

NJ Early PAMS Adopters

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Rutgers University Photochemical Assessment Monitoring Station (PAMS)



Markes-Agilent Issues

One PC, separate software, no integration between software

- Blanks and standards can be identified in Markes software, but they are treated as routine samples in Agilent software
- Need to manually rename sample folders created by Agilent software to identify QC data
- PAMS TAD recommends staggering schedule of QC checks, need extra effort to rename sample folders (RTS, CCV, Blanks, etc.)

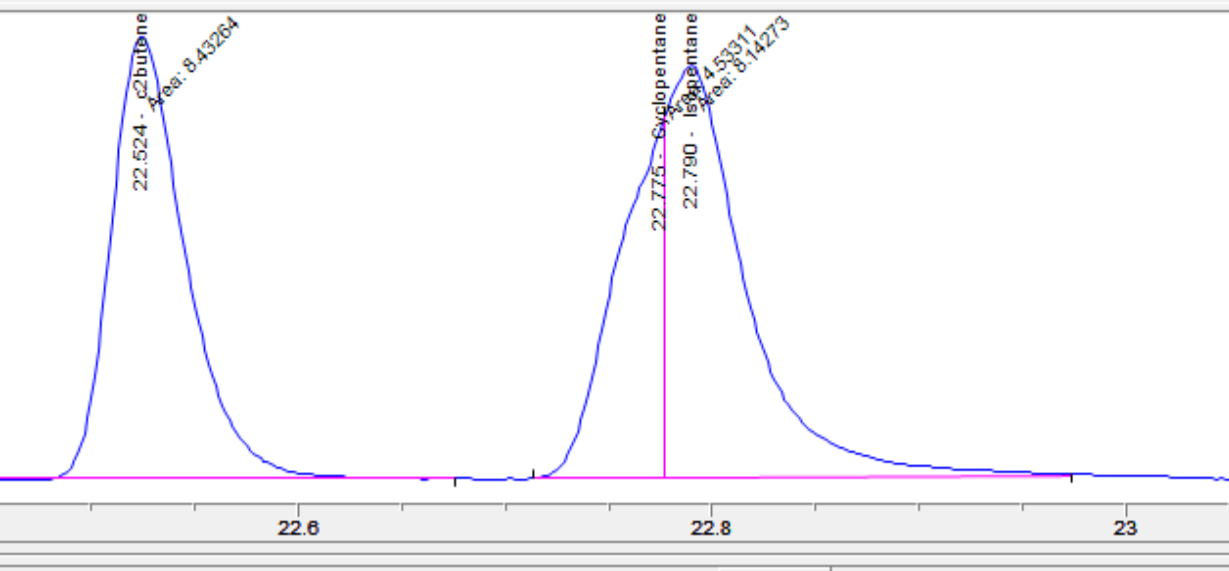
Markes Issues

- Kori purge vent flow needed frequent adjustment
 - Too low moisture builds in the Kori
 - Too high caused reduce H₂ pressure and H₂ safety shutdown
- Unity Connection issue after power outages
 - Requires several attempts, restarting computer and software in different sequences to get working again
- Desorption duration extended to remove water in the Kori and inconsistent sampling start times
 - These were addressed in the roll out of the new Markes 2.0 software

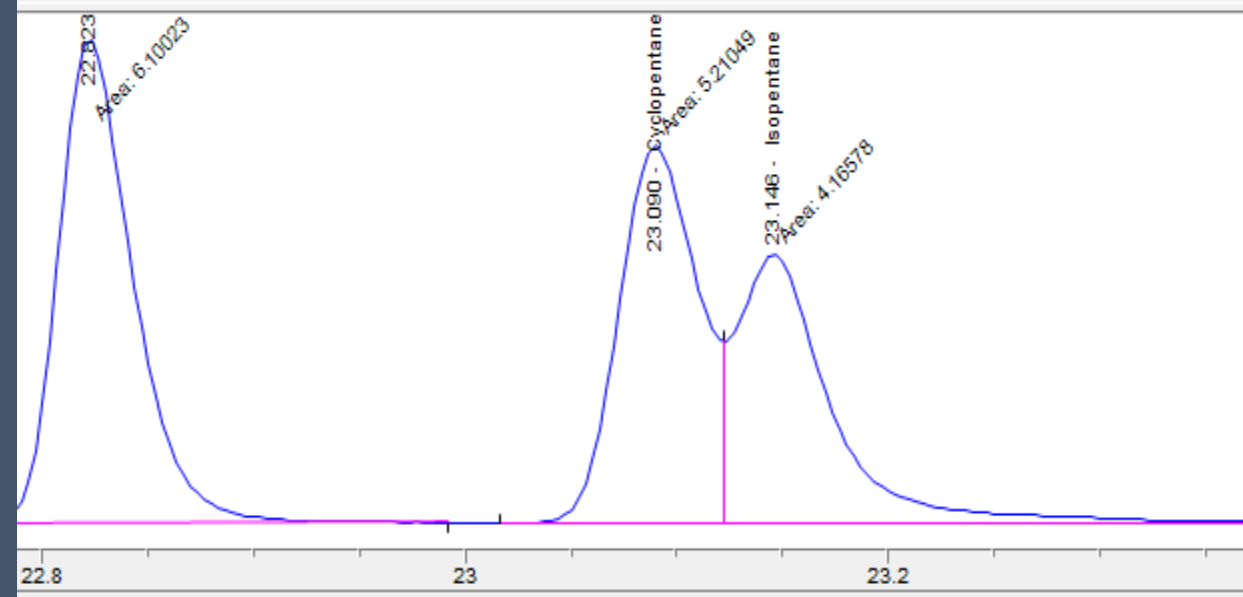
Agilent Issues – GC-FID

- Columns – original GC columns supplied by Agilent had problems resolving components
 - replaced with different columns, but results were still not ideal
 - Changed test a third column in 2019 (Using NY suggested column)
 - Looking for EPA guidance on which column works best for the system
- Moisture problem possibly caused by H₂ generator
 - Additional filter added downstream of H₂ generator
- Column snapped towards the flame
 - Basic training on column cutting/installing important
- System shut down frequently this season
 - H₂ Sensor Shutdown needs a minimum amount of flow
 - Power outages- need manual reset of GC and H₂ generator
 - Temperature of shelter requires good AC unit

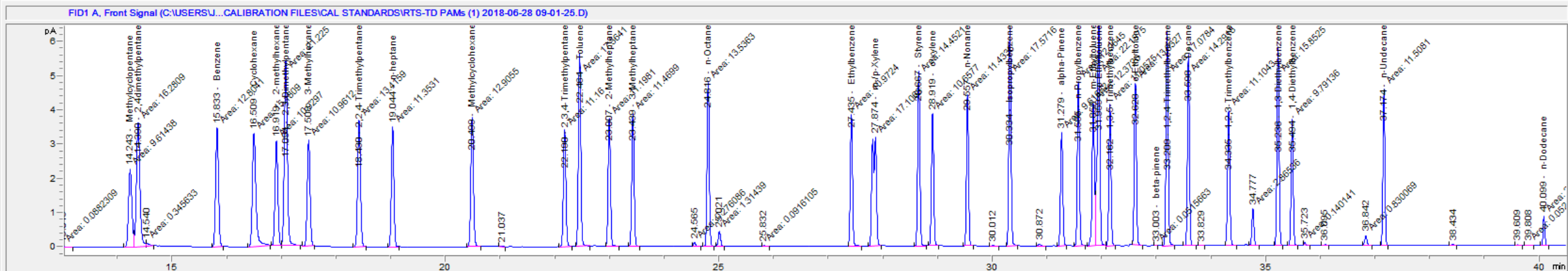
PAMs (1) 2019-06-06 11-57-02.D



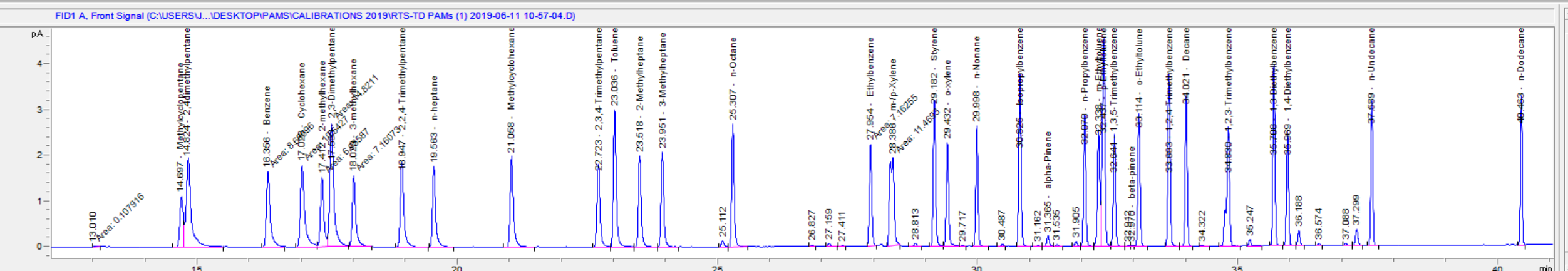
TS-ID PAMs (1) 2019-07-29 23-57-05.D



2018

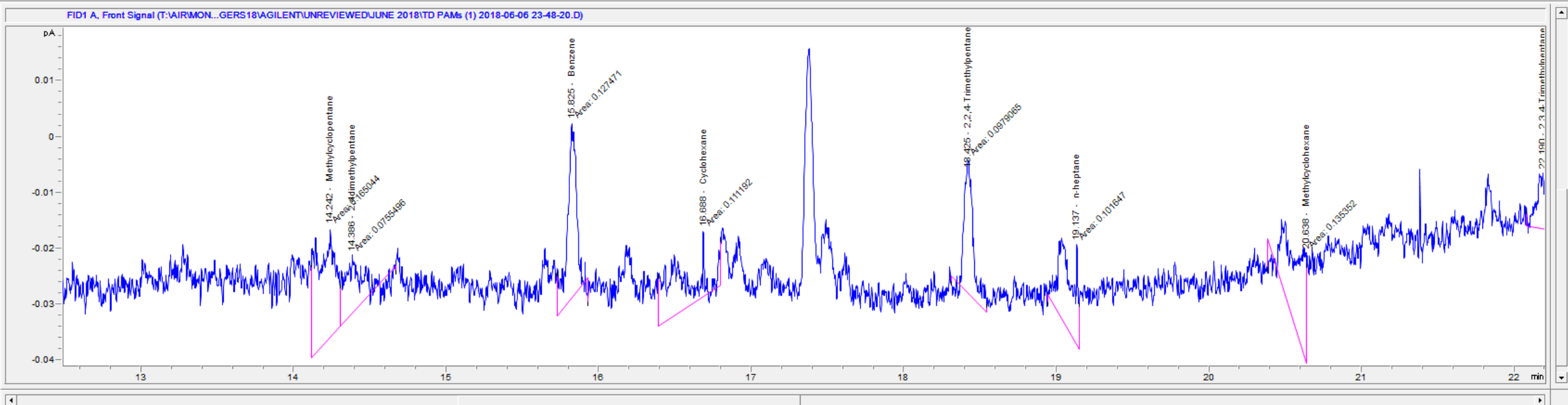
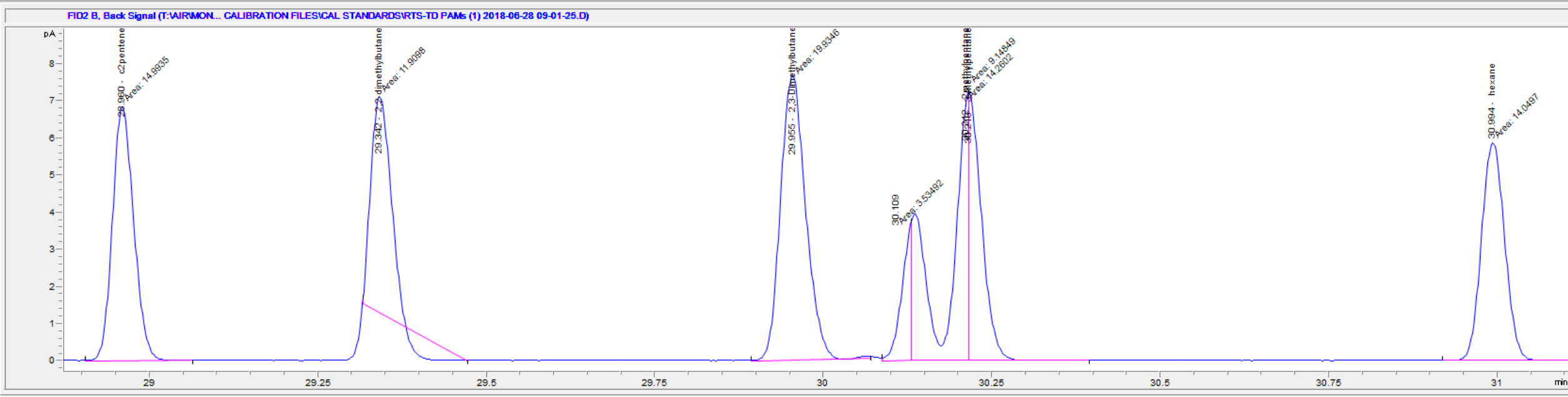


2019



Agilent Issues - Software

- Many different software products and versions
 - We are using Open Lab CDS Chem Station Edition Vs: C.01.08
- Each product has different capabilities and limitations – some products do not quantify unknowns
- Manual peak integration needed on many peaks
 - Some peaks won't integrate (can manually change settings to accommodate smaller peaks)
 - Report generation or reprocessing of data required after integration



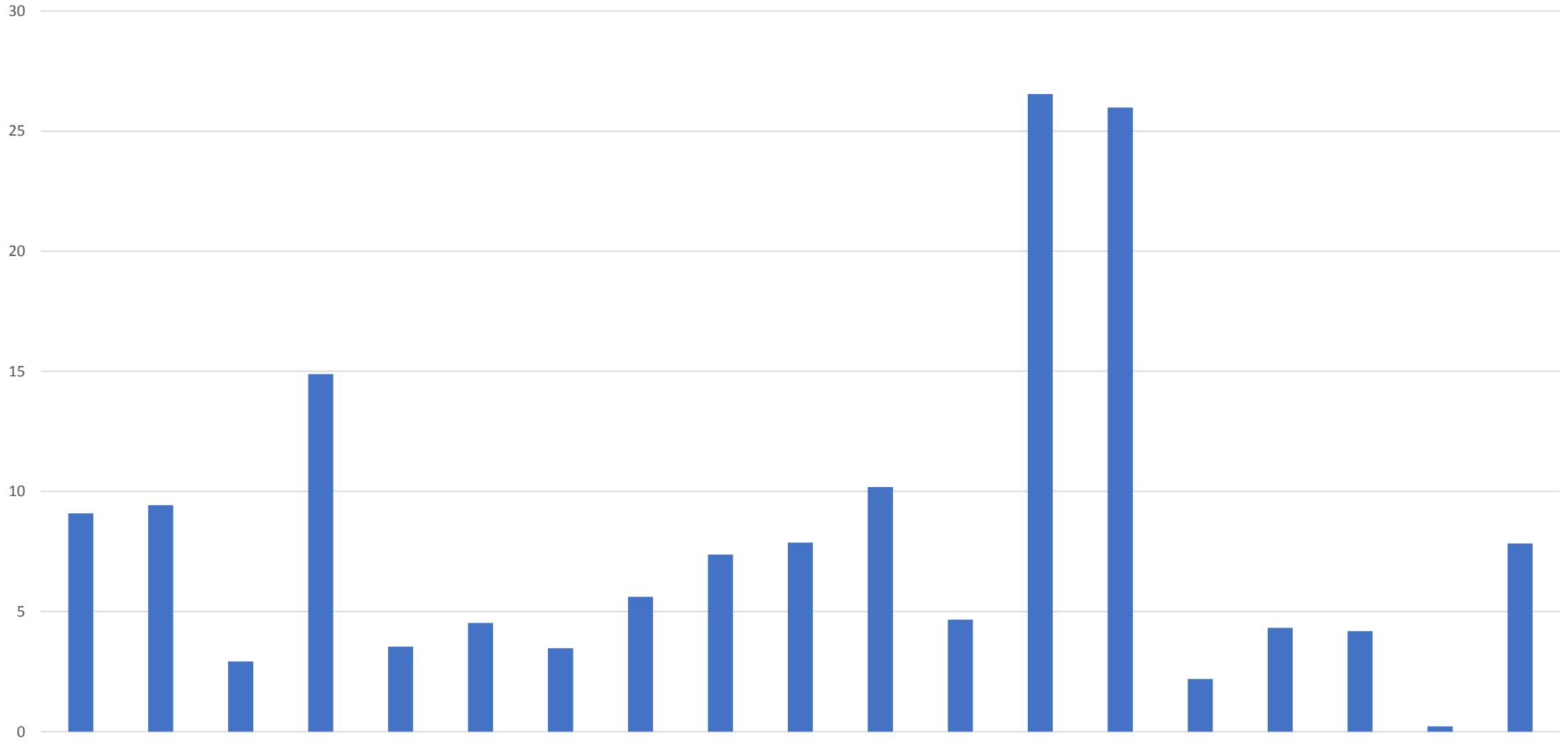
Agilent Issues – Software (continued)

- Need the capability to compile report files from the data files which can be used for reviewing and validating data and for generating AQS transactions
 - Currently working with Agilent on this capability
- NJ has Gold Service contract
 - Support has been quick, 1 or 2 days for site visits
 - Preventive Maintenance / preseason service annually

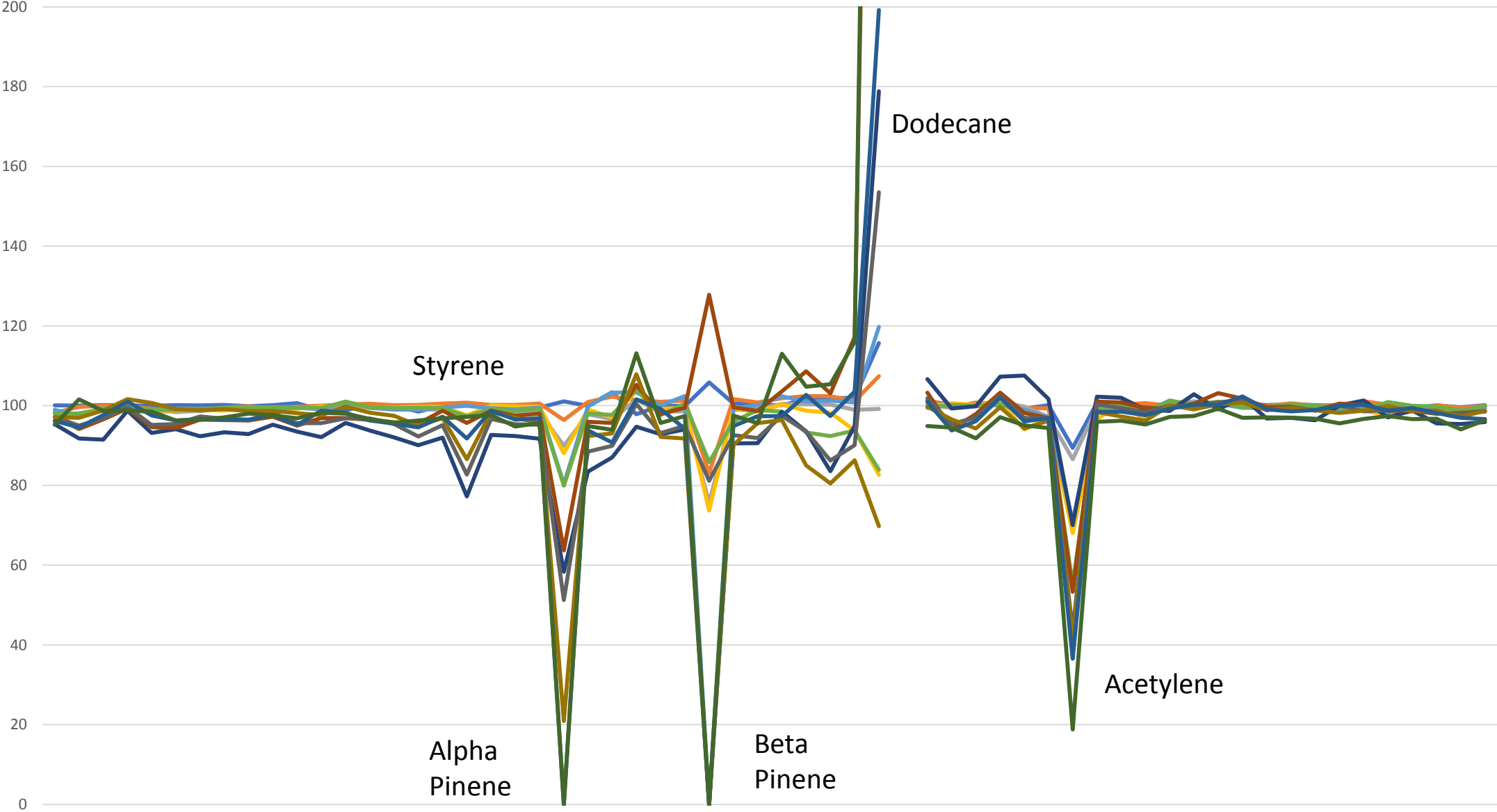
NJDEP QA/QC in 2018-2019

- Weekly blanks using dedicated canisters filled with N₂ obtained from the headspace of liquid N₂ tank
 - Currently investigating research grade N₂ in offseason
- Weekly checks of concentrations and retention times using PAMS Retention Time Standard (RTS)
- Weekly checks at 10% of the PAMS RTS (Continuing Calibration Verification – CCV)
 - Markes has a setting for injection of 80 cc instead of 800 cc of the PAMS RTS
- Results
 - Blanks: 2.2 to 25 total ppbC (2 blanks at 25 in 2019 attributed to canister)
 - Recovery: RTS mainly +/- 15%
 - Acetylene remained fairly consistent but using propane RF for ambient data
 - Beta-pinene – lost detection from RTS (only 1.37ppbc)- Using Benzene RF

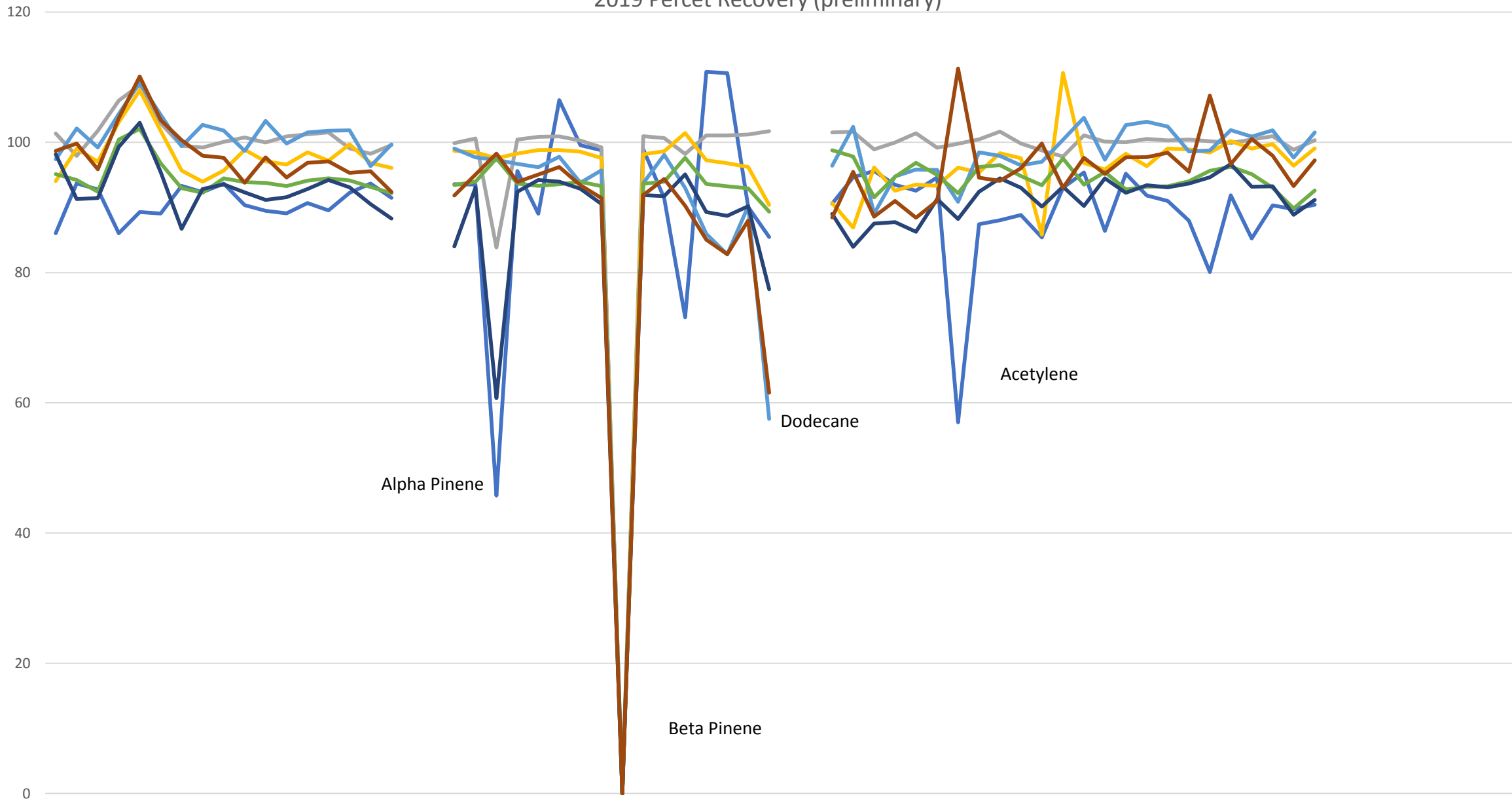
2018-19 Blanks (total ppbC)



2018 Percent Recovery of RTS



2019 Percent Recovery (preliminary)



Alpha Pinene

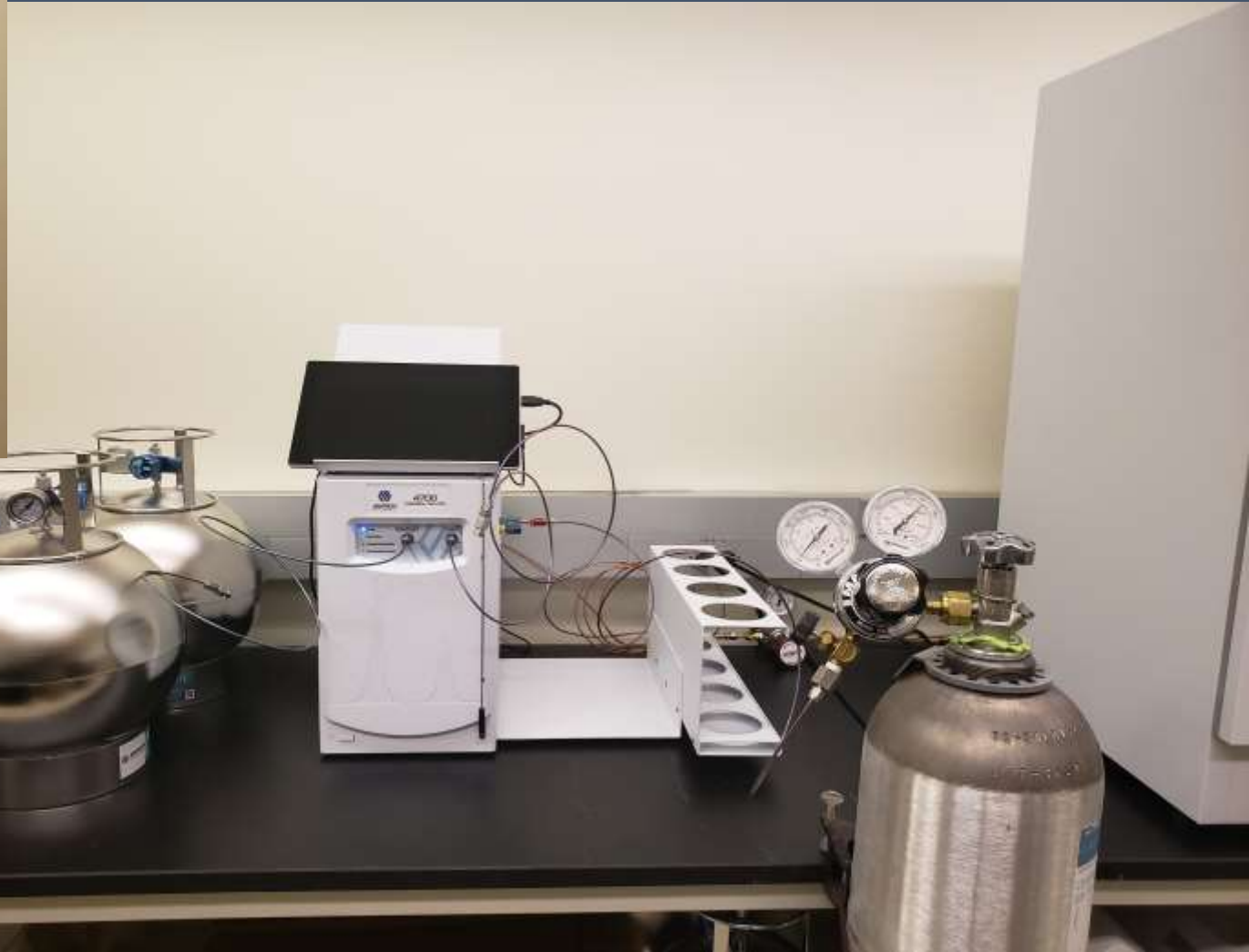
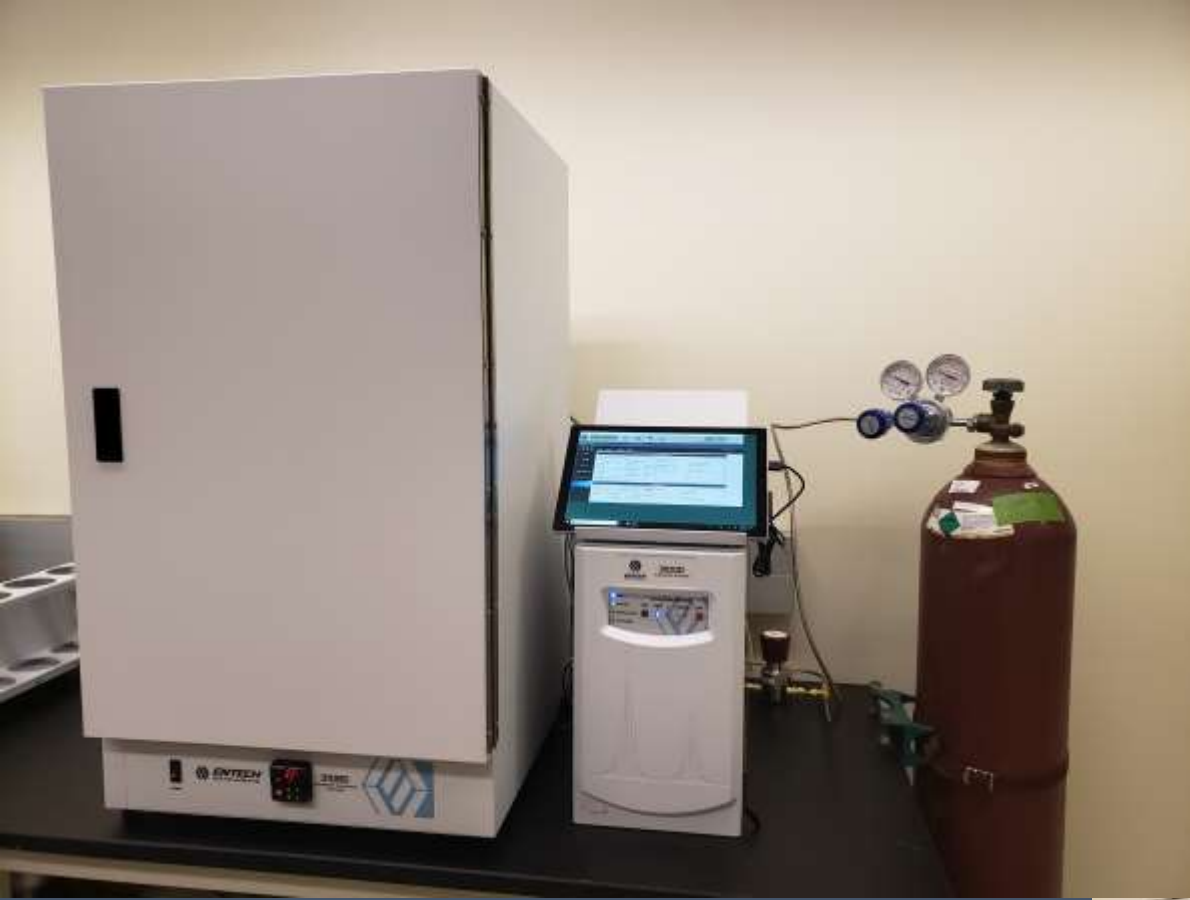
Beta Pinene

Dodecane

Acetylene

QA/QC Required in 2021

ACTIVITY	FREQUENCY	STANDARD	DETAILS
ICAL, Initial Calibration	Before & After season	ICAL standard, benzene and propane	3 points, 1-25 ppbC
System blank	Daily	Nitrogen	< MDL or 0.5 ppbC
Secondary Source Calib. Verification SSCV	Weekly	can use PAMS Retention Time Standard	$\pm 30\%$ of concentrations of benzene and propane
Continuing Calibration Verification, CCV	Daily	Can use PAMS Retention Time Standard	$\pm 30\%$ of concentrations of target compounds
Retention Time Standard	Weekly	Can use PAMS Retention Time Standard	Within established retention time windows
Precision check	Weekly, replicate of CCV	Can use PAMS Retention Time Standard	Abs. Rel. % diff $\leq 25\%$ for each target



Canister cleaning and dilution System

- Purchased from Entech
- Required 2 days for installation and training
- Cleaning system can clean 8-6L cans or 2 – 15L cans at a time
(NJ opted to buy some 15L cans due to the frequency of QA/QC in TAD)
- Will be used to dilute for Initial Calibration (propane and benzene) and Continuing calibration (10% of RTS)
 - Able to dilute 100x (up to 10000x possible with 2nd dilution)
- NJ will begin humidifying standards and blanks (Polished 18 MΩ)

- Entech suggested many cans are no good
- NJ purchased some new ones for comparison
 - Electropolished canisters have shorter lifespan due to thinner barrier between the sample and the surface
 - SUMMA and Silonite[®] canisters have a virtually unlimited lifetime unless severely abused



NJDEP, Bureau of Air Monitoring, 2019

Other Issues

- NJ could use technical support from the Regional EPA office
- NJ paid for additional training from Agilent separately after determining that the training that came with equipment was not targeted to PAMS operation

Acknowledgements, Discussion

- Pete Furdyna, NYSDEC
- NJ Air Monitoring Chief: Luis Lim
- NJ PAMS data reviewer: Rudy Zsolway, Jessica Munyan
- Questions
- Comments