

AAPCA 2021 BEST PRACTICES IN AIR POLLUTION CONTROL

**COVID-19 IMPACTS ON GEORGIA AMBIENT AIR QUALITY
MONITORING PROGRAM (AAMP)**



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Ambient Air Monitoring Program
Georgia EPD- Air Protection Branch



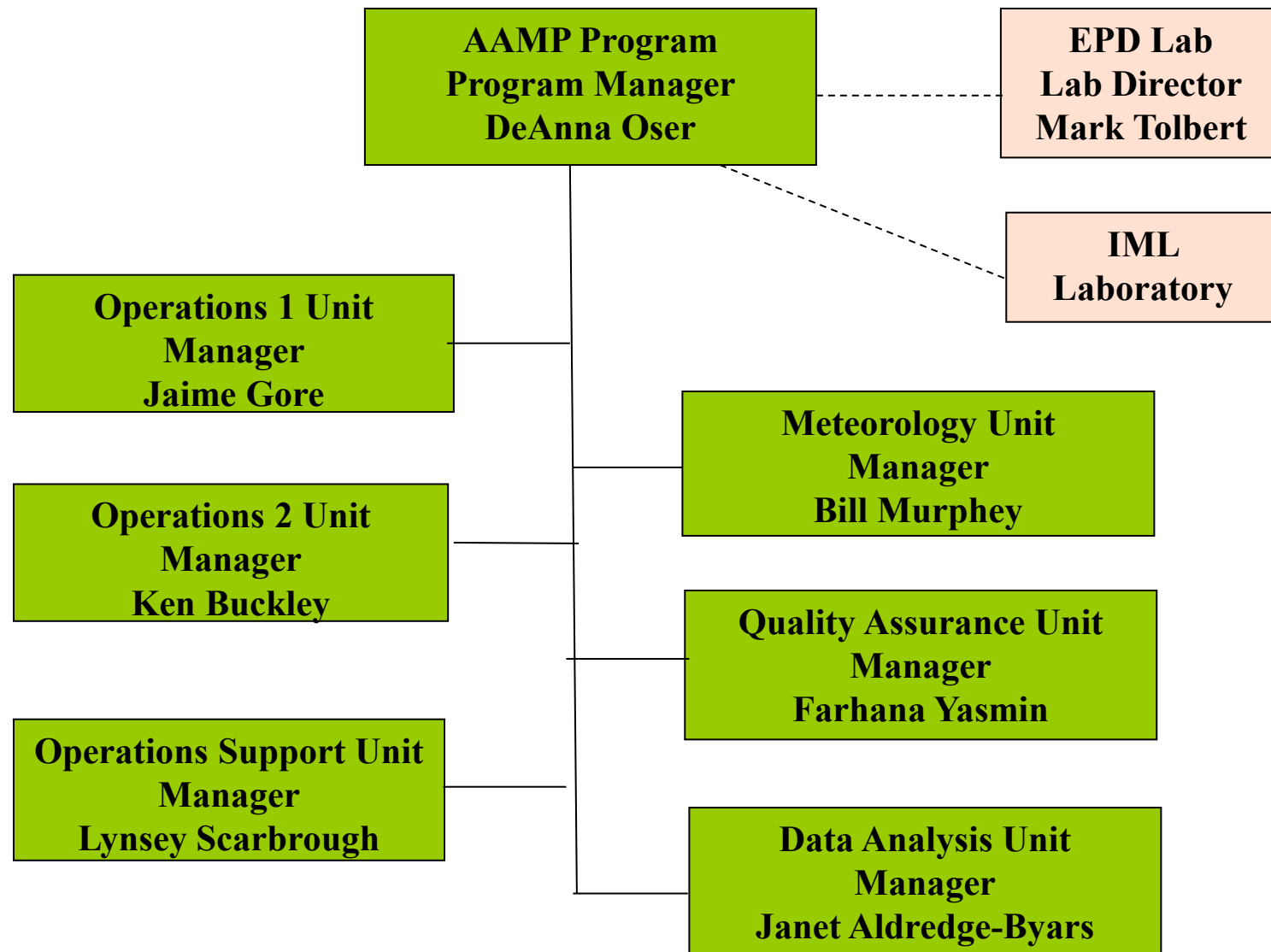
OVERVIEW

- ☐ **Overview Georgia AAMP**
- ☐ **Challenges due to Covid-19 Pandemic**
- ☐ **Steps to overcome the challenges**
- ☐ **Successes**
- ☐ **Sustainability**



GEORGIA AMBIENT AIR MONITORING PROGRAM

- The Ambient Monitoring Program has been monitoring air quality in the State of Georgia for more than forty years
- During that time, the list of monitored compounds has grown to more than 200 pollutants at approximately 37 sites in 30 counties across the state.
- This monitoring is performed to protect public health and environmental quality.

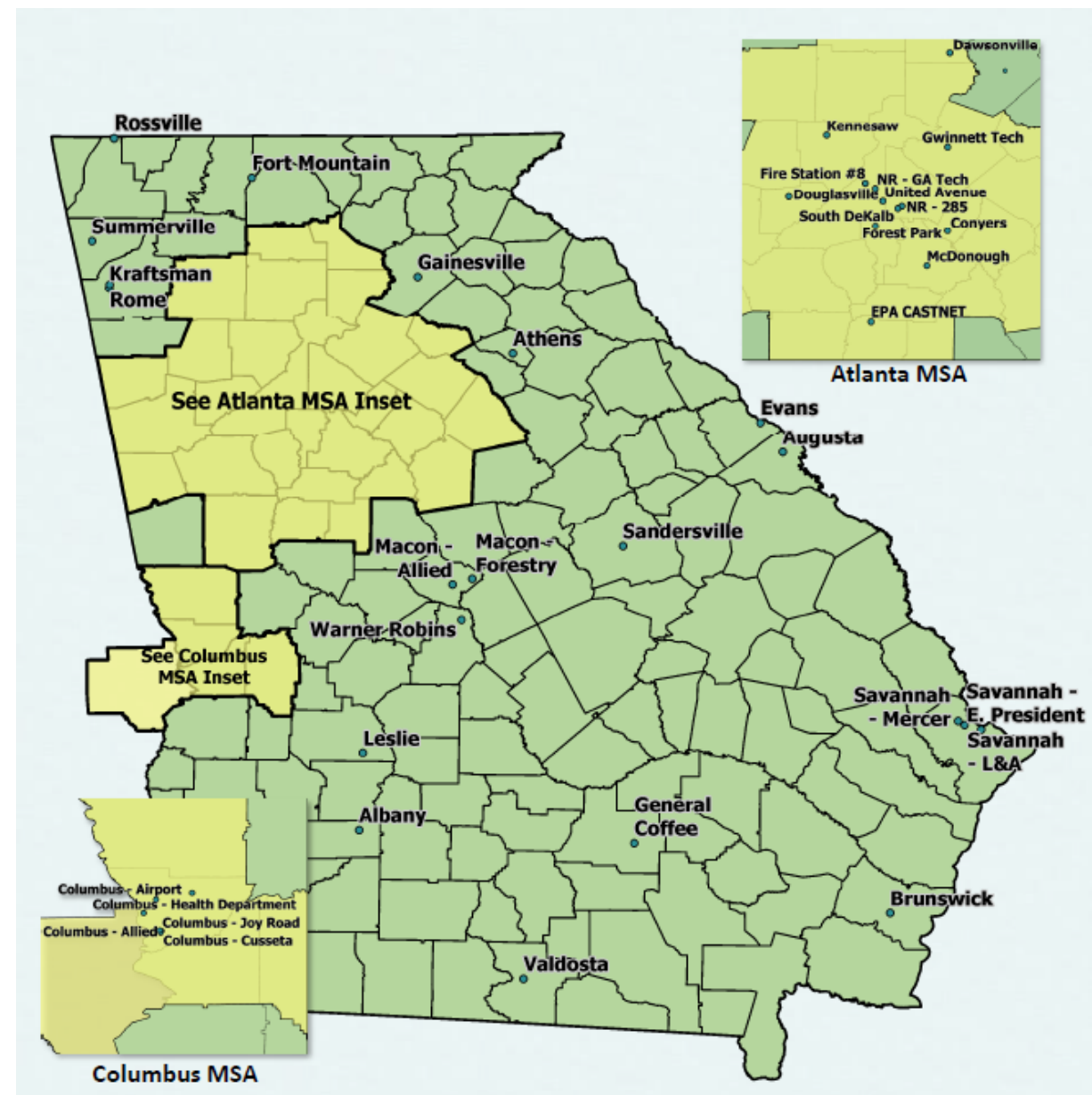




GEORGIA AMBIENT AIR MONITORING NETWORKS

GA AAMP currently collects and analyzes data to meet requirements for Georgia Ambient Air Monitoring Networks projects:

- ✓ Criteria Air Pollutants (CAPs)
- ✓ National Core Multi-pollutant (NCore)
- ✓ National Air Toxics Trend Stations (NATTS)
- ✓ Near-Road Monitoring Network (NRMN)
- ✓ Photochemical Assessment Monitoring Station (PAMS)
- ✓ Particulate Matter Chemical Speciation Network (CSN)
- ✓ Special Projects: Ethylene Oxide Monitoring Study and Forsyth Air Monitoring Study





COVID-19 IMPACT

- **Coronavirus Disease 2019 (COVID-19) epidemic has had dramatic impacts in our day-to-day life/job in 2020**
- **The Georgia Governor issued his first shelter in place order on March 23, 2020**
- **Remote work went from an occasional option to an everyday reality for all of AAMP's non-field staff, including the Quality Assurance (QA) Unit**
- **GA AAMP Operation Unit, Operations Support Unit, and Quality Assurance Unit managed to continue handling all field monitoring and sampling operations (which include the QA/QC activities)**
- **However, Quality Assurance (QA) Unit data validation and verification faced challenges during the monthly data review**



CHALLENGES ON DATA VALIDATION AND VERIFICATION

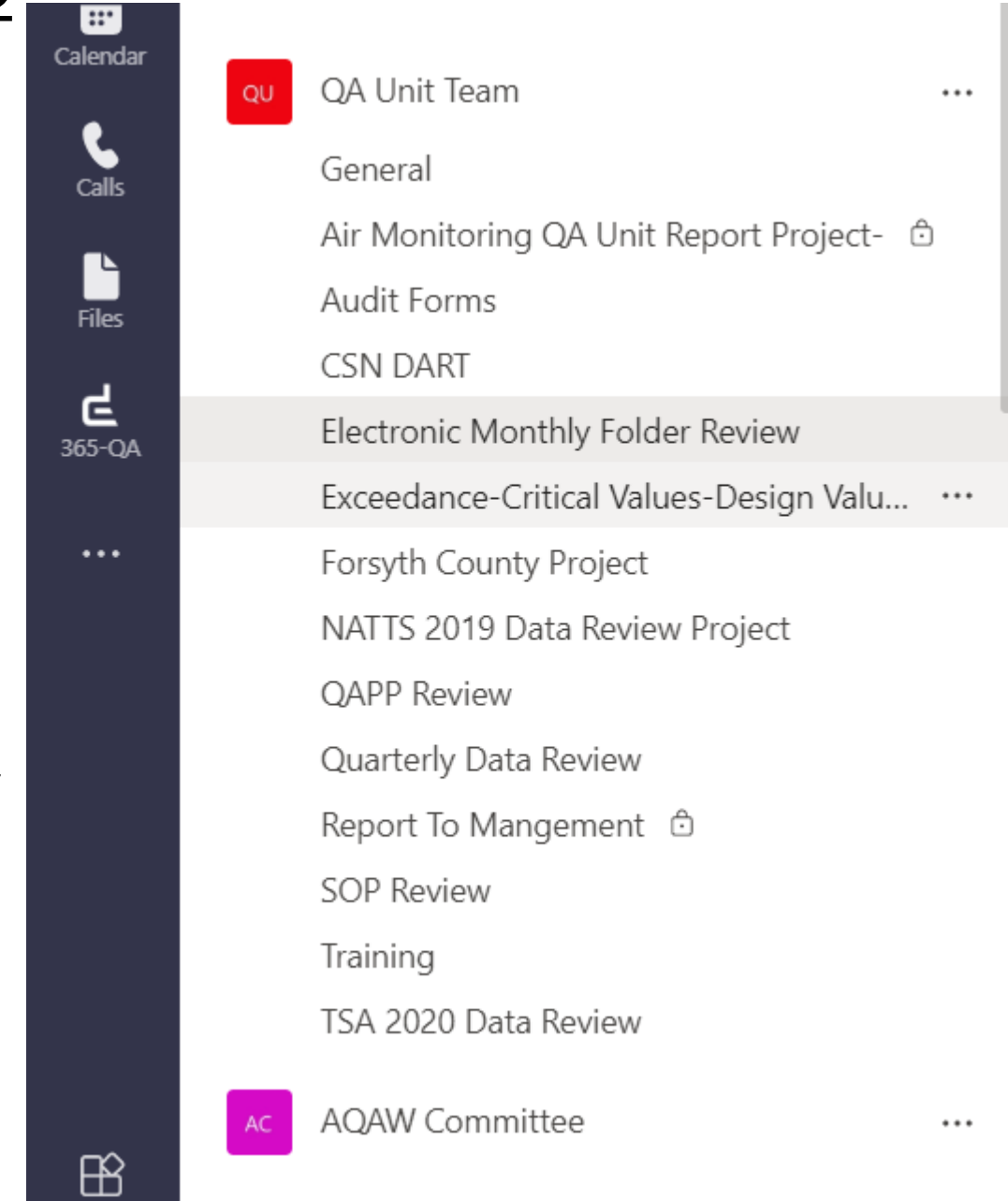
- **Data Validation Specialist** and **Data Verification Specialist** reviewed data using hard copy folders on a monthly basis
- Lack of access to electronic document (lack/limited VPN access)
- Lack of access to hardcopy document
- Lack of face-to-face interaction between the Data Validation Specialist and Data Verification Specialist





AVAILABLE TOOLS AND RESOURCES

- Worked with EPD IT and GA EPD Admin to get VPN access for all staff
- Implementation of electronic monthly folder review using Microsoft TEAMS/One Drive
- Trained all staff on Microsoft TEAMS and OneDrive
- Created electronic folder/validation summary logs for monthly data validation and verifications
- Transitioned the recordkeeping process from hard copy records held in physical folders to electronic records and documentation





DEFINING NEW CLEAR GOAL/EXPECTATION

- Each **Validation Specialist** is responsible of specific parameter data validation and raw data AQS upload
- All Validation Specialists are trained to upload quality checks (QC) (such as flow rate verifications (FRV) and 1-point (1p) QC checks) in AQS and uploaded monthly instead of quarterly.
- All **Verification Specialists** are responsible for review of the QC/FRV as part of monthly review data prior to AQS upload
- New standardized verification checklist forms are created and implemented for each parameter to eliminate inconsistency in data review

QA Data Verification Summary-CO							
Site:							
Pollutant: CO							
Month /Year of Data							
	Date	Event Time	Data missing for more than 15 mins in an hour? Yes/No	If Yes, Null code used	Precision Percent difference over ±15%? Yes/No	If Yes, Null code used	Commonly Used Null Code
ZPS – Zero/Precision/Span							
CO	Zero	0.40 < ppm ≤ 0.60					Zero/Precision/Span calibration checks null code: "BF" for any invalid hours. Zero/span only checks null code: "AY" for any invalid hours Note: if the percent difference is > 15% data will need to be investigated and an appropriate null code may need to be applied back to last good/valid check
	Precision	5.0 < %d ≤ 15.0					
	Mid-Low Point	5.0 < %d ≤ 15.0					
	Mid-High Point	5.0 < %d ≤ 15.0					
	Span	5.0 < %d ≤ 10.0					
Multipoint Calibrations/ Adjusted Or Unadjusted Calibration							When an adjusted calibration or unadjusted check occur for a gaseous pollutant, any invalid hours will receive a "BC" null code.
S:\Ambient\Ops							
II\Calibrations\CONT_AMBIENT							
QA Audits							QA audits null code: "BL" for any invalid hours. If audit fails than further information/sampler investigation/operation unit's follow-up checks needed before invalidating the data.
			Yes/No	If yes, Date-Hour-Null/Qualifier Code	Null Code/Qualifier Code		
Temperature		Any temperature less than 20°C or greater than 30°C?			Null code of "AE" for "Shelter Temperature Out of Limits".		
CO Concentration		Any CO concentration between 0.02 and -0.4ppm?		null code and qualifier code looks correct? :	MD qualifying code if CO concentration between 0.02 and -0.4ppm		
		CO concentration <-0.4ppm			BR null code is value <-0.4 ppm		
		CO concentration >35ppm			If results greater than 35ppm are further investigated by the Data Validation Specialist.		
Data Verification Summary							
			Yes/No	Verification Specialist Comments/Recommendations (Make sense? If not, give recommendations)			(Make



ACCOUNTABILITY

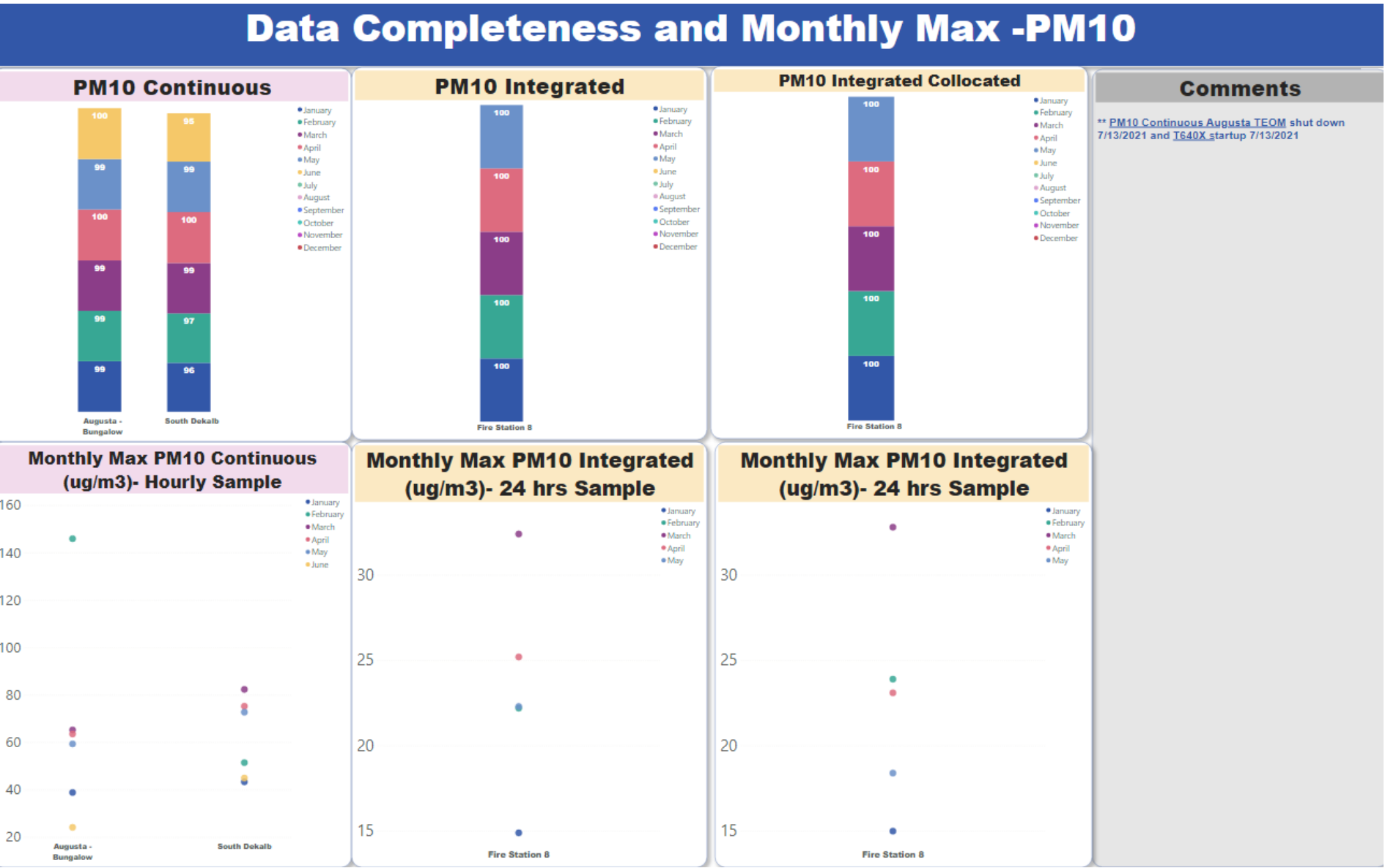
- The QA Unit has also incorporated an AQS data audit procedure to ensure AQS data errors are identified and corrected by QA Unit staff throughout the year
 - ✓ Monthly Data Review
 - ✓ Quarterly Data Review
 - ✓ Quarterly/Annual Report to Management
- Reports were developed using data visualization tool called Power BI which gives summary of GA AAMP network data in visual form, with display choices such as tables, charts, and maps, making it easier for teams to use it





ACCOUNTABILITY- MONTHLY DATA REVIEW

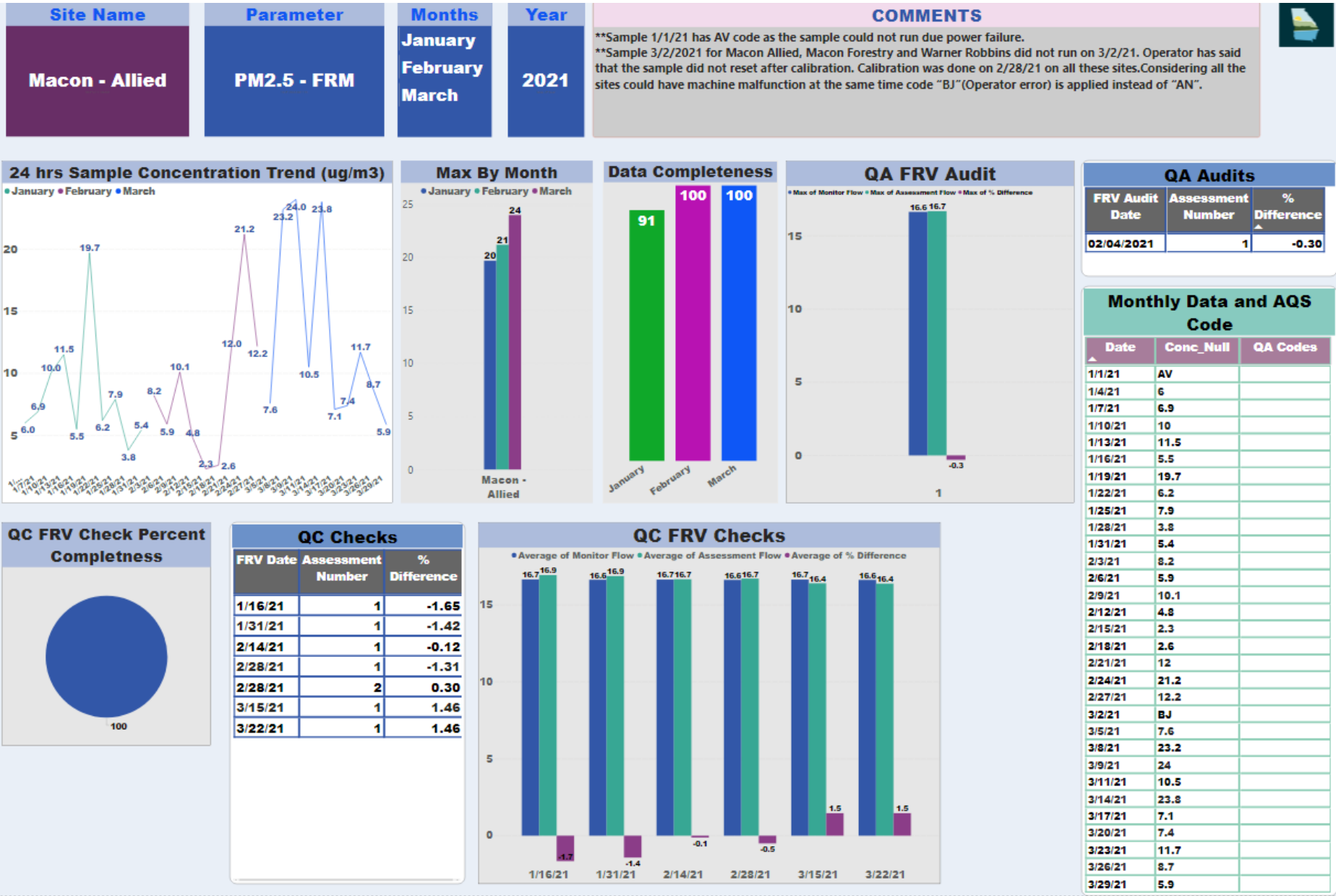
- Monthly Data Review: Validation Specialist and QA Manager reviews monthly to ensure raw data have been successfully uploaded in AQS
 - ✓ AMP 430 Data Completeness Report
 - ✓ AMP 501 Raw Data Report





ACCOUNTABILITY-QUARTERLY DATA REVIEW

- Quarterly Data Review: The Validation Specialist conducts a quarterly in-house audit to ensure that the ambient monitoring data generated by the GA AAMP, meets or exceeds the requirements set forth in 40 CFR Part 58
 - ✓ AMP 430 Data Completeness Report
 - ✓ AMP 501 Raw Data Report
 - ✓ AMP 251 QA Raw Assessment Report (1p-QC, FRV, QA Audits)
 - ✓ AMP 256 QA Data Quality Indicator Report (Precision and Bias)
 - ✓ AMP 503 Extract Blank Data Report (only for PM_{2.5} Integrated)

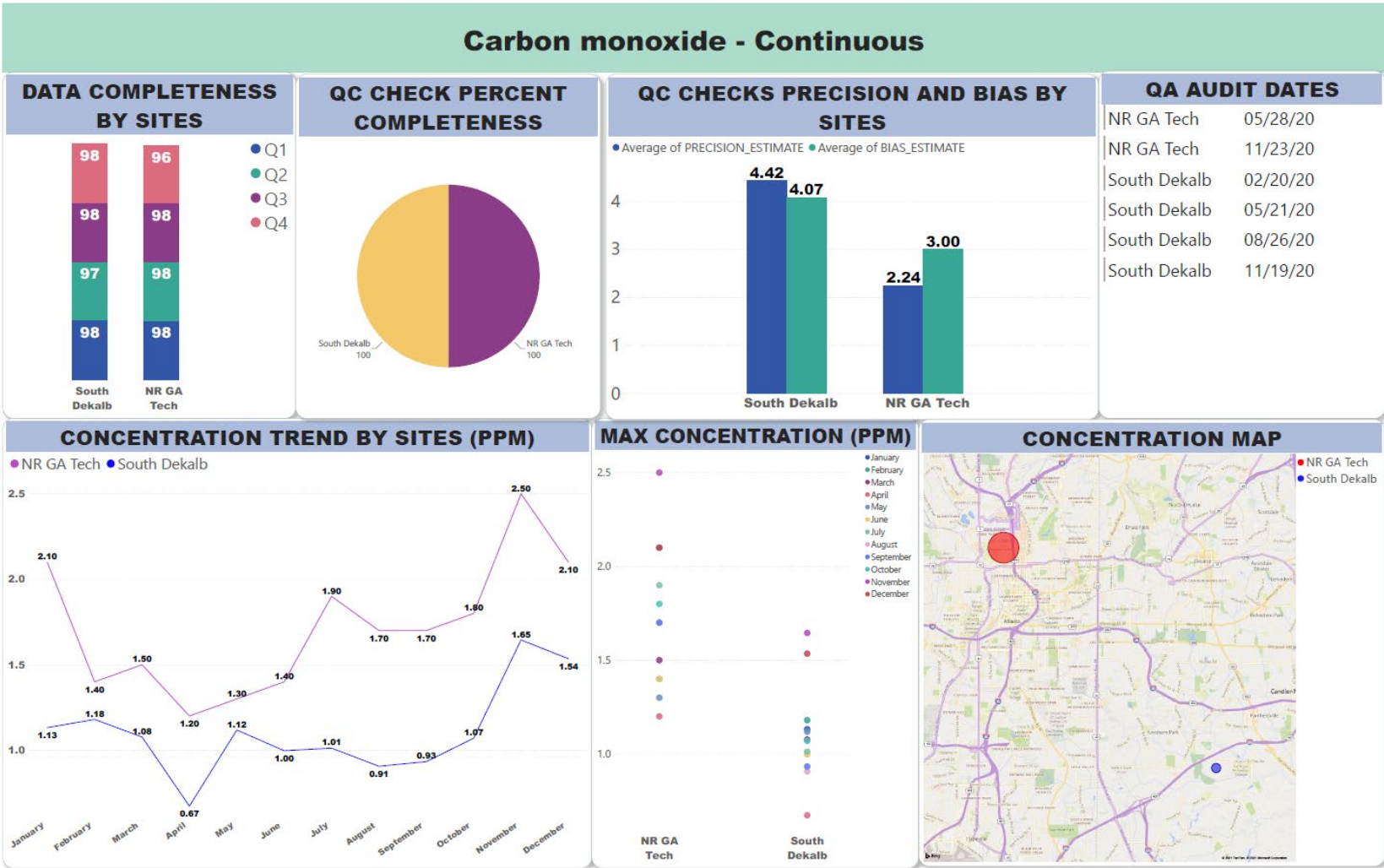




ACCOUNTABILITY- REPORT TO MANAGEMENT

- [Quarterly/Annual Report to Management](#): QA Manager performs a quarterly/in-depth annual management systems review and shares with GA EPD management

Table 1. Attainment of Quantitative Quality Objectives for Criteria Air Pollutants						
Parameters	Data Promptness	Data Completeness	Precision	Bias	QC Check Completeness	QA Audit Completeness
	Data Entered in AQS – 90 days following the close of each quarter	Ozone is 90% annual while all other parameters are 75% per quarter	Precision and Bias have different requirements per parameter – please see QAPP for requirements and attachment.		All gaseous pollutants are every two weeks and PM monitors are once every 30 days	All gaseous parameters are performed once annually, and PM monitors are once every 5-7 months
Ozone (O ₃)	Yes	Yes	Yes	Yes	Yes	Yes
Carbon Monoxide (CO)	Yes	Yes	Yes	Yes	Yes	Yes
Nitrogen dioxide (NO ₂)	Yes	Yes	Yes	Yes	No (All site except met the criteria NR-285 NO ₂ monitor 3 rd and 4 th quarter)	Yes
Sulfur dioxide (SO ₂)	Yes	Yes	Yes	Yes	Yes	Yes
Lead (Pb)	Yes	Yes	Yes	Yes	Yes	Yes
Particulate Matter (PM _{2.5}) (Covers both continuous and integrated monitors)	Yes	No (All sites >75% except 3 rd Quarter Brunswick PM _{2.5} FRM)	Yes	Yes	Yes	No (All sites except Columbus-Cusseta PM _{2.5} FRM monitor was not audited twice in 2020)
Particulate Matter (PM ₁₀) (Covers both continuous and integrated monitors)	Yes	Yes	Yes	Yes	Yes	Yes





VIRTUAL WORKPLACE INFRASTRUCTURE

- Established a strong virtual workplace that includes collaboration on TEAMS and share ideas and get work done
- Train all staff on how to use Microsoft TEAMS to make call/chat/sharing screen
- Bi-weekly QA Unit Meeting to discuss data validation/verification and updates on data collections issues
- Validation Specialist and Verification Specialist adds detail comments on Air Vision monthly validation summary and Power BI Report regarding null/QA code reasoning for both integrated and continuous parameters
- Data Validation Specialist also provide monthly data review summaries with site operators as a way of communicating successful data collection and/or noted issues with the field staff.



CONTINUOUS TRAINING

- **Air Protection Branch (APB) hosts quarterly Air Branch 101 for new employee**
- **GA AAMP Monthly Meetings are held and each month different topic discussed**
- **QA Unit host continuous/peer-to-peer/cross-training**
- **EPD IT offers routine Cyber Security Training**
- **APB also monthly Virtual Lunch and Learn**

APB/AAMP and QA Unit Trainings March 2020- June 2021	
Trainings	Date of Completion
QA Unit- Electronic Folder Review using One drive/Teams meeting for Data Validation and Verification training	March 2020
QA Unit- PM2.5 continuous (T640x) data validation training	March 2020
QA Unit- Ozone Data Validation Training	March 2020
QA Unit- TEOM data Validation	April 2020
QA Unit- NATTS Validation and Verifications Training	April 2020
QA Unit- Using DASC Tools	April 2020
QA Unit- Ozone OPQC AQS upload Training	April 2020
AAMP New Employee Training	May 2020
Air Branch 101 training	June 2020 October 2020 March 2021 July 2021
QA Unit- AQS Quarterly Data Review	July 2020
QA Unit- Neph Data Validation	August 2020 October 2020
QA Unit- Forsyth VOC Data Validation Training	September 2020
QA Unit- Upload Forsyth Data to Air Vision	September 2020
Ambient Program Meeting - Safety Training	October 2020
Ambient Program Meeting – Site Assessment	November 2020
Ambient Program Meeting - PAM GC Operation	January 2021
AAMP New Employee Training	February 2021
QA Unit- PM2.5 Exceedance Training	March 2021
QA Unit-QA Audit AQS Entry	March 2021
Ambient Program Meeting -- Electronic Logbook	March 2021
O3 Data Validation Step by Step Guide hosted	April 2021
Neph Data Validation Training	April 2021
BAM's Data Validation	April 2021
Picarro Data Validation and SOP Training	April 2021
Air Vision Steps for O3 Data Validation Training	April 2021
Validation Macro Training	May 2021
Electronic Timesheet for QA Unit	May 2021
AirNow Setup Training	June 2021
Black Carbon Data Validation	June 2021
ECOS Data Training	June 2021



SUCCESSSES

- Electronic filing have made in-person and remote work easier. Information is more accessible, and staff is more productive
- Transitioning to an electronic review of the ambient monitoring data allowed more flexibility for staff. The reviews are completed while working remotely or in the office, with no impact on productivity
- Electronic data packages provide a complete picture, including documentation of any notes/comments included in the data review discussions
- Validation Specialist, Verification Specialist and QA Manager are intimately involved in the data review process. Increased communication made transition to electronic folder smoother and promoted consistency/operational continuity in data validation and data verification
- Monthly feedback to the field operators after the data is reviewed promotes more ownership of the data, which allows the coding to better “tell the story” of the data
- Electronic data packages have reduced printing costs, filing time, and the need for physical storage space
- Allows more accessibility Branch-wide and make file transfers easier
- Continuous/Peer-to-peer/Cross training enhanced collaboration, professional development and encourage innovative thinking



SUSTAINABILITY

- GA EPD is now in the process of transitioning away from full-time remote work
- The QA Unit will continue to use the lessons from this large-scale work-from-home experience to reimagine how work is done and what brings success to the QA Unit Team
- The QA Unit manager and staff are committed to maintaining the electronic documentation and data review process and quarterly data audits to promote consistency, and timely and accurate data submission to AQS
- The QA Unit's data review SOPs are being updated to implement the data documentation and review procedures as normal business operations
- QA Unit will continue to hold bi-weekly meetings and monthly virtual trainings. Recording the training sessions provides flexibility for on-demand training



QUESTIONS?

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