OFFICE OF AIR QUALITY PLANNING AND STANDARDS

The QA EYE

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SPECIAL POINTS OF INTEREST:

- **We may be trying to accommodate an absolute difference acceptance criteria for low level 1-point QC data (pg.3)**
- **Need to make sure industrial monitors are really needed for NAAQS evaluations (pg.11)**

INSIDE THIS ISSUE:

Year End Update

OAQPS, ORD and EPA Regions have been working on a number of QA Initiatives in 2015. The following is a brief progress report on these projects.

PM2.5 Method 2.12

Due to the recent issues with data invalidation in the $PM_{2.5}$ program, OAQPS and the Regions have made an effort to update the 1998 $PM_{2.5}$ method guidance document. OAQPS solicited for comments on this document early this year and received about 175 comments. We revised the document through the fall and in November sent a draft out for review with a Dec 18, 2015 closing date for comments. OAQPS will review these comments and distribute a final version on AMTIC in January 2016.

QA Handbook Volume II

This document was last updated in 2013. With the proposed revision to the 40 CFR Part 58 Appendix A regulations, we felt it was a good time to update the Handbook. Work on this document took a back seat this summer with priority given to the $PM_{2.5}$ method revisions and the response to comment process for the QA rule revision. We plan to have a draft out for final review by February 2016 with a final by April, 2016.

Zero Air Generator Guidance

As the QA Handbook Revision Workgroup reviewed the document, there was a suggestion to develop a verification process for zero air generators. Dennis Mikel (OAQPS), Mathew Plate (Region 9) and Yousaf Hameed (Clark County) stepped forward and worked as a focus team to develop a guidance document. A draft has been created and is in the process of external review. It will be incorporated into the QA Handbook Volume II as an appendix which is scheduled for completion in April 2016.

(continued on page 2)

Ozone Technical Comments Being Addressed

In July, EPA received some comments related to ozone monitoring that we are in the process of addressing. EPA received a request to:

- upgrade ozone scrubbers to address ozone interferences for all of the existing analyzers across the network;
- adjust ozone concentrations to account for inlet height above ground level; and
- adjust ozone concentrations to account for local barometric pressure at altitudes above sea level.

We are still in the process of working through these issues but the following will provide some information on where we've been and where we are going.

Upgrading Ozone Scrubbers

We are confident, based on quality assurance and quality control requirements in 40 CFR part 58, Appendix A and data quality assessments, that the vast majority of ozone monitoring data collected nationwide are suitable for attainment/non-attainment determinations.

Continued on Page 6

QA Update *Continued from Page 1*

Electronic Logbook Guidance

In March, 2015 OAQPS convened a Workgroup made up of monitoring organizations and EPA Regions to discuss the use of electronic logbooks for ambient air monitoring. Monitoring organization personnel provided a series of presentations on their process to collect and store electronic logbook data. Although EPA does not have a policy in place on the use of electronic logbooks, OAQPS endeavors to develop a minimum set of guidelines for ambient air monitoring in the hopes that we can work with our office of general council to approve this guidance. The Workgroup has completed the guidance document and OAQPS has received some external review from a representative of the Cross-Media Electronic Reporting Rule (CROMERR). Response on the guidance was positive. The next step will be to meet with the Office of General Council. We hope to have some definitive answer on this guidance by spring 2016.

TSA Workgroup

Based upon the findings of recent TSAs, OAQPS and EPA Regions have had conversations about the consistency of implementing TSAs across the country. In an effort to educate each other on how TSA's are performed, OAQPS formed a Workgroup with the EPA Regions to develop guidance on the TSA process. Starting in April, 2015, the Workgroup has met approximately every three weeks to go over the proposed sections of the guidance document. The Workgroup has made a lot of progress. It has been an enlightening experience hearing how the various regions conduct the TSA, what they look for, what information they evaluate prior to implementing a TSA, how findings are reported and how corrective action is implemented. We expect this guidance to be completed in the summer of 2016.

NOy Update…IPN/NPN/NO_2

As discussed in QA EYE issue 18, ORD has been testing the use of NO_2 standards as an adequate replacement to NPN or IPN. They have been performing calibrations on NOY instruments using all three standards this summer and fall and the results using NO_2 appear to be very comparable to the IPN/NPN. ORD has a number of projects in the works but mentioned they will be providing some guidance based on the evaluation of data from this study by July, 2016.

PAMS QA Implementation Plan

With the restructuring of PAMS to monitor at a core set of NCore sites in CBSAs with a population of 1 million, and the potential for use of auto-GCs, OAQPS is working on a quality assurance (QA) implementation plan that will provide a succinct "plan of attack" for the development of the core network. The document will provide a timeline of the various activities that need to take place between 2016 and July, 2019 when full implementation of the core network is required. Each activity will be described, along with roles and responsibilities of the monitoring organizations and EPA. This document will provide the "plan" but not technical details which will be included in a revised PAMS technical assistance document (TAD).

The QA Implementation Plan will only focus on the core PAMS network (estimated at around 48 sites). It will not discuss any enhanced monitoring that would be developed by the monitoring agencies which would need to be more flexible relative to the monitoring required at the core network. A small EPA Workgroup, made up of volunteers from the EPA Regions and OAQPS, are working through this document. The goal is to have a draft available in March, 2016 for review by the monitoring organizations.

More details on the PAMS network can be found at the Federal Register Notice of the Final Ozone Rule on 10/26/2015 (Vol. 80, No. 206) http://www.gpo.gov/fdsys/pkg/FR-2015-10-26/pdf/2015-26594.pdf

Standard Reference Photometer (SRP)

The Region 6 SRP is fixed and recertified and is being packed up for return to Region 6 (Houston). The Region 7 SRP has a solenoid problem that is being repaired. The Region 1 and 2 SRPs were sent to RTP and will be set up, and recertified in December /January timeframe . The traveling SRP is finished recertifying the Region 8 SRP and will be sent to Region 6 as a second SRP for the comparison training that will occur in January, 2016. Scott Moore (ORD) will be doing the training in Houston. Work is almost completed on the SRP QAPP.

Review of Acceptance Criteria for Low Level 1-point QC Checks

EPA received quite a few comments of concern on the one-point QC check proposed in the most recent regulatory changes to 40 CFR Part 58 Appendix A. Most of the comments were related to the proposed selection of the QC check concentration based on the mean or median concentration at the site. QA EYE Issue 18 (page 4) provides more detail on the proposal and the comments received. As a follow-up to the Issue 18 article, EPA asked Sonoma Technology to evaluate a larger data set of 1-point QC data and annual PE data to determine whether EPA could identify a concentration "cutoff" value where a difference instead of a percent difference could be used for low concentration QC acceptance criteria. This paradigm was implemented for the level 1 and 2 Annual PE audit ranges as described in the February 17, 2011 Technical Guidance on AMTIC. This two-tiered acceptance criteria might provide some comfort for those monitoring organizations already challenging their instruments at lower levels (good for you!) and provide some incentive for monitoring organizations to attempt the audit at lower concentrations, especially at NCore sites where trace gas instruments are the norm.

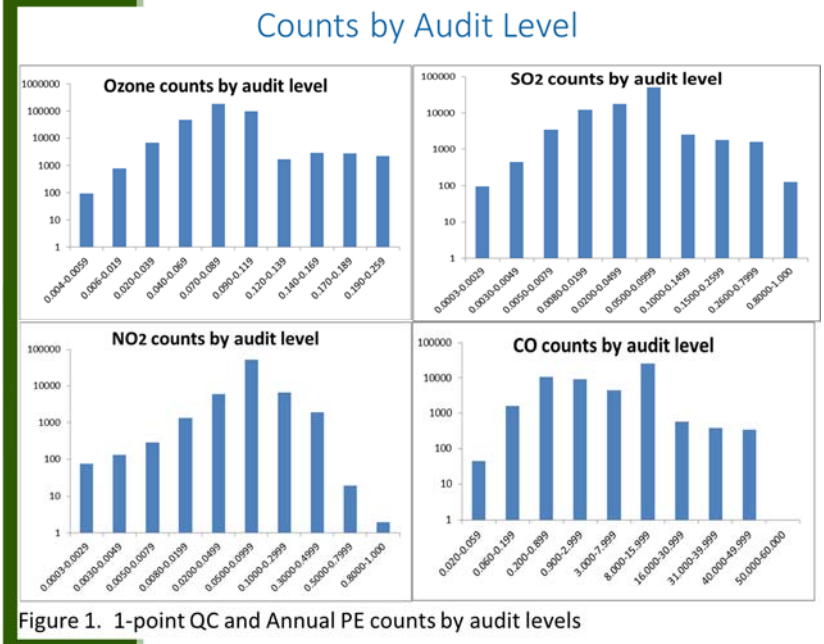


Figure 1. 1-point QC and Annual PE counts by audit levels

Evaluation Process

STI downloaded QA data from EPA's Air Quality System (AQS) AMP 504 reports from 2012-2014 for all gaseous pollutants. STI then used Python and MS Access 2010 to process the data into .csv files suitable for input into R. R code was then used to generate summary statistics and calculate percent and absolute differences. R was also used to generate plots showing the absolute and percent differences, binning the differences by the 10 annual PE audit level concentrations listed in the proposed rule and can be seen in Figure 1.

STI generated four types of figures for the gaseous criteria pollutants:

- Absolute difference notched box-whisker plots, binned by the concentration ranges
- Percent difference notched box-whisker plots, binned by the concentration ranges
- Absolute difference and percent difference interquartile range values bounded by two-tail 95% confidence intervals, binned by the concentration ranges
- Fraction of samples exceeding each of the different performance acceptance criteria by bin.

As indicated in Figure 1, the data sets for the two low concentration bins and the high concentration bins are relatively limited compared to the middle ranges and was the reason we combined both QC check and annual PE data.

Figure 2 displays the percent and absolute difference notched box-whisker plots for ozone. Notch box-whisker plots show the interquartile range as the box, the median concentration as the center line, the 95% confidence level in the median as the notch, and 1.5*interquartile range as whiskers; points beyond the whiskers are shown as outlier dots. In all cases, the smallest absolute differences and largest percent differences are in the lowest concentration bins (left side of the figures).

(Continued on page 4)

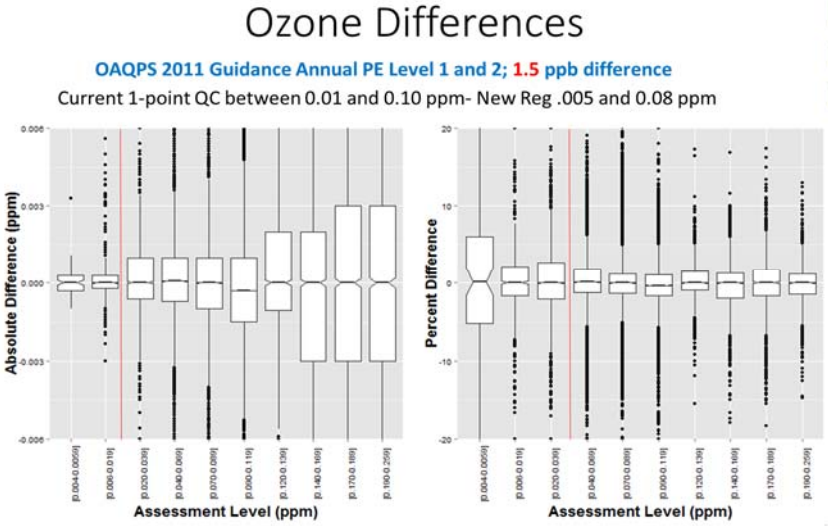


Figure 2. Ozone Absolute and Percent differences.

Acceptance Criteria for Low Concentration 1-point QC Check *(Continued from Page 3)*

Conversely, the highest absolute differences and smallest percent differences are observed in the highest concentration bins. These patterns are expected.

For O_3, SO_2, and CO, most bins center around absolute and percent differences of zero, showing no pattern of bias in reported concentrations relative to the audits. A few less populated bins do have some bias, but these are often within the 95% confidence level range of zero, and are thus statistically indistinguishable from no bias. In contrast, NO_2 (see Fig.3) has a clear pattern of both absolute and relative bias, with positive bias at lower concentrations and negative bias at higher concentrations.

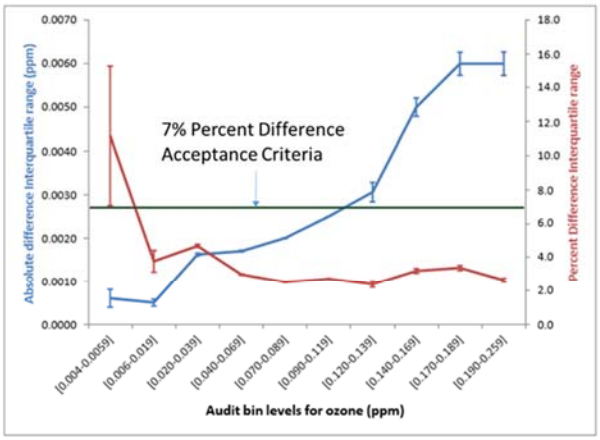


Figure 4. absolute difference and percent difference lines and intersection

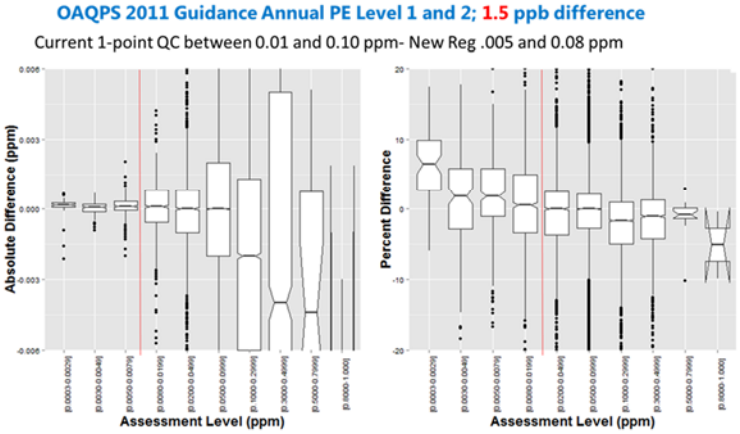


Figure 3 NO2 Absolute and Percent Differences

Another way of looking at this information is to evaluate where the percent difference statistics cross the absolute difference. This "knot" might be the concentration we could consider a switch from percent difference to absolute difference. Figure 4 illustrates this for ozone where the knot intersects at the third level audit bin. However, as you review the percent and absolute difference compared to the 7 percent difference acceptance criteria, you can see in Figure 2 as well as Figure 4 that the percent differences are well within acceptance criteria for audit levels three as well as two. So although Fig 4 is useful, looking at both figures will help make decisions as to the concentrations where it makes the most sense to allow for a absolute difference acceptance criteria.

Summary –Gaseous Pollutants

For the four gaseous pollutants, the data seem to corroborate the concentration and acceptance criteria we provided in the our Feb, 2011 technical memo for the Annual PE's which was:

O_3, SO_2 and NO_2: Audit Bins 1 and 2 ± 1.5 ppb difference
CO: Audit Bins 1 and 2 ± 0.03 ppm

Since the data in the earlier assessments as well as the recent STI work may be based on more sensitive trace gas instruments we may provide some additional flexibility at these lower concentrations for the 1-point QC checks. We expect to have a technical memo out on this in early 2016.

PM2.5 and Pb

In October, STI performed additional analysis of $PM_{2.5}$, Pb-PM_{10} and Pb-TSP parameters. We will be reviewing this data over the next few months to determine whether we can lower the cutoff range for data evaluation as well as determine if use of a absolute difference may be appropriate.

Training Opportunities

There are a few training activities on the horizon.

PM2.5 Gravimetric Lab Training

In late 2014, Region 4 implemented a training session for $PM_{2.5}$ gravimetric lab technicians. They plan on offering a similar training course in March, 2016 and plan to advertise it nationally. The session is focused specifically on lab technicians. If interested contact Stephanie McCarthy at mccarthy.staphanie@epa.gov. Space will be limited to 25 people .

National NPAP/PEP Training

Annual NPAP/PEP training is scheduled for the week of March 14 2016.

National Ambient Air Monitoring Conference

Plans are still not completely solid but it is looking like this conference will be scheduled for August, 2016. QA training will be available. A save the date will be posted on AMTIC soon.

Re-Engineering the NPAP Through the LEAN Process

The NPAP program has been around for a long time; from the old mailed audit systems to the present through the probe technique; and has been a very successful audit program. However, it has not been without its problems. The biggest complaint have been getting the audit results into AQS in a timely fashion and making sure all of the audits get scheduled and completed. We looked to the LEAN process (see QA EYE Issue 18 page 8) to help us re-engineer the process completely. The result? A completely new Performance Evaluation Audit Tool (PEAT) built in-house that integrates AQS, a new audit datasheet, and automated audit data upload to AQS. Here are the highlights of the PEAT system and general flow of the new program:

New Audit Selection Interface in AQS

AQS has been modified to include an interface to help the Regional NPAP leads sort, select, and schedule sites for NPAP audits. This tool will also export the metadata for these sites to assist in the audit. The NPAP leads and the monitoring organization staff will use these exports to confirm that the metadata is correct or if updates are required. AQS will also upload the metadata used in the AQS upload transactions from the pre-selected sites to the PEAT application.

PEAT

PEAT is a PC based application that replaces the current audit spreadsheet and has enhanced capabilities for managing the audit. PEAT uses the downloaded data from AQS to pre-populate site metadata in preparation for the audit thereby eliminating transcription errors by the auditor. PEAT also uses a "spreadsheet" format to record data from the audit in a similar way as the old spreadsheet; however, PEAT is much more secure and allows little customization by the auditor which will lead to more consistent NPAP audits nationwide. Auditors will use the AQS data, pre-populated in PEAT, to "verify" the metadata on-site by looking at the actual monitoring equipment. PEAT will automatically generate AQS transactions to correct metadata in AQS that does not reflect what is actually on-site. These transactions will be delivered to the monitoring contact for submittal to AQS. And finally, PEAT will automatically create an AQS transaction file for the audit and submit it to AQS for approval.

Improved Audit Data Entry to AQS

Audit data upload to AQS is very easy because you don't have to do it; PEAT works with AQS and does it for you. Actually, it only takes a click of a button. To do this, PEAT uses data previously downloaded from AQS to pre-populate required AQS transaction fields to minimize mismatches that have historically resulted in AQS upload errors. It then compiles this information with the audit information and creates the AQS transaction file. With one click of the mouse, the file is submitted to AQS but is not publicly accessible. It sits in a "holding area" awaiting approval from the Regional NPAP leads before moving to the public domain. The entire process is automated to ensure that AQS formats, AQS codes, and audit fields are all correctly and consistently filled in so AQS does not reject the transaction. The program is configured so that no audit will remain in the "holding area" for more than 30 days.

The LEAN process is very useful for those who have not gone through it in some capacity. Hats off to the guys in the Ambient Air Monitoring Group (Mark Shanis, Greg Noah, Mike Papp, Lew Weinstock) and the National Air Data Group (Robert Coats, Way Poteat, Chris Chapman, Michael Brooks, and Martin Husk) and for the great collaborative work!

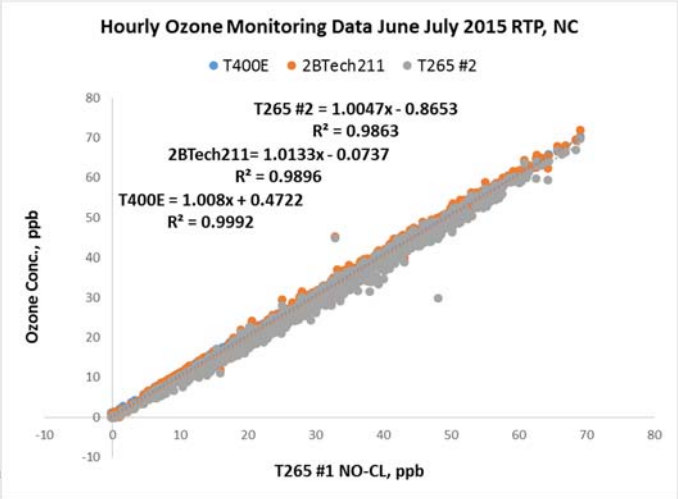
Regarding the status of the NPAP PEAT; Beta testing has begun by NADG. In mid-January it will be tested by Mark Shanis and Greg Noah here in RTP and then by one or two of the Regions. After any bug fixes, we anticipate NADG will present a final version in mid-March at the annual NPAP audit training sessions here in RTP .

Ozone Issues *Continued from page 1*

There are uncertainties associated with the UV ozone method, as there are with other methods for measuring air quality; however, we think the magnitude of these uncertainties is small and the impact minimal; therefore, a network-wide replacement or modification of UV-absorption ozone analyzers is not needed.

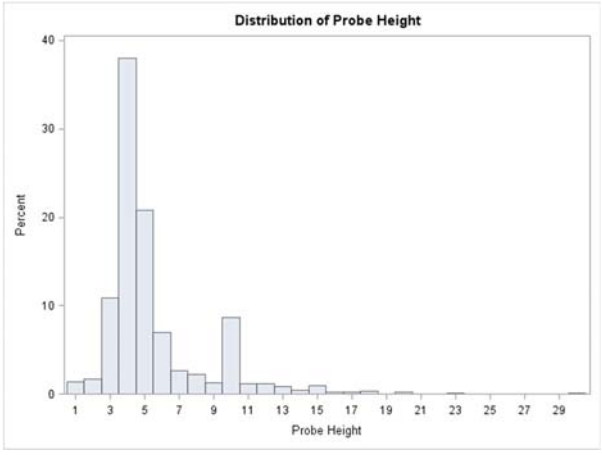
We are aware that UV-absorption Federal Equivalent Method (FEM) ozone analyzers are susceptible to potential interferences from compounds that sometimes occur in ambient air. However, most of the experimental testing for interferences (e.g., aromatic organic compounds and mercury) are at concentrations much higher than seen in typical urban ambient air (Kleindienst et al., 1993 and Li et al, 2006). The EPA has always cautioned against siting analyzers in locations where interferences could be problematic (e.g., near sources of aromatic hydrocarbons or roadways). Carefully-sited and well-maintained UV ozone analyzers minimizes the potential for interferences. The nitrogen oxide chemiluminescence (NO-CL) ozone method has no significant interferents. If a monitoring agency suspects that an analyzer is susceptible to potential measurement interferences due to its location, the agency can temporarily collocated that analyzer with a NO-CL ozone analyzer (currently an FEM) to determine if interferences exist. If the monitoring agency determines interferences are an issue with an UV ozone analyzer, they can replace that analyzer with a NO-CL analyzer, or another FEM with a scrubber that is not susceptible to the interferences present.

Humidity alone causes negligible (within 0.5 percent) water vapor interference in the absence of other VOC interferences (Kleindienst et al., 1993 and Spicer et al., 2010). We also have data from our EPA on-site monitoring station to show the absence of a humidity interference on ozone analyzers without a sample inlet drier. We operate a Teledyne API (TAPI) model 400E UV-FEM (without a drier), with a 2BTech Model 211 (with a drier), and two TAPI T265 NO-CL analyzers (with a drier) at our on-site monitoring station in RTP, North Carolina (NC). The summer months in NC consistently have hot and humid conditions. We have evaluated data from our on-site monitoring station during June and July of 2015 where the humidity averaged 73.8%, the dew point 20.4°C, and the temperature 26.0°C (see figure below). Even with a few unexplained outliers for the 2BTech Model 211 and the T265 #2, the slopes were within 1%, the intercepts within 1 ppb, and the correlations were excellent between the 4 analyzers (including the 400E without a sample inlet drier). We have also compared the hourly values from a Thermo Scientific 49i UV analyzer (without a drier) with a TAPI T265 in RTP during June and July of 2012. The 49i compared very well with the T265. The slope was 1.019, the intercept was 0.121 and the correlation was 0.998.



Adjusting ozone concentrations to account for inlet height above ground level

Ozone analyzers must be contained in a temperature controlled station; therefore, monitor probe heights are typically a function of monitoring station height and sample manifold inlet height. Although our siting criteria in 40 CFR part 58 allows for inlet heights between 2 and 15 meters above ground level for ozone, most of the 1300 or so monitor inlets are typically at a height of 3 to 5 meters with the exception of about 80 CASTNET sites where the probe height is 10 meters. Excluding one monitor with a probe height at 82 meters in California, the average probe height for 1302 ozone monitors in 2014 was 5.4 meters (see fig. below).



There are too few studies available at this time with the appropriate data to develop a reasonable quantitative relationship for adjusting ozone data (or design values) in urban areas.

We have begun a study out at the monitoring site on the EPA RTP campus. We currently have inlets set up at 2 meter, 5 meter and 10 meter heights and will be collecting ozone data over the next year to provide more information on this issue. *Continued on Page 7*

Ozone Issues *(continued from page 6)*

Adjusting Ozone Concentration to Account for Local Barometric Pressure at Altitudes Above Sea Level

Modern ozone analyzers have the built in capability of directly measuring and compensating for sample temperature and pressure. Therefore, ozone concentrations do not need to be adjusted at high altitudes as long as the analyzer's temperature and pressure compensation (TPC) is turned ON. Temperature and pressure compensation is done automatically and the default setting for most ozone analyzers is for the temperature/pressure compensation be turned on. It is also a requirement of the FEM designation for some approved ozone analyzers. Most (about 96%) of the ozone analyzers being used by monitoring agencies reporting data to AQS have temperature and pressure compensation. It is recommended that the temperature and pressure compensation of the ozone analyzer be turned on when operating at altitudes greater than 1000 FT.

Ozone analyzers based on UV absorption determine ozone concentrations based on the Beer-Lambert equation (shown below) and calculate the concentration of ozone from the ratio of light intensities. The concentration of ozone depends on more than the ratio of intensities. Temperature and pressure influence the density of the sample. The density changes the number of ozone molecules in the absorption tube. These effects are addressed by directly measuring temperature and pressure and including the actual values in the calculation of ozone concentration in ppb.

$$CO_3 = -\frac{10^9}{\alpha \times L} \times \frac{T}{273°K} \times \frac{29.92inHg}{P} \times \ln\frac{I}{I_o}$$

CO3 = Concentration of ozone in ppb
I = Intensity of light passed through the sample
Io = Intensity of light passed through the sample free of ozone
α = Absorption coefficient
L = Path length
ln = Natural Log
T = Sample temperature in degrees Kelvin
P = Pressure in inches of mercury

Example of the TPC enable for the T265 O_3 analyzer

References

Kleindienst, T.E., Hudgens, E.E., Smith, D.F., McElroy, F.F., and Bufalini, J.J. (1993). Comparison of Chemiluminescence and Ultraviolet Ozone Monitor Responses in the Presence of Humidity and Photochemical Pollutants. J. Air Waste Manage. Assoc., 43:213-222.

Li, Y., Lee, SR., Wu, CY (2006) UV-Absorption Based Measurements of Ozone and Mercury: An investigation on their mutual interferences. Aerosol and Air Quality Research, 6 (4):418-429.

Spicer, C.W., Darrell, J.W., and Ollison, W.M. (2010). A Re-Examination of Ambient Air Ozone Monitor Interferences. J. Air Waste Manage. Assoc., 60:1353-1364.

Authors Contributing to Issue 19

We thank the following for contributing to Issue 19 of the QA EYE: Joan Rice for the article on the ozone comments (page 1); Greg Noah and Mark Shanis for the NPAP LEAN update (Page 5); Tim Hanley on reporting particle count data (page 9) and aethalometer data (page 10); Solomon Ricks for the article on the Ambient Air Protocol Gas Program and Greg Noah for the PM2.5 weighing room in the cloud. (page 13).

We are always looking for interesting QA related articles for the QA EYE. If you have something you think would interest the greater QA community, please send your articles to Mike Papp at: papp.michael@epa.gov

Negative Value Reporting to AQS for Gaseous Criteria Pollutants.. A Proposal

We have been getting requests to provide larger windows for the reporting negative values for some gaseous criteria pollutants. For the gaseous criteria pollutants, we have traditionally allowed negative values based on the method detection limit of the monitoring instrument. As an example, if a monitoring organization had an older instrument with an MDL of 2 ppb the absolute minimum value allowed in AQS would be - 2 ppb. If they purchased a new instrument with a 0.5 ppb MDL, then the absolute minimum value allowed in AQS would be -0.5 ppb. The AQS Team uses the MDL of each approved method to set the absolute minimum value. Values below the absolute minimum are rejected. OAQPS is being asked to lower some of these absolute minimums for a few reasons:

- Too much data is being reported below the current absolute minimum for the method and it's affecting the data completeness.
- The zero drift acceptance criteria that was modified in June 3, 2014 (see AMTIC[1]) allows for more negative zero drift than some current absolute minimums listed in AQS.

Internal discussions in OAQPS about negative data have been interesting. There are some camps that believe no negative value is valid while others believe some level of negative data reporting is acceptable. With the process of using the negative of the MDL as the absolute minimum acceptable value, we create a patchwork of negative data in AQS that is method dependent and inconsistent across a parameter.

Proposed Solution

With the decrease of NAAQS standards and the improvements of monitoring instrumentation, there will be a normal course of change to methods that will improve MDLs, zero drift and therefore legitimately move absolute minimum acceptable values, that in the past might have been acceptable, to values closer to zero. As the FRM/FEM performance parameters change, so must the absolute minimum acceptable value. With this in mind, OAQPS will be suggesting the use of one absolute minimum value for each gaseous criteria pollutant (O_3, NO_2, SO_2, CO) rather that have the absolute minimum values dictated by the approved method MDL. Table 1 provides a review of lower detectable limit (LDL) and the 12 and 24 hour zero drift in the FRM/FEM performance parameter requirements in Table B1 of 40 CFR Part 53. This is indicated by "B1". In addition, Table 1 lists the 24 hour and 14 day zero drift guidance in the QA Handbook (HB) as revised based on the June, 2014 technical memo. The last line in the table is the proposed absolute minimum negative acceptable value that will be set in AQS. It is a compromise between the upper standard for the LDL and zero drift requirements. The only exception to this is NO_2 range. ORD has changed the other criteria pollutant ranges in Table B1 but NO_2 has not been revised for some period of time and we know the LDL and zero drift has improved on monitoring instruments since these ranges were promulgated. Therefore we believe that the -0.005 ppm absolute minimum is reasonable for NO_2

We will be working with the AQS team and the EPA Regions over the month of January to discuss this proposal. As the FRM/FEM performance criteria change in 40 CFR Part 53, EPA will review/revise absolute minimums in light of these changes.

If you have comments on this approach please send an email to Mike Papp (papp.michael@epa.gov)

[1] http://www3.epa.gov/ttn/amtic/cpreldoc.html

Table 1. Comparison of FRM/FEM requirements in Table B1 and requirements in QA Handbook (HB)

		SO2		O3		CO		NO2
Performance Parameter	**Units**	**Upper**	**Lower**	**Upper**	**Lower**	**Upper**	**Lower**	**Std Range**
B1-LDL	ppm	0.002	0.001	0.005	0.002	0.4	0.2	0.01
B1- Zero drift 12/24 hr.	ppm	0.004	0.002	0.004	0.002	0.5	0.3	0.02
HB Zero 24 hr.	ppm	0.003		0.003		0.4		0.003
HB Zero 14 day	ppm	0.005		0.005		0.6		0.005
Absolute Min Reported	ppm	-0.004		-0.004		-0.4		-0.005

Availability of Parameter Code for Reporting of Particle Count Data to AQS.

A new parameter code is now available for reporting of particle count data to AQS. Parameter code 87101 is intended to be used for measurements from the Teledyne-API 651 or TSI 3783 for particle number as a total count. These instruments, which are identical in design and operation, have been implemented at several near-road monitoring stations as part of the recent deployment of the near-road monitoring program, but may be used at other locations. Particle counts are one of several measurements identified as being a secondary priority for multipollutant monitoring at near-road monitoring stations. Details on priorities for multipollutant monitoring at near-road monitoring stations can be found in Section 16 of the Near-road NO_2 Monitoring Technical Assistance Document (TAD) on AMTIC.

Parameter Code	**87101**
Parameter Description	*Particle Number, Total Count*
Parameter Abbreviation	*PNt*
Reported Unit and Standard Unit	**132**
Unit Description	*Count per cm^3*
Unit Abbreviation	*#/cm^3*
Method Code	**173**
Sample Collection Description	*T-API 651/TSI 3783 at 3.0 lpm and 0.6 um cutpoint*
Sample Analysis Description	*Water-Based Condensation particle Counter*
Duration Code	**1**
Monitor Network Code	**Near Road**
Monitor Network Description	*Monitors at sites meeting the near road design per Part 58*
Dominant Source *(if applicable)*	**Mobile**

Reporting of Particle Count Data to AQS

Here are the key fields for submission of data. The bold faced fields are the key ones. The italics fields will populate with the bold faced ones loaded.

Happy Trails Jewell Smiley

About 15 years ago, OAQPS entered into a memorandum of understanding (MOU) with the Office of Radiation and Indoor Air (ORIA) laboratories in Las Vegas, NV and Montgomery, AL. The Las Vegas assistance was involved in field sampling activities associated with the $PM_{2.5}$ and the Chemical Speciation Program while the Montgomery National Analytical Radiation Environmental Laboratory (NAREL) helped us develop and implement the annual "Mega Performance Evaluation Program" for the Chemical Speciation and IMPROVE Program and the National Gravimetric Laboratory Performance Evaluation program. Three folks from the ORIA Montgomery were instrumental in the development of these programs: Eric Boswell, Steve Taylor and Jewell Smiley. Jewell happily retired in August this year.

Jewell has certainly been a bright spot for OAQPS for the 15 or so years that we've been implementing the Chemical Speciation Network (CSN) with the help of the ORIA NAREL. Jewell has an easy going manner, which tends to camouflage his extraordinary knowledge and insight of chemistry and physics as it is applied to air pollution. Right from the start, Jewell coordinated a small team that developed the Mega PE performance evaluation program for the CSN and IMPROVE network from the ground up. His particular attention to detail and care in his work has led to a PE program whose quality has never been called into question by those participating in the program.

Not only has he improved the quality of our programs over his tenure with NAREL; but Jewell advanced the science of air pollution monitoring. One example was his discovery, along with the team in Montgomery, of corrosion on the nickel-coated aluminium used in some the very sharp cut cyclones used in the CSN network. In developing the proficiency test samples it became apparent that nickel was being transfered from the cyclones on to the audit filters; creating a higher concentration of nickel compared to samples collected from cyclone made of pure aluminum. His discovery and evaluation not only helped produced better proficiency test audits but was used to alert the cyclone vendors to this issue and reduced the contamination of nickel from the cyclones in the routine CSN network. We published this information in QA EYE Issue 3 (page 3).

Jewell has been the ultimate QA diplomat in the way he has professionally handled himself in performing the technical systems audits of the CSN program. In discovering findings that effected the quality of the CSN and IMPROVE data he always found a way of expressing his concerns in a helpful manner. With that easy going delivery he has time-after-time assisted the participating organizations in solving issues that were identified through the audits and performance evaluations.

OAQPS has truly been fortunate to have the opportunity to work with Jewell and the Montgomery Team. His devotion to the science and quality of the CSN and IMPROVE data is recognized not only at OAQPS but also the laboratory personnel he evaluated and audited.

Update on Reporting Aethalometer Data to AQS

Aethalometer data has been measured and submitted to AQS for many years. Since there are several versions of the Aethalometer monitor, there has been an evolution of what is available to report from these instruments. Very early versions of the Aethalometer typically provided one output, which was a Black Carbon channel at a wavelength of 880 nm. Later models provide two outputs with the addition of an Ultraviolet (UV) channel (370 nm) to the existing Black Carbon channel. The most recent available Aethalometer, the Magee Scientific AE 33 and Teledyne-API M633 provide a seven channel/wavelength output. We will be working to add parameter and method codes for the additional five Aethalometer channels over the coming weeks. Up until the AE33/M633, the Aethalometer would only report data measured at Standard Temperature and Pressure (STP). The AE33/M633 allows reporting of data in either STP or local conditions (using the connected external weather station available from Teledyne or Magee Scientific). Since all other $PM_{2.5}$ measurements are made at local conditions and having Aethalometer data in local conditions reduces the uncertainty in comparing $PM_{2.5}$ data across measurements (e.g., CSN to Aethalometer Black Carbon), we recommend reporting $PM_{2.5}$ Aethalometer data at local conditions. For the AE33/M633, this can be done by purchasing and adding the external weather station to the instrument or by using on-site temperature and barometric pressure readings and adding a math channel to the data acquisition system. For earlier versions of the Aethalometer, on-site ambient temperature and barometric pressure will be needed to adjust the measured values to report at local conditions in the monitoring agencies data acquisition system (e.g., using a math channel).

Reporting of Aethalometer Data to AQS

Aethalometer data can be reported from different monitor makes and models. Below find the key codes for reporting Aethalometer data.

	For reporting of data collected at local conditions (Recommended)	**For reporting of data at STP (legacy reporting)**
Parameter Code	**88313**	**84313**
Parameter Description	*Black Carbon PM2.5 LC*	*Black Carbon PM2.5 STP*
Parameter Code	**88314**	**84314**
Parameter Description	*UV Carbon PM2.5 LC*	*UV Carbon PM2.5 STP*
Reported Unit and Standard Unit	**105**	**001**
Unit Description	*Micrograms/cubic meter (LC)*	*Micrograms/cubic meter (25C)*
Unit Abbreviation	*ug/m3 LC*	*ug/m3 SC*
Duration Code	**1**	**1**

Method Codes	**Sample Collection Description**	**Sample Analysis Description**
Seven Wavelength Units		
894	Magee Scientific TAPI M633 Aethalometer	Optical absorption
Dual Wavelength Units		
876	Magee Scientific AE22ER Aethalometer	Optical absorption
867	Magee Scientific AE21HS Aethalometer	Optical absorption
866	Magee Scientific AE21ER Aethalometer	Optical absorption
861	Magee Scientific AE2100 Aethalometer	Optical absorption
Single Wavelength (BC)		
864	Magee Scientific AE1600 Aethalometer	Optical absorption
862	Anderson RTAA_800 Aethalometer	Optical absorption

Industrial Monitors are Evaluated Against the NAAQS Unless Properly Coded In AQS

Recent events in reviewing SO_2 design values have identified monitors with the MONITOR TYPE "Industrial" in AQS as violating the NAAQS. During discussions with the Regions and monitoring organizations it was discovered that some of these monitors where not intended to be collecting data for NAAQS purposes by the way they were sited or how they implemented quality control requirements.

The Bottom Line

There are 7 active MONITOR TYPES in AQS: EPA, Industrial, Non-EPA Federal, Other, SLAMS, SPM and Tribal. Any MONITOR TYPE [with the exception of special purpose monitoring (SPM) stations for the first two years of operation] reporting data to AQS with a federal reference or equivalent monitor is subject to comparison to the NAAQS unless it is coded with a NAAQS exclusion code. When data quality assessments are run for a monitoring agency or a primary quality assurance organization (PQAO), all criteria pollutant monitors of every MONITORING TYPE are aggregated and reported as regulatory monitors with the exception of those monitors with NAAQS exclusion codes. The use of the NAAQS exclusion code must be approved by the EPA Region. Monitoring organizations and PQAOs should review all criteria pollutant monitors to ensure that monitors not intended to be compared to the NAAQs are properly identified.

SPM Monitors

An SPM is a monitor included in an agency's monitoring network that the agency has designated as a special purpose monitor station in its annual monitoring network plan and in the AQS, and which the agency does not count when showing compliance with the minimum ambient air monitoring requirements. The ambient air regulation allows operation of the SPM for two years in which time they can be shut down and therefore would not meet data completeness requirements for a NAAQS comparison. If the SPM(s) remain operational after two years they can then be used for attainment decisions and must meet all regulatory requirements. Any SPM data collected by an air monitoring agency using a federal reference method (FRM), federal equivalent method (FEM), or approved regional method (ARM) must meet the requirements of §58.11, §58.12, and Appendix A (QA requirements) to Part 58 part or an approved alternative to Appendix A. As part of the annual monitoring network plan, monitoring organizations must include a statement of whether the operation of the SPM meets the Part 58 requirements of appendices A, B, C, D, and E. Unless the network plan describes why the SPM will be operating in non-compliance with the Part 58 regulations it is assumed to be in compliance. If the SPM is intended to be operating in non-compliance with Part 58 requirements, it is suggested that the SPM include the NAQQS exclusion code which can then be approved by the EPA Regions.

Another Issue with Industrial Monitors... PQAOs

On August 10, 2015, the SO_2 Data Requirements Rule (DRR) was signed, and subsequently published in the Federal Register on August 21, 2015 (80 FR 51052). The DRR requires the characterization of air quality around sources emitting 2,000 or more tons per year of SO_2 through either modeling or monitoring. States may also satisfy the DRR with respect to these sources by providing proof of federally enforceable emissions limits.

If the state, local, or tribe (S/L/T) decides to monitor, they may install and operate monitors themselves, or the S/L/T may allow the SO_2 monitors to be operated by another party, such as industry or possibly industry contractors. In either scenario, the S/L/T is responsible for ensuring that the DRR requirements are satisfied. However, this option for delegation raises some concern about what organization will be specifically responsible for the activities to ensure the quality of the data and therefore identified in AQS as the Primary Quality Assurance Organization (PQAO). Information on PQAOs can be found in 40 CFR Part 58 Appendix A. It is EPA's opinion that the S/L/T monitoring agency should strongly consider including monitors operated by other parties (e.g. industry or contractors) to satisfy the DRR requirements as part of the S/L/T PQAO. The advantages for this rationale include consideration of resources needed to meet the following requirements:

QA Independence- The S/L/T organizations are required to have or establish an independent QA management function that has sufficient technical expertise and management authority to conduct independent oversight and assure the implementation of the organization's quality system relative to the ambient air quality monitoring program and should be organizationally independent of environmental data generation activities. The industry/contractor operators, as a separate PQAO, would need the resources and personnel to establish this independence and document it in a QMP as described in the next section.

Quality System Documentation-The S/L/T quality management plan (QMP), quality assurance project plans (QAPP), and standard operating procedures (SOPs) can be used for these monitors if they are part of the S/L/T PQAO. Our assumption is that the S/L/T monitoring agency already have these documents written and approved. If the industry/contractor operators were to be its own PQAO, it would have to develop these documents and have them approved by the state agency and reviewed/approved by the EPA Region before the start of monitoring on January 1, 2017. Although there would be an opportunity to share standard operating procedures, a QAPP is more specific to an individual project and a QMP is even more specific to the industry/contractors organization so they are less "transferable" from one organization to the next.

Continued on Page 12

Industrial Monitors and PQAOs (Continued from page 11)

The National Performance Audit Program (NPAP)- NPAP is implemented annually at each PQAO and at 20% of the sites within the PQAO. If the DRR SO_2 sites are within the S/L/Ts PQAO, then NPAP can be implemented at least once (minimally) within the first three year period they are operating the site. This is important because monitors uniquely operated to satisfy the DRR can potentially be shut down after 3 years of operation if they show a design value less than 50% of the NAAQS. In using NPAP, State and Tribal Air Grant (STAG) funds would be redirected (as is the normal case) back to EPA to federally implement the NPAP audits. We also suggest that these new SO_2 sites be given some priority and be audited ASAP. If an industry/contractor operator were to be its own PQAO, it would have to implement an NPAP audit each year (since the requirement is for each PQAO to be audited annually). So, the cost per monitoring site for implementing NPAP audits at a PQAO with one or only a few sites will be higher than for a PQAO (i.e., state agency) that has more monitoring sites. Since almost all air monitoring agencies allow federal implementation of NPAP, the state would have to provide additional resources to EPA to implement these audits since EPA cannot receive funds from industry. Alternatively, the industry/contractor operator would have to find certified NPAP auditors to perform the NPAP audits. At present, there are not many independently certified NPAP auditors available so this may be a difficult, but not impossible, option.

Technical Systems Audits- EPA Regions perform technical systems audits on PQAOs every three years and visit a percentage of the air monitoring sites. If the industry operator decides to be its own PQAO, additional audits would be required to be performed on each industrial or other party PQAO by the EPA Regions.

In addition to the QA related documentation and programs, the S/L/T agency and the industry/contractor operator would need to determine how the following would be met:

- Submission of an Annual Network Plan
- Annual Certification of data
- Meeting data submission requirements in 40 CFR 58.16

Based on the anticipated increase in work-load within the next year as state, local, and possibly tribal agencies, industrial, or other organizations make efforts to select and install monitoring SO_2 sites, we must bear in mind the implementation burdens described above. These new sites must have accompanying quality assurance personnel and quality system documentation necessary to implement the monitoring program on time. Industry/contractors may be more familiar with PSD monitoring versus monitoring for NAAQS comparisons. Monitoring for NAAQS comparisons contain additional QA, reporting and certification related burdens. Therefore, we strongly suggest the state, local, or tribal air agencies consider being the PQAO for any industrial or other party monitoring that might be used to satisfy the DRR. If not, EPA will need to be aware of those situations in order to track their progress on meeting the quality system for this ambient air monitoring activity prior to the start of any monitoring in support of the DRR.

Ambient Air Protocol Gas Verification Program – 2016

As a new year comes around, AAMG continues its efforts to encourage state, local and tribal agency participation in the Ambient Air Protocol Gas Verification Program (AA-PGVP). At the NACAA Monitoring Steering Committee meeting in October 2015, AAMG provided a presentation updating the status/progress of the program. Unfortunately, the picture wasn't as bright as was hoped. As shown in Figure 1, participation by monitoring organizations has suffered a steep drop; cylinders verified on a quarterly basis come primarily from gas producers. Participation in the annual survey has also declined; at the moment, participation averages approximately 50%.

Summary of Cylinders Submitted (Since 2011)

	2011	2012	2013	2014
Monitoring organizations	68%	49%	12%	15%
Gas producers	32%	51%	88%	85%

Efforts are underway to encourage more participation from the monitoring organizations. For example, for those agencies that felt a financial pinch due to shipping costs, AAMG has made arrangements with UPS to allow for agencies to use EPA's shipping account to pay for cylinder shipment. Also, as a reminder, AAMG provides a way for agencies to receive DOT HazMat certification; thereby allowing them to ship the cylinders through EPA's shipping account. The DOT certification is available online, and should be completed by those participating in the program. AAMG will also take steps to update the current email list of agencies, to ensure the appropriate personnel are contacted.

Results

2011	2012	2013	2014
65 Verifications results:	58 Verifications results:	59 Verifications results:	52 Verifications results:
64 were within the +4 – 5% AA-PGVP criteria	57 were within the +4 – 5% AA-PGVP criteria	59 were within the ±4 – 5% AA-PGVP criteria	52 were within the +4 – 5% AA-PGVP criteria
58 were within the ±2% Acid Rain Program criteria	51 were within the +2% Acid Rain Program criteria	56 were within the +2% Acid Rain Program criteria	50 were within the ±2% Acid Rain Program criteria

The program has proven its effectiveness, as the concentrations of the cylinders continue to compare favorably to the results obtained by the verification labs (see Figure 2). However, the general purpose of the program was, and is, to verify cylinders purchased by end-users; not to verify cylinders provided by the producers.

If anyone has any questions, or would like to sign-up for participation in the program, please contact Solomon Ricks at either (919) 541-5242, or via email, ricks.solomon@epa.gov

Jenia Tufts Joins OAQPS AAMG QA Team

Jenia setting up a MetOne sampler at AIRS site with Solomon Ricks

Since about 2000 the Office of Radiation and Indoor Air (ORIA) has been a trusted and important partner assisting OAQPS in the implementation of a number of key Ambient Air QA Program activities. Due to a key retirement of Jewell Smiley (see article on page 9), the National Analytical Radiation Environmental Laboratory (NAREL) in Montgomery, Alabama divested of what we called the Annual Chemical Speciation Network (CSN) Mega Performance Evaluation (Mega-PE) and the Bi-annual National Gravimetric Lab PE. With the NAREL divestment of these activities, OAQPS was able to secure a new federal position and some funding to ensure that these PEs continue.

With a little scurrying around in OAQPS starting in July, we were able to advertise, interview, and hire Jenia Tufts, who started November 2.

Jenia comes with a wealth of experience. She has a BS in Natural Resources from NC State and a MS in Environmental Sciences and Engineering from UNC Chapel Hill. Prior to the hire she was an ORISE Research Fellow working in the U.S. EPA National Homeland Security Research Center, Decontamination and Consequence Division where she conducted independent research into the physical and transport properties of bioaerosols. Prior to that she worked at RTI as the director of the EPA ETV Air Pollution Control Technology (APCT) Center, where she had overall responsibility for quality assurance at the program level, overseeing all testing and reporting, preparing testing protocols, reviewing and approving test/quality assurance plans, verification reports, and verification statements. Jenia also reviewed, developed, implemented and evaluated quality assurance and quality control practices and procedures at the program level, including designing, developing, reviewing and approving EPA QA Categories II and III testing protocols and QAPPs for both laboratory and field studies. This is just a smattering of the field, lab and QA experience Jenia has under her belt. She has also worked on a number of projects with State agencies including the Texas Commission on Environmental Quality, the New York State Energy Research and Development Authority, and the Northeast States for Coordinated Air Use Management (NESCAUM).

Jenia will be getting up to speed on the CSN Mega-PE over the next few months to understand just what it took for ORIA to implement this program. All the field and laboratory equipment that ORIA used in the program have been transferred down to OAQPS. Fortuitously we have been able to work with ORD NERL to garner some laboratory space to house and use the analytical equipment, and will use our OAQPS monitoring site (AIRS) for sampling. Jenia is in the process of reading a lot of our ambient air QA regulations and guidance. We plan to have the next Mega-PE implemented sometime this summer.

Welcome aboard Jenia!

PM2.5 Weighing Room Conditions – In the Cloud

Over the past couple of years, we have seen too many instances of $PM_{2.5}$ data being invalidated because of temperature and humidity issues. Some of these issues have been related to the loss of temperature and humidity archives and a lack of easy access to the climate control data and statistics as a whole. Thankfully, technology keeps marching on and providing new options for us to consider. There are technologies available in recent dataloggers that can help ensure data is easily accessible and protected. The first is using a logger that is connected to a remote server or "the cloud". There are now loggers available that allow the user to access and configure their logger through the web, set control limits, and store their logged weighing room conditions as well. The user can also set alarms to alert the analyst via email or text message that the room is out of control limits so that corrective action can occur saving valuable weighing time. Real-time access to the logger is also a capability to monitor changes in conditions. Of course all of this comes with a cost for web-hosting. At typically a few hundred dollars a year, it seems like a good deal to ensure your data is not accidentally deleted or your hard drive is not lost.

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The Office of Air Quality Planning and Standards is dedicated to developing a quality system to ensure that the Nation's ambient air data is of appropriate quality for informed decision making. We realize that it is only through the efforts of our EPA partners and the monitoring organizations that this data quality goal will be met. This newsletter is intended to provide up-to-date communications on changes or improvements to our quality system. Please pass a copy of this along to your peers and e–mail us with any issues you'd like discussed.

Mike Papp

Key People and Websites

Since 1998, the OAQPS QA Team has been working with the Office of Radiation and Indoor Air in Montgomery and Las Vegas and ORD in order to accomplish it's QA mission. The following personnel are listed by the major programs they implement. Since all are EPA employees, their e-mail address is: last name.first name@epa.gov.

The **EPA Regions** are the primary contacts for the monitoring organizations and should always be informed of QA issues.

Program	Person		Affiliation
STN/IMPROVE Lab Performance Evaluations	Jenia	Tufts	OAQPS
Tribal Air Monitoring	Emilio	Braganza	ORIA-LV
Speciation Trends Network QA Lead	Dennis	Crumpler	OAQPS
OAQPS QA Manager	Joe	Elkins	OAQPS
Standard Reference Photometer Lead	Scott	Moore	ORD-APPCD
National Air Toxics Trend Sites QA Lead	Greg	Noah	OAQPS
Criteria Pollutant QA Lead	Mike	Papp	OAQPS
NPAP Lead	Mark	Shanis	OAQPS
PM2.5 PEP Lead	Dennis	Crumpler	OAQPS
Pb PEP Lead	Greg	Noah	OAQPS
Ambient Air Protocol Gas Verification Program	Solomon	Ricks	OAQPS

Websites

Website	URL	Description
EPA Quality Staff	EPA Quality System	Overall EPA QA policy and guidance
AMTIC	http://www3.epa.gov/ttn/amtic/	Ambient air monitoring and QA
AMTIC QA Page	http://www3.epa.gov/ttn/amtic/quality.html	Direct access to QA programs