

Power Plant Pollutant Control “MEGA” Symposium (MEGA 2016)

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Final Program

TECHNICAL AGENDA

Workshop – Monday, August 15, 2016

7:00 am – 6:00 pm

Registration

Harbor Registration

7:00 am – 8:00 am

Continental Breakfast for Workshop Attendees

Essex AB

(Ticket Required)

8:00 am – 5:30 pm

Workshop “Air Pollution Control Fundamentals”

Essex AB

(Ticket Required)

10:00 am – 10:15 am

Coffee Service for Workshop Attendees

Essex AB

12:00 pm – 1:00 pm

Lunch for Workshop Attendees

Falkland

2:45 pm – 3:00 pm

Refreshment Break for Workshop Attendees

Essex AB

Technical Program – Tuesday, August 16, 2016

7:00 am – 6:30 pm

Registration

Harbor Registration

7:00 am – 8:00 am

Continental Breakfast

Harborside Foyer

7:00 am – 8:00 am

Presenter’s Breakfast

Kent ABC

8:00 am – 9:00 am

Opening Session

Harborside Ballroom ABC

Welcome

George R. Offen, Sr. Technical Executive, EPRI

Featured Speaker

Shannon Angielski, Executive Director, CURC

“The Role for Coal Research in Today’s and Tomorrow’s Electric Generation Environment”

SESSION 1: MATS Compliance by Co-Benefits

Harborside Ballroom ABC

Chair: Tom Martz, EPRI

9:00 am – 9:25 am

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Effectiveness of MATS Controls Based on Data Reported to EPA.....1

J. Edward Cichanowicz,¹ Michael Hein,² James Marchetti³

¹J.E. Cichanowicz, Inc., Los Gatos, CA; ²Hein Analytics, LLC, Whitefish, MT; ³J.P. Marchetti, Inc., Washington, DC

9:25 am – 9:50 am

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Gary Blythe,¹ David Colley,¹ Richard Jackson,² Matt McCants,² Louis

Manigault³; ¹AECOM, Austin, TX; ²Santee Cooper, Monks Corner, SC

9:50 am – 10:15 am

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SCR Mercury Oxidation.....28

Thomas D. Martz,¹ W. Scott Hinton²; ¹EPRI, Palo Alto, CA;

²W.S. Hinton & Associates, Gulf Breeze, FL

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Harbor Foyer

10:15 am– 10:45 am

TECHNICAL AGENDA

Technical Program – Tuesday, August 16, 2016

SESSION 2: MATS Compliance by Co-Benefits (Continued)

Chair: Tom Martz, EPRI

10:45 am – 11:10 am **CANCELLED**

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Challenges Within Laboratory Testing of SCR Catalysts for Mercury Oxidation.....N/A

Thorsten Dux,¹ Thies Hoffmann²; ¹STEAG Energy Services GmbH, Herne, Germany, ²STEAG SCR-Tech, Inc., Kings Mountain, NC

11:10 pm – 11:35 pm

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SCR Catalyst Management for Optimal NOx and Hg Emissions Control....32

Scott Rutherford, Chris Reeves, Cormetech Inc., Durham, NC

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Chair: Andrew O'Palko, DOE

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Gary M. Blythe,¹ Mandi K. Richardson,¹ Charles E. Dene,² Nanda Srinivasan²; ¹AECOM, Austin, TX, ²EPRI, Palo Alto, CA

1:00 pm - 1:25 pm

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Troy Patton¹, Ray Gansley², Rikard Hakansson³, ¹Seminole Electric, Palatka, Florida, ² General Electric, Knoxville, Tennessee, ³General Electric, Vaxjo, Sweden

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William A Steen,¹ Gary M Blythe,¹ Mandi Richardson,¹ Nanda Srinivasan,² and Chuck Dene²; ¹AECOM, Austin, TX, ²EPRI, Palo Alto, CA

1:50 pm - 2:15 pm

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Dean Bell¹, Gary J. Meyer², Thomas P. McCullough²; ¹American Electric Power, Columbus, OH, ²Redox Technology Group, Carmel, IN

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Chair: Andrew O'Palko, DOE

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John H. Pavlish and Nick L. Lentz; Midwest Energy Emissions Corp.,

Lewis Center, OH

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James B. Jarvis, Sterling M. Gray, Garrett E. Smith, Andrew Wang; AECOM, Austin, TX

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Reception in Exhibit Hall

Grand Ballroom V-X

Baltimore Inner Harbor Cruise

6:30 pm - 9:30 pm

(Ticket Required)

Final Program

TECHNICAL AGENDA

7:00 am – 6:30 pm

Registration

Harbor Registration

7:00 am – 8:00 am

Continental Breakfast

Harborside Ballroom

7:00 am – 8:00 am

Presenter's Breakfast

Kent ABC

Technical Program – Wednesday, August 17, 2016

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Harborside Ballroom AB

Chair: Sharon Sjostrom, AES

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Joe Wong¹, Robert Huston¹, Roger Cayton¹, Chris Vizcaino¹, Sheila Glesmann¹, Doug Campbell¹, Noah Meeks³, Laura Berry⁴, and John Cover²; ¹ADA Carbon Solutions, LLC, Littleton, CO, ² Nova Scotia Power, Halifax, Nova Scotia, ³Southern Company, Birmingham, AL, ⁴Southern Research, Birmingham, AL

8:25 am – 8:50 am

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Comprehensive Mercury Reduction Test Program for a Lignite-fired Unit.....129

Jon Norman¹, James McConnell², United Conveyor Corporation Dry Sorbent Injection, LLC, Waukegan, IL, ²GE Power, Windsor, CT

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Thomas K. Gale, Steve Baloga; Novinda Corporation, Denver, CO

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8:00 am – 8:25 am

CANCELLED

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Jonathan Carley, Dr. Louis Fradette, Dr. Sylvain Lefebvre, CO₂ Solutions Inc., Quebec, Canada

8:25 am – 8:50 am

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Heat Recovery and Use Technology Assessments....153

Max Bernau¹, David Morett¹, Katherine Dombrowski¹, Scott Hume², Andrew Maxson³, Russell Noble⁴, ¹AECOM, Austin, TX, ²EPRI, Charlotte, NC, ³EPRI, Palo Alto, CA, ⁴Southern Company Services, Birmingham, AL

8:50 am – 9:15 am

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Jared Pozarnsky¹, Mike Mengel², Rodney Hendrickson³; ¹GRE, Underwood, ND; ²MET; ³MET Lebanon, PA

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Shintaro Honjo¹, Takuya Okamoto², Masayuki Inui², Joseph Kowalczyk⁴ and Jerrad Thomas¹ ¹ Mitsubishi Heavy Industries America, Inc., Houston, TX; ²Mitsubishi Hitachi Power Systems, Ltd., Yokohama, Japan; ³ Mitsubishi Heavy Industries, Ltd., Yokohama, Japan; ⁴ Southern Company Services, Inc., Birmingham, AL

Coffee Service

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Technical Program – Wednesday, August 17, 2016

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Nick Evans, Mitch Lund, Mat Koppang; Nol-Tec Systems, Circle Pines, MN; Haley Turner, Louisville Gas & Electric (LG&E), Louisville, KY

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David Young, Sharon Sjostrom, Constance Senior, ADA-ES, Highlands Ranch, CO

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Katie Arambasick¹, John Currie², Katherine Dombrowski³, David Morett⁴, Nanda Srinivasar⁵, ¹AECOM, Austin, TX, ²EPRI, Palo Alto, CA

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Sterling M. Gray,¹ Kevin J. O'Boyle,² Gus Shearer³; ¹AECOM, Austin, TX, ²LJUNGSTRÖM, Wellsville, NY

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James E. Staudt; Andover Technology Partners, North Andover, MA

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Chiranjib Saha, James H. Irvin; Southern Research, Birmingham, AL

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Rodrigo R. S. Camargos, Stewart H. Nicholson; Primex Process Specialists Inc., Doylestown, PA

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*Thomas E. Pearson¹, Travis Reynolds², Joseph Naugle³; ¹GE Power,
Knoxville, TN; ²GE Power, Knoxville, TN; ³NRG Homer City Services
LLC, Homer City, PA*

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Mandar Gadgil, The Babcock & Wilcox Company, Barberton, OH

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*E. Joseph Duckett, Rajat Ghosh, Paul Farber, SNC-Lavalin America
Inc., Alcoa, Lake Charles, LA*

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*Kevin J. Peterson,¹ Stephen H. Nelson,¹ Aydra R. Kalynchuk,²
Michael T. Hoydick²; ¹Longview Power, Madsville, WV, ²Amec
Foster Wheeler, Pittsburgh, PA*

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*Daniel T. Menniti¹, Haley Turner², ¹Breen Energy Solutions,
Carnegie, PA, ²LGE-KU Louisville, KY*

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Jeffrey A. Kolde,¹ John J. Knotts,¹ Matthew A. McCluskey,¹ Mark E. de Garbolewski,¹ W.L. Gore & Associates, Elkton, MD, Dan Sendro,² Mark Scaccia²: ²FirstEnergy, Greensburg PA

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Zach Barnea,¹ Hagay Keller,¹ Gabriel Jindikhashvily,² Margee Zaher.² ¹MecuRemoval Ltd., Netanya, Israel; ²Engineering Division, Israel Electric Company, Haifa, Israel.

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Nicholas Ferri,¹ Tony Volpicelli,² Robert Sisson³; ¹Delta Measurement and Combustion Controls, Apex, NC; ²Delta Measurement and Combustion Controls, Hopedale, MA; ³Duke Energy, Hernando, FL

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Rodney Foo,¹ Rob Berger², Johan J. Heiszwolf³; ¹Lhoist Research & Development, Nivelles, Belgium, ²Anaproc, Delft, The Netherlands

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Pat Mongoven, Curt Biehn, Randy Griffard, Richard Zhang; Mississippi Lime Company, Saint Genevieve, MO

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Jon Norman, United Conveyor Corporation Dry Sorbent Injection, LLC, Waukegan, IL

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Rodney Foo,¹ Jim Dickerman,² Jerry Hunt², Johan J. Heiszwolf,¹ Landon Johnson²; ¹Lhoist Research & Development, Nivelles, Belgium, ²Lhoist North America, Fort Worth, TX, ³Great River Energy, Stanton, ND

3:50 pm - 4:15 pm

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Guisu Liu,¹ Jose C. Sanchez², Greg Archer³; ¹AECOM, Austin, TX; ²EPRI, Palo Alto, CA; ³Great River Energy, Maple Grove, MN

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Grand Ballroom Foyer

5:00 pm - 6:30 pm

Reception in Exhibit Hall

Grand Ballroom V-X

Final Program

TECHNICAL AGENDA

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Continental Breakfast

Harborside Ballroom

7:00 am – 8:00 am

Presenter's Breakfast

Kent ABC

Technical Program – Thursday, August 18, 2016

**SESSION 9A: Effluent Limitation Guidelines (ELG) —
Technologies for Compliance
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Harborside Ballroom AB**

Chair: Jeffery Preece, EPRI

8:00 am – 8:25 am

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*Jonathan O. Allen,¹ Christopher K. Ferens-Foulet,¹ Chethan
Acharya²; ¹Allen Analytics LLC, Tucson, AZ, ²Southern Company
Services, Birmingham, AL*

8:25 am – 8:50 am

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Stephen E. Winter, Amec Foster Wheeler NA

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*Robert Nicolo¹, Song Wu², Shintaro Honjo³; ¹Environmental Products
Director, Mitsubishi Hitachi Power Systems Americas, Inc.,
²Mitsubishi Hitachi Power Systems Americas, Inc., ³Global Research
& Innovation - Houston Office, Mitsubishi Heavy Industries America,
Inc., Houston, TX*

9:15 am – 9:40 am

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*Shannon R. Brown, Steven Feeney, Joseph M. Mitchell, Ted R.
Parsons; The Babcock & Wilcox Company, Barberton, OH*

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Chair: Tony Facchiono, EPRI

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*Enrique Bosch¹, Francisco Rodríguez¹, Enrique Tova¹, Brent
Stenson², Vincent Cheng²; ¹INERCO, Amherst, NY, ²ATCO POWER,
Calgary, Alberta, Canada*

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*Charles A. Lockert,¹ James Czarniecki,²; ¹Breen Energy Solutions,
Carnegie, PA, ²Orlando Utilities/Stanton Energy Center, Orlando, FL*

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Noel Rosh, BIDEN CERAM Environmental, Inc., Overland Park, KS

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*John M Boyle, Penelope Stamatakis, Fuel Tech, Inc.U.S.A.;
Piers de Havilland Fuel Tech Srl Italy*

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TECHNICAL AGENDA

Technical Program – Thursday, August 18, 2016

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Chair: Jeffery Preece, EPRI

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*Mandi Richardson¹, Cassandra Hutson¹; Chuck Dene²; ¹AECOM,
Austin, TX; ²EPRI, Palo Alto, CA*

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CANCELLED

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*Bruce A. Keiser; Angela Zagala; and W. Carlson; Nalco, an Ecolab
Company*

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*Thomas E Higgins¹, Dennis Fink², Krystal Perez²; ¹CH2M, Reston,
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*Diane R. Martini,¹ Keith W. Ambrose²; Burns & ¹McDonnell,
Chicago, IL; ²Duke Energy, Charlotte, NC*

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James B. Jarvis, Sterling M. Gray; AECOM, Austin, TX

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Christopher Bertole, Cormetech Inc., Durham, NC

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*Kyle Neidig¹, Michael Klump¹; Chelsea Lucas²; Yoshinori Nagai³;
¹Mitsubishi Hitachi Power Systems America Inc., Galena, OH;
²Southern Company; ³Mitsubishi Hitachi Power Systems America
Inc., Basking Ridge, NJ*

Lunch

Harbor DE

11:50 am – 12:50 pm

Final Program

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Technical Program – Thursday, August 18, 2016

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Chair: Susan Thorneloe, EPA

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Stephen Shulder,¹ Michael Rosen,² Joy Rooney,² Rajendra Gaikwad²;

¹EPRI, Charlotte, North Carolina, ²Sargent & Lundy LLC, Chicago, IL

1:15 pm – 1:40 pm

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Susan Thorneloe¹, Greg Helms², Dan Fagnan², David Kosson², Andrew Garrabrants³, ¹US EPA/ORD-RTP, NC; ²US EPA, Office of Land and Emergency Management, Washington, DC; ³ Vanderbilt University, Washington, DC

1:40 pm – 2:05 pm

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Richard Munson¹, Randy Shepler²; ¹Beumer Kansas City, Kansas City, MO; ²Design Build Group, CCC Group

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Dale Timmons, R.G., NAES Corporation, Issaquah, WA

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Herek L. Clack, Department of Civil & Environmental Engineering, University of Michigan, MI

1:15 pm – 1:40 pm

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Tony Bazzi¹, Michael Estes¹, and Bruce Scherer² ¹Engineering Support Organization, DTE Energy, Detroit MI; ²Particulate Controls Technologies, Helena, AL

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Xing Zhang, IEA Clean Coal Centre

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John A. Knapik¹, Jia (Erick) Ma¹, Steve Burgund², Steve Marchigiano³; ¹The Babcock & Wilcox Company, Barberton, Ohio, ²Dynegy, Wood River Station, Alton, Illinois, ³Duke Energy, Crystal River Station, Crystal River, FL

TECHNICAL AGENDA

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Chair: Rick Himes, EPRI

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Ryan W. Essex¹, Tim J. Kreff²; 1HDR Inc., Chicago, IL; 2Wisconsin Power and Light Co., Madison, WI

2:30 pm - 2:55 pm CANCELLED

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Economizer Outlet Temperature Control Provides Flexibility for Cycling Plants.....N/A

Joseph T. Buckler, Ryan D. Hensel, Mel J. Albrecht; The Babcock & Wilcox Company, Barberton, OH

2:30 pm - 2:55 pm

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Jason F. Baker, Dean P. Bell, Thomas L. Hart; American Electric Power Service Corp., Columbus, OH.

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Mandi Richardson¹, Gary Blythe¹, Chuck Dene², Nanda Srinivasan²; 1AECOM Austin, TX, 1EPRI Palo Alto, CA

Final Program

POSTER SESSIONS

POSTERS

Poster Sessions:

Posters will be presented on Tuesday, August 16 from 4:00 pm - 5:00 pm and on Wednesday, August 17 from 5:00 pm - 6:30 pm in the Grand Ballroom Foyer in conjunction with the Reception in the Exhibit Hall.

CO₂

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Adel J. Al-Khalifah, Saudi Electricity Company

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Sergei Komkov-Epshtein, Global Consulting, Chicago, IL

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John H. Kumm,¹ Christina Duell,² David Eldridge,³ Anatoly Gimburg,⁴ Amanda McClaskey,⁵ Jack Ross,^{6, 1,2} EA Engineering, Science, and Technology, Inc., PBC, Hunt Valley, MD, ^{3,4,5} JHMI Utilities, LLC, Baltimore, MD, ⁶ Affiliated Engineers, Inc.

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Ed Weinberg,¹ Robert Mroz,²; ESSRE Consulting, Inc. Richboro PA, ²HYTEK-Bio, LLC, Dayton, MD

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Jonathan O. Allen,¹ Christopher K. Ferens-Foulet,¹ George Offen²; ¹Allen Analytics LLC, Tucson, AZ, ²EPRI, Palo Alto, CA

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Yongxin Feng¹, Yaming Liu¹, Kai Xu¹, Zhuo Xiong², Yongchun Zhao², Junying Zhang², Chuguang Zheng²; ¹Electric Power Research Institute of Guangdong Power Grid Company, Guangzhou, China, ²State Key Laboratory of Coal Combustion, Huazhong University of Science and Technology, Wuhan, China

Control #51

Emission of Mercury in a 35MWth Industrial-Scale Oxyfuel Combustion Power Plant with Different Flue Gas Recycle.....N/A
Yaming Liu¹, Yongxin Feng¹, Kai Xu¹, Jianping Yang², Yongchun Zhao¹, Junying Zhang¹, Chuguang Zheng²; ¹Electric Power Research Institute of Guangdong Power Grid Company, Guangzhou, China, ²State Key Laboratory of Coal Combustion, Huazhong University of Science and Technology, Wuhan, China

Control #62

Advanced Kinetics of HgO Oxidation Over a V-based SCR Catalyst.....N/A
David Repp¹; Silvia Alcove-Clave²; Michael Nash²; Nicola Usberti²; Alessandra Beretta³ ¹Johnson Matthey, Alpharetta, Georgia, US; ²Johnson Matthey Technology Centre, Reading, UK; ³Politecnico di Milano, Milano, Italy

Control #69

On-site Production of Lime to Remove Acid Gases from Illinois Coal Combustion Flue Gas.....N/A
Ivan Sugiyono, Hong Lu; Illinois State Geological Survey, University of Illinois at Urbana-Champaign, Champaign, IL

Control #71

Powdered Activated Carbon Injection Resulting in Improved Dispersion.....N/A
Regina Rodriguez, David Mazyck, PhD, Jack Dwiega, Erica Gonzaga, Christine Valcarce, PhD; Carbonxt, Inc., Gainesville, FL

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Control #73

Powdered Activated Carbon for the Removal of Mercury in WFGD Wastewater.....N/A

Erica Gonzaga, David Mazyck, Christine Valcarce, Regina Rodriguez; Carbonxt, Inc., Gainesville, FL

Control #79

Experimental Validation of CFD Models for Activated Carbon Injection.....N/A
Prescott L. Eisele, Eric ten Siethoff, Jeffery M. Russell; MPR Associates, Alexandria, VA

Control #90

Integrating ADAir-Mixer™ Technology to Optimize System Performance with DSI Applications.....N/A

Cody Wilson¹, Elizabeth Morley¹, Constance Senior¹, Mark Pavof¹, Dave Dorste²; ¹ADA-ES, Highlands Ranch, CO; ²Blender Products, Denver, CO

Control #92

Assessment of Field Test Methods to Monitor Hg Oxidation Performance Across an SCR.....N/A

Xin Liu, Nick Pollack; STEAG SCR-Tech, Inc., Charlotte, NC

Control #94

Mercury Treatment Options for MATS Compliance: A review.....N/A

Nick Pollack¹, Thorsten Dux²; ¹ STEAG SCR-Tech, Inc., Kings Mountain, NC; ² STEAG Energy Services GmbH, Herne, Germany

Control #123

Mercury Emissions from the Combustion of Coal, Dried Sludge and RDF.....N/A

Sang-Sup Lee, Min Park; Department of Environmental Engineering, Chungbuk National University, Cheongju, South Korea

ELG ZLD

Control #30

ZLD, Near ZLD, Treat and Discharge – What Is Best?.....N/A

Steve Feeney; The Babcock & Wilcox Company, Barberton, Ohio

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Regina Rodriguez, Christine Valcarce, PhD, David Mazyck, PhD, Erica Gonzaga; Carbonxt, Inc., Gainesville, FL

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Matthew K. Heermann, Sargent & Lundy, LLC Chicago, IL

Measurement Methods

Control #101

Laboratory and Field Testing Directed Toward Minimizing Uncertainty in Boiler Heat Rate Measurements when Utilizing Stack Emissions Monitoring Equipment.....N/A

Jack Bionda,¹ Volker Schmid,¹ Dave Wheeler,² Tom Martz,³ Samuel Korellis,³ Chuck Dene³, ¹Clean Air Engineering, Inc., Pittsburgh, PA, ²Clean Air Engineering, Inc., Knoxville, TN, ³EPRI, Palo Alto, CA

Control #107

NIST Programs to Achieve Accurate, Internationally-Recognized Stack Emission Measurements.....N/A

Aaron Johnson, NIST Programs Gaithersburg, MD

Control #114

Continuous and Real-Time FTIR Monitoring of Sulfuric Acid and Other Components in Coal-Fired Power Plant Flue Gas.....N/A

Constant Marks, Brian Adair, Curtis Laush; Geosyntec Consultants, Austin, TX

NOx SCR

Control #31

Unique Cold-side SCR Arrangement on the Palm Beach Renewable Energy Facility No. 2 Waste-to-Energy Plant.....N/A

Ryan D. Hensel, Mike D. Fick; The Babcock & Wilcox Company, Barberton, OH