

# **Power Plant Air Pollutant Control “MEGA” Symposium 2012**

**Baltimore, Maryland, USA  
20-23 August 2012**

**Volume 1 of 2**

**ISBN: 978-1-62276-816-5**

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

The opinions expressed in these papers are solely of the authors and should not be considered as having the endorsement or support of the Association.

Compilation Copyright © 2012 by the Air & Waste Management Association.  
Copyright of the individual papers are retained by the authors. Published in July 2012

Printed by Curran Associates, Inc. (2013)

For permission requests, please contact the Air and Waste Management Association  
at the address below.

Air and Waste Management Association  
One Gateway Center, 3rd Floor  
420 Fort Dzusne Blvd.  
Pittsburgh, Pennsylvania 15222-1435

Phone: 800 270 3444  
Fax: 412 232 3450

[www.awma.org](http://www.awma.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2634  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

## VOLUME 1

### **SESSION 1: MATS COMPLIANCE CONSIDERATIONS**

*Chair: Tony Facchiano*

<b>Coal's Triple Challenge for Air Regulation Compliance: Technology, Measurement, and Commercial</b> .....	1
<i>Dennis W. Johnson, James H. Brown, Michael J. Martin, Anesha Rumble</i>	
<b>The MATS Conundrum, A Tongue-in-cheek Case Study</b> .....	14
<i>Peter T. Belmonte, Robert (Bob) Fraser</i>	
<b>Important Considerations for Permitting of Emission Control Systems – Lessons Learned and Recommendations</b> .....	35
<i>Anand Yegnan, Jennifer Flannery, Julie Ross, Mike McClintock, John Sherwell</i>	

### **SESSION 2A: HAPS AND SO<sub>x</sub> CONTROL: DSI**

*Co-Chairs: Andrew O'palko, Ramsay Chang*

<b>Survey of Power Plants Using Dry Sorbent Injection of Alkaline for Acid Gas Control</b> .....	47
<i>Katie Arambasick, Katherine Dombrowski, Gary Blythe, R. Chang, C. Dene</i>	
<b>Preparing for New Multi-Pollutant Regulations with Multiple Low Capital Approaches</b> .....	64
<i>Martin Dillon, Tom Campbell, Greg Filippelli, Sharon Sjostrom, David Young, Andrew Szafarz</i>	
<b>Interactions between DSI and ACI/Fuel for Simultaneous SO<sub>2</sub>, HCl and HG Removal</b> .....	84
<i>Jonathan E. Norman</i>	
<b>Dynamic Control of DSI for SO<sub>3</sub> Management</b> .....	91
<i>Robert Branning, Phil Reeves, Brian Moore, Matt Blankner</i>	

### **SESSION 2B: HAPS AND SO<sub>x</sub> CONTROL: DSI**

*Co-Chairs: Andrew O'palko, Ramsay Chang*

<b>HCl Control Using Hydrated Lime Dry Sorbent Injection</b> .....	104
<i>Anthony A. Silva, Ashley Krout, Curt Biehn</i>	
<b>Dry Sorbent Injection (DSI) Suitability for MATS Compliance</b> .....	121
<i>James C. Dickerman, Melissa R. Sewell, M.B. Looney</i>	
<b>Results of Dry Sorbent Injection Testing to Reduce HCl</b> .....	136
<i>Carl P. Laird, Kevin J. Smith, M.B. Looney</i>	
<b>An Enhanced CFD Based Chemistry Model for SO<sub>3</sub> Mitigation by Dry Sorbent Injection</b> .....	148
<i>Liming Shi, Guisui Liu, Lewis Benson</i>	

### **SESSION 3A: MERCURY CONTROL – INTEGRATED OPTIONS**

*Chair: Ravi Srivastava*

<b>Effects on Mercury and Other Air Toxics with Mercury Control Testing on a Lignite Fired Unit Using the DryFine™ Process and Equipped with Electrostatic Precipitators and Wet FGD Systems</b> .....	162
<i>Charlie Bullinger, R. Chang, Greg Archer, Diane Stockdill, Jennifer Paradis, Gary Blythe, Constant Marks</i>	
<b>Results of Emission Testing with Fuel Additives, Activated Carbon, and an Evaluation of Mercury Re-emission at a Coal-Fired Power Plant</b> .....	177
<i>Paul Farber, John McLeod, Casey Smith, John Faber, Ajay Jayaprakash, Steve Katzberger</i>	
<b>Optimization of Mercury Control on a New 800-MW PRB-Fired Power Plant</b> .....	195
<i>Gary Blythe, Jacob S. Bissell, Louis S. Labatt</i>	
<b>Design and Operation of a Pilot Pulse-Jet Baghouse on Medium to High Sulfur Coal</b> .....	209
<i>M.B. Looney, R. Merritt, S. Liu, R. Chang, T. Millar, G. Barfield</i>	

### **SESSION 3B: MERCURY CONTROL – FGD**

*Chair: Chuck Dene*

<b>Mercury Control Strategy of a Wet Sodium Scrubber</b> .....	219
<i>Philip Elliott</i>	
<b>Improving Mercury Capture Efficiency of WFGDs by Controlling Re-emissions</b> .....	233
<i>Bruce A. Keiser, John Meier, Jianwei Yuan</i>	
<b>Investigation of Mercury Control by Wet FGD Systems</b> .....	243
<i>Gary Blythe, John E. Currie, Mandi K. Richardson, William Steen, C. Dene</i>	

<b>Balance of Plant Effects of Bromide Addition for Mercury Control.....</b>	259
<i>Katherine Dombrowski, Katie Arambasick, R. Chang</i>	
<b>MHI Mercury Removal System with NH<sub>4</sub>Cl Injection.....</b>	270
<i>Shintaro Honjo, Keisuke Iwakura, Bill Welliver, Satoru Sugita, Takeshi Ikeda, Nobuyuki Ukai, Katsumi Nochi, Tatsuto Nagayasu, Masashi Kiyosawa, Susumu Okino, Corey Tyree</i>	

### **SESSION 3C: MERCURY CONTROL – ACI**

*Co-Chairs: Nick Hutson, Sharon Sjostrom*

<b>Extended Use of Concrete-Friendly™ C-PAC™ Sorbent at PPL Montana Corette Station.....</b>	285
<i>Ronald R. Landreth, David Royer</i>	
<b>Performance of Non-Halogenated Activated Carbon for Mercury Compliance.....</b>	297
<i>Heather Byrne, Ameena Khan, Caitlin Gross, David Mazyck, William Naylor, Wallis Harrison, Ralph Altman</i>	
<b>Next-Generation Activated Carbon Performance in Emission Systems .....</b>	307
<i>Kent Wanninger, Luke Ford, Margaret Ruane, Robert Huston, Jacqueline Cecil, Chris Vizcaino, Jacob Lowring, Sheila Glesmann</i>	
<b>Latest Advancements in Mer-Cure™ Technology for Utility MATS Compliance.....</b>	320
<i>Maggie Skelton, Rob Coughlin, Lester Flem, Richard LaFlesh, Carl Edberg, John Iovino</i>	
<b>Second Generation ACI Systems: Applying the Lessons Learned in Round One.....</b>	338
<i>William E. Siegfriedt, Wayshalee Patel, Jacob S. Bissell</i>	

### **SESSION 3D: MERCURY CONTROL – SORPTION**

*Co-Chairs: Nick Hutson, Sharon Sjostrom*

<b>Full Scale Performance of Mercury Control with Non-Carbon Reagent.....</b>	343
<i>James R. Butz, Gary Theis, Justin Moser</i>	
<b>Demonstration of Technology for Enhanced Mercury Control with SDA and CDS Units .....</b>	353
<i>Nicholas S. Ergang, Bruce A. Keiser, Rebecca Stiles, Steve Smokey</i>	
<b>Field Demonstrations of Fixed-Structure Sorbents for Mercury Emission Control from Coal Fired Flue Gas.....</b>	360
<i>Tom Machalek, Carl Richardson, R. Chang, Xiao-Chun Lu, Jeff Kolde, Stephen Stark, M.B. Looney</i>	
<b>Full-scale Test Evaluation of a Multi-element Sorbent Trap Sampling Method for Halogen and Trace Metal Emissions .....</b>	374
<i>John H. Pavlish, Jeffrey S. Thompson</i>	

### **SESSION 4A: CO<sub>2</sub> CONTROLS – STRATEGIES (CONCURRENT WITH SESSION 5A)**

*Chair: Frank Princiotta*

<b>Global Climate Change - The Power Generation Challenge.....</b>	389
<i>Frank Princiotta, Dan Loughlin</i>	
<b>Status of Post-Combustion Carbon Capture RD&amp;D at U.S. DOE National Energy Technology Laboratory .....</b>	402
<i>Shailesh D. Vora, Lynn A. Brickett, Timothy Fout, Ronald K. Munson, James T. Murphy</i>	
<b>Assessment of Greenhouse Gas Retrofit Issues for Coal Fired Power Plants .....</b>	419
<i>Joy T. Gloria, David A. Bahr, John Chang</i>	
<b>EGU GHG Control Options – Early Results and Trends.....</b>	429
<i>Mark DiPrinzo, John Sherwell</i>	
<b>GHG BACT Case Study for a Combined Cycle Gas Turbine Project .....</b>	440
<i>George F. Holder II</i>	

### **SESSION 5A: NO<sub>x</sub> CONTROL (CONCURRENT WITH SESSION 4A)**

*Chair: Alejandro Jimenez*

<b>Improvement in Performance of SCR Catalyst Using Combustion Additives: Technology Status Update.....</b>	448
<i>Mandar Gadgil, Larry Pierson, Elizabeth Hansen, Derek Silbaugh, John Meier</i>	
<b>Improving SCR Efficiency by Eliminating Buildups with a Combination of Air Cannons and Sonic Horns .....</b>	462
<i>Jeff Shelton, Arthur Bosshart, Clyde Strope</i>	
<b>Performance and Development Data for Gas-Gas Mixing Processes on SCR Applications .....</b>	472
<i>Kevin J. Rogers, Mitch W. Hopkins</i>	
<b>Optimizing Catalyst Performance Aids in Lowering Operational &amp; Management Costs.....</b>	495
<i>Michael B. David, Volker Rummehohl, Howard Benisvy, Kent W. Schulz</i>	

<b>The Fact and Fiction of SCR Catalyst Regeneration.....</b>	516
<i>Mark Ehrnschwender</i>	

## **SESSION 4B: CO<sub>2</sub> CONTROLS – OXY-FIRED/PRECOMBUSTION (CONCURRENT WITH SESSION 5B)**

*Chair: Ravi Srivastava*

<b>Doosan Power Systems OxyCoal™ Technology.....</b>	525
<i>David W. Sturgeon, Jim W. Rogerson, Gerry J. Hesselmann, Hyeok P. Kim, Keith Morris</i>	
<b>Carbon, Sulfur and Nitrogen Behavior During Pilot-Scale Testing of Oxy-Coal Combustion.....</b>	537
<i>Andrew Fry, Bradley Adams, Timothy Fout</i>	
<b>Fire-Side Corrosion of Heat Transfer Surface Materials for Air- and Oxy-coal Combustion.....</b>	548
<i>Andrew Fry, Bradley Adams, Kevin Davis, David Swensen, William Cox</i>	
<b>Mercury Measurements from Pilot-Scale Furnaces under Air- and Oxy-fired Conditions.....</b>	562
<i>Brydger Van Otten, Andrew Fry, Bradley Adams, Jost Wendt, Geoff Silcox, Ignacio Prediado</i>	
<b>Solid Sorbent Enhanced Water-Gas Shift Process for Pre-Combustion CO<sub>2</sub> Capture.....</b>	580
<i>William Steen, Carl Richardson, Thomas Machalek, Jennifer Paradis, Massoud Rostam-Abadi, Yongqi Lu, Hong Lu, Meghan Napoli</i>	

## **SESSION 5B: NO<sub>x</sub> – MULTIPOLLUTANT CONTROL (CONCURRENT WITH SESSION 4B)**

*Chair: C.W. Lee*

<b>Using Your SCR as Part of Your Mercury Mitigation Strategy by Co-Benefits.....</b>	593
<i>Anthony Favale, Stephen Guglielmo, Peter Jin, Yoshinori Nagai, Corey Tyree</i>	
<b>Enhanced Mercury Control by Managing SCR Systems for Mercury and NO<sub>x</sub>.....</b>	607
<i>Scott Hinton, A. Jimenez, C. Dene, Corey Tyree</i>	
<b>Achieving and Maintaining Hg Oxidation Performance through SCR Catalyst Selection and Management.....</b>	622
<i>Chris E. DiFrancesco, Christopher J. Bertole, Jeremy T. Freeman, Katsumi Nuchi</i>	
<b>Analytical Management of SCR Catalyst Lifetimes and Multipollutant Performance .....</b>	643
<i>Stephen Niksa, Balaji Krishnakumar, Farrokh Ghoreishi, Corey Tyree</i>	

## **VOLUME 2**

<b>The Effect of Ammonia on HCl Emissions .....</b>	655
<i>Garrett E. Pavlovic, Anthony A. Silva, Mark J. Mullen</i>	

## **SESSION 4C: CO<sub>2</sub> CONTROLS – SOLVENTS (CONCURRENT WITH SESSION 5C)**

*Co-Chairs: Tim Fout, Will Yelverton*

<b>Pilot-Scale Evaluations of Advanced Solvents and a Novel Solvent-Gas Contactor for Lower-Cost CO<sub>2</sub> Capture.....</b>	666
<i>Brandon M. Pavlish, Nathan J. Fiala, John P. Kay, Joel G. Downs</i>	
<b>Babcock &amp; Wilcox Power Generation Group', Inc.'s RSAT™ Process and Field Demonstration of the OptiCap™ Advanced Solvent at the US-DOE's National Carbon Capture Center .....</b>	684
<i>Jeb W. Gayheart, Stephen A. Moorman, Ted R. Parsons, Christopher W. Poling</i>	
<b>Pilot Demonstration and Techno-Economic Analysis of Piperazine Solvent with High Temperature Two-Stage Flash for CO<sub>2</sub> Removal from Coal-Fired Flue Gas.....</b>	702
<i>Eric Chen, Gary Rochelle, Andrew Sexton, Kevin Fisher, Katherine Dombrowski, Bruce Lani</i>	
<b>Project Update of 500 TPD Demonstration Plant for Coal-fired Power Plant and MHI Amine Emission Reduction Technology.....</b>	713
<i>Steven Holton, Tatsuya Tsujuchi, Takahito Yonekawa, Paul Wood, Takuya Hirata, Hiromitsu Nagayasu, Takashi Kamijo, Yasuo Kubota, Michael Ivie, Nick Irvin</i>	

## **SESSION 5C: NO<sub>x</sub> CONTROL – ALTERNATE STRATEGIES/FUELS (CONCURRENT WITH SESSION 4C)**

*Chair: Rick Himes*

<b>Predicting the Impact of Furnace Ash Deposition on Furnace Temperature and NOx and CO Emissions .....</b>	728
<i>Andrew Fry, Dave Wang, Brydger Van Otten, Kevin Davis, Timothy Fout</i>	

<b>Advanced DeNOx Technologies for the Minimization of Capital and Operational Costs in Combustion Facilities .....</b>	744
<i>Francisco Rodríguez, Enrique Tova, Enrique Bosch, John W. Sale, Andoni Redondo</i>	

**SESSION 4D: CO<sub>2</sub> CONTROLS – SOLVENTS AND SORBENTS (CONCURRENT WITH SESSION 6)**

*Co-Chairs: Lynn Brickett, Will Yelverton*

<b>Ferrybridge CCPilot100+ Post Combustion CO<sub>2</sub> Capture Pilot Plant Operating Experience and Test Results.....</b>	759
<i>F.D. Fitzgerald, R.A. Gardiner, M. Hunt, K.W. Morris</i>	
<b>CCUS Demonstration Project at WA Parish Station-Results of FEED Study .....</b>	767
<i>David J. Stopek, Roger Smith, Sean McHone</i>	
<b>Enzyme Catalyzed Process for Low Cost CO<sub>2</sub> Separation and Capture.....</b>	779
<i>Sean Black, Tracy Bucholz, Robert Martinelli, Brett Rambo, John Reardon, Matthew Hulvey</i>	
<b>Solid Sorbents as a Retrofit CO<sub>2</sub> Capture Technology: Update on 1 MW<sub>e</sub> Pilot Progress.....</b>	795
<i>Travis Starns, Sharon Sjostrom, Holly Krutka, Cody Wilson, Michael Ivie</i>	
<b>A Low Cost High Capacity Regenerable Sorbent for Post Combustion CO<sub>2</sub> Capture .....</b>	807
<i>Gökhan Alptekin, Ambal Jayaraman, Robert Copeland, Steve Dietz</i>	

**SESSION 6: PARTICULATE CONTROL (CONCURRENT WITH SESSION 4D)**

*Chair: Chuck Dene*

<b>Newmont Mining Experience with 10 Meter Long Filter Bags.....</b>	818
<i>Robert E. Snyder, Kuda Mutama</i>	
<b>Operating Experience with Fabric Filters on High Sulfur Fuel .....</b>	829
<i>Rick Lausman, Scott Rogers</i>	
<b>Electrostatic Precipitator Upgrade Opportunities Through a Review of Best Performers in Coal-Fired Power Plants.....</b>	840
<i>K.S. Kumar, J.A. Knapik, D.S. Hartman</i>	

**SESSION 7A: SO<sub>x</sub> CONTROL (CONCURRENT WITH SESSION 8A)**

*Chair: James Hoffman*

<b>Survey of Recently Installed Dry FGD Systems.....</b>	856
<i>Lesley Baker, David B. Holstein, Benjamin Williams, Gary Blythe, C. Dene</i>	
<b>Initial Start-Up and Commissioning of Circulating Dry Scrubber at Cooper Unit 2 .....</b>	869
<i>Jeromy K. Jones, Carl V. Weilert, Samuel E. Yoder, Mary Jane Warner</i>	
<b>Demonstration of the B&amp;W PGG / GEA Niro SDA Peak Control System .....</b>	880
<i>Bryan J. Jankura, Kevin E. Redinger, Carly Miller, Niels Jacobsen, Niels G. Hansen, Ludek Sklenář</i>	

**SESSION 8A: WATER (CONCURRENT WITH SESSION 7A)**

*Co-Chairs: George Offen, Brian Fisher*

<b>Pilot Scale Demonstration of an Activated Iron Process for Removing Heavy Metals and Nutrients from the FGD (Flue Gas Desulfurization) Wastewater .....</b>	901
<i>Yong H. Huang, Xinjun (Jason) Teng</i>	
<b>Alternatives Analysis for Water Sources used to Operate a Flue Gas Desulfurization System .....</b>	913
<i>Connie J. Faustini, Robert L. Keating, Susan T. Gray</i>	
<b>Use of Treated Municipal Wastewater to Supply Water for Wet Flue Gas Desulfurization System.....</b>	924
<i>P. Diane Mountain, John Sherwell, Gary Walters</i>	
<b>MHI's Simple Zero Liquid Discharge System for Wet FGD .....</b>	932
<i>Motofumi Ito, Shintaro Honjo, Norikazu Inaba, Satoru Sugita, Tetsu Ushiku, Tatsuto Nagayasu, Toshihiro Fukuda, Seiji Kagawa</i>	

**SESSION 7B: SO<sub>x</sub> – MULTIPOLLUTANT CONTROL (CONCURRENT WITH SESSION 8B)**

*Chair: Danielle Petrucci*

<b>Measured Particulate, HCl, and Hg Emissions from Circulating Dry Scrubbers Compared to the EPA Mercury Air Toxic Standards.....</b>	946
<i>Terence Ake, Roderick Beittel, Anthony Licata, Douglas Beck, Eric Walters</i>	
<b>Multi-Pollutant Control with a CFB Scrubber System .....</b>	956
<i>Mark R. Bleckinger, Marty A. Stange, Paul E. Petty</i>	

<b>Operating Experiences with a Novel SDA Design.....</b>	971
<i>Kevin E. Redinger, Bryan J. Jankura, Niels Jacobsen, Mogens Rübner-Petersen, Chang Zhitie</i>	

### **SESSION 8B: WATER (CONCURRENT WITH SESSION 7B)**

*Co-Chairs: George Offen, Brian Fisher*

<b>Siemens WFGD Effluent Characterization Study - Phase III.....</b>	981
<i>Stephen E. Winter, Michael A. Sandell, Michael T. Hoydick</i>	
<b>Dealing with Fines Accumulation in FGD Gypsum Dewatering .....</b>	991
<i>Carl V. Weilert, Paul N. Dyer</i>	
<b>Dissolved Metals Concentrations in FGD Wastewater Correlate with FGD Oxidation State .....</b>	1003
<i>Jonathan O. Allen, Corey A. Tyree</i>	

### **SESSION 7C: SO<sub>x</sub> – WET FGD (CONCURRENT WITH SESSION 9)**

*Chair: Chuck Dene*

<b>New Life for a Dual Loop Wet FGD System .....</b>	1013
<i>Glenn D. Fenske, Paul J. Williams, Carl A. Palmberg, Jeffrey Jenkins</i>	
<b>Georgia Power Plant Hammond Scrubber Performance Decline .....</b>	1031
<i>William B. Blevins, Ned West</i>	
<b>Corrosion in Alloy WFGD Absorber Reaction Tanks.....</b>	1039
<i>Purusha Bonnin-Nartker, Shannon R. Brown, Richard F. DeVault, John M. Jevec, Michael G. Milobowski, Kevin J. Rogers, Jeff Sarver, Sandy Ulbricht</i>	

### **SESSION 9: EMISSIONS MEASUREMENTS (CONCURRENT WITH SESSION 7C)**

*Chair: Jeff Ryan*

<b>The State of Technology for Monitoring PM and HCl under the EGU NESHAP .....</b>	1054
<i>Wayshalee Patel, Paul Farber, Emily Kunkel</i>	
<b>Application of the Process Particle Counter (PPC) for Real-time PM Measurements and Optimization of Power Generation Emissions Control Systems .....</b>	1066
<i>Donald J. Holte, Bruce Easom, Gerry Klemm</i>	
<b>Flue Gas Desulfurization CEMS Design Lessons Learned and Monitoring Technologies to Meet the New Mercury and Air Toxics (MATS) Rule.....</b>	1096
<i>Timothy J. Kuiken</i>	
<b>Field Testing of a Continuous Real-Time In Situ SO<sub>2</sub>/SO<sub>3</sub> Monitor.....</b>	1105
<i>Curtis T. Laush, Brian A. Adair, Gregory N. Coleman, Richard M. Himes</i>	

### **POSTERS: MEASUREMENTS**

<b>Fast Response NO<sub>x</sub> Monitoring For Better SCR Optimization During Transient Conditions in Both Gas Turbines and Coal Fired Boilers.....</b>	1121
<i>Ken Greaves</i>	
<b>Inspection Achievements of Cogeneration Process for CEMS Audit in Taiwan .....</b>	1134
<i>Ting Ke Tseng, Jiun-Horng Tsai, Jhin-Sheng Su, Ruo-Jun Zhu, Shyh-Wei Chen, Tsung Wen Chien</i>	
<b>Predictive Emissions Monitoring Systems (PEMS): Regulation of Alternative Monitoring Systems in Canada.....</b>	1148
<i>Denis Maftei, Paul Niejadlik, Mike Jammer, Anthony Ciccone</i>	

### **POSTERS: MERCURY**

<b>Mercury Volatilisation During Setting of FGD-Gypsum Plaster .....</b>	1164
<i>Daniel Kunth, Jan Schuetze, Heinz Koeser, Sven Reichstein</i>	
<b>Interactive Process Optimization Guidance for Mercury Emissions Control .....</b>	1168
<i>Stephen Niksa, Balaji Krishnakumar, Lesley Sloss, Wojciech Jozewicz, Gunnar Futsaeter</i>	
<b>Developing an AS™ Standard for Mercury Sorbents.....</b>	1182
<i>Yin Zhang</i>	
<b>Meeting MATS Mercury Limits with Challenging Combustion Scenarios .....</b>	1183
<i>Marcus A. Sylvester</i>	
<b>Mercury (Hg) Control Process, Demonstrates Significant Oxidation and Removal of Mercury (Hg) From Combustion Flue Gas in Compliance with the MATS Rule, and Shows Noteworthy Economical Capital and O&amp;M Cost .....</b>	1184
<i>Russ D. Bryson, Terry E. Marsh</i>	

## **POSTERS: MULTIPOLLUTANT**

<b>Newly Patented CEFCO Process for Compliance with MACT, MATS, CSAPR and NESHAP Rules .....</b>	1185
<i>Robert E. Tang, John Conroy</i>	
<b>Sonic Capture of Condensates Containing Particulates and Dissolved Gases.....</b>	1198
<i>Howard E. Purdum, William Downs</i>	
<b>Catalytic Multi-Pollutant Abatement of Gas Turbine Exhaust .....</b>	1199
<i>Niklas Jakobsson, Hans Jensen-Holm</i>	
<b>Technology Update - Wet Electrostatic Precipitation Applied to Fossil Fuel Combustion .....</b>	1213
<i>George Voss, John Baker</i>	
<b>Complying with EPA's Mercury and Air Toxics Standard .....</b>	1214
<i>Robert Nicolo</i>	

## **POSTERS: FGD**

<b>Reaction Mechanism of Selenite, <math>S_2O_8^{2-}</math> and <math>Mn^{2+}</math> in a Limestone-Gypsum FGD Liquor .....</b>	1215
<i>Hiroyuki Akiho, Hiromitsu Matsuda, Shigeo Ito</i>	
<b>Recent Operating Results of the Five New Wet FGD Installations for Ameren Corporation.....</b>	1225
<i>Bruce C. Studley, Robert Nicolo, Steve Mosch</i>	
<b>Wet-Limestone FGD Solids Analysis by Thermogravimetry.....</b>	1234
<i>Brad Buecker</i>	
<b>Wet FGD Process Advances using CAATech: Compact Absorber Arrangement .....</b>	1248
<i>Mitchell J. Krasnopoler, Anand Mahabaleshwaran, Stephen Henson, Steve Frankosky</i>	
<b>Dry Sorbent Injection (DSI) of High Performance Hydrated Lime for <math>SO_3</math> Removal.....</b>	1249
<i>Richard Zhang, Curt Biehn, Thomas Gale</i>	
<b>The Use of NPV Calculations to Evaluate the Selection of FGD Technologies.....</b>	1250
<i>Anthony Licata, Ray D'Alessandro, Todd Clark</i>	

## **POSTERS: GENERAL**

<b>MHI Carbon Capture Integrated with MHI High Efficiency System.....</b>	1263
<i>Tiffany Wu, Tatsuya Tsujiiuchi, Shintaro Honjo, Takuya Okamoto, Tatsuto Nagayasu, Tsuyoshi Miyaji, Seiji Kagawa, Todd Wall, Nick Irvin</i>	
<b>Phase-Changing Absorbents for <math>CO_2</math> Capture.....</b>	1275
<i>R. Perry, B. Wood, S. Genovese, M. O'Brien, T. Westendorf, M. Meketa, R. Farmum, J. McDermott, I. Sultanova, G. Rubinsztajn, H. Lam, T. Perry, R.-K. Vipperla, L. Wichmann, R. Enick, L. Hong, D. Tapriyal</i>	
<b>Validation of New SCR Catalyst Bench-Scale Test Facility .....</b>	1276
<i>Thomas Gale</i>	
<b>Relating the Deactivation Potential of SCR Catalysts to Fuel Properties and Firing Conditions.....</b>	1277
<i>Balaji Krishnakumar, Stephen Niksa, A. Jimenez</i>	
<b>The Technical Suitability and Limitations of PPS Filter Media When Utilized in Utility Boiler Baghouses .....</b>	1278
<i>Christina C. Clark, Terry G. Williamson, Jeff K. Smith, John D. McKenna</i>	
<b>Addressing Deposition and Corrosion Concerns in Preparation for the Conversion of a Utility Boiler from Pulverized Coal to Biomass .....</b>	1293
<i>Kevin Davis, James Valentine, Huafeng Wang, Guisu Liu, Ed Pozzobon</i>	
<b>The American Society of Mechanical Engineer's Research Committee on Energy on Energy, Environment, and Waste is Reinventing Itself - New Programs, New Subcommittees, New Agenda .....</b>	1294
<i>Robert E. Sommerlad</i>	
<b>Author Index</b>	