-03 10:15:44#	dyan	Manual log entry	Logged in as config in order to change phase duration so Diagzero test did not self abort before stabilizing.
#2012-07-03 10:15:46#	dyan	User Logout	

Example of a good, descriptive, NPS station logbook entry

Log entries recorded through the DataView software reside on each station's computer and are uploaded once a week via modem to the ARS data validators. The logs are then reviewed and used for data validation. Site operators at the EPA-sponsored sites return completed logbook pages with the exposed filter pack and SSRF as the pages are filled. The completed pages are unpacked with the filter pack and routed to AMEC’s data operations staff where the pages are filed in the designated site notebook that includes all documentation pertinent to that site. These site notebooks are accessible to the AMEC data validators.

## **OUTSTANDING SITES**

National Park Service (NPS) sites that achieved 95%-100% validated ozone data for June 1, 2012 through August 31, 2012 and U.S. Environmental Protection Agency (EPA) sites that achieved 95%-100% validated ozone data for April 2012 through July 2012:

ACA416, ME	KEF112, PA	SAN189, NE
ASH135, ME	LAV410, CA	SEK430, CA
CAN407, UT	MAC426, KY	SHN418, VA
CDR119, WV	MCK131, KY	UVL124, MI
CHA467, AZ	MEV405, CO	VIN140, IN
DEN417, AK	MOR409, WA	VOY413, MN
GLR468, MT	PAR107, WV	WST109, NH
GRB411, NV	PET427, AZ	YEL408, WY
GRC474, AZ	PIN414, CA	YOS404, CA
GRS420, TN	PNF126, NC	
HOW132, ME	PSU106, PA	
JOT403, CA	ROM406, CO	

Please contact us with topics and tips of what you want us to explore next time in your **CASTNET: Eye on Air Quality** newsbrief.

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For monitoring site assistance, please contact:

NPS CASTNET sites: contact Air Resource Specialists Telephone: 1-800-344-5423 (Mountain Time)

EPA CASTNET sites: contact AMEC Telephone: 1-888-224-5663 ext. 2602 or ext. 6620 (Eastern Time)