TABLE OF CONTENTS

KEYNOTE

EPA’s Air Program Priorities & Monitoring Challenges................................................................. 1
   Janet McCabe

SESSION 1A: PROGRESS IN OIL AND GAS PRODUCTION MONITORING AND
MEASUREMENTS (CONCURRENT WITH SESSIONS 2A & 3A)
   Chair: Jason Dewees, Co-Chair: Dave Dayton

Fort Worth, TX Natural Gas Air Quality Study: Ambient Monitoring ........................................ 14
   R.G. Oommen, M.O. Pring, D.P. Dayton

Fort Worth, TX Natural Gas Air Quality Study: Point Source Emissions Testing ........................ 25
   J.J. Ibanez, D. Ranum, M.O. Pring

Fort Worth, TX Natural Gas Air Quality Study: Data Analysis and Findings .............................. 31
   M.O. Pring, J. Wilhelm

Quantification of Emissions from Oil and Gas Production Sites Using an Onsite Direct Measurement
   Approach ........................................................................................................... N/A
   M.T. Modrak, M.S. Amin, E.D. Thoma, A.P. Eisele, J.M. DeWees, R.R. Segall

SESSION 2A: CHARACTERIZING AIR QUALITY IMPACTS NEAR ROADWAYS AND OTHER
SOURCES (CONCURRENT WITH SESSIONS 1A & 3A)
   Chair: Rich Baldauf; Co-Chair: Hilary Hafner

Characterization and Development of Methods for Ambient “True NO2” ........................................ 36
   M.R. Beaver, K.G. Kronmiller, R.W. Long

Development of a Passive Deposition Sampler for Monitoring Near Field Particle Emission ............. 41
   Z. Fan, C. Yu, S.A. Einstein, P.J. Lioy

A Cost Effective Desorption Method for Measuring Roadside Atmospheric Aromatic Hydrocarbons .... 47
   G. Laing, G. Henshaw, B. Prince, D. Williams, J. Salmon, M. Bart

Mercury in Soils and Ambient Air Vicinal to Chlor-Alkali Plants (CAPs) - Historical Perspective ... N/A
   G. T. Hunt

SESSION 3A: PM 2.5 CHARACTERIZATION AND CHEMICAL SPECIATION (CONCURRENT
WITH SESSIONS 1A & 2A)
   Chair: R.K.M. Jayanty, Co-Chair: Prakash Doraiswamy

Estimation of Direct-Injection Spark-Ignition (DISI) Soot Mobility Diameter from Transmission
   Electron Microscopy Measurements ....................................................................................... 51
   T.L. Barone, J.M.E. Storey, A.D. Youngquist, J.P. Szybist

Preliminary Raman Imaging Studies of Commercial Vehicle Cab Air Surface Depositions .................. 56
   R.M. Connaiser, G. Capp, S.A. Lewis, J.M. Storey, L.A. Lewis

Achieving Sub Sub-μg PM1.0 Filter Weighing Uncertainties ..................................................... 61
   D. Dikken

The Use of Triboelectric Technology for Monitoring Dust in the Workplace ................................. N/A
   E. Parker, R. Dechene

SESSION 1B: PROGRESS IN OIL AND GAS PRODUCTION MONITORING AND
MEASUREMENTS (CONCURRENT WITH SESSIONS 2B & 3B)
   Chair: Jason Dewees, Co-Chair: Dave Dayton

Assessment of Methane and VOC Emissions from Select Oil and Gas Production Operations Using
   Remote Measurements, Interim Report on Survey Studies in CO, TX, and WY ......................... 67
   Modrak
Exploring the Geospatial Aspects of VOC Emission Profiles from Dry and Wet Oil and Gas Production in Fort Worth TX Area ............................................................... N/A

D. Olson, E.D. Thoma, M. Pring, B.C. Squier, G. Gehrke, R. Oommen, D. Dayton

The Monitoring and Analysis of Volatile Organic Compounds for Assessment of Ambient Ozone in the United Kingdom and Wyoming – 2012 Measurements Symposium .................................................... 74

Peter Dumitrean, Trevor Davies, Mark Broomfield, Robert A. Field, Derek C. Montague, Jeff Solits, Geoff Dollard

Impacts to Air Quality from Oil and Natural Gas Development in Pennsylvania’s Allegheny National Forest ............................................................... 79

N. Pekney, R. Hammack, G. Veloski, J. Tamilia, M. McCawley

SESSION 2B: CHARACTERIZING AIR QUALITY IMPACTS NEAR ROADWAYS AND OTHER SOURCES (CONCURRENT WITH SESSIONS 1B & 3B)

Chair: Rich Baldauf, Co-Chair: Hilary Hafner

Assessing Rail Yard Impact on Local Air Quality ............................................................... 84


Characterization of Carbonaceous Aerosol Concentrations Next to a Major Freeway in Las Vegas, Nevada ............................................................... 89


Results from Las Vegas and Detroit Near-Road Studies ............................................................... N/A


Results of NO2 Monitoring in Support of the Implementation of the National Near-Road Monitoring Network ............................................................... 95

N. Watkins, H. Hafner, R. Baldauf

SESSION 3B: PM 2.5 CHARACTERIZATION AND CHEMICAL SPECIATION (CONCURRENT WITH SESSIONS 1B & 2B)

Chair: R.K.M. Jayanty, Co-Chair: Prakash Doraiswamy

Improved Measurement of Aerosol Black Carbon with Real-time Compensation for Filter Loading Effects ............................................................... 101

A.D.A. Hansen, G. Mocnik, T.J. Morphy

Development of Digital Microfluidic Impactor for Online Determination of Sulfate ............................................................... 105

A. Khlystov, B. Hsu, R. Fair

Operation of the Aerosol Chemical Speciation Monitor (ACSM) in the Southeastern U.S. ............................................................... 110


In Situ Measurements of Gas and Fine Particle Species Emissions from Prescribed Burning of Differently Treated Fuels in the South-Eastern United States ............................................................... 115

K. Baumann, J. Schauer, D. Blake, S. Mitchell, N. Christensen, M. Fort, E. Edgerton

SESSION 1C: PROGRESS IN OIL AND GAS PRODUCTION MONITORING AND MEASUREMENTS (CONCURRENT WITH SESSIONS 2C & 3C)

Chair: Jason Dewees, Co-Chair: Dave Dayton

Odours in the Alberta Oil Sands - Co-Measurement of Volatile Organic Compounds and Sulphur Compounds in the Athabasca Oil Sands Region (AOSR) of Northern Alberta by dual detector Pneumatic Focusing Gas Chromatography (PFGC) ............................................................... 120

R. O’Brien, K. Percy, A. Legge

Measurement of Polynuclear Aromatic Hydrocarbons (PAHs) in Epiphytic Lichens for Receptor Modeling in the Alberta Oil Sands Region ............................................................... 126

William B. Studabaker, Sagar Krupa, R.K.M. Jayanty, James H. Raymer

SESSION 2C: CHARACTERIZING AIR QUALITY IMPACTS NEAR ROADWAYS AND OTHER SOURCES (CONCURRENT WITH SESSIONS 1C & 3C)

Chair: Rich Baldauf, Co-Chair: Hilary Hafner

An Approach to Characterizing Particulate Matter Collected Near a Local Commuter Highway ............................................................... 128

P. Presler-Jur, L.C. Greene
Personal and Community Based Measures of Select Particulate Matter Components, Nitrogen Dioxide and Ozone in an Asthmatic Cohort
R. Williams, A. Rappold, M. Case, J. Thornburg, R. Devlin

Conversion of Dust Source Test Methods for Application to Gases
C. Cowherd Jr.

The Influence of Trees and Noise Barrier on Ultrafine Particle and CO Concentrations at Three Near-Roadway Communities
A. Khlystov, M. Lin, G.S. W. Hagler, R.W. Baldauf, V. Isakov, J. Faircloth, L. Jackson

SESSION 3C: PM 2.5 CHARACTERIZATION AND CHEMICAL SPECIATION (CONCURRENT WITH SESSIONS 1C & 2C)
Chair: Rkm Jayanty, Co-Chair: Prakash Doraiswamy

PM$_{2.5}$ Chemical Speciation Results for Texas – 2005-2009
R.J. Tropp, L.-W. Chen, S.D. Kohl

Aircraft Measurements of Aerosol Composition over Eastern Coastal Area of China
L. Ren, J. Chen, H. Liu, Z. Bai, R. Zhang, M. Zhang

A Study of Heavy Metal Characteristics and Its Source Apportionment in Ambient Environment of Delhi
S. Gupta, A.K. Srivastava, D. Singh, V.K. Jain

Maximizing Canister Performance for Recovery of Acrolien, Naphthalene, and Formaldehyde
D. Cardin, T. Robinson

SESSION 4A: ADVANCEMENTS IN AMBIENT AIR MONITORING METHODS (CONCURRENT WITH SESSIONS 5A & 6A)
Chair: Julie Swift, Co-Chair: David Shelow

Improving the Analysis Method of Hexavalent Chromium in Ambient Air
V. Genther

PS-1 Fence Line Monitoring – Phenolic Short Term Study by GC/MS/SIM for EPA Region 4
M. Howell, J. Hauser, J.L. Swift, S. Sholar, D. Tedder, B. Van Devender

Effective Extraction of Lead and Other Metals from Ambient Particulate Matter for Analysis by ICP-MS
R.J. Mercurio

SESSION 5A: GHG AND AREA SOURCE MEASUREMENT METHODS AND TECHNIQUES (CONCURRENT WITH SESSIONS 4A & 6A)
Chair: Dennis Mikel, Co-Chair: Robert Wright

Novel Approach to Enhanced Detection of Nitrous Oxide in Ambient Air
E.H. Bramston-Cook, R. Bramston-Cook

Deployment of Novel Laser-based Instruments for Continuous Unattended Measurements of Greenhouse Gases (CO$_2$, CH$_4$, H$_2$O, N$_2$O) and Pollutants (CO, NO$_2$)
D. Baer, A. Gardner, T. Owano, R. Provenzal, V. Parsotam, P. Graves, M. Gupta

Evaluation of a Cavity Ring-Down Spectroscopy Analyzer for Isotopic CO$_2$
A.L. Sumner, E. Hanft, A. Dindal, C. Rella

Development of the Mobile Tracer Correlation Approach for Quantification of Emissions from Landfills and Other Large Area Sources
T.L. Footer, E.D. Thoma, J.M. DeWees, R.B. Green, G.R. Hater, N.D. Swan

SESSION 6A: ADVANCES IN STATIONARY SOURCE MEASUREMENTS (CONCURRENT WITH SESSIONS 4A & 5A)
Chair: Jeff Ryan, Co-Chair: Robert Spellicy

W.R. Stevens, B.K. Gullett, Lukas Oudejans, J. Ryan

Developing an Industrial Flare Emission Measurement Method Using Passive Fourier Transform Infrared Spectroscopy
L. Krnavek, R. Spellicy, S. Evans
Developing a VOC Carbon Balance and Total Mass Emission Estimate .............................................. 207
R.W. Law, D.H. Word

Long-Term Sampling – A Method for Continuous Emission Monitoring of Dioxins/Furans and
Mercury ........................................................................................................................................ 218
J. Reinmann

SESSION 4B: ADVANCEMENTS IN AMBIENT AIR MONITORING METHODS (CONCURRENT
WITH SESSIONS 5B & 6B)
Chair: Julie Swift, Co-Chair: David Shelow

Evaluation of an Automated Air Sampling System: LESS™ ................................................................ 223
K. Hunt, L. Ogle

Sampling, Measurement, and Analysis of VOCs - What Are the Best Tools for the Job? ............................. 227
N.M. Watson

A Next Generation Air Toxics Preconcentrator for Enhanced Reliability and Accuracy ......................... N/A
D. Cardin, T. Robinson

SESSION 5B: GHG AND AREA SOURCE MEASUREMENT METHODS AND TECHNIQUES
(CONCURRENT WITH SESSIONS 4B & 6B)
Chair: Dennis Mikel, Co-Chair: Robert Wright

Aerostat-Lofted Instrument Platform and Sampling Method for Determination of Emissions from
Open Area Sources ......................................................................................................................... 237
J. Aurell, B.K. Gullett, D. Tabor, C. Pressley, W. Stevens, R. Gribble

D.K. Mikel

SESSION 6B: ADVANCES IN STATIONARY SOURCE MEASUREMENTS (CONCURRENT WITH
SESSIONS 4B & 5B)
Chair: Jeff Ryan, Co-Chair: Robert Spellicy

Continuous Monitoring of HCl at Stationary Sources ........................................................................... 247
R. Brown

Optimization and Performance of the BHA Stationary Source Emissions Method for Selected
Aldehydes ........................................................................................................................................ 251

Methods Used For Monitoring Amine and Amine Degradation Products at Stationary Sources ............ 256
S.L. Shaw, A. Rohr

SESSION 7A: VAPOR INTRUSION MEASUREMENTS (CONCURRENT WITH SESSIONS 8A & 9A)
Chair: Robert Truesdale, Co-Chair: Christopher Lutes

Long-Term Detailed Study of Vapor Intrusion Temporal Variability: Implications for Indoor Air and
Soil Gas Sampling Guidance ........................................................................................................... 261
C.C. Lutes, B. Cosky, B. Schumacher, J. Zimmerman, H. Hayes, R. Truesdale, S. Lin, B. Hartman

Evaluation of Vapor Intrusion Attenuation Factors ............................................................................. N/A
G.K. Olson, D. Alexander

Can Short-term Fan Testing Provide Insight Into Vapor Intrusion? ......................................................... 270
C.C. Lutes, B. Cosky, L. Abreu, B. Schumacher, J. Zimmerman, R. Kapuscinski, R. Truesdale

Spatio-Temporal Variability in Indoor Air Concentrations of Chlorinated Solvents Due to Vapor
Intrusion .......................................................................................................................................... 277
J. Johnston, J. MacDonald Gibson

SESSION 8A: COARSE PM MEASUREMENTS (CONCURRENT WITH SESSIONS 7A & 9A)
Chair: James Flanagan, Co-Chair: Jay Turner

Key Findings from the USEPA Coarse PM Pilot Speciation Study ....................................................... 282
J. Turner, S. Brown, P. Roberts, J. Rice

XRF Attenuation Effects for Coarse PM: Comparison of Theory and Experiment .............................. 292
J. Flanagan, A. McWilliams, J. Nichol, S. Brown, J. Turner, J. Rice
Characterization of Carbonaceous Matter from the USEPA Coarse PM Pilot Speciation Study ........................................ 297
J. Rice, S. Brown, P. Roberts, S. Feinberg, J. Turner

Relationship between Black Carbon and Size Fractionated Aerosols at Delhi, India .......................................................... N/A
A. Srivastava, S. Kumar, V.K. Jain

SESSION 9A: STATIONARY SOURCE FINE AND CONDENSABLE PARTICULATE MEASUREMENT (CONCURRENT WITH SESSIONS 7A & 8A)
Chair: Ron Myers

Digital Camera Opacity Technique (EPA ALT 082, ASTM D7520) Applications .......................................................... 304
S. Dolan

Determination of Actual Condensable and Non-Condensable PM_{2.5} Emissions from Stationary Sources........................................... 311
A.S. Werner, W.C. Gray, S.A. Shanklin, I.M. Pérez, S. Tong

New Particulate Matter Test Methods ......................................................................................................................... N/A
J. Serne

Condensable Particulate Matter Testing: Operational and Analytical Necessities ................................................................. 318
R. McCulloch, P. Clark

SESSION 7B: VAPOR INTRUSION MEASUREMENTS (CONCURRENT WITH SESSIONS 8B & 9B)
Chair: Robert Truesdale, Co-Chair: Christopher Lutes

Innovative Sampling Methods for Focusing the Subslab Soil-Gas Investigation .......................................................... 321
M.A. Schmidt

New Advances in Canister Analysis; the Future of Ambient Monitoring and Soil-gas Analysis on One System................................. 326
N.M. Watson, S. Davies, D. Wevill

Tablet Computer Based Data Acquisition in Indoor Air Studies at Vapor Intrusion Sites .......................................................... 331
C. Lutes, N. Roache, R. Forbort, K. Halbert

Validation of Leak Free Soil Gas Sampling using Tracer Gases and Helium Leak Detection ......................................................... N/A
D. Cardin, T. Robinson

SESSION 8B: COARSE PM MEASUREMENTS (CONCURRENT WITH SESSIONS 7B & 9B)
Chair: James Flanagan, Co-Chair: Jay Turner

Sampling of Particulate Matter in Evaluation of Air Quality in Rural United States .......................................................... 338
K. Riggs, K. Cowen

High-Throughput Analysis of Aerosol Samples with an Expert Particle Analysis System (EPAS) .................................................. 342
G. Casuccio, R. Willis, H. Lentz, T. Lersch, T. Peters, E. Sawvel, A. Ault, V. Grassian

Assessment of Measurement Error for the Hong Kong PM_{10} and PM_{2.5} Speciation Networks ............................................. 348
V. Yadav, J. Turner, Z. Yuan, A. Lau, P. Louie

Characteristics of Chemical Composition of Coarse and Fine Particle Matter in Osaka, Japan .................................................. 360
A. Mizohata, N. Ito, J. Matsumoto

SESSION 9B: STATIONARY SOURCE FINE AND CONDENSABLE PARTICULATE MEASUREMENT (CONCURRENT WITH SESSIONS 7B & 8B)
Chair: Ron Myers

Problems and Inconsistencies, and Their Potential Solutions for Sampling and Analysis of EPA Method 202 Condensible PM Samples ................................................................. 365
J. Bruce Nemet

New Test Method for Measuring Fine Particulate (PM_{2.5} micron) in Wet Stacks .......................................................... 371
T. Baldwin, D. Bivins, S. Gronstal, R. Neulicht

Field Evaluation and Precision Testing - CTM-039 Dilution Sampling System .......................................................... 377
W. Gray

Description of a Pseudo-Particulate Formation Mechanism in New EPA Method 202 .......................................................... 381
Jack Bionda
SESSION 10A: ADVANCEMENTS IN CONTINUOUS AMBIENT AIR MONITORING / NEW METHODS (CONCURRENT WITH SESSIONS 11A & 12)
Chair: Andrey Khlystov, Co-Chair: Thomas Kelly

Advances in Field Proven Configurations of Air Toxics Monitoring Technologies – An Impending Shift from Canister Sampling Methods to Continuous Field VOC Sampling Methods ...................................................... N/A  
S. Cloran

Field Testing of New-Technology Ozone Monitors .............................................................................................................................. 393  
W.M. Ollison, W. Crow, C.W. Spicer

Assessment and Comparison of Federal Reference and Equivalent Methods for Ozone ........................................................................ 398  
R.W. Long, M.R. Beaver, K.G. Kronmiller

Background Corrected Ambient NO₂ Measurements ................................................................................................................................. 403  
T. A. McKarns, M.F. Kutter

SESSION 11A: MONITORING APPLICATIONS AND INSIGHTS (CONCURRENT WITH SESSIONS 10A & 12)
Chair: Kenneth Walsh, Co-Chair: Hilary Hafner

The Goodyear Tire and Rubber Company Air Quality Monitoring Program ................................................................................................................. 408  
D. Seifert, J. Bowser

Data Quality and Method Quality Objectives for EPA’s National Air Toxics Trends Monitoring Program ................................................................................................................................. 413  
D.K. Mikel

Update on the National Air Toxics Trends Stations Proficiency Testing Program ............................................................................................................. 418  

Design and Construction of the CASTNET Web Interfaces for Environmental Monitoring Data ................................................................................................................................. 423  
M. Salthotra, F. Divita Jr.

SESSION 12: AFO AIR EMISSION MEASUREMENTS (CONCURRENT WITH SESSIONS 10A & 11A)
Chair: Lingjuan Wang-Li

Measurement and Analysis of Non-Methane Volatile Organic Compound Emissions from a Swine Confinement Building in North Carolina ................................................................................................................................. N/A  
I.C. Rumsey, V.P. Aneja, W.A. Lonnenaman

Calibration Standards for Measurement of Volatile Siloxanes in Anaerobic Digester and Landfill Gases Using Permeation Tubes................................................................................................................................. 427  
R. Bramston-Cook, E. Bramston-Cook, S. Puente

Measurement and Analysis of Temporal and Spatial Variations of Bioaerosol Concentrations in a High-rise Egg Production House in Southeast U.S. ................................................................................................................................. 433  
D. Hu, L. Wang-Li, O.D. Simmons, J. Classen, J. Osborne

Online, Direct Measurement of Volatile Siloxanes in Anaerobic Digester and Landfill Gases by Gas Chromatography with Mass Spectrometric Detection ................................................................................................................................. 438  
R. Bramston-Cook, E. Bramston-Cook

SESSION 10B: ADVANCEMENTS IN CONTINUOUS AMBIENT AIR MONITORING / NEW METHODS (CONCURRENT WITH SESSIONS 11B)
Chair: Andrey Khlystov, Co-Chair: Thomas Kelly

Performance Evaluation of Handheld Detectors for Toxic Gases and Environmental Hazards ........................................................................ 444  
T. Kelly, K. Riggs, S. Serre

An Assessment of the Performance of the Monitor for AeRosols and GAse in Ambient Air (MARGA): A Semi-continuous Method for Soluble Compounds ................................................................................................................................. N/A  

Field Evaluation of the Xact 625 Ambient Metals Monitor ................................................................................................................................. 449  
T. Kelly, A. Dindal, M. Caudill, M. Jones
SESSION 11B: MONITORING APPLICATIONS AND INSIGHTS (CONCURRENT WITH SESSIONS 10B)
Chair: Kenneth Walsh, Co-Chair: Hilary Hafner

Effect of Sulfur Dioxide Emission Reduction on Air Quality and Acid Precipitation in Guangdong Province, China
C. Jianhua, R. Lihong, Z. Haohao ................................................................. 454

ADDITIONAL PAPERS

Identification and Attribution of Methane Sources in Boston and San Francisco
Eric Crosson, Chris W. Rella, Nathan Phillips .............................................. 459

Real-Time Siloxanes Measurements at Landfill and Digester Sites using FTIR
Barbara Marshik, Peter G. Zemek ............................................................... 464

FTIR Analysis of the Relationship of SO$_2$, SO$_3$, and H$_2$SO$_4$ in Coal Fired Plants and Their Relationship to Surrogates and Hg Sorption
Peter G. Zemek, Barbara Marshik ............................................................... 469

Quantitative Passive Sampling for Assessing Soil Vapor Intrusion to Indoor Air
Todd McAlary, Hester Groenevelt, Tadeusz Górecki, Suresh Seethapathy, Paolo Sacco, Derrick Crump, Brian Schumacher, Michael Tuday, Heidi Hayes, Paul Johnson ................................................................. 472

Author Index