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Systems for continuous, ambient monitoring of Ethylene Oxide -Updates from the field

National Ambient Air Monitoring Conference

August 2022

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PRESENTATION OVERVIEW

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- 1. What makes CRDS so special?
- 2. Monitoring systems & applications
- 3. New Ambient Air Monitoring System for EtO
- 4. Field Monitoring Data

2

WHAT MAKES CRDS SO SPECIAL?



Real-Time, continuous measurements





No sample pretreatment, chromatographic separation, or complex peripherals



Specific & sensitive to a wide variety of compounds and applications



Turn-key, low operating costs, long-term stability

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3

ETHYLENE OXIDE APPLICATIONS

Fenceline monitoring stations

Mobile monitoring surveys

Leak Detection & Repair (LDAR)

Continuous Emissions Monitoring (CEMS)

Indoor air quality

Fixed multi-point leak detection

Stack Testing





Turnkey Systems



Mobile Solutions

How is Picarro CRDS being utilized?

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NEW SYSTEM FOR CONTINUOUS, AMBIENT MONITORING



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5

AAMS METHODOLOGY DESIGN



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- Chemical scrubber (PAIAC) removes EtO but captures finescale variability
- The Zero State also captures any instrument related drift
- During the sample state, gas bypasses the scrubber and is sampled directly by the analyzer

In Summary:

- Zero state is measured
- Sample state is measured
- Sample Zero = Corrected EtO

ZERO REFERENCE MODULE





HARDWARE DESIGN

- Simple to deploy, operate, maintain
- Simple to determine operation of device and quality of data
- Scrubber is field serviceable
- Air-tight stainless steel Swagelok fittings
- Improves the three key areas for an improved Method Detection Limit (MDL)
 - Zero Drift
 - Precision
 - Fine scale variability
- Generates the highest level of confidence without sacrificing real-time performance and reliability

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AAMS SOFTWARE

	Status	State Colors
PICARRO	Alarm Status: Connected Communication Status: Connected Active Method: Pararo Method 1 Curret Scate: SAMPUNKO Next State Starts. In: C2.1 Next State Starts. In: C2.1 Next Scatter Hand: Order: None Next Reference Check: None Scrubber Status: None	Sampling Zerong QC Sarub Check QC Gas Check Reference Standby Setting
Real-Time Data Condenced Data Method Data Str	saming Support	
4.14 ppb Mean:1.49 ppb Std. Deviation:1.88 ppb Slope:0.0 ppb/s		
Data: Corrected Ethylene Oxide ~		
Selected Point Coordinates: Time: Value:	1 0 2115000	22:06:40
6.63 ppb		
Mean: 1.59 ppb Std. Deviation: 3.0 ppb Slope: 0.0 ppb/s	14	1 3. 3. 1
Data: Ethylene Oxide (EtO) ~		
Selected Point Coordinates:		12.00
Time: Value:	21:50:00 22:06:40	
Warnings: 2022-05-26 07:36:35 - None		Sync silding

2 Zero Reference Module			- 0 ×
	Status		State Colors
PICARRO Start Pause Stop Stop after one cycle Red The Data Condensed Data National Cale Start	Alam Status: Oranected Communication Status: Connected Active Nethols: UNHUMO Next Status: SMMUKO Next Status: SMMUKO Next Status: SMMUKO Next Status: CMMUKO Next Status: None Scrubber Status: None		Sumpling Zorong QC Statub Check QC Statub Check Reference Scaledy Scales Export Data
Active method: EWHUM04			
Select Method			
EWHUM04 ~			
Set as Active Method	Save As	Discard Changes	Delete Method
Edit Selected Method		* Saved	
Configure Cycle (required) Zeroing Duration (minutes) 4 Sampling Duration (minutes) 4 Setting Duration (minutes)			setting Zeroing Secting Sampling Secting
Single Cycle Duration: 10 minutes			
Configure QA / QCs (optional)			
Scrubber Health Check Every 12 hours Day Week Month Scrubber health check wil begin ng jater than	on Today	r.	
Reference Check Every			
© 12 hours Starting O Day Starting Week Month	at 13:00		8
Reference check will begin no later than 16 mi	autes after the start of the scheduled hour		
Warnings: 2022-06-20 10:40:21 - None			Clear Warnings

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SOFTWARE FEATURES

- Centralize user experience in one place
- Multiple dataset export types with custom time periods (hours to months)
- Flexible data management of large datasets & compatibility with dataloggers
- System health tracking of individual components with notification
- Automated validation with gas standards
- Customizable method, zeroing frequency, and averaging times

FIELD MONITORING DATA



- Mean (10 min averages) = 6 ppt (0.011 μg/m³)
- Standard Deviation
 - 1σ , 10 minute average (green) = 27 ppt (0.049 μ g/m³)
 - 1σ , 1 hour average (gray) = 14 ppt (0.025 μ g/m³)

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COMPREHENSIVE SYSTEMS & SOLUTIONS FOR EtO EMISSIONS REDUCTION

CEMs AND STACK TESTING SYSTEMS



- Report more accurate and representative emissions concentrations and mass rates
- Improve process understanding and optimization of emissions controls
- Real-time data with secure access, on-site or in the cloud
- Fully automated, continuous operation with minimal maintenance

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INDOOR AIR QUALITY SYSTEMS



- Facility-wide coverage with multipoint sampling and alert indicators
- Improved workforce safety with fast event detection (seconds)
- Early detection and applications in Process Safety Management (PSM) & Risk Management Plans (RMP)
- Reduction of false positives and nondetects
- Fully automated, continuous operation with minimal maintenance

FENCELINE AND AMBIENT MONITORING SYSTEMS



- Detection of ppt, ppb and ppm fugitive emissions
- Support for mobile surveys (LDAR) and fixed deployments
- Proven expertise with 15+ years supporting international monitoring networks
- Fully automated, continuous
 operation with minimal maintenance
- Mobility application with backup power supplies (i.e. UPS)

THANK YOU – QUESTIONS?

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