PAMS AutoGC

Monitoring Network Performance for NMHCs Across 35 Monitors in Texas

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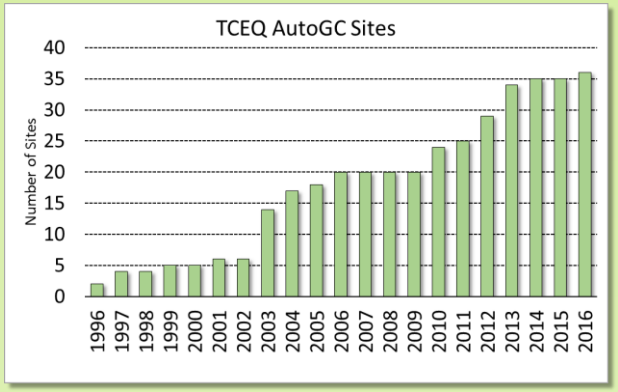
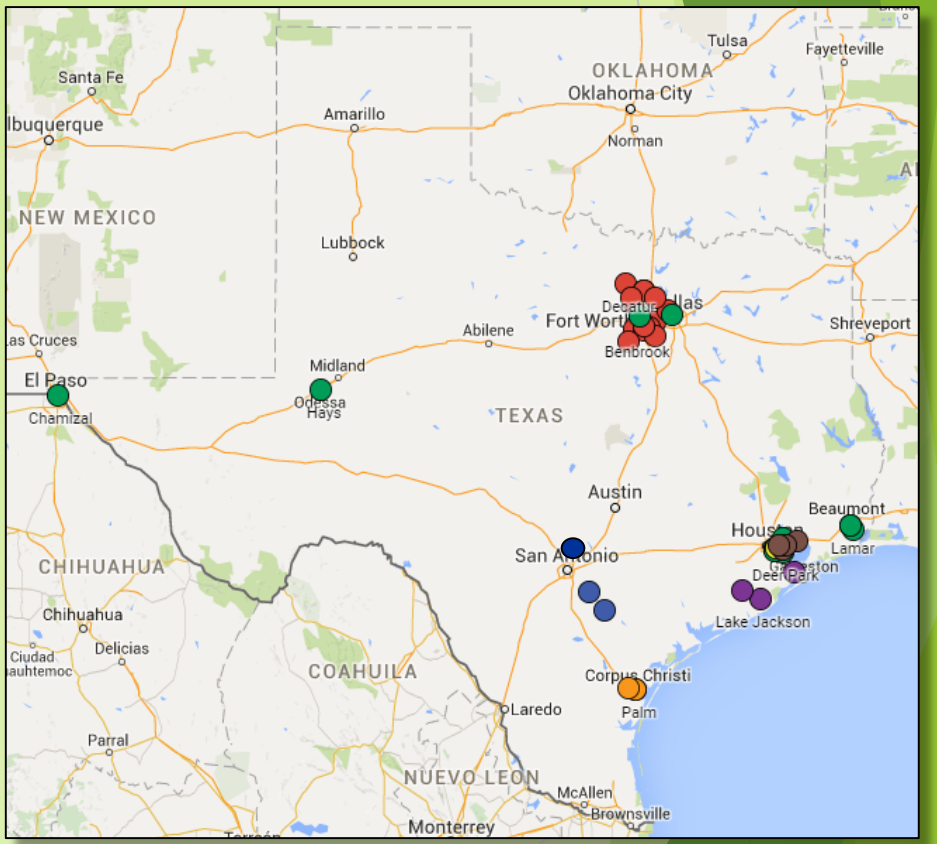
TCEQ AutoGC Networks

Network	# of Sites
Houston Regional Monitoring Group	4
Extended Industry Monitoring Sites	3
North Texas Commission	13
University of Texas CEER	4
Harris County Pollution Control	1
TCEQ	12
Total AutoGC Sites	37

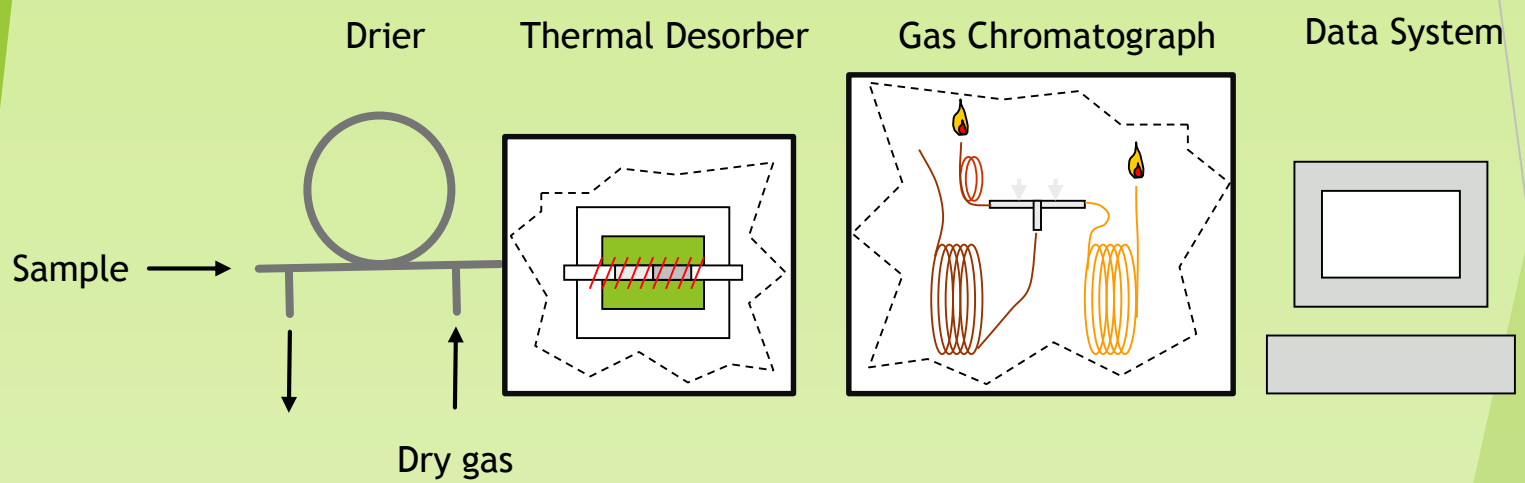
AutoGC Sites in Operation by Year





AutoGC Systems: Hourly Sample Collection and Separation

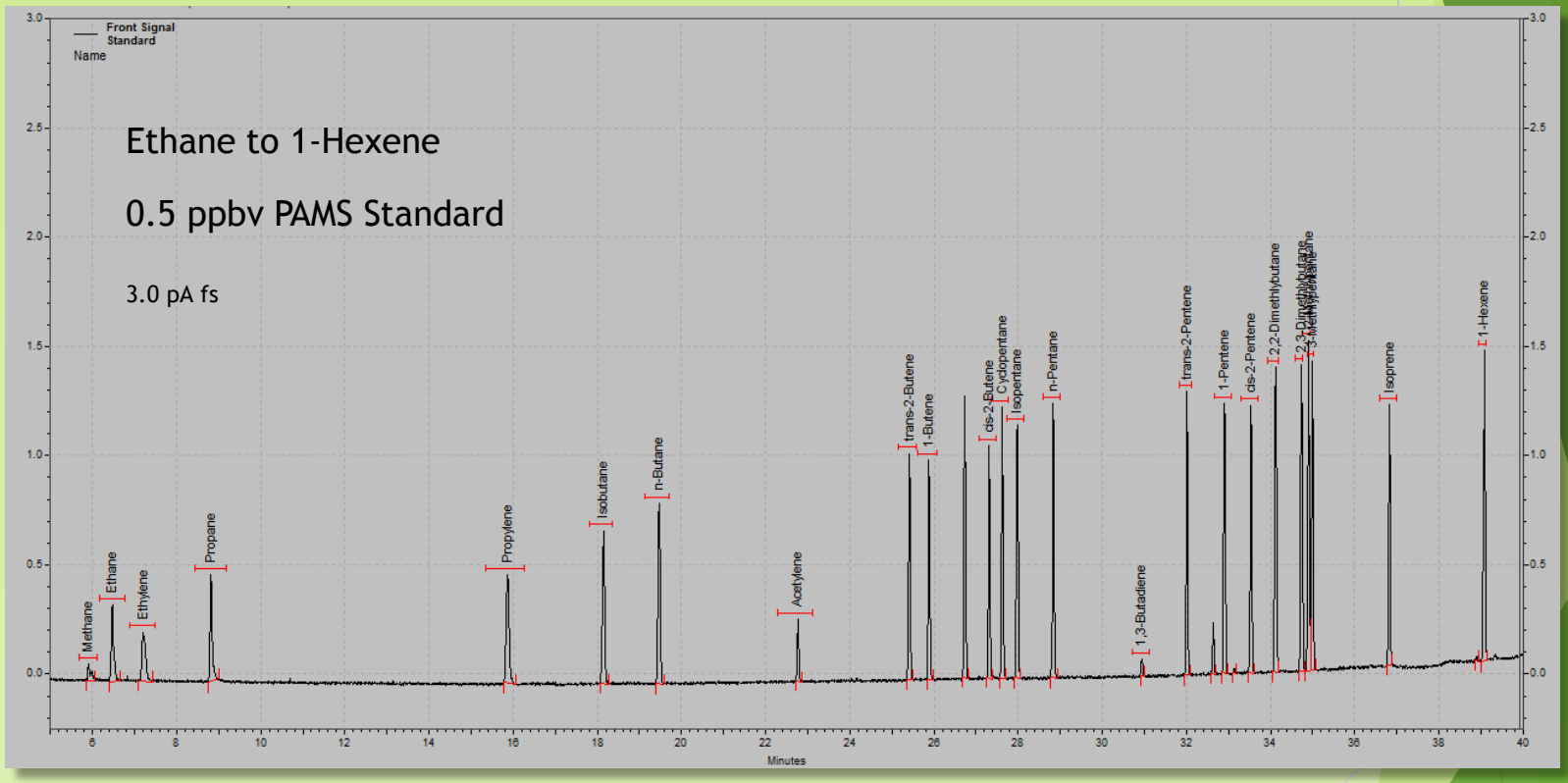
Basic System for the Separation of NMHCs from Ambient Air



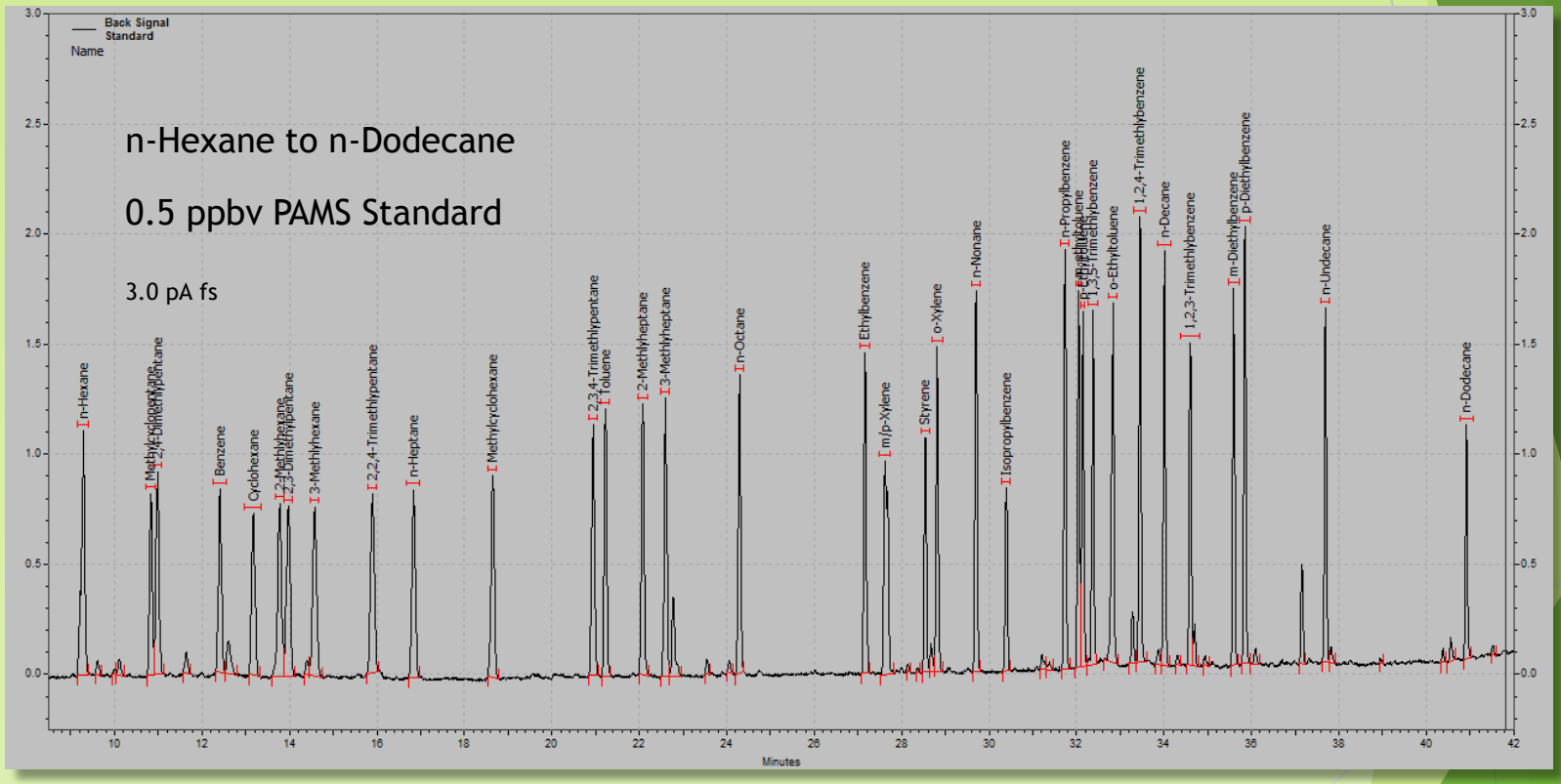
Additional Automation for Introduction of Quality Control Samples

- Automatic introduction of QC samples
  - Dynamically diluted check standard
  - Analytical blank
- Manual dilution of multipoint calibration curve
- Dilution from 100 ppbv or 1 ppmv multi-component standard

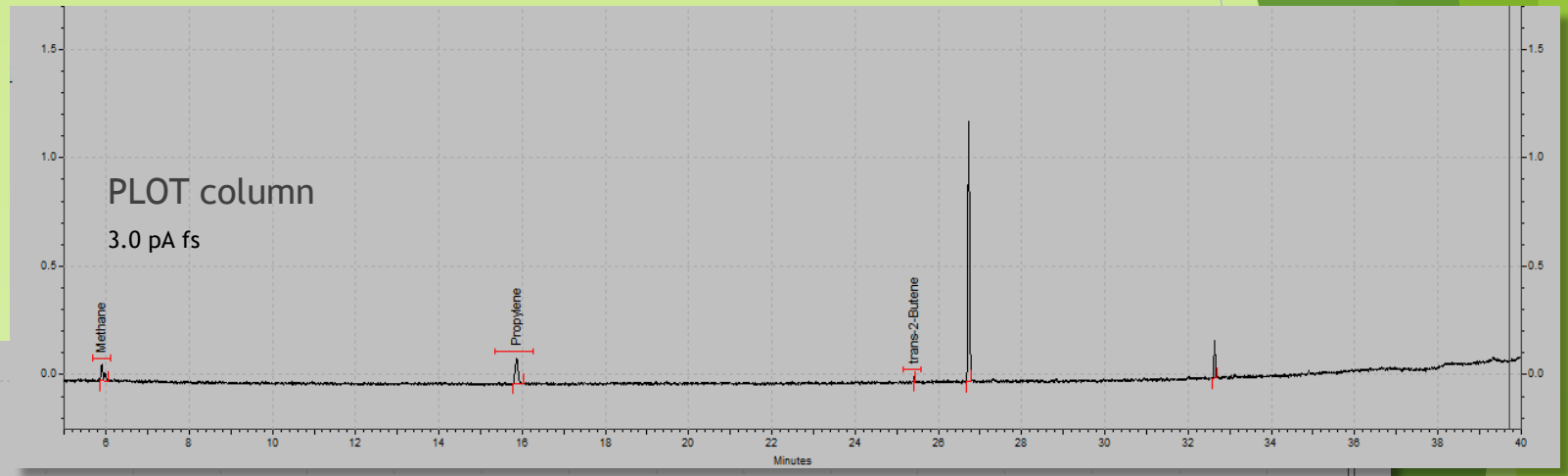
C2-C6 Alumina PLOT Separation

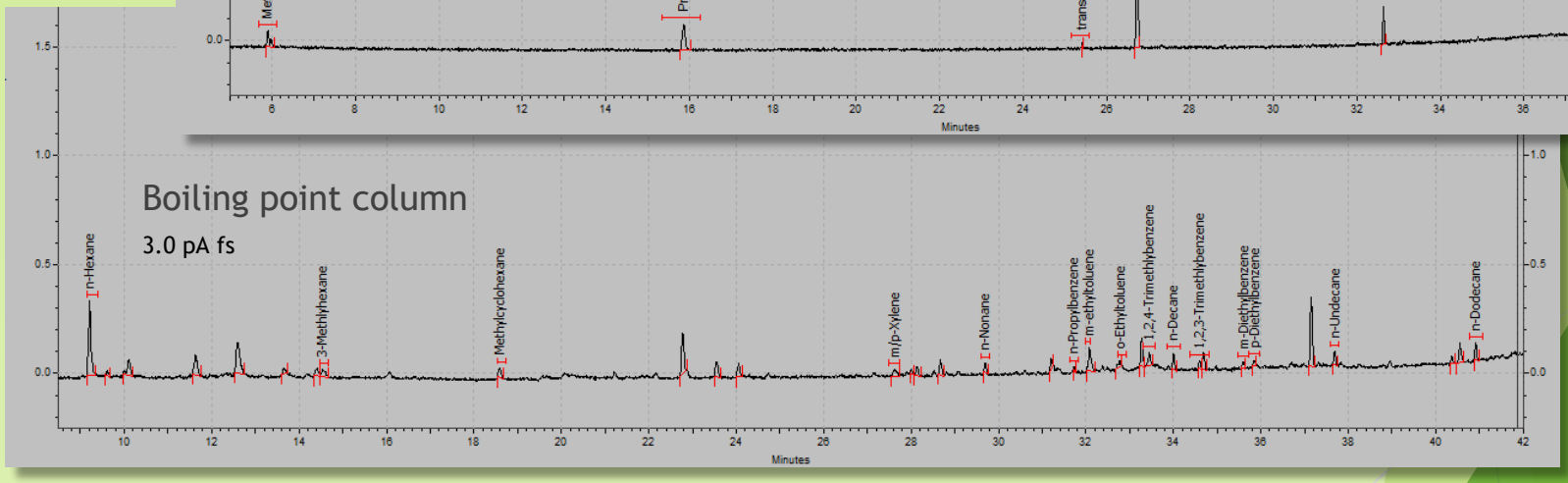


C6+ Dimethylsiloxane (Boiling Point) Separation

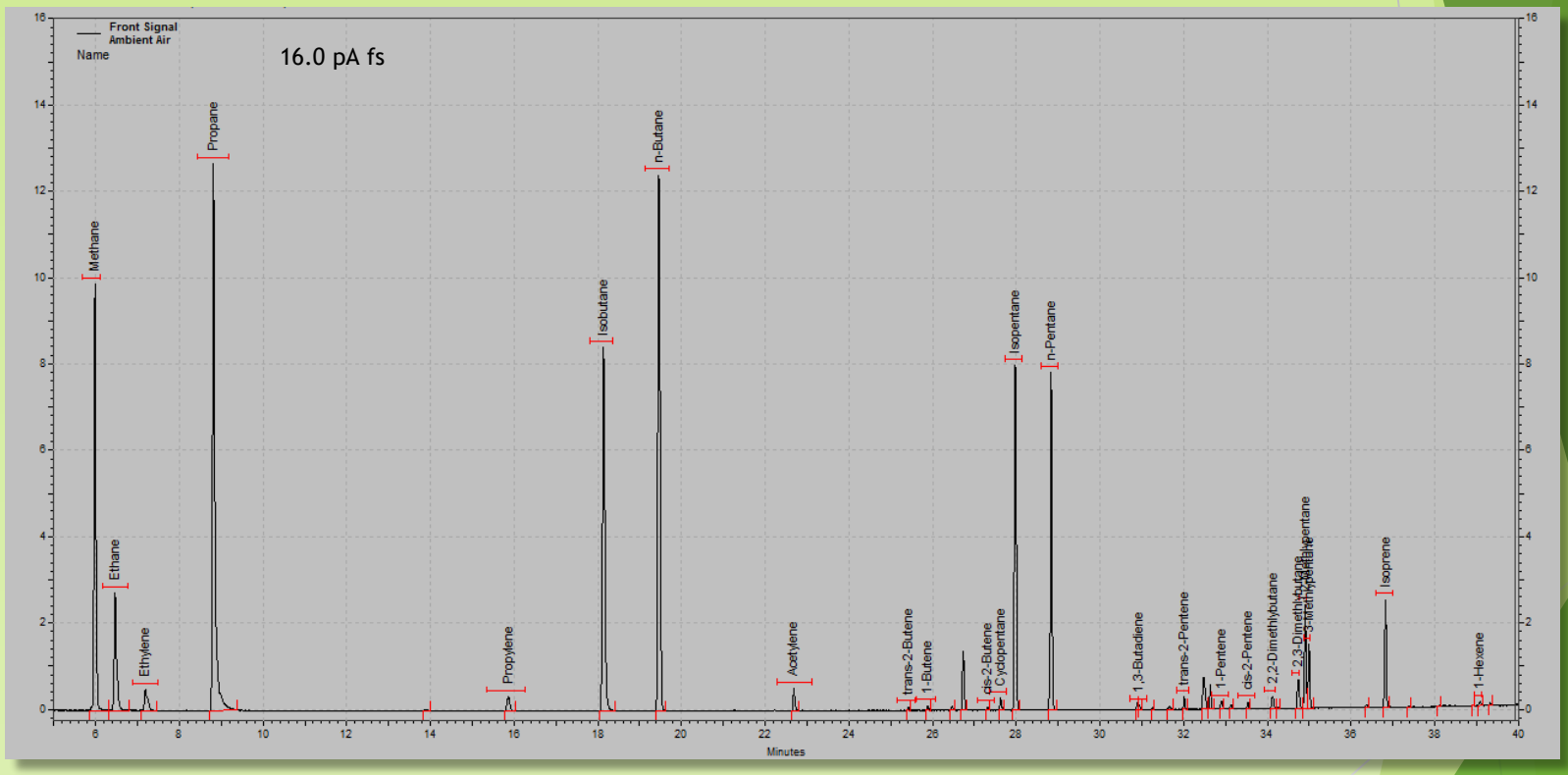


Analytical Blank

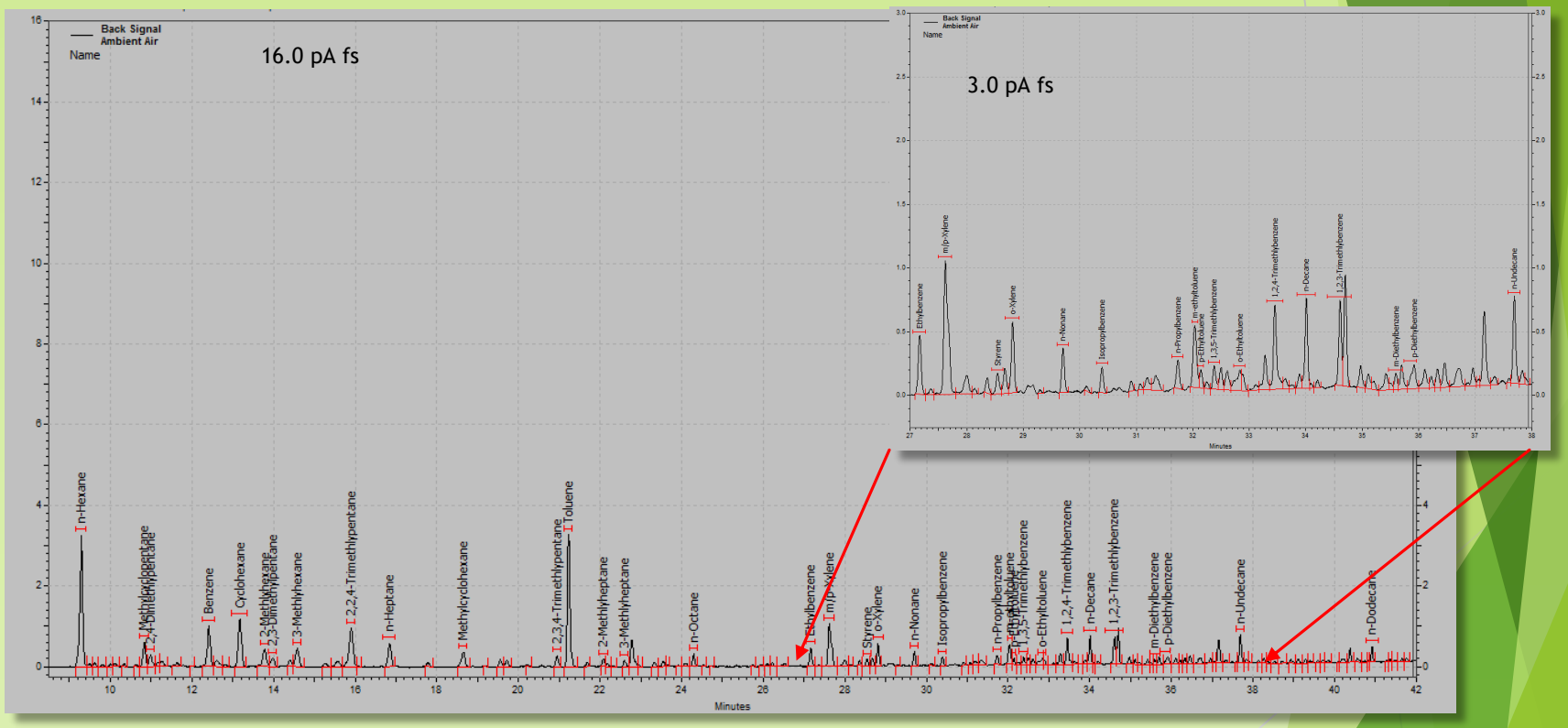




Ambient Air – PLOT Column



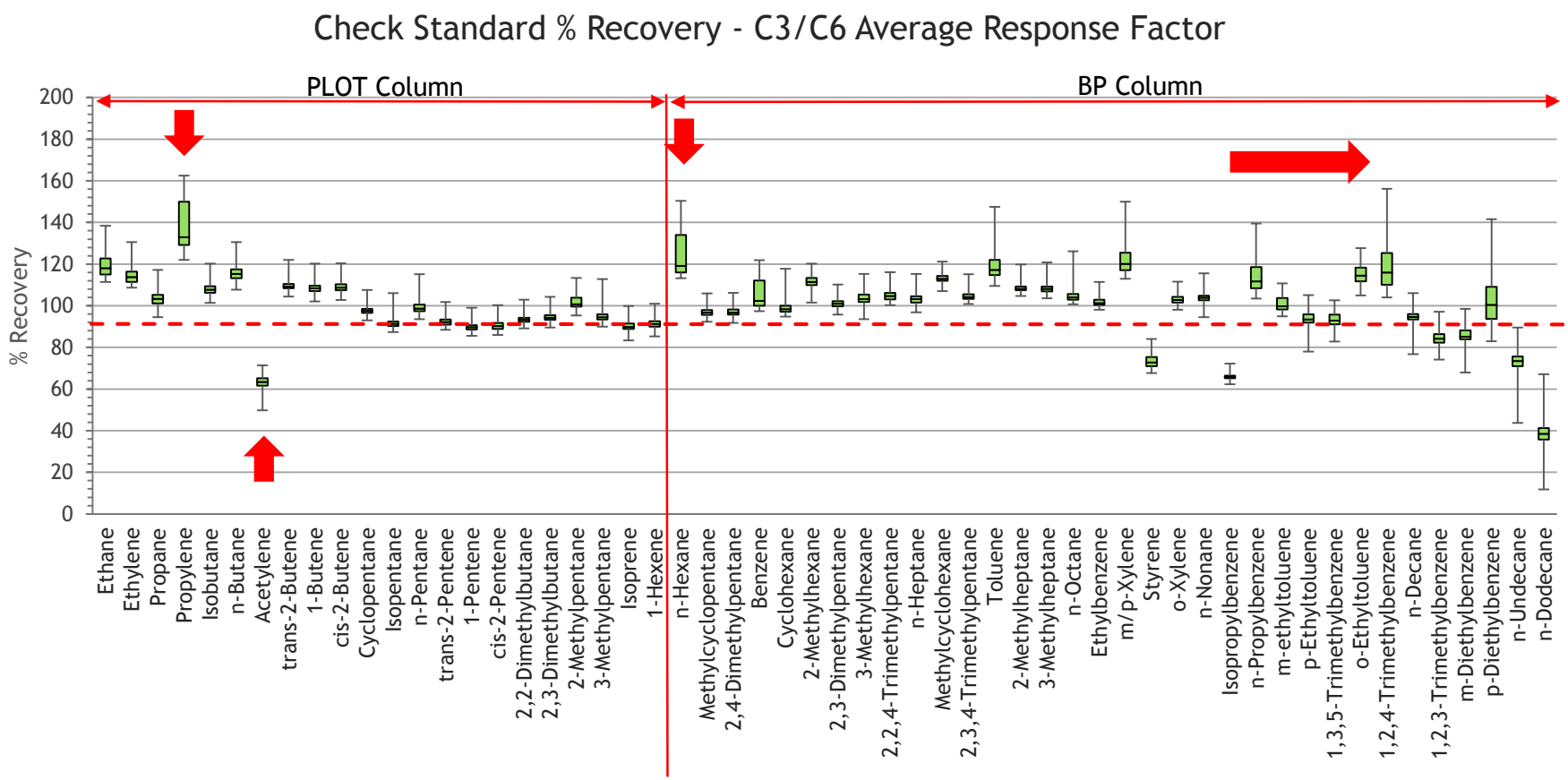
Ambient Air – Boiling Point Column



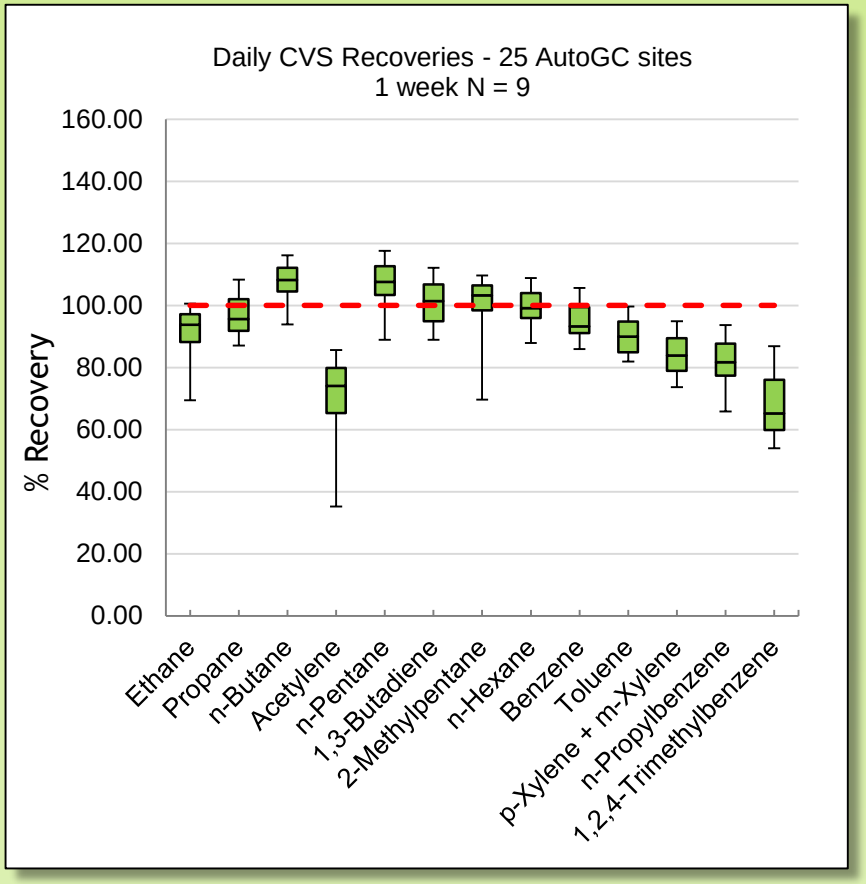
Network Quality Control

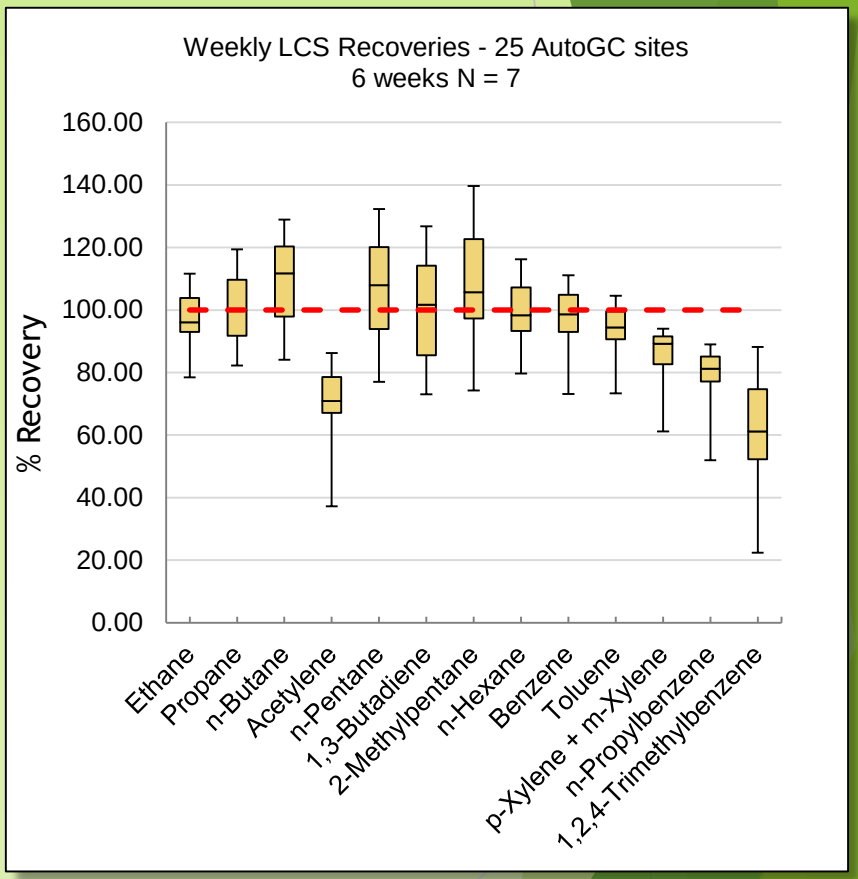
Quality Control Check	Composition	Purpose	Frequency	Acceptance Criteria
Retention Time Standard (RTS)	Mixture containing all target compounds ideally between 1-5 ppbC	To help assess retention time shifts and optimize processing methods	Twice a month or weekly	100% of the compounds are identified correctly in the multicomponent RTS
Calibration Verification Standard (CVS)	Mixture of 15 reference compounds including Propane and Benzene used for calibration	To assess the instrument drift and ensure continued instrument calibration	Daily	1) Propane and Benzene % recoveries within 75% - 125% and all other calibrants within 55 - 145%
				2) Data must be bracketed by valid CVS
Method (Analytical) Blank	Humidified, clean air	To assess system contribution to the measurement	Daily	1) All target compounds < 2.0 ppbC
				2) TNMHC < 20 ppbC
				3) Data must be bracketed by valid blanks
Precision Check	Mixture used for CVS	To assess analytical precision	Weekly	Propane and Benzene %RPD < 20% in two consecutive CVS runs
Laboratory Calibration Standard (LCS)	Mixture of 15 reference compounds including Propane and Benzene used for calibration	Second source standard, statically blended 5 ppbv	Twice a month or weekly	Propane and Benzene % recoveries within 70-130%

Recoveries in Daily Check Standard at 0.5 ppbv



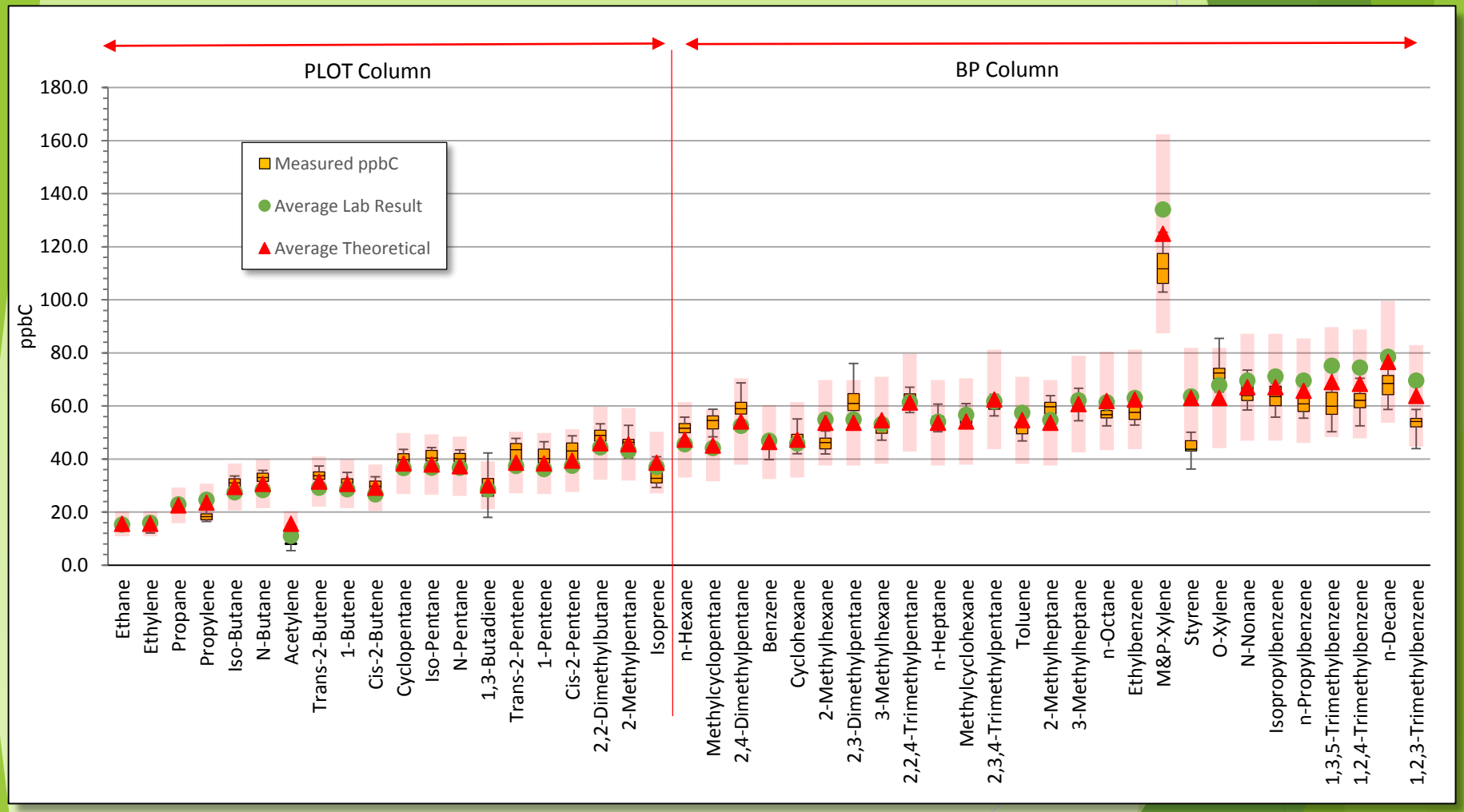
Network Quality Control – 25 AutoGC Sites





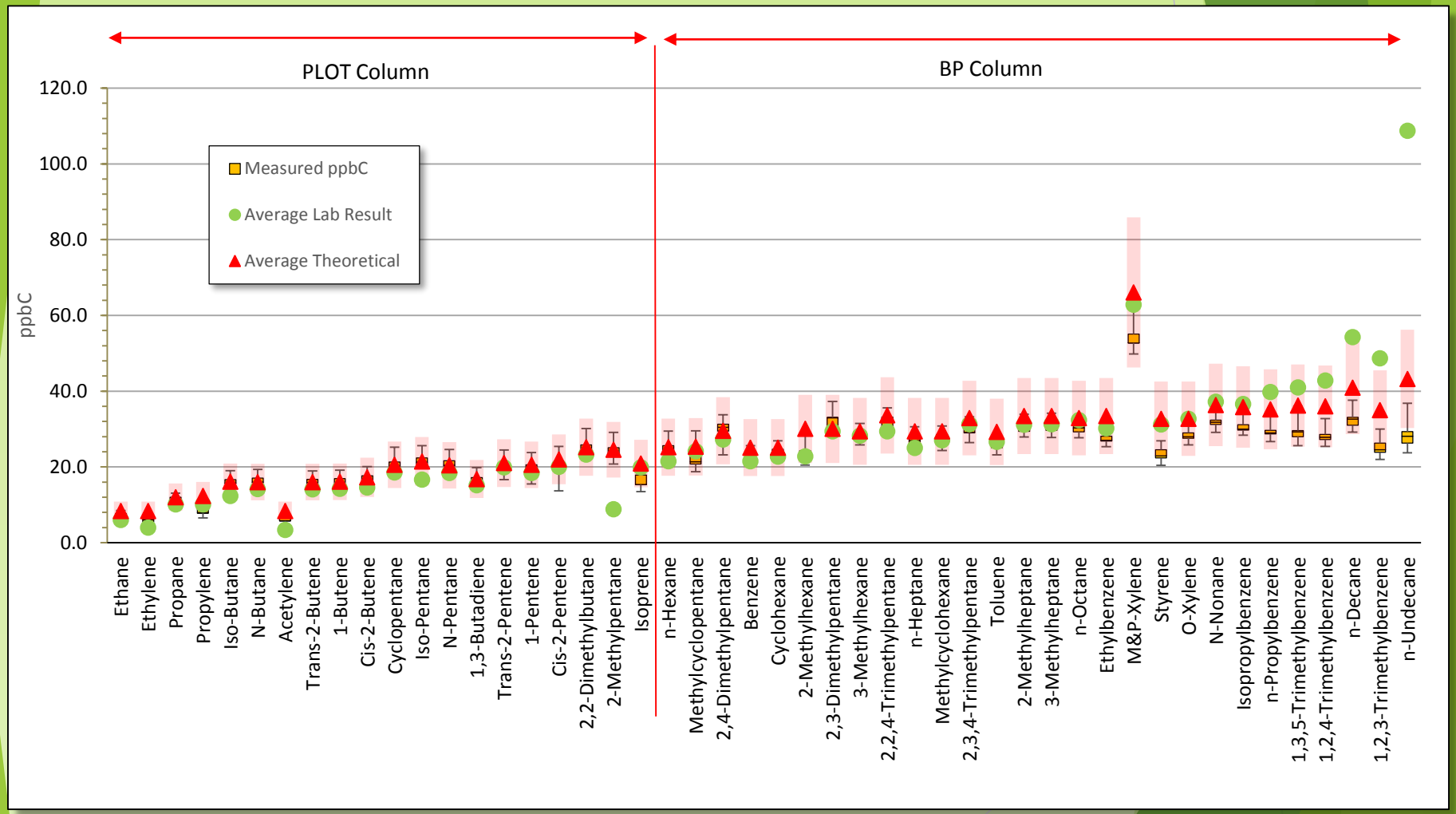
TCEQ Performance Evaluation Audit

Fall 2014 - 12 AutoGCs



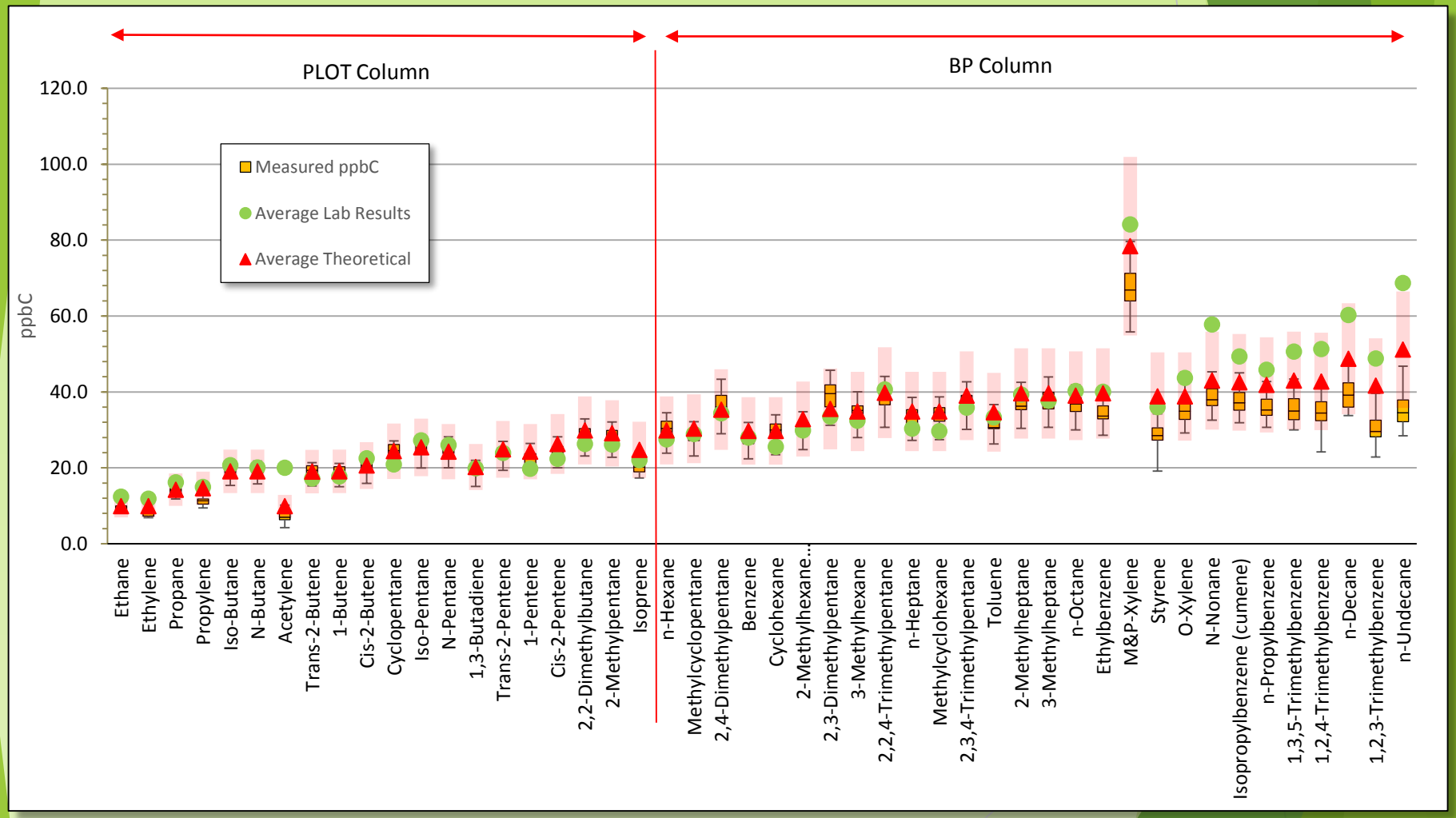
AECOM Performance Evaluation Audits

Q2 & Q4 2015 - 13 AutoGCs North Texas Network



AECOM Performance Evaluation Audits

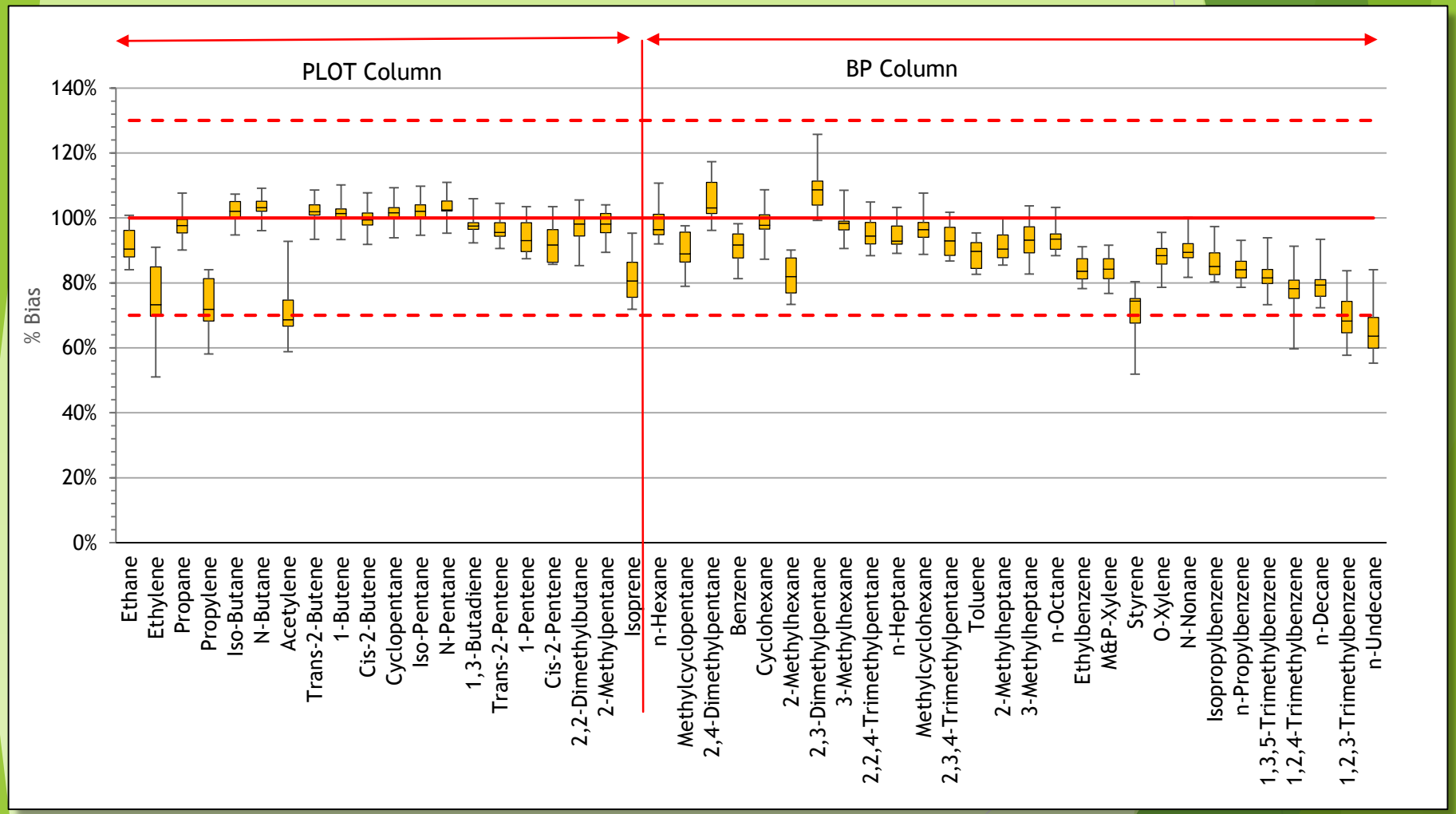
Q2 & Q3 2015 - 7 AutoGCs Houston/Galveston Network



Normalized Performance Audit Data

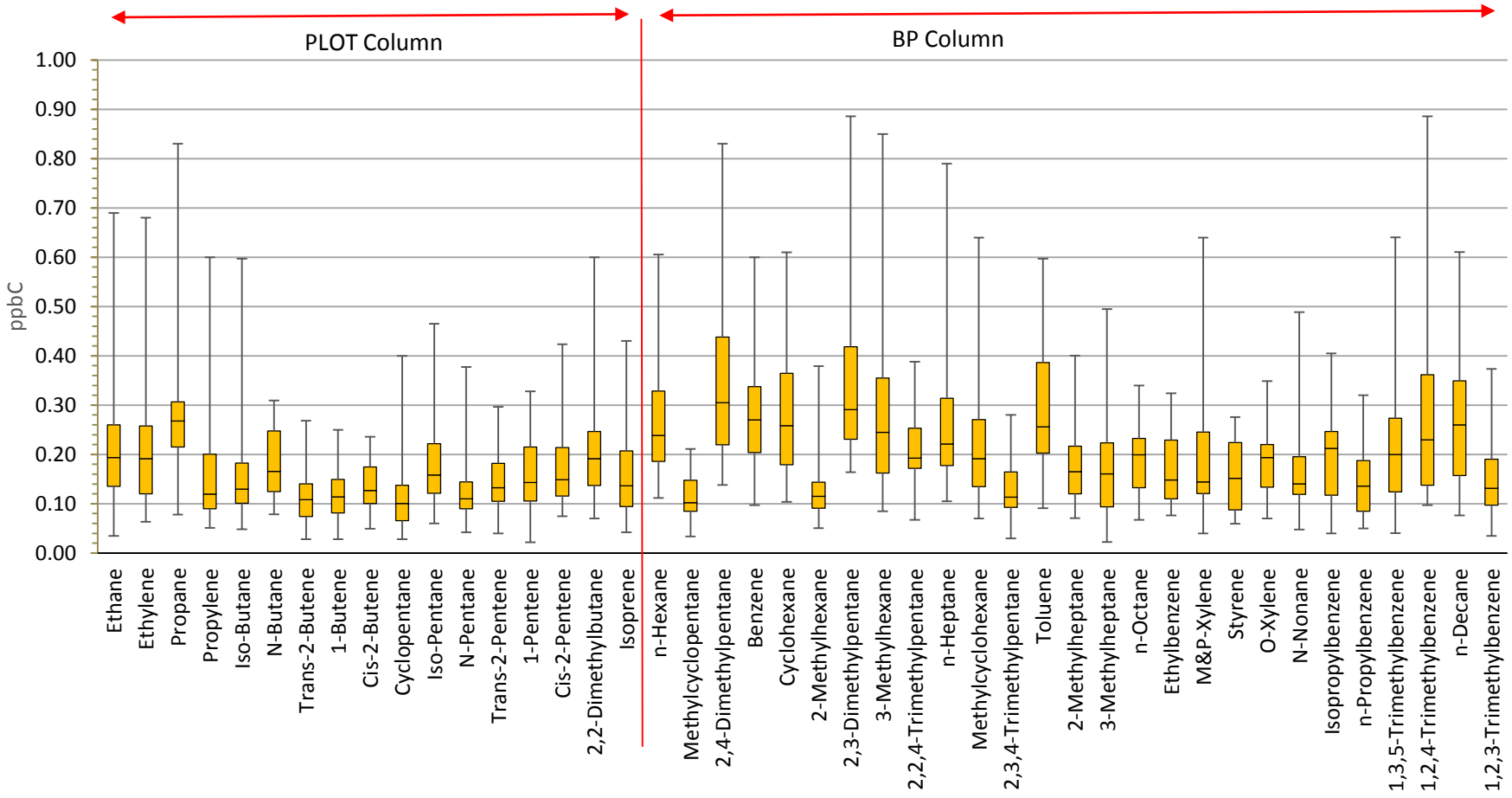
Fall 2014 - Spring 2015 – 32 AutoGC Sites

Network	# of Sites	Nominal ppbv
NTC	13	5
EIMS	7	5
TCEQ	12	7

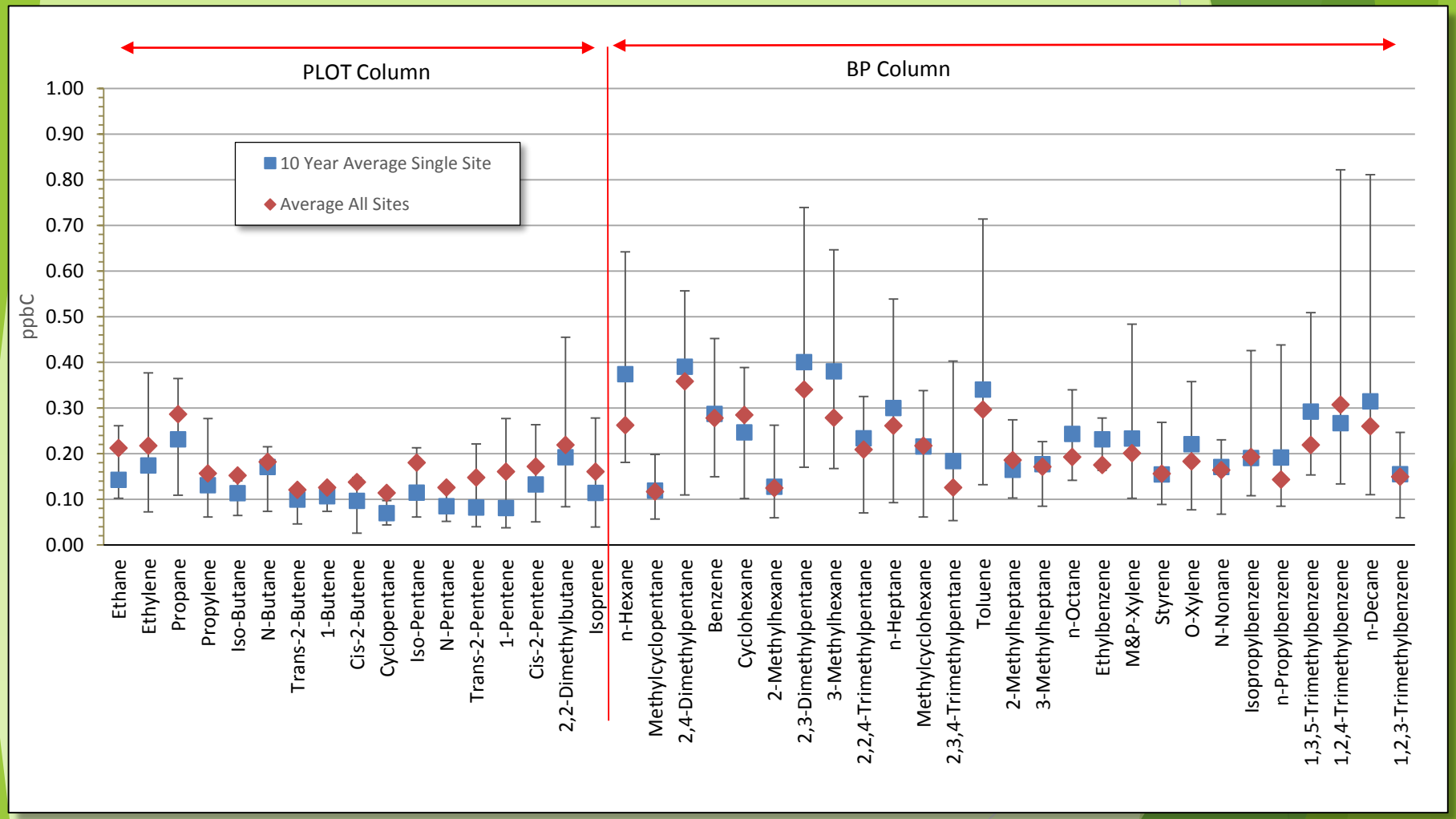


Minimum Detection Limits across 34 AutoGC Systems 40 CFR part 136 Appendix B

Network	# of Sites
NTC	13
EIMS	5
TCEQ	11
UT	4
HCPCS	1

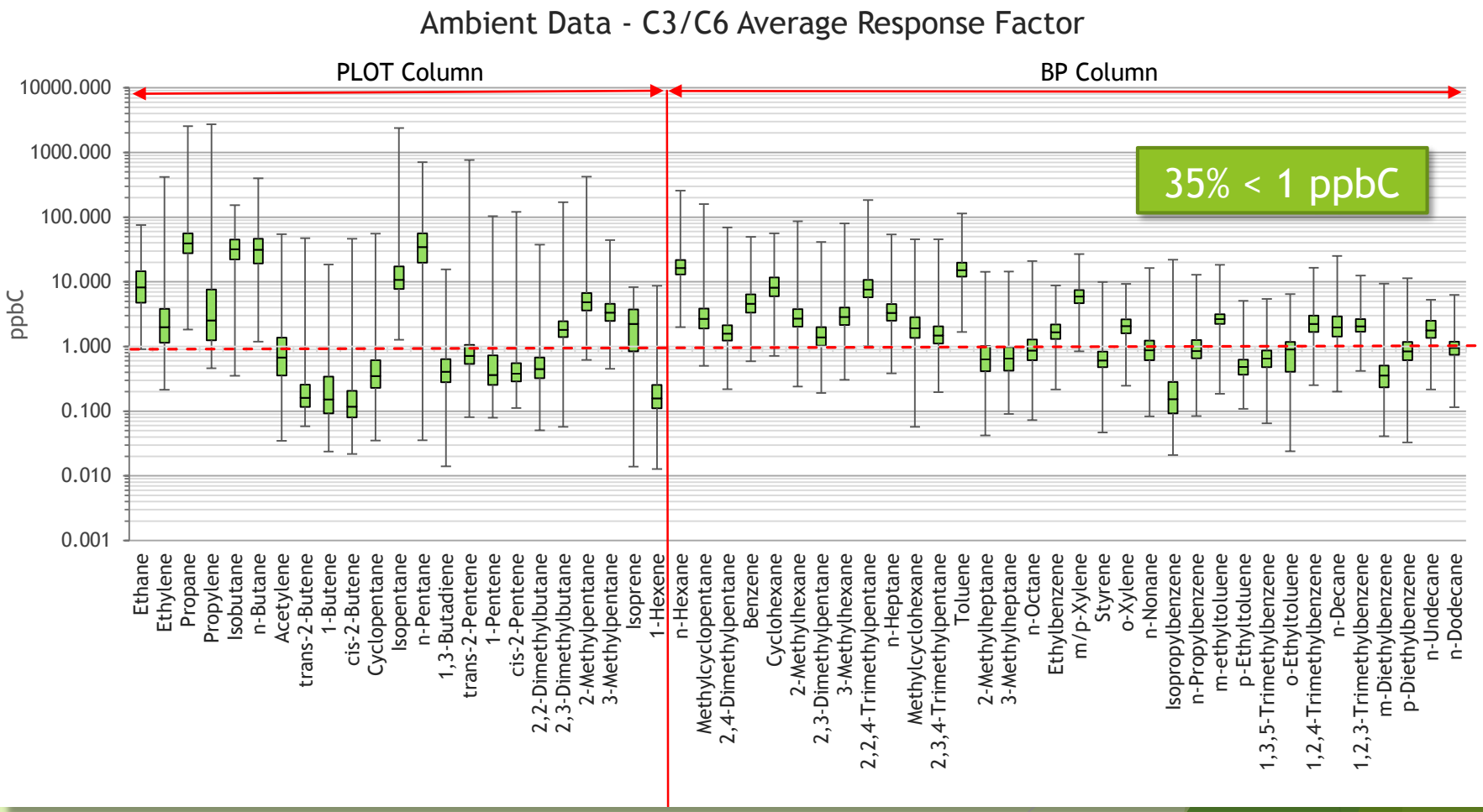


Minimum Detection Limits over 10 years on a Single AutoGC System 40 CFR part 136 Appendix B



Distribution of Ambient Data

3.5 Months – over 1900 measurements



Summary
Requirements for Successful AutoGC

- Chromatographic Data System
  - Capable of identification and quantitation of complex samples
  - Robust and simple calibration strategy
  - Output format for easy review of data
  - Event control for automation of quality control checks
- Standard Operating Procedures
  - Daily operations for consistent data collection
  - Validation to handle deviations consistently
- Data Quality Objectives
  - Well defined control limits
  - System for identifying and correcting failures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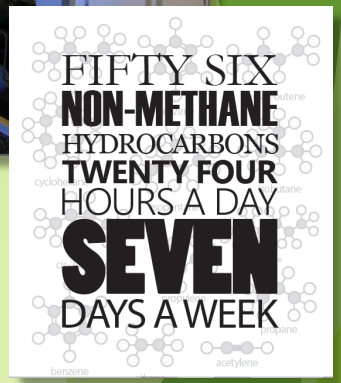
FIFTY SIX
NON-METHANE
HYDROCARBONS
TWENTY FOUR
HOURS A DAY
SEVEN
DAYS A WEEK

Acknowledgements

"Without data you are just another person with an opinion." ---W. Edwards Deming

AECOM

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✦✦✦

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✦✦✦

Texas Commission on Environmental Quality

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