

FINAL PROGRAM

**ATMOSPHERIC OPTICS:
AEROSOLS, VISIBILITY, AND THE RADIATIVE BALANCE**
September 27-30, 2016 • Snow King Hotel, Jackson Hole, WY

<http://visibility.awma.org>

**Five courses on
Monday, Sept. 26, 2016**



AIR & WASTE MANAGEMENT
ASSOCIATION

FINAL PROGRAM

ABOUT THE CONFERENCE

This international conference will provide a technical forum on advances in the scientific understanding of the effects of aerosols on urban, regional, continental, and global-scale haze and the radiative balance. The conference will take a multipronged approach and address scientific topics (e.g., related to measurements, modeling, etc.) as well as regulatory and policy issues. There will be sessions on black and brown carbon, as recent research has shown the importance of these particles for radiative forcing. In addition, there will be sessions related to the synergistic and increasing concerns of the effects of atmospheric nitrogen and carbonaceous material on haze, climate change, and nitrogen deposition on ecosystems. Conference learning will be enhanced with a half day excursion and hikes in Grand Teton National Park and a Night Sky Program.

GENERAL INFORMATION

REGISTRATION

Register online at <http://visibility.awma.org> or complete the registration form and bring it with you on site during the following hours:

Monday, Sept. 26	7:00 am - 5:00 pm
Tuesday, Sept. 27	7:00 am - 5:00 pm
Wednesday, Sept. 28	7:00 am - 12:00 pm
Thursday, Sept. 29	7:00 am - 5:00 pm
Friday, Sept. 30	7:30 am - 10:30 am

Your registration will not be processed without payment.

REFUND POLICY

If written notice of cancellation is received on or before September 19, 2016 payment will be refunded, less a \$75 cancellation fee. Substitutions may be made at any time; payment for any difference is due at the time of substitution. This refund policy applies to all occurrences, including weather-related events and other natural disasters. In the unlikely occurrence of event cancellation, the Association is not liable for any expenses incurred by the registrant other than the full refund of registration fee(s) paid.

CONTINUING EDUCATION CREDIT OPPORTUNITIES

Conference and course attendees may be eligible for continuing education credits. For more information, please contact Gloria Henning at glhenning@awma.org or 412-904-6021.

CONFERENCE PROCEEDINGS

Conference abstracts will be posted on the A&WMA website prior to the start of the conference. Following the conference, presentations will also be posted. Attendees will be notified by e-mail when the proceedings are available.

CONFERENCE COMMITTEE

- Delbert J. Eatough (Chair), Brigham Young University
- Joe Adlhoch, Air Resource Specialists
- Elisabeth Andrews, University of Colorado, Boulder
- Junji Cao, Chinese Academy of Sciences, Beijing
- Kip Carrico, New Mexico Institute of Mining and Technology
- Rajan Chakrabarty, Washington University St. Louis
- Zhen (Stephen) Cheng, Shanghai Jiaotong University, China
- Judith Chow, Desert Research Institute
- Jenny Hand, Colorado State University
- Nicole Hyslop, University of California, Davis
- Philip Hopke, Clarkson University
- Mukesh Khare, Indian Institute of Technology, Delhi, India
- Byeong-Kyu Lee, University of Ulsan, Korea
- Taehyoung Lee, Hankuk University of Foreign Studies, Korea
- Shun Cheng (Frank) Lee, Hong Kong Polytechnic University
- William Malm, CIRA-Colorado State University
- Chuck McDade, University of California, Davis
- Tom Moore, WESTAR-WRAP
- Shamsh Pervez, Pt. Ravishankar Shukla University, India
- Luis Alonso Díaz Robles, University of Santiago, Chile
- Bret Schichtel, National Park Service, Air Resources Division
- Ivar Tombach, Consultant
- Kostas Tsigaridis, Columbia University and NASA GISS
- Jay Turner, Washington University St. Louis
- Ricky Tropp, Desert Research Institute
- Rebecca Washenfelder, NOAA
- John Watson, Desert Research Institute
- Chung-Shin (Jonathan) Yuan, National Sun Yatsen University, Taiwan
- Qi Zhang, University of California Davis

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GENERAL INFORMATION

LOCATION & LODGING

Conference Hotel

Snow King Resort
400 East Snow King Avenue
Jackson Hole, WY 83001
1-800-522-KING; www.snowking.com

Additional Accommodations

Painted Buffalo Inn

400 West Broadway, Jackson, WY 83001
307-733-4340;

Rawhide Motel

75 S Milward St, Jackson, WY 83001
307-733-1216; www.rawhidemotel.com

TRANSPORTATION

The Snow King Hotel will provide guests with complimentary transportation to and from the Jackson Hole airport upon request.

The Jackson Hole Shuttle, <http://www.jhshuttle.com/>, has 24-hr shuttle service from the Jackson Hole Airport to the town of Jackson.

PRESENTER'S BREAKFAST

Presenters and Session Chairs will meet for a continental breakfast on the day of their session in the Jackson Room to review program details. Presenters should bring their presentations on a memory stick/USB to this meeting.

JOURNAL SPECIAL ISSUE

A special Issue of the *Journal of the Air & Waste Management Association (JA&WMA)* dedicated to the material presented at this conference will be published. Anyone who presented at the conference may submit a manuscript for consideration. All submissions will undergo the usual peer review process before being accepted. If anyone would like to submit please send an e-mail to Delbert Eatough indicating the intended material for the manuscript, e.g. the conference control number related to the manuscript. Submissions to the *Journal* should indicate they are for the Special Issue and should be received by December 15, 2016 to insure inclusion in the special issue. Publication of the Special Issue is anticipated about a year from the conference.

SPECIAL EVENTS

GRAND TETON NATIONAL PARK EXCURSION

On Wednesday, September 28, the conference will take a field trip to the Grand Teton National Park Class I area, participate in one of four options for the afternoon, and then rejoin for a special National Park Service Fireside and a Night Sky program.

Option 1: Webcam Visibility and Wet Deposition Site and Heron Pond and Swan Lake Hike

Option 2: Bradley Lake/Taggart Lake/Beaver Creek Loop

Option 3: Jenny Lake

Option 4: Historical Tour

Space on tours is nearly full. If you haven't signed up for a tour, come to the registration area on site to see if space is still available.

At 5:30 pm, the Park Service will treat us with a Fireside about the Park in the outdoor amphitheater next to the Colter Bay Visitor Center.

For complete details, visit the website at <http://visibility.awma.org>.

NIGHT SKY PROGRAM

From 6:30-8:00 PM you will be free to have dinner on your own. Buses will take groups to several locations for dinner, and return to the Night Sky Program site, just north of the Colter Bay Visitor Center. The night sky program will begin at 8:00 PM, and buses at the site will return on a staggered schedule as they are full to the Snow King Hotel.

PHOTO CONTEST

Conference participants are invited to participate in the Visibility Photo Contest. Don't forget to vote for your favorite!

Photos will be on display in the Timberline Foyer. To enter, email a digital copy of the photo to Kristi.gebhart@colostate.edu and bring an 8x10 print to the conference to post.

Air Resource Specialists, Inc. is sponsoring prizes for photos voted best in class by conference attendees. Winners will be announced at the Thursday luncheon by Kristi Gebhart and Anna Lee Farber.

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GOLD



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Air Resource Specialists, Inc. (ARS) has nationally recognized expertise in operating air quality, meteorology and visibility monitoring programs as well as conducting comprehensive special studies. Formed in 1981, ARS has successfully conducted a wide range of projects for federal, state, municipal, and tribal agencies, and industrial clients. Areas of special expertise include: criteria pollutant, meteorology, and visibility monitoring; data analysis; research, audit, and instrument services; air quality and visibility modeling; and environmental compliance services. Our staff of scientists, field specialists, data analysts, and support personnel, operate over 100 monitoring sites nationwide, including large and small networks in urban, rural, and remote locations. www.air-resource.com



ARA Instruments is a manufacturer of innovative ambient air monitoring equipment. We specialize in portable, battery-powered particulate samplers for air pollution research. We also offer flow calibration instruments and accessories for routine air monitoring. Our goal is to help our customers make important air quality decisions by providing affordable, versatile, reliable, and accurate equipment. www.arainstruments.com



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Sponsor Table Diagram on Page 21

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GOLD, CONT.



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National Atmospheric
Deposition Program

The National Atmospheric Deposition Program (NADP) provides fundamental measurements of pollution in precipitation (wet deposition) and estimates of pollutant dry deposition. These measurements support informed decisions based upon the flow of pollutants into different ecosystem types. The NADP is composed of five networks measuring different chemical components. Special attention is given here to the Total Deposition Science Committee (TDEP), with its mission to improving the science behind wet, dry, and total atmospheric deposition of multiple chemical species. <http://nadp.isws.illinois.edu>

Thank you to the following for financial support for the Technical Program:

- U.S. Environmental Protection Agency 
- U.S. Department of Energy
- U.S. National Science Foundation
- U.S. National Park Service
- Electric Power Research Institute
- California Air Resources Board
- South Coast Air Quality Management District

PRELIMINARY PROGRAM

PROFESSIONAL DEVELOPMENT COURSES

HALF DAY COURSES

Half Day Course registration includes refreshment breaks, and a copy of the course manual. Lunch will be on your own with options available at the venue.

APPLICATION OF TIME SERIES METHODS TO AIR QUALITY DATA

Monday, September 26, 2016

8:00 am – 12:00 pm

Timberline 2

Instructor: *Philip K. Hopke, Center for Air Resources Engineering and Science, Clarkson University*

This course will provide an introduction to time series analyses of air quality data. Such analyses can be used to understand the underlying causative factors for collected data or to use existing data to forecast future behavior. There are a wide variety of available tools and their applicability and limitations of the various methods will be presented. Examples of the application of various methods will be provided.

CONTEMPORARY AEROSOL OPTICS

Monday, September 26, 2016

1:00 pm - 5:00 pm

Timberline 2

Instructors: *Hans Moosmüller, Desert Research Institute, Reno NV; Rajan Chakrabarty, Washington University in St. Louis, St. Louis, MO; and Rebecca Washenfelder, National Oceanic & Atmospheric Administration, Boulder, CO*

This course will outline the importance of aerosol optics for estimating visibility impairment and radiative forcing of climate, identifying the relevant optical parameters that are needed for understanding and modeling. This will be followed by a general discussion of aerosol physics before focusing on contemporary measurement and characterization techniques of aerosol optical properties. Computational electromagnetic techniques discussed will include both exact calculation methods and useful approximations while the discussion on experimental techniques will include state-of-the-art in situ, filter-based, and remote sensing techniques and instruments for quantification of aerosol scattering, absorption, and extinction coefficients, phase functions and asymmetry parameters.

FULL DAY COURSES

Full day courses will include refreshment breaks, lunch, and a copy of the course manual.

AIR QUALITY MODELING

Monday, September 26, 2016

8:00 am - 5:00 pm

Summit 2

Instructors: *Mukesh Khare, Civil Engineering Department, Indian Institute of Technology, Delhi, India; and S. M. Shiva Nagendra, Civil Engineering Department, Indian Institute of Technology, Madras, India*

Visibility is a dynamic and complex local/urban phenomena. Fine particles and gaseous air pollution affect visibility in the ambient environment by creating haze through complex dispersion mechanisms. This course has been designed to give attendees a basic understanding of fundamental principles of contaminant dispersion including meteorological parameters affecting pollutant dispersion, principle of Gaussian plume theory, types of air quality models and their uses and techniques of model validation and verification and adjustments. Participants shall also be taught as to how visibility acts as a surrogate for air pollution impact on the environment followed by the theory of visibility prediction models using air quality relationship on

PRELIMINARY PROGRAM

PROFESSIONAL DEVELOPMENT COURSES

THE PRACTICAL USE OF SATELLITE OBSERVATIONS FOR VISIBILITY AND AIR QUALITY ANALYSIS

Monday, September 26, 2016

8:00 am - 5:00 pm

Timberline 3

Instructors: Pawan Gupta, NASA Goddard Space Flight Center, Greenbelt, MD; and Sean Raffuse, Crocker Nuclear Laboratory, University of California, Davis, CA

This course is in collaboration with NASA's Applied Remote Sensing Training Program (ARSET), <http://arset.gsfc.nasa.gov/> airquality. The course will provide an overview of satellite data and its application in visibility and air quality data analysis. The focus will be on understanding what present satellite measurements can and can't provide and how to use them. In addition to an overview of satellite data and terminology, we will explore common and achievable uses for satellite data in air quality analysis (e.g., events, trends, long-range transport, spatial context) through a series of case studies.

REGIONAL HAZE RULE: SCIENCE, MODIFICATIONS, AND STATE IMPLEMENTATION PLAN REQUIREMENTS

Monday, September 26, 2016

8:00 am - 5:00 pm

Timberline 1

Instructors: Bret Schichtel, NPS-ARD, Fort Collins, CO; and Tom Moore, WESTAR/WRAP, Fort Collins, CO

EPA is currently reviewing the requirements of the Regional Haze Rule (RHR), with any changes to be completed in 2016. It is anticipated that the haze metrics used to track progress, estimate natural visibility goals and planning requirements will be modified resulting in new RHR guidance documents and potentially RHR changes. These changes will impact the requirements for the next round of the RHR State Implementation Plans (SIPs) currently due in 2018.

This course will review the visibility and aerosol science and regulations underpinning the RHR. Issues raised by States and others on the current RHR SIP requirements will be discussed and how revisions to these requirements address these issues. With this background, detailed descriptions of the RHR SIP requirements will be presented and discussed along with examples of different elements of a SIP.

SESSION SCHEDULE - TUESDAY, SEPTEMBER 27, 2016

7:00 am - 5:00 pm

Conference Registration
Grand Teton Mezzanine

7:00 am - 8:00 am

Continental Breakfast
Grand Teton Mezzanine

7:00 am - 8:00 am

Presenter's Breakfast
Jackson Room

OPENING PLENARY SESSION

Grand Room

8:00 am - 9:40 am

Welcome

Delbert J. Eatough, Conference Chair

Introduction of Plenary Speakers: *Rajan Chakrabarty and William Malm*

The many cloudy faces of black carbon in the climate system

Bjørn Samset, Senior Researcher, Center for International Climate and Energy Research - Oslo (CICERO)

Aerosol water: now you see it now you don't

Ann Marie Carlton, Associate Professor, Department of Chemistry, University of California, Irvine

9:40 am - 10:00 am

Networking Break

Timberline Foyer

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SESSION SCHEDULE - Tuesday, September 27, 2016

TRACK A

SESSION 1: VISIBILITY AS AN INDICATOR OF HUMAN HEALTH EFFECTS

Grand Room

Session Chairs: Delbert Eatough, Brigham Young University; Phillip Hopke, Clarkson University

10:00 am

Control #1

A 1960's Copper Smelter Strike and Increased Visibility: Natural Experiment of Reduced Sulfate Particle Pollution on Regional Mortality

C. Arden Pope III: Brigham Young University

10:20 am

Control #44

Using Visibility to Examine Health Effects in Epidemiologic Studies: An Historical Perspective

Bart Ostro: University of California -Davis

10:40 am

Control #3

Municipal Solid Waste Burning: Discoloring the Taj Mahal and Human Health Impacts in Agra

Raj M. Lal, Lina Luo, Armistead G. Russell: Georgia Institute of Technology; Ajay S. Nagpure, Anu Ramaswami: University of Minnesota; Sachchida N. Tripathi: Indian Institute of Technology – Kanpur; Michael H. Bergin: Duke University

11:00 am

Control #114

Blending Output from Forest Fire Smoke Models with Measured PM_{2.5} Concentration Can Improve their Utility for Exposure Assessment in Epidemiologic Research and Public Health Surveillance

Weiran Yuchi and Sarah Henderson: British Columbia Center for Disease Control

11:20 am

Control #67

Development of a Visibility Forecasting Product using the GEM-MACH Air Quality Model – a Pilot Project for the Lower Fraser Valley of British Columbia

Rita So, Andrew Teakles, Jonathan Baik, Keith Jones, Roxanne Vingarzan: Environment and Climate Change Canada

11:40 am

Control #72

Citizen Science and NexGen Visibility Measurement Shawn Dolan: Virtual Technology LLC and Sustainable Sky's Org

TRACK B

SESSION 2: SATELLITE AND REMOTE SENSING APPLICATIONS TO HAZE/AEROSOL MONITORING

Teton Room

Session Chairs: Rajan Chakrabarty, Washington State University in St. Louis and Katie Kaku, CSRA

10:00 am

Control #64

Assessing the Limitations of Surface-level Aerosol Mass Calculations from Aerosol Optical Depth and Lidar Observations During the SEAC⁴RS Campaign

Katie C. Kaku: CSRA; Jeffery S. Reid: Naval Research Laboratory; Robert E. Holz, Ralph E. Kuehn: University of Wisconsin; Jianglong Zhang: University of North Dakota; Eric S. Edgerton: Atmospheric Research & Analysis, Inc.; Brent N. Holben, Anne M. Thompson: NASA; Shi Kuangi, University of Alabama Huntsville

10:20 am

Control #84

A Global Time Series of Aerosol Optical Depth, Derived from MODIS and VIIRS Observations

Falguni Patadia: MSU/GSFC/613; Robert C. Levy: GSFC/613; Shana Mattoo: SSAI/GSFC/613

10:40 am

Control #66

A Laboratory Experiment for the Statistical Evaluation of Aerosol Retrieval (STEAR) Algorithms

Gregory L. Schuster, Luke D. Ziemba, Andreas J. Beyersdorf, Bruce E. Anderson, Michael A. Shook, Richard H. Moore: NASA LaRC; Reed Espinosa, Adriana Rocha-Lima, Jose V. Martins: UMBC; Oleg Dubovik, Fabrice Ducos, David Fuertes, Tatsiana Lapyonok, Yevgeny Derimian: U. de Lille 1

11:00 am

Control #101

Study on Aerosol Optical properties and Radiative Effect in Cloudy Weather in the Guangzhou Region

DENG Tao, DENG XueJiao, TAN Haobo, LI Fei: China Meteorological Administration

11:20 am

Control #106

TwilightSat: A New Concept for Optical Satellite Remote Sensing of Atmospheric Aerosols

Hans Moosmüller, Michealene laukea-Lum: Desert Research Institute; Jeffrey C. LaCombe, Eric Wang: University of Nevada Reno

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SESSION SCHEDULE - Tuesday, September 27, 2016

12:00 pm - 1:30 pm (Grand View Ballroom)

Lunch Presentation on The Night Sky Program at Grand Teton National Park

Robert Hoyle, Lead Park Ranger/Interpretation

TRACK A

SESSION 3: HUMAN PERCEPTION OF VISIBILITY

Grand Room

Session Chair: Ivar Tombach, Consultant

1:30 pm

Control #93

Study of Carbonaceous Fractions Associated with Indoor PM2.5/PM10 during Asian Cultural and Ritual Burning Practices

Yasmeen Pervez: CSIT; Shippi Dewangan, Shamsh Pervez: Pt.

Ravishankar Shukla University; Rajan Chakrabarty: Washington

University in St. Louis; John G. Watson, Judith C. Chow: Desert Research Institute

1:50 pm

Control #27

Preserving Treasured Views – The National Park Service Visual Resource Inventory

Mark Meyer, Melanie Peters, John Vimont: National Park Service;

Robert Sullivan: Argonne National Laboratory

2:10 pm

Control #79

Reconciliation of Urban Visibility Preference Studies: Implications for an Urban Visibility Standard

Bret A. Schichtel: National Park Service; William C. Malm, Dustin

Schmidt, Jenny Hand: Colorado State University

2:30 pm

Control #51

A Review of Seven Visibility Preference Studies as they Relate to Various Visibility Metrics

William C. Malm: Colorado State University; Bret A. Schichtel:

National Park Service

2:50 pm

Control #86

Urban Visibility Standards and Trends in Fort Collins, Colorado

Cassie Archuleta: City of Fort Collins Environmental Services

Department; Bret Schichtel: Cooperative Institute for Research

in the Atmosphere; Joe Adlhoch, Emily Vanden Hoek: Air

Resource Specialists; Gregory Harshfield, Gordon Pierce:

Colorado Department of Health and Environment

3:30 pm - 3:50 pm

Networking Break

Timberline Foyer

TRACK B

SESSION 4: AEROSOL AND VISIBILITY MODELING AT LOCAL, REGIONAL, AND GLOBAL SCALES

Teton Room

Session Chair: Tom Moore, WESTAR

1:30 pm

Control #58

Calculating Single Source Visibility Impacts Using a Reactive Puff Model

Eladio Knipping, Naresh Kumar: Electric Power Research Institute;

Prakash Karamchandani, Lynsey Parker, Greg Yarwood: Ramboll Environ

1:50 pm

Control #115

Single Source Visibility Assessment using CAMx

Marco A. Rodriguez, Chao-Jung Chien, Caitlin Shaw, Courtney

Taylor: AECOM

2:10 pm

Control #30

PM2.5 Pollution in Households Involved with Solid Fuel Burning Practices: Application of Receptor Models for Source Apportionment

Shamsh Pervez, Jeevan Matawle: Pt. Ravishankar Shukla Univ.

2:30 pm

Control #2

Application of Global High-resolution Emission Inventories of Air Pollutants from Combustion Sources

Shu Tao, Huizhong Shen, Qirui Zhong: Peking University

2:50 pm

Control #45

Assessment of Regional Air Quality Resulting from Emission Control in the Pearl Delta River Region in China

Nan Wang, X.J. Deng, T. Deng, C.Q. Yin: Guangdong Provincial Key

Laboratory of Regional Numerical Weather Prediction; X.P. Lyu: The Hong

Kong Polytechnic University; Y. Li: Hong Kong University of Science and

Technology

3:10 pm

Control #116

Evaluation of Revised Uniform Rate of Progress (URP) Procedures to Assess Reasonable Progress Goals (RPGs) for the Second Regional Haze Rule Implementation Period of 2018-2028

Ralph Morris, Ramboll Environ; Zac Adelman, UNC Chapel Hill;

Tom Moore, WESTAR

FINAL PROGRAM

SESSION SCHEDULE - Tuesday, September 27, 2016

TRACK A

SESSION 5: PANEL: EVOLVING ISSUES IN AIR QUALITY RELATED TO A CHANGING CLIMATE

Grand Room

Session Chair: Kip Carrico, New Mexico Institute of Mining and Technology

3:50 pm - 5:30 pm

Panelists:

- **Kip Carrico** - New Mexico Institute of Mining and Technology
- **Jenny Hand** - Colorado State University
- **Sean M. Raffuse** - University of California, Davis
- **Sarah Suda-Petters** - North Carolina State University
- **Gannet Hallar** - University of Utah and DRI Storm Peak Laboratory
- **Hans Moosmüller** - Desert Research Institute

The magnitude and pace of anthropogenic climate change have profound implications for related air quality problems. Aerosols (and some trace gas species) are well-known as climate drivers, directly via backscatter and absorption of radiation and indirectly via cloud impacts. Among the most impacted air quality parameters are ozone and aerosol concentrations. Whereas anthropogenic emissions of greenhouse gases are just beginning to be addressed, emission reductions in aerosols and their precursors have been remarkably successful in the US over the last 50 years. Thus perturbed natural sources of aerosols have become more important in urban and, in particular, rural areas. Trends related to this include the growing importance of primary and secondary carbonaceous aerosols as well as an upward trend in mineral dust species observed in the Western US over two decades. The panel will address the following related questions:

- *Warming and extreme weather: what are the expected changes and how will it impact air quality?*
- *A warming climate: what does this mean for visibility and regional haze?*
- *What trends are emerging with 'perturbed natural sources' of PM including windblown dust and biomass burning smoke?*
- *What are the feedback processes involving inter-connected changes in air quality and climate?*
- *What are the current research needs to further reduce uncertainties in aerosol-climate interactions?*

TRACK B

SESSION 6: ATMOSPHERIC NITROGEN — A BRIDGE BETWEEN VISIBILITY, ECOLOGICAL, AND AGRICULTURAL ISSUES

Teton Room

Session Chairs: Bret Schichtel, National Park Service; Richard Poirot, Consultant

3:50 pm

Control #33

Back Trajectory Insights on Sources of Nitrogen at Rocky Mountain National Park, CO

Kristi A. Gebhart, Jim Cheatham, Kristi Morris, John Vimont: National Park Service

4:10 pm

Control #50

Modeled Source Apportionment of Reactive Nitrogen in the Greater Yellowstone Area

Tammy M. Thompson: Colorado State University; Michael G. Barna, Bret A. Schichtel: National Park Service; C. Thomas Moore: Western States Air Resources Council (WESTAR)

4:30 pm

Control #95

The Increasing Importance of Deposition of Reduced Nitrogen in the United States

Jeffrey L. Collett, Jr., Yi Li, Bret A. Schichtel: Colorado State University; John T. Walker, Donna B. Schwede, Xi Chen, Melissa A. Puchalski: US EPA; Christopher M.B. Lehmann, David Gay: University of Illinois Urbana-Champaign

4:50 pm

Control #77

NADP's Total Deposition Science Committee (TDEP): Advancing the Use of Measurement and Modeling Data for Spatial Interpolation of Total Atmospheric Deposition

Greg Beachley, Donna Schwede, Gary Lear, John T. Walker, Melissa Puchalski: US EPA; Christopher M. Rogers: Amec Foster Wheeler; Kristi Morris: National Park Service

5:10 pm

Control #117

The Cache Valley Ammonia Super Volcano

Randal S. Martin: Utah State University; Munkh Baasandorj: Utah Division of Air Quality

5:30 - 6:30 pm

Exhibitor Networking Reception
Timberline Foyer

FINAL PROGRAM

SESSION SCHEDULE - Wednesday, September 28, 2016

7:00 am - 12:00 pm

Registration

Grand Teton Mezzanine

7:00 am - 8:00 am

Continental Breakfast

Grand Teton Mezzanine

7:00 am - 8:00 am

Presenter's Breakfast

Jackson Room

TRACK A

SESSION 7: PANEL: REGIONAL PERSPECTIVES ON THE SECOND PLANNING PERIOD FOR REGIONAL HAZE STATE IMPLEMENTATION PLANS

8:00 am - 9:40 am

Grand Room

Session Chair: Tom Moore, *WESTAR-WRAP*

Panelists:

- **Theresa Pella**, *Central States Air Resource Agencies (CenSARA)*
- **Joseph Jakuta**, *Ozone Transport Commission (OTC)*
- **Rob Kaleel**, *Lake Michigan Air Directors Consortium (LADCO)*
- **Arthur Marin**, *Northeast States for Coordinated Air Use Management (NESCAUM)*
- **Mary Uhl**, *Western States Air Resources Council (WESTAR)*

The panelists will discuss the results to date of efforts to improve visibility at Class I areas. They will also discuss existing and potential future challenges, such as whether EPA's transport rule requirements are more effective than the Regional Haze rule's best available retrofit technology (BART) provisions. Also to be addressed will be ongoing legal actions and potential future legal challenges. Some panelists will be able to share technical work that is underway or will be initiated in the near future. Depending on the Class I area, ongoing and planned future reductions in Sulfur Dioxide and Nitrogen Oxide emissions are and will be largely responsible for visibility improvements. Still, achieving long-term goals necessitates a multi-pollutant approach.

Members of the Panel will present information on the impacts of key aerosol components of haze, including sulfates, nitrates, elemental carbon, organic carbon, and crustal materials such as dust/soil. The panel will also discuss EPA's draft reasonable progress guidance and how those provisions may ultimately influence state and regional technical work for the next round of Regional Haze SIPs.

TRACK B

SESSION 8A: AEROSOL-OPTICAL RELATIONSHIPS

Teton Room

Session Chair: Ivar Tombach, Consultant

8:00 am

Control #52

The Application of a Fast Fourier Transform Index to Webcam Images for Quantitative Characterization of Haze
William C. Malm: Colorado State University; Scott Cismoski: Air Resource Specialists; Melanie Ransmeier, Bret A. Schichtel: National Park Service

8:20 am

Control #4

Effect of PM_{2.5} Chemical Constituents on Atmospheric Visibility Impairment in Delhi City, India
Isha Khanna, Mukesh Khare: Indian Institute of Technology; Prashant Gargava: Central Pollution Control Board; Anwar Ali Khan: Environment Department Uttar Pradesh

8:40 am

Control #57

Effects of Local Emissions on Urban Visibility Measured with a Mobile Airship Monitoring Platform
P. K. Hopke: Clarkson University; J. Hovoka, N. Kuzelova, J. Bendl, M. Klan, C. Leoni: Charles University; O. F. Bischof: TSI Inc.;

9:00 am

Control #69

Dual Wavelength Integrating Nephelometer to Determine Source Influences on Particle Concentration Measurements
Herbert Schloesser: Ambilabs LLC

9:20 am

Control #6

Visibility in Dusty Environment: Experiment and Theory
Speaker to be announced

9:40 am to 10:00 am

Networking Break
Timberline Foyer

FINAL PROGRAM

SESSION SCHEDULE - Wednesday, September 28, 2016

TRACK A

SESSION 9A: REGIONAL HAZE RULE

Grand Room

Session Chairs: Joe Adlhoch, Air Resource Specialists; Bret Schichtel, National Park Service

10:00 am

Control #73

Potential Alternative to the Regional Haze Rule Visibility Progress Tracking Metric

Brett Gantt, Neil Frank, Melinda Beaver: US EPA

10:20 am

Control #74

Comparison of Tracking Progress Metrics under the Regional Haze Rule using Default and Impairment Based Approach

Scott A. Copeland: CIRA; Brett Gantt, Neil Frank, Melinda Beaver: US EPA; Bret A. Schichtel, John Vimont: National Park Service

10:40 am

Control #78

The Dependence of the Distribution in Natural Haze on Haze Levels and the Contributions from Anthropogenic Sources

Bret A. Schichtel, Kristi A. Gebhart, John Vimont: National Park Service; Scott Copeland, William C. Malm: Colorado State University; Neil Frank, Tom Moore: WESTAR

11:00 am

Control #55

A Conceptual Approach to Address Anthropogenic/Non-Antropogenic Emission Sources to Help Develop a More Accurate Regional Haze Program Glidepath

Theresa Pella: CenSARA; Cassie Archuleta: City of Fort Collins Environmental Services Department; Uarporn Nopmongcol, Ralph Morris: Ramboll Environ; Emily Vanden Hoek, Joe Adlhoch: Air Resource Specialists

11:20 am

Control #88

Visibility Improvements Past and Future in the Southeastern United States

Sheila Holman: North Carolina Department of Environment and Natural Resources; Patricia F. Brewer: National Park Service

12:15 pm - 6:30 pm Grand Teton National Park Excursion

8:00 pm - 10:00 pm Night Sky Program

Busses depart from the Lobby entrance

TRACK B

SESSION 8B: AEROSOL-OPTICAL RELATIONSHIPS CONT

Teton Room

Session Chair: Kip Carrico, New Mexico Institute of Mining and Technology

10:00 am

Control #63

On the Implications of Aerosol Liquid Water and Phase Separation for Modeled Organic Aerosol Mass

Havala O. T. Pye, Ben N. Murphy: US EPA; Aikaterini Bougiatioti, Hongyu Guo, Athanasios Nenes, Nga L. Ng, Rodney Weber, Lu Xu: Georgia Institute of Technology; Ann Marie Carlton, Khoi Nguyen: Rutgers University; Weiwei Hu, Jose L. Jimenez: University of Colorado at Boulder

10:20 am

Control #53

Estimating Temporal Trends in Biogenically Formed Secondary Organic Aerosols Resulting From Reduction in Atmospheric Aerosol Water Content Across the Continental United States

William C. Malm and J.L. Hand: Colorado State University; Bret Schichtel: National Park Service

10:40 am

Control #60

The Hygroscopicity of Organic Compounds as a Function of Carbon Chain Length, Carboxyl, Hydroperoxide, and Carbonyl Functional Groups

Sarah Suda Petters, Markus D. Petters: North Carolina State University; Ezra J. T. Levin, Sonia M. Kreidenweis: Colorado State University; Demetrios Pagonis, Megan S. Clafin, Paul J. Ziemann: University of Colorado at Boulder

11:00 am

Control #8

Role of RH, Temperature, and PM_{2.5} in the Changes in Ambient Visibility, Busan, Korea

Gee-Hyeong Park: Busan Institute of Health and Environment; Byeong-Kyu Lee: University of Ulsan

11:20 am

Control #28

Mass Extinction Efficiency and Hygroscopicity of PM_{2.5} in Major Chinese Cities

Zhen Cheng, Yujie He, Naiqiang Yan: Shanghai Jiao Tong University; Yungang Wang: GAGO Inc.; Xin Ma: China Meteorological Monitoring Center; Jingkun Jiang: Tsinghua University; Xiaoliang Wang: Desert Research Institute; Li Sheng, Jiangkai Hu: China Meteorological Monitoring Center

11:40 am

Control #20

An Examination of the Current IMPROVE Algorithm

A.J. Prenni, B.A. Schichtel: National Park Service; J.L. Hand, W.C. Malm: Colorado State University

FINAL PROGRAM

SESSION SCHEDULE - Thursday, September 29, 2016

7:00 am - 5:00 pm

Registration

Grand Teton Mezzanine

7:00 am - 8:00 am

Continental Breakfast

Grand Teton Mezzanine

7:00 am - 8:00 am

Presenter's Breakfast

Jackson Room

TRACK A

SESSION 10: PANEL: AIR QUALITY ISSUES IN THE WESTAR REGION

Grand Room

Session Chairs: Mary Uhl, Tom Moore, WESTAR

8:00 am - 9:40 am

Panelists:

- **Nancy Vehr**, *Air Quality Division Administrator, Wyoming*
- **Bryce Bird**, *Division of Air Quality Director, Utah*
- **Gordon Pierce**, *Program Manager, Colorado Department of Public Health and Environment*
- **Stephen Coe**, *Air Resources Management Bureau, State of Montana*

The panel presentation will focus on air quality issues in four WESTAR member states close to the conference location: Wyoming, Utah, Montana, and Colorado. All four states will address how they have each addressed visibility and potential degradation associated with winter ozone episodes, smoke, and energy development including oil and gas mining as well as from a rural perspective. Two of the states - Utah and Colorado - will also address these issues from an urban perspective. The presentation will highlight the similarities or differences in how states have addressed these issues as a result of the state's specific policy perspective or other unique circumstances.

9:40 am to 10:00 am

Networking Break
Timberline Foyer

TRACK B

SESSION 11: NEW INSTRUMENTS AND MEASUREMENT TECHNIQUES

Teton Room

Session Chairs: Ann Dillner, University of California, Davis; Jaron Hansen, Brigham Young University

8:00 am

Control #5

Development of the GC-MS Organic Aerosol Monitor (GC-MS OAM) For In-field Detection of Particulate Organic Compounds

Paul M. Cropper, Delbert J. Eatough, Jaron C. Hansen: Brigham Young University; Robert A. Cary: Sunset Laboratory

8:20 am

Control #7

Use of a GC-MS Monitor for In-Field Detection of Fine Particulate Organic Compounds in Source Apportionment

Delbert J Eatough, Paul Cropper, Jaron C. Hansen: Brigham Young University; Robert A. Cary: Sunset Laboratory Inc.

8:40 am

Control #11

Advanced Detection Methods for Thermal/Optical Analysis of IMPROVE Samples

John G. Watson, Judith C. Chow, Gustavo M. Riggio, Xiaoliang Wang, Paul M. Cropper, Devon K. Overson: Desert Research Institute; L.-W Antony Chen: University of Nevada

9:00 am

Control #36

A Non-destructive, Inexpensive Method for Predicting TOR OC and EC in the IMPROVE and CSN networks using Infrared Spectra

Ann M. Dillner, Andrew T. Weakley: University of California Davis; Giulia Ruggeri, Matteo Reggente, Satoshi Takahama: Swiss Federal Institute of Technology Lausanne (EPFL)

9:20 am

Control #92

Optical Characterization of Filtered Aerosols Using Broadband Illumination: An Enhanced Measurement System for the IMPROVE Air Quality Network

Keith J. Bein, Nicholas J. Spada, Charles E. McDade, Warren H. White: University of California-Davis

FINAL PROGRAM

SESSION SCHEDULE - Thursday, September 29, 2016

TRACK A

SESSION 9B: REGIONAL HAZE RULE CON'T.

Grand Room

Session Chairs: Joe Adlhoch, Air Resource Specialists; Bret Schichtel, National Park Service

10:00 am

Control #34

The Role of "Margin of Error" In Regional Haze Determinations

Gale F Hoffnagle: TRC Environmental Corporation

10:20 am

Control #65

Source Attribution for Visibility Planning using a Regional Photochemical Model

Patricia F. Brewer: National Park Service; Gail Tonnessen: US EPA; Tom Moore: Western States Air Resources Council

10:40 am

Control #68

The Uniform Rate of Progress and Setting a Reasonable Progress Goal in Western U.S. Class I federal areas

Gail Tonnesen: US EPA; Tom Moore: WESTAR; Patricia F. Brewer: National Park Service

11:00 am

Control #42

Assessment of the Contributions to Visibility Impairment in the Western United States and the Potential Effects of New Guidance for Tracking Visibility Progress

Ralph Morris: Ramboll Environ US Corporation; Tom Moore: WESTAR

11:20 am

Control #54

Using NAAPS Smoke to Estimate National Regional Haze Contributions in the Western U.S.

Neil Frank: US EPA (retired); Rudy Husar, Washington University; Doug Westphal, Naval Research Laboratory

12:00 pm - 1:30 pm (Grand View Ballroom)

Photo Contest Winners

Kristi Gebhart and Anna Lee Farber

Lunch Presentation

Current Resource Issues at Grand Teton

Sue Consolo-Murphy, Chief of the Division of Science and Resource Management, Grand Teton National Park

TRACK B

SESSION 12: SECONDARY ORGANIC AEROSOLS

Teton Room

Session Chair: Phillip Hopke, Clarkson University

10:00am

Control #14

Drying-Induced Evaporation of Secondary Organic Aerosols during Summer

Christopher J. Hennigan, Marwa M. H. El-Sayed, Dziejzorm Amenumey: University of Maryland

10:20 am

Control #12

More Complete Analysis of IMPROVE Samples for Visibility and Source Apportionment Studies

Judith C. Chow, John G. Watson, Xiaoliang Wang, Paul M. Cropper: Desert Research Institute

10:40 am

Control #37

Organic Functional Group and OM/OC Measurements at Select IMPROVE Sites using Infrared Spectra: Organosulfates and Amines

Ann M. Dillner, Mohammed Kamruzzaman: University of California Davis; Satoshi Takahama: Swiss Federal Institute of Technology Lausanne (EPFL)

11:00 am

Control #23

Carbonaceous Aerosols and their Light Absorption Ability at an Urban Site of Delhi: Implications for Local Air Quality and Climate

Zainab Arub, Annada Padhi, Shilpi Samiksha, Ramya Sunder, Gazala Habib, Gaurav Singh, India Institute of Technology

11:20 am

Control #96

Improving Understanding of the Southeastern U.S. Biomass Burning Contribution to SOA

Stephanie L. Shaw, Eladio M. Knipping: Electric Power Research Institute; Karsten Baumann, Eric S. Edgerton: Atmospheric Research & Analysis; Charlie L. Blanchard, George M. Hidy: Envair; John J. Jansen: Southern Company Services; Aikaterini Bougiatioti, Athanasios Nenes, Rodney J. Weber, Jenny P.S. Wong: Georgia Institute of Technology

11:40 am

Control #46

Projections of Anthropogenic Secondary Organic Aerosols Over China Under RCP Scenarios

Changqin Yin: Institute of Tropical and Marine Meteorology; Tijian Wang, Bingliang Zhuang: Nanjing University; Xuejiao Deng, Tao Deng, Nan Wang: Institute of Tropical and Marine Meteorology

FINAL PROGRAM

SESSION SCHEDULE - Thursday, September 29, 2016

TRACK A

SESSION 13: POTENTIAL IMPACTS OF EMISSIONS FROM OIL AND GAS FIELDS ON AIR QUALITY AND VISIBILITY

Grand Room

Session Chair: Tom Moore, WESTAR

1:30 pm

Control #35

Upper Green River Basin, WY, Oilfield Disposal Pond Emission Study

Cara Keslar, Adam Deppe: Wyoming DEQ; Richard Bowers, Ann Smith: GSI Environmental Inc.

1:50 pm

Control #80

Statistical Analysis of Winter Ozone Events in the Uinta Basin, Utah

Marc L. Mansfield: Utah State University

2:10 pm

Control #85

Using Modeling Technique to Quantify Background Ozone Concentration in the Uintah Basin, Utah

Huy Tran, Trang Tran, Marc L. Mansfield: Utah State University

2:30 pm

Control #49

Modeled Representation of Visibility Impacts due to Emissions Associated with Oil and Gas

Tammy M. Thompson: Colorado State University; Michael G. Barna, Bret A. Schichtel: National Park Service; C. Thomas Moore: Western States Air Resources Council (WESTAR)

2:50 pm

Control #22

An Overview of the Bakken Air Quality Study

A.J. Prenni, B.C. Sive, K.A. Gebhart, B.A. Schichtel: National Park Service; D.E. Day, A.R. Evanoski-Cole, A. Hecobian, Y. Zhou, J.L. Hand, A.P. Sullivan, Y. Li, M.I. Schurman, Y. Desyaterik, W.C. Malm, J.L. Collett Jr: Colorado State University

3:10 pm

Control #61

Aerosol Light Scattering Measurements in the Bakken Oil Fields

Derek E. Day, Jenny L. Hand, Ashley Evanoski, Jeff L. Collet Jr.: Colorado State University; Kristi A. Gebhart, Anthony J. Prenni, Bret Schichtel: National Park Service

TRACK B

SESSION 14: MINERAL DUST AEROSOLS: IMPACTS ON AIR QUALITY AND VISIBILITY

Teton Room

Session Chairs: Rob Farber, Atmospheric Clarity; Jenny Hand, Colorado State University

1:30 pm

Control #17

Spatial and Seasonal Patterns in Mineral Dust Concentrations at Remote Sites Across the United States

J. L. Hand: Colorado State University; B. A. Schichtel: National Park Service; W. H. White, N. P. Hyslop: University of California-Davis; T. E. Gill: University of Texas at El Paso

1:50 pm

Control #87

The Impact of African Dust on the Annual Average PM_{2.5} Concentrations at the Maximum Concentration PM_{2.5} Monitoring Site in the Houston Texas Region, 2009-2015

David W. Sullivan: The University of Texas at Austin; James H. Price, Kasey Savanich: Texas Commission on Environmental Quality; Richard J. Tropp: Desert Research Institute

2:10 pm

Control #108

Optical Properties of Suspended Mineral Dusts from Desert Source Regions

Johann P. Engelbrecht, Hans Moosmüller: Desert Research Institute; R. K. M. Jayanty: RTI International; Gary Casuccio: RJ Lee Group, Inc.

2:30 pm

Control #25

Taming the Wind Blown Dust in the Western Mojave Desert
Rob Farber, Atmospheric Clarity

2:50 pm

Control #62

Fine Particle Generation from Fugitive Dust Sources

Julie Schuder and Chatten Cowherd, Jr.: AV Dust Control Group

3:10 pm

Control #26

Assessing the Impact of Precipitation on PM Coarse (PM_{10-2.5})

Yousaf Hameed: Clark County Department of Air Quality

3:30 pm - 3:50 pm

Networking Break

Grand Teton Mezzanine

FINAL PROGRAM

Thursday, September 29, 2016

Technical Poster Session 3:50 pm - 5:50 pm (Grand Room)

Session Chairs: Delbert Eatough, Brigham Young University and Alfred Lawrence, Isabella Thoburn College, India

VISIBILITY AS AN INDICATOR OF HUMAN HEALTH EFFECTS (Topic Area A)

Control #125

Measuring and Reporting Visual Air Quality Management Progress in the Canadian Lower Fraser Valley, BC

Julie E. Saxton, D. Laurie Bates-Frymel: Metro Vancouver; Markus Kellerhals, BC Ministry of Environment

Control #127

Indoor Air Quality Assessment and Health Impact in Context with the Living Standards in Urban & Rural Lucknow Homes

*Alfred Lawrence and Tahmeena Khan
Department of Chemistry, Isabella Thoburn College, Lucknow, India*

HUMAN PERCEPTION OF VISIBILITY (Topic Area B)

Control #56

Using Dark Sky Images Captured with a Standard Digital Camera to Quantify Visual Air Quality and the Night Sky Viewing Experience at Bryce Canyon National Park

Scott Cismoski: Air Resource Specialists; William C. Malm: Colorado State University; Bret A. Schichtel: National Park Service

AEROSOL AND VISIBILITY MODELING AT LOCAL, REGIONAL, AND GLOBAL SCALES (Topic Area C)

Control #129

Source apportionment of biogenic contributions to ozone formation over the United States

Rui Zhang and Daniel Cohan: Rice University; Alex Cohan: Lake Michigan Air Directors Consortium (LADCO); and Arastoo Pour-Biazar: The National Space Science Technology Center, University of Alabama in Huntsville

SATELLITE AND REMOTE SENSING APPLICATIONS TO HAZE/AEROSOL MONITORING (Topic Area D)

Control #123

Aerosol Optical Parameters Detection from LIDARS and Applications to an Ultraviolet and Visible Radiative Transfer Model

Richard Medina: NOAA Center for Atmospheric Sciences, Howard University

ATMOSPHERIC NITROGEN (Topic Area E)

Control #21

Enhanced Concentrations of Reactive Nitrogen Species During the Hewlett Gulch and High Park Fires in Colorado

A.J. Prenni, B.A. Schichtel: National Park Service; K.B. Benedict, A.P. Sullivan, J.L. Collett Jr.: Colorado State University; C.M. Carrico: New Mexico Institute of Mining and Technology

Control #128

Innovative Approach to Selectively Measure Nitrogen Dioxide from Industrial Processes Over a Wide Linear Dynamic Range

Dr. Charles A. Odame-Ankrah, Carlyn, L.F. McGeean, Charles, E. Grimm, Shaun, W. Hayward; Brodie, D. Bigger; and Brian, W. Rosentreter, Global Analyzer Systems Ltd.

AEROSOL-OPTICAL RELATIONSHIPS (Topic Area F)

Control #39

Ambient Aerosol Extinction in Great Smoky Mountains National Park

Timothy D. Gordon, Gavin R. McMeeking, Ping Chen: Handix Scientific; Jim Renfro, Anthony J. Prenni: National Park Service

NEW INSTRUMENTS AND MEASUREMENT TECHNIQUES (Topic Area G)

Control #38

Nitrogen Oxides Measurements Using Direct Optical and Chemiluminescence Techniques

Caroline Allen, Christian M. Carrico: New Mexico Institute of Mining and Technology; Peter Anderson: 2B Technologies

Control #118

A "MAGIC" Water Condensation Particle Counter

Gregory S. Lewis, Steve Spielman, Arantzazu Eiguren Fernandez, and Susanne V. Hering: Aerosol Dynamics Inc.; Patricia B. Keady, Aerosol Devices Inc.

Control #119

A Universal Spot Sampler for High-Efficiency, Concentrated Collection of Aerosol Particles on a Solid Substrate and in Liquids

Patricia B. Keady, Christopher Hare: Aerosol Devices, Inc.; Arantzazu Eiguren Fernandez, Gregory S. Lewis and Susanne V. Hering: Aerosol Dynamics Inc.

FINAL PROGRAM

Thursday, September 29, 2016

Technical Poster Session 3:50 pm - 5:50 pm (Grand Room)

SECONDARY ORGANIC AEROSOLS (Topic Area H)

Control #124

Urban Heat Island (Uhi) Influence on Secondary Pollutant Formation at a Tropical Humid Environment

Gsnvksn Swamy, Dr. S.M. Shiva Nagendra, Indian Institute of Technology; Dr. Uwe Shlink: Helmholtz Centre for Environmental Research, Leipzig, Germany

POTENTIAL IMPACTS OF EMISSIONS FROM OIL AND GAS FIELDS ON AIR QUALITY AND VISIBILITY

(Topic Area I)

Control #40

Upper Green River Basin, WY, Historical Analysis of Pollutant Concentrations

Leif Paulson, Adam Deppe, Cara Keslar: Wyoming DEQ

Control #83

FDDA (Nudging) Impacts on WRF-CAMx Model Performance in Simulating Winter O₃ Formation in Uintah Basin

Trang Tran, Huy Tran: Utah State University; Erik Crosman: University of Utah

Control #120

Novel Lab Method to Detect Methane or CO₂ Leakage from Damaged Cement in Unconventional Oil and Gas Wells

Raili Taylor and John McLennan: Dept. of Chemical Engineering and Energy and Geoscience Institute (EGI), University of Utah; Jake Tuttle: Chemical Engineering Dept., University of Utah; Randy Neilsen: Dept. of Mining Engineering, University of Utah

Poster Diagram on Page 22

MINERAL DUST AEROSOLS: IMPACTS ON AIR QUALITY AND VISIBILITY (Topic Area J)

Control #32

Back Trajectory and Meteorological Factors in Spring Dust Trends in the Southwestern U.S.

Kristi A. Gebhart, Bret A. Schichtel: National Park Service; Jenny L. Hand: Colorado State University; Warren H. White, Nicole P. Hyslop: University of California; Thomas E. Gill: University of Texas

AEROSOL FIELD STUDIES AND MONITORING NETWORKS (Topic Area K)

Control #76

US EPA Applications of the Monitor for AeRosols and Gases in Ambient air (MARGA) to Measure Ambient Gaseous and Particulate Pollutants and Dry Deposition Fluxes

Gregory Beachley, John T. Walker: US EPA; Ian Rumsey: College of Charleston; Ashley Evanoski-Cole: Colorado State University

Control #59

Source apportionment studies of particulate matter in China

S.C. Lee and Y. GAO: The Hong Kong Polytechnic University

Control #89

Behavior Of Atmospheric Pollutants In Closed Valleys

Carmen Zapata, Natalia Cano, Mauricio Ramirez, José Fernando Jimenez: Universidad Nacional de Colombia

Control #29

Characteristics of Absorbing Aerosols During Winter Foggy Period over the National Capital Region of Delhi: Impact of Planetary Boundary Layer Dynamics and Solar Radiation Flux

Philip K. Hopke: Clarkson University; S. Tyagi, A. Mishra: Gautam Buddha University; S. Tiwari: Indian Institute of Tropical Meteorology; S. Singh: CSIR-National Physical Laboratory; S.D. Attri: India Meteorological Department

FINAL PROGRAM

Thursday, September 29, 2016

Technical Poster Session, con't. 3:50 pm - 5:50 pm (Grand Room)

Session Chairs: Delbert Eatough, Brigham Young University and Alfred Lawrence, Isabella Thoburn College, India

AEROSOL FIELD STUDIES, CON'T.

Control #121

The Southeastern Aerosol Research and Characterization Network 1992-2016

Stephanie L. Shaw: Electric Power Research Institute; Eric S. Edgerton: Atmospheric Research & Analysis; John J. Jansen: Southern Company Services

Control #122

Spatial Variability and Speciation of PM_{2.5} in New Delhi, India

Pallavi Pant: University of Massachusetts-Amherst; Sarath K. Guttikunda: Desert Research Institute; Shamsh Pervez: Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, (India); Richard E. Peltier: University of Massachusetts-Amherst

TRENDS IN VISIBILITY (Topic Area L)

Control #126

Addressing Challenges in Analyzing and Projecting Emissions Trends

Susan S.G. Wierman, Julie McDill, Susan McCusker: Mid-Atlantic Regional Air Management Association, Inc. (MARAMA)

LIGHT ABSORBING CARBON (Topic Area M)

Control #107

Optical Properties of Emissions from Laboratory Peat Combustion

Hans Moosmüller, Madhu Gyawali, Reddy L. N. Yatavelli, Adam C. Watts, V. Samburova, X. Wang, A. Y. Khlystov: Desert Research Institute; R. K. Chakrabarty: WUSTL; L.-W. A. Chen: UNLV; I. Arnold: University of Arizona, Tucson

Control #90

The Impacts of Diesel Emission Control Strategies on Elemental Carbon Concentrations in the South Coast Air Basin

Payam Pakbin, Aaron Katzenstein, Scott Epstein, Phil Fine: South Coast Air Quality Management District; Yue Lin, Ph.D student at University of California – Riverside; Michela Vicariotto, Ph.D. student at University of California – Irvine

Control #105

Aerosol Optics, Radiative Forcing, and Climate Change

Hans Moosmüller: Desert Research Institute

Control #47

Physicochemical Characteristics of the Black Carbon Aerosol and its Radiative Impact in a Polluted Urban Area of China

Q.Y. Wang, R.J. Huang, J.J. Cao: Chinese Academy of Sciences

Control #43

Effects of Black Carbon Mixing State on Aerosol-climate Interaction in China Using a Source-oriented WRF/Chem Model

Hongliang Zhang: Louisiana State University

Control #109

Coefficients of an Analytical Aerosol Forcing Equation Determined with a Monte-Carlo Radiation Model

Hans Moosmüller, Chul E. Chung: Desert Research Institute; Taufiq Hassan: Hankuk University of Foreign Studies

FINAL PROGRAM

TECHNICAL SESSION SCHEDULE - Friday, September 30, 2016

7:00 am - 10:30 am

Registration

Grand Teton Mezzanine

7:00 am - 8:00 am

Continental Breakfast

Grand Teton Mezzanine

7:00 am - 8:00 am

Presenter's Breakfast

Jackson Room

TRACK A

SESSION 15: AEROSOL FIELD STUDIES AND MONITORING NETWORKS

Grand Room

Session Chair: Ricky Tropp, Desert Research Institute, and Dr. Jamson Masih, Wilson College, Mumbai, India

8:00 am

Control #13

Wintertime PM_{2.5} Pollution in UT: What Can Measurements at Ground Level and Higher Elevation Tell Us?

Munkbayar Baasandorj: Utah Department of Environmental Quality and University of Utah; Sebastian W. Hoch, John C. Lin, Ryan Bares, Fasoli Ben: University of Utah; Randy Martin: Utah State University; John Sohl: Weber State University; Dylan B. Millet: University of Minnesota

8:20 am

Control #18

Temporal Trends in the Difference Between Gravimetric and Reconstructed Fine Mass at Rural and Urban Sites across the United States

J. L. Hand, W. C. Malm: Colorado State University; A. J. Prenni, B. A. Schichtel: National Park Service; W. H. White: University of California; D.A. Ridley, C. L. Heald: Massachusetts Institute of Technology

8:40 am

Control #24

Positive Matrix Factorization and Data Quality Assessment of EPA's PM_{2.5} Chemical Speciation Network (CSN) Derived from Six Collocated CSN Sites for the Period 2010 - 2013

Richard J. Tropp: Desert Research Institute; L.-W. Antony Chen: University of Nevada Las Vegas

9:00 am

Control #15

Chemical and Morphological Characteristics of Fine Particulate Matter Emitted from an Open Municipal Solid Waste (MSW) Disposal Site in India

Anju Elizabeth Peter, S.M. Shiva Nagendra: Indian Institute of Technology

9:20 am

Control #19

Personal Exposure Measurements of PM Concentrations at a Central Business District in Chennai City

Jyothi S Menon, Shiva Nagendra S M: Indian Institute of Technology

9:40 am

Control #97

Concentration of Particulate Matter and Polycyclic Aromatic Hydrocarbons at Northern Central part of India

Jamson Masih: Wilson College; Ajay Taneja: Dr. B.R. Ambedkar University

TRACK B

SESSION 16A: LIGHT ABSORBING CARBON

Teton Room

Session Chair: Rebecca Washenfelder, NOAA

8:00 am

Control #71

Contribution of Different Chemical Species to Brown Carbon Aerosol in Biomass Burning Emissions

Andrey Khlystov, Vera Samburova, Jessica Connolly, Chiranjivi Bhattarai, Deep Sengupta, Adam Watts, and Hans Moosmüller: Desert Research Institute

8:20 am

Control #113

Light absorbing carbonaceous aerosols from cookstoves in India

Apoorva Pandey, Sameer Patel, Pratim Biswas, Rajan Chakrabarty: Washington University in St. Louis; Shamsh Pervez: Pt. Ravishankar Shukla University, Chhattisgar; Judith Chow, John Watson: Desert Research Institute

8:40 am

Control #94

Brown Carbon Absorption in the Red and Near Infrared Spectral Region

Chul E. Chung: Desert Research Institute; András Hoffer, Ádám Tóth, András Gelencsér: MTA-PE Air Chemistry Research Group

9:00 am

Control #75

A Decade of Backscatter-Corrected Transmittance Measurements by IMPROVE

Warren H. White, Krystyna Trzepla, Nicole P. Hyslop: University of California; Jenny L. Hand: Colorado State University; Bret A. Schichtel: National Park Service

9:20 am

Control #41

Multispectral BC Comparison to Continuous Mass Measurement of Wide-Ranging Aerosols

David Gobeli, Seung-Ho Hong: Met One Instruments, Inc.; George Allen: NESCAUM

10:00 am - 10:20 am

Networking Break
Timberline Foyer

FINAL PROGRAM

TECHNICAL SESSION SCHEDULE - Friday, September 30, 2016

TRACK A

SESSION 17: TRENDS IN VISIBILITY

Grand Room

Session Chairs: Jenny Hand, Colorado State University;
Rebecca Washenfelder, NOAA

10:20 am

Control #91

Long-Term Visibility Trends in Megacities in China, India and the U.S. during 1944-2016

Yungang Wang: GAGO Inc.

10:40 am

Control #16

Observed Historical Trends in Atmospheric Haze Interpreted with a Global Chemical Transport Model

Chi Li, Brian L. Boys, Aaron van Donkelaar: Dalhousie University; Randall V. Martin: Dalhousie University and Harvard-Smithsonian Center for Astrophysics; Sacha Ruzzante: Dalhousie University and Queen's University

11:00 am

Control #98

Recent Developments in Improved Understanding of San Joaquin Valley's Impact on Grand Canyon Visibility Since 1980

Rob Farber, Atmospheric Clarity

11:20 am

Control #82

The Effect of Atmospheric Sulfate Reductions on Diffuse Radiation and Photosynthesis

Rebecca A. Washenfelder: University of Colorado and NOAA; Gretchen Keppel-Aleks: University of Michigan

11:40 am

Control #102

Aerosol Concentration, Composition and Optical Effects During Valley Cold Pool Occurrences

Mark C. Green: Desert Research Institute

TRACK B

SESSION 16B: LIGHT ABSORBING CARBON, CON'T Teton Room

Session Chairs: Rajan Chakrabarty, Washington University in St. Louis

10:20 am

Control #112

Intensive optical properties of fresh and aged brown carbon aerosols from biomass burning in the Arctic Tundra

Benjamin J. Sumlin, Rajan K. Chakrabarty: Washington University in St. Louis

10:40 am

Control #111

A Two-Component 'Ångström Exponent' analysis of Aethalometer Data

Anthony D. A. Hansen: Magee Scientific Co.

11:00 am

Control #110

Fractal Scaling and Radiative Properties of Coated Soot Aggregates: Implications for Direct Forcing

William Heinson, Rajan Chakrabarty: Washington University in St. Louis

11:20 am

Control #100

Representing the Black Carbon Aging Process in the Two-way Coupled WRF-CMAQ Modeling System

Jia Xing, Jiandong Wang, Shuxiao Wang, Bin Zhao, Jiming Hao: Tsinghua University; Jonathan E. Pleim, David C. Wong, Rohit Mathur, Christian Hogrefe: US EPA

11:40 am

Control #48

Sensitivity of BC Concentrations and Climate Impact to Aging and Scavenging Processes in the OsloCTM2

Marianne T. Lund: Center for International Climate and Environmental Research – Oslo (CICERO); Terje Berntsen: University of Oslo and Center for International Climate and Environmental Research – Oslo (CICERO)

12:00 pm

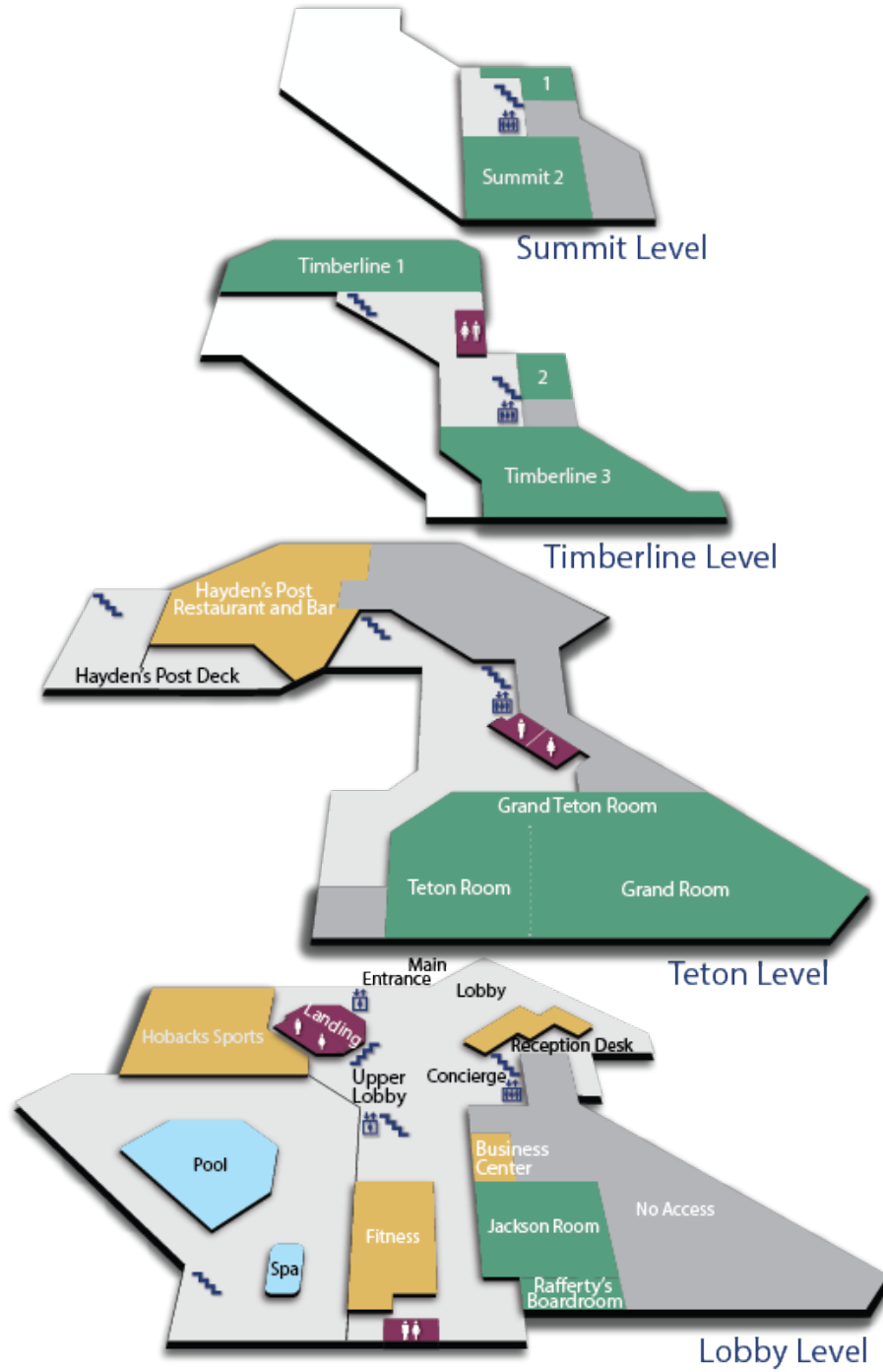
Control #10

Quantifying enhancement in aerosol radiative forcing during 'extreme aerosol days' in summer at Delhi National Capital Region, India

Arun Srivastava, Sumant Kumar: Jawaharlal Nehru University; Sagnik Dey: IIT Delhi

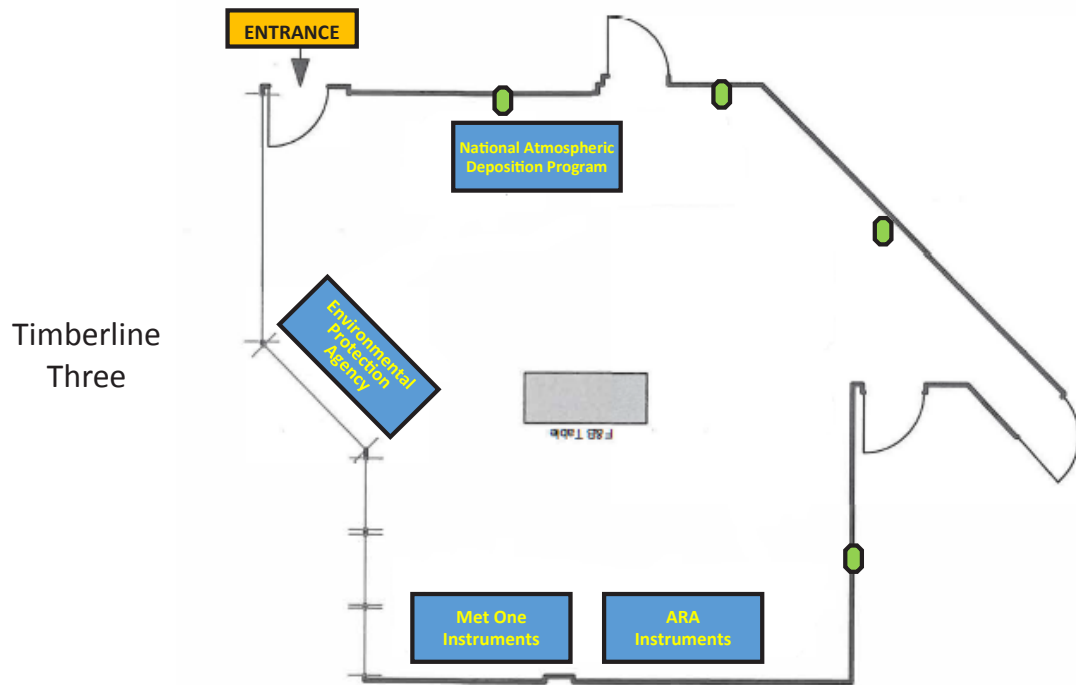
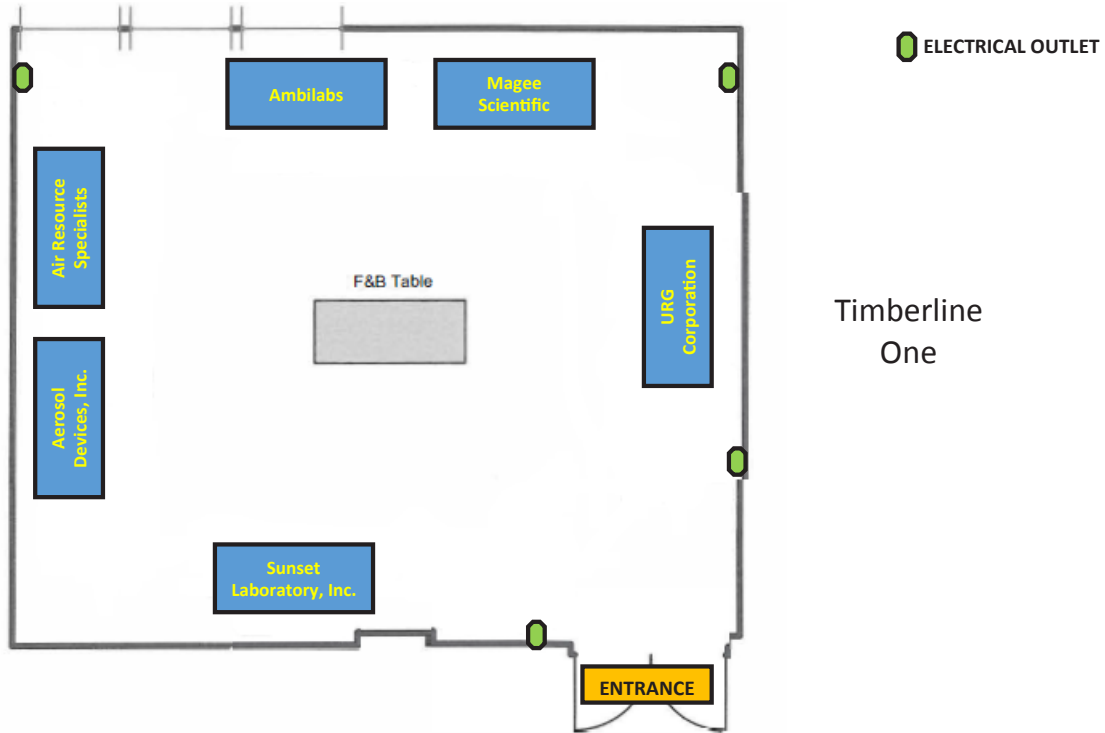
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SNOW KING HOTEL FLOOR PLAN



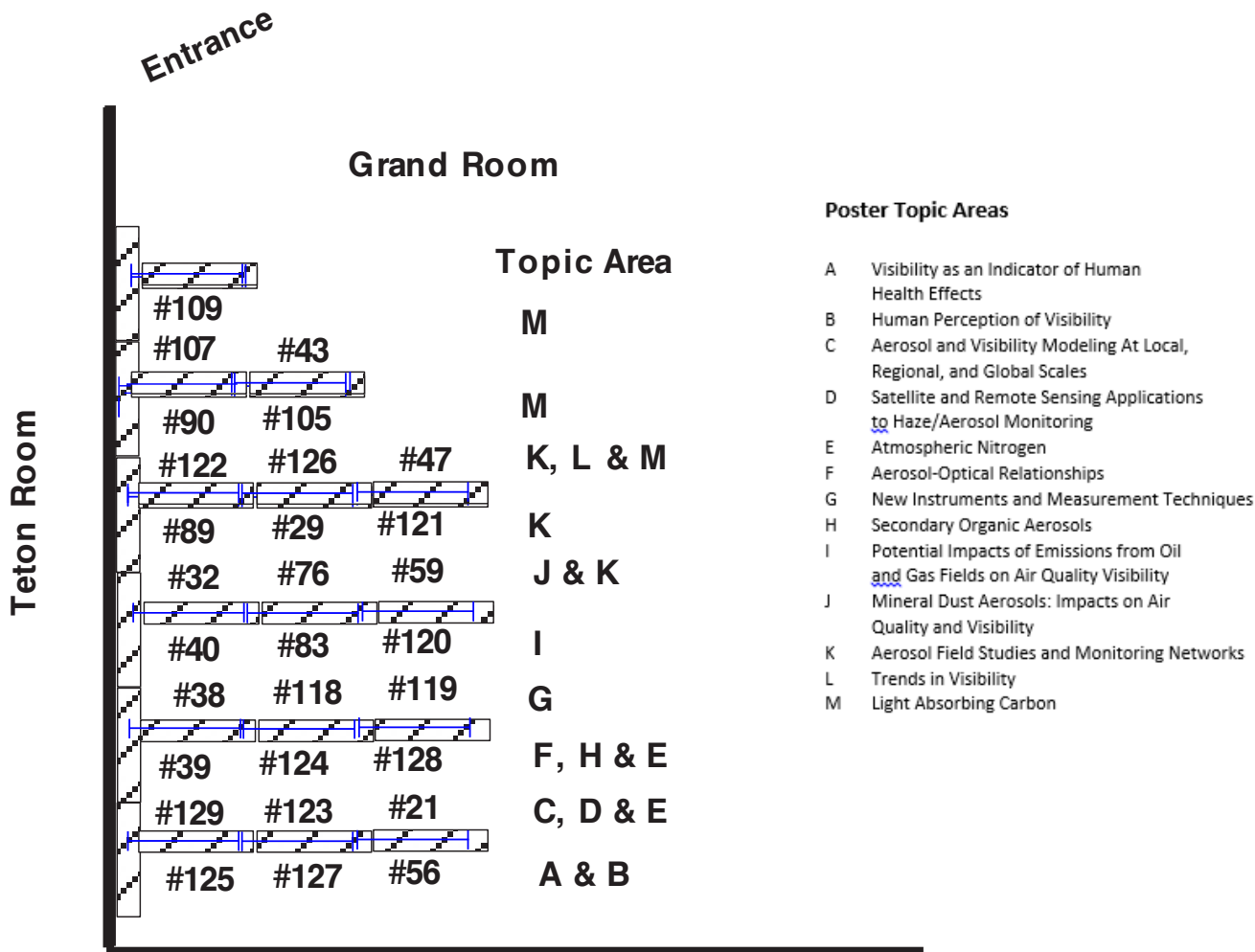
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SPONSOR TABLE DIAGRAM



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TECHNICAL POSTER DIAGRAM





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