

COAL: WORLD ENERGY SECURITY

The 34th International Technical Conference on
Clean Coal & Fuel Systems

May 31 – June 4, 2009

Sheraton Sand Key, Clearwater, Florida, USA



**Five Days – The Hottest Topics –
The World’s Leading Experts –
The Most Comprehensive Program on Clean
Coal Technologies –
From “Dawn to Dusk” –
Representatives from 6 Continents –
On One of the World’s Best Beaches**

THE CLEARWATER CLEAN COAL CONFERENCE

Endorsing Organizations:

- American Public Power Association
- CanmetENERGY
- China Coal Research Institute
Ministry of Coal, People's Republic of China
- Edison Electric Institute
- Export Assistance Center, U.S. Commercial Service
- Illinois Clean Coal Institute
- International Energy Agency: Coal Research
- Japan Coal Energy Center (JCOAL)
- National Mining Association
- National Rural Electric Cooperative Association
- Ohio Coal Development Office
- U. S. Geological Survey



For 5-1/2 days the world’s experts will be in Clearwater, Florida, to share their knowledge and expertise on clean coal technologies. Issues on the front burner of the electric utility industry will be spotlighted. All in attendance will have a firm grasp on the critical issues facing the industry today and tomorrow. 12 tutorials, 11 plenary sessions and 25 technical sessions will delve into the technological solutions for coal.

The 34th International Technical Conference on Clean Coal & Fuel Systems Agenda

The 34th International Technical Conference on Clean Coal & Fuel Systems Agenda		
<p>Sunday, May 31, 2009</p> <p>10:00 a.m. to 4:45 p.m. -- Beverage Service</p> <p>10:00 a.m. to 4:30 p.m. -- Three Concurrent Tutorials 10:00 a.m. to Noon:</p> <ul style="list-style-type: none"> • Direct Coal to Liquids <i>Dr. Caroline Burgess Clifford</i> <i>Pennsylvania State University</i> • Beneficiation of High-Moisture Coals for Improved Performance and Reduced Emissions <i>Dr. Nenad Sarunac,</i> <i>Energy Research Center, Lehigh University,</i> <i>Mark Ness, Great River Energy; and</i> <i>Richard Weinstein, Falkirk</i> • Understanding Utility Boiler Ash Formation and Deposition and Finding Solutions <i>Christopher Zygarlicke, Energy & Environmental</i> <i>Research Center, University of North Dakota</i> <p>12:15 to 2:15 p.m.</p> <ul style="list-style-type: none"> • Management and Optimization of NO_x <i>Bonnie Courtemanche, P.E., Babcock Power, Inc.</i> • Geological Storage of CO₂ <i>Dr. Sean T. Brennan, U.S. Geological Survey</i> • Capitalize on Gasification Plant & Process Design Best Practices <i>Mike Mendez, P.E., Business Consultant, Aspen</i> <i>Technology</i> <p>2:30 to 4:30 p.m.</p> <ul style="list-style-type: none"> • Mercury Regulations: Demystifying the Law, <i>Giselle Sherman, Corning Inc.</i> • Low NO_x Technology <i>Alan Paschedag,</i> <i>Manager of Engineering, Siemens Energy Inc, and</i> <i>J. J. Letcavits,</i> <i>Senior Engineer, American Electric Power</i> • Introduction to Oxy-Fuel Technology <i>Hamid Sarv,</i> <i>Director, The B&W Research Center,</i> <i>The Babcock & Wilcox Company</i> <p>6:00 p.m. -- CTA Board of Directors' Reception</p>	<p>Monday, June 1, 2009</p> <p>7:30 to 8:00 a.m. -- Continental Breakfast</p> <p>8:00 a.m. to 11:30 a.m. – Plenary Session: Welcome – <i>Barbara A. Sakkestad, Vice President, Coal</i> <i>Technology Association</i> Overview – <i>Stanley J. Vecchi, The Babcock & Wilcox Company</i> <i>& Chairman of the Coal Technology Association</i> Percy Nicholls Award to and Address by, Dr. George <i>Richards, Focus Area Leader, Energy System Dynamics,</i> <i>National Energy Technology Laboratory, U.S. Department of</i> <i>Energy</i> Keynote Address: The World's Energy and Environmental Challenges – <i>Dr. John C. Chen, Professor</i> <i>and Dean Emeritus, Lehigh University and Past President,</i> <i>American Institute of Chemical Engineers,</i> Keynote Panel: New and Existing Power Plants Before the Advent of Commercial CCS – <i>Dr. Janos M. Beer,</i> <i>Professor Emeritus of Chemical and Fuel Engineering,</i> <i>Massachusetts Institute of Technology</i></p> <p>11:30 a.m. to 12:30 p.m. – Lunch on the Beach</p> <p>12:30 to 2:30 p.m. – Panel: CO₂ Solutions: Oxy-fuel Operation at the Industrial Scale – <i>Dr. Ligang Zheng,</i> <i>Canmet Energy, Canada , and Dr. Terry Wall, Asia-Pacific</i> <i>Partnership Oxyfuel Working Group and University of</i> <i>Newcastle, Australia</i></p> <p>2:30 to 3:00 p.m. -- Break</p> <p>3:00 to 5:00 p.m. – Three Concurrent Tutorials:</p> <ul style="list-style-type: none"> • Effluent Water Chemistry Guidelines <i>John Smolenski, Tampa Electric Company</i> • National Actions Impacting State Programs, (Climate Change, CAMR, CAIR, BART) <i>Joshua Ellwein, Tampa Electric Co.</i> • Mercury Emission TMDL <i>Byron Burrows, Tampa Electric Co.</i> <p>5:10 to 6:10 p.m. – CO₂ in the Future – <i>Klaus S. Lackner,</i> <i>Ewing-Worzel Professor of Geophysics, Department of Earth &</i> <i>Environmental Engineering (HKSM), Columbia University</i></p> <p>6:10 to 7:10 p.m. -- Welcome in the Exhibit Center</p>	<p>Tuesday, June 2, 2009</p> <p>7:30 to 8:00 a.m. – Continental Breakfast</p> <p>8:00 to 10:30 a.m. – Plenary Session: Global Climate Change And the Power Generation Challenge – <i>Frank Princiotta, Director, Air Pollution</i> <i>Prevention and Control Division of the National Risk</i> <i>Management Research Laboratory, U.S. Environmental</i> <i>Protection Agency and</i> Panel: Advanced High Efficient Coal Fired Power Plants – <i>Prof. Dr. Klaus R. G. Hein, University of Stuttgart</i></p> <p>10:30 to 11:00 a.m. – Break</p> <p>11:00 a.m. to 12:40 p.m. – Five Concurrent Sessions</p> <ul style="list-style-type: none"> • Oxy-Fuel Technology I – Overview & Demonstrations <i>Dr. Ligang Zheng, CanmetENERGY</i> • Post Combustion CO₂ Capture <i>Dr. Yewen Tan, CanmetENERGY</i> • Coal Conversion to Chemicals & Fuels -- <i>Massood</i> <i>Ramezan, Science Applications International Corp.</i> • Advanced Materials – <i>Stanley J. Vecchi, B&W</i> <i>Research Center, The Babcock & Wilcox Company</i> • Hydrogen Production from Opportunity Fuels -- <i>Dr. Yen Nguyen, Advanced Technologies Solutions</i> <p>12:40 to 1:40 p.m. – Lunch on the Beach</p> <p>1:40 p.m. to 3:40 p.m. -- Panel: Coal to Liquids <i>Dr. Edmundo Vasquez, Combustion Components Associates</i></p> <p>3:40 p.m. to 4:00 p.m. -- Break</p> <p>4:00 p.m. to 6:00 p.m. Five Concurrent Technical Sessions</p> <ul style="list-style-type: none"> • Oxy-Fuel Technology II – Experimental Studies <i>Dr. Ligang Zheng, CanmetENERGY and</i> <i>Dr. Horst Hack, Foster Wheeler Development Corp.</i> • Mercury Abatement Options for Power Plants <i>Giselle Sherman, Corning, Inc.</i> • Carbon Capture & Storage I <i>Prof.-Dr. Klaus R.G. Hein, University of Stuttgart</i> • Advanced Modeling – <i>Dr. Edmundo Vasquez,</i> <i>Combustion Components Associates</i> • Advanced Concepts for Emissions Control <i>Dr. Yiannis Leventis, Northeastern University</i> <p>6:00 to 8:00 p.m. – Beach Party</p>

Wednesday, June 3, 2009

7:30 to 8:00 a.m. – **Continental Breakfast**

8:00 to 10:00 a.m. – Panel -- Issues & Opportunities for Coal in Developing Countries

Dr. Yao Qiang,

Professor, Tsinghua University

10:00 to 10:30 a.m. – Break

10:30 a.m. to 12:30 p.m. – **Five Concurrent Technical Sessions**

- **Oxy-Fuel Technology III – Burner Developments**
Dr. Ligang Zheng, CanmetENERGY and Dr. Lawrence E. Bool, Praxair, Inc.
- **Gasification Technology I – Josh Strege, University of North Dakota Energy & Environmental Research Center**
- **Carbon Capture & Storage II**
Prof.-Dr. Klaus R.G. Hein, University of Stuttgart
- **Biomass USA**
Dr. John Dooher, Adelphi University
- **Low NO_x Technology**
Alan Paschedag, Siemens Energy, Inc. and J. J. Letcavits, American Electric Power

12:30 to 2:00 p.m. – **Themed Luncheon on the Beach**

- **Phil Champagne**, ASTM Standards for Coal Technology
- **J.J. Letcavits**: Low NO_x Technology

These tables are booked:

- **Dr. John Dooher**: Biomass/Waste in Power Plants
- **Dr. Horst Hack**: Oxy-fuel
- **Prof. Dr. Klaus R.G. Hein**: Biomass/Waste in Power Plants
- **Denny McDonald**, Status of Oxyfuel
- **Howard Meyer**: Conference First Timers
- **Alan Paschedag**: Low NO_x Technology
- **Yogesh Patel**: Utility Water Issues
- **Massood Ramezan**: Coal to Liquids
- **Dr. Nenad Sarunac**: Performance Improvement of Existing Power Plants
- **Hamid Sarv**, Renewable Energy
- **Giselle Sherman**: Mercury Control
- **Chris Smyrniotis**: Slag Control
- **Dr. Edmundo Vasquez**: Modeling Issues

Wednesday, June 3, 2009 (cont'd)

2:00 p.m. to 4:00 p.m. – **Five Concurrent Technical Sessions**

- **Oxy-Fuel Technology IV – Emissions**
Dr. Ligang Zheng, CanmetENERGY, and Dr. Yao Qiang, Tsinghua University
- **Computer Simulations**
Dr. Edmundo Vasquez, Combustion Components Associates
- **Gasification Technology II – Stelios Arvelakis, University of North Dakota Energy & Environmental Research Center**
- **Carbon Capture & Storage III**
Hamid Sarv, The Babcock & Wilcox Company
- **Biomass Europe I**
Prof.-Dr. Klaus Hein, University of Stuttgart

4:00 p.m.: **Tutorial on Post-Combustion Capture of CO₂ from Coal-Fired Power Plants**

George A. Farthing, B&W Research Center, The Babcock & Wilcox Company

6:00 p.m. – **Clearwater Clean Coal Conference Committee Meeting**



Florida Coal Facts:

- **Florida Ranks 13th in U.S. Coal Use with 28 Million Tons**
- **36% of Florida's Electricity Comes from Coal**
- **Florida has 12 Large Coal Fired Power Plants**

The combined direct and indirect contributions of the coal industry to Florida's economy are more than \$5 billion.

Thursday, June 4, 2009

7:30 to 8:00 a.m. – **Continental Breakfast**

8:00 to 10:00 a.m. – Panel: Future Landscape of Greenhouse Gas Emissions' Regulations

Vince Albanese, Senior Vice President Regulatory Affairs, Fuel Tech, Inc.

10:00 to 10:30 a.m. – Break

10:30 a.m. to 12:30 p.m. – **Five Concurrent Technical Sessions**

- **Oxy-Fuel Technology V – Fundamentals & Advanced Concepts**
Dr. Ligang Zheng, CanmetENERGY, and Dr. Christopher R. Shaddix, Sandia National Laboratories
- **Multi Emission Controls**
Bruce Clements, CanmetENERGY
- **Chemical Looping – Bartev Sakadjian**
The Babcock & Wilcox Company
- **Biomass II**
Prof.-Dr. Klaus R.G. Hein, University of Stuttgart
- **Improving Power Plant Efficiency and Reducing Emissions -- Dr. Nenad Sarunac**
Energy Research Center, Lehigh University

12:30 p.m. to 2:00 p.m. – **Lunch on the Beach & Roundtable Wrap-up Discussion**

2:00 to 5:00 p.m. – **Workshop: Converting Efficiency to Profits**

Anthony Widenman, Detroit Edison

Friday, June 5, 2009

7 a.m. – **Departure of the Polk Power Plant Tour**



**Program Announcement – The Clearwater Clean Coal Conference –
34th International Technical Conference on Clean Coal & Fuel Systems**

Sunday, May 31, 2009

10:00 a.m. to 7:00 p.m. – Beverage Service

10:00 a.m. to 4:30 p.m. – Three Concurrent Tutorials

10:00 a.m. to Noon	<ul style="list-style-type: none"> • Direct Coal to Liquids <i>Dr. Caroline Burgess Clifford, Pennsylvania State University</i> 	<ul style="list-style-type: none"> • Beneficiation of High-Moisture Coals for Improved Performance and Reduced Emissions <i>Dr. Nenad Sarunac, Energy Research Center, Lehigh University, Mark Ness, Great River Energy; and Richard Weinstein, Falkirk Mines</i> 	<ul style="list-style-type: none"> • Understanding Utility Boiler Ash Formation and Deposition and Finding Solutions <i>Christopher Zygarlicke, Energy & Environmental Research Center, University of North Dakota</i>
12:15 to 2:15 p.m.	<ul style="list-style-type: none"> • Management and Optimization of NO_x <i>Bonnie Courtemanche, P.E. Babcock Power, Inc.</i> 	<ul style="list-style-type: none"> • Geological Storage of CO₂ <i>Dr. Sean T. Brennan, U.S. Geological Survey</i> 	<ul style="list-style-type: none"> • Capitalize on Gasification Plant & Process Design Best Practices <i>Mike Mendez, P.E., Business Consultant, Aspen Technology</i>
2:30 to 4:30 p.m.	<ul style="list-style-type: none"> • Low No_x Burners <i>Alan Paschedag, Siemens Energy, Inc. and J. J. Letcavits, American Electric Power</i> 	<ul style="list-style-type: none"> • Introduction to Oxy-fuel Technology <i>Hamid Sarv, Director, B&W Research Center, The Babcock & Wilcox Company</i> 	<ul style="list-style-type: none"> • Mercury Regulations: Demystifying the Law <i>Giselle Sherman, Corning, Inc.</i>
6:00 p.m. – CTA Board of Directors' & Conference Committee Reception			



The 2009 Clearwater Clean Coal Conference

Monday, June 1, 2009

7:30 to 8:00 a.m. – **Continental Breakfast**

8:00 a.m. to 11:30 a.m. – **Monday Morning Plenary Session:**

Welcome – *Barbara A. Sakkestad, Vice President, Coal Technology Association*

Overview – *Stanley J. Vecci, B&W Research Center, The Babcock & Wilcox Company & Chairman of the Coal Technology Association*

Percy Nicholls Award to and Address by,

Dr. George Richards, National Energy Technology Laboratory, U.S. Department of Energy

Keynote Address: The World's Energy and Environmental Challenges

Dr. John C. Chen, Professor and Dean Emeritus, Lehigh University and

Past President, American Institute of Chemical Engineers, USA

Panel: New and Existing Power Plants Before the Advent of Commercial CCS

Dr. Janos M. Beer, Professor Emeritus of Chemical and Fuel Engineering,

Massachusetts Institute of Technology, USA

- *Howard Herzog, Principal Research Engineer, Massachusetts Institute of Technology, USA*
- *John Marion, Vice President Global Technology, Boiler Business, ALSTOM Power Inc., USA*
- *Jeffrey Phillips, Senior Program Manager Advanced Generation, Electric Power Research Institute, USA*
- *Lars Stromberg, Professor and Vice President of R&D, Vattenfall AB, SWEDEN*
- *Dr. Hisashi (Sho) Kobayashi, Corporate Fellow, Praxair, USA*

10 a.m. to 6:30 p.m. – **Exhibit Center Set up**

11:30 a.m. to 12:30 p.m. – **Lunch**

12:30 to 2:30 p.m. – **Panel: CO₂ Solutions: Oxy-fuel Operation at the Industrial Scale**

Dr. Ligang Zheng, CANMET Energy Technology Center, Natural Resources Canada, CANADA and

Dr. Terry Wall, Asia-Pacific Partnership Oxyfuel Working Group and University of Newcastle, AUSTRALIA

- *Lars Stromberg, Professor and Vice President of R&D, Vattenfall AB, SWEDEN*

2:30 to 3:00 p.m. – **Break**

3:00 to 5:00 p.m. – **Three Concurrent Tutorials**

• **Effluent Water Chemistry Guidelines**

John Smolenski, Tampa Electric Co.

• *Mark Ewing, Siemens Water Technologies Corp.*

• *Douglas Spolarich, Siemens Water Technologies Corporation*

• **National Actions Impacting State Programs, (Climate Change, CAMR, CAIR, BART)**

Joshua Ellwein, Tampa Electric Co.

• *Scott Osbourn, Golder Associates*

• **Mercury Emission TMDL**

Byron Burrows, Tampa Electric Co.

5:00 to 6:00 p.m. – **Plenary Session – CO₂ in the Future**

Klaus S. Lackner, Ewing-Worzel Professor of Geophysics,

Department of Earth & Environmental Engineering (HKSM), Columbia University

6:00 to 7:00 p.m. – **Welcome in the Exhibit Center**

The 2009 Clearwater Clean Coal Conference

Tuesday -- June 2, 2009

7:30 to 8:00 a.m. – **Continental Breakfast**

8:00 to 10:30 a.m. – Plenary Session

Global Climate Change And the Power Generation Challenge, *Frank Princiotta, Director of the Air Pollution Prevention and Control Division (APPCD) of the National Risk Management Research Laboratory, U.S. Environmental Protection Agency, USA*

Panel: Advanced High Efficient Coal Fired Power Plants

Prof. Dr. Klaus R. G. Hein, Professor Emeritus, University of Stuttgart, GERMANY

- *Rudolph Blum, General Manager R & D and Chemical Engineering & Optimization, DONG Energy A/S, DENMARK*
- *Prof. Jianxiong Mao. Department of Thermal Engineering, Tsinghua University, PEOPLE'S REPUBLIC OF CHINA*
- *John L. Marion, Vice President Global Technology, Boiler Business, ALSTOM Power Inc., USA*
- *Dr. Miko Sato, Associate Vice President, Central Research Institute of Electric Power Industry, JAPAN*

10:30 to 11:00 a.m. – **Break**

FIVE CONCURRENT TECHNICAL SESSIONS – TUESDAY MORNING

	Oxy-Fuel I -- Overview & Demonstrations <i>Dr. Ligang Zheng, CanmetENERGY</i>	Post-Combustion CO₂ Capture <i>Dr. Yewen Tan, CanmetENERGY</i>	Coal Conversion to Chemicals & Fuels <i>Massood Ramezan, Science Applications International Corp.</i>	Advanced Materials <i>Stanley J. Vecci, B&W Research Center, The Babcock & Wilcox Company</i>	Hydrogen Production from Opportunity Fuels <i>Dr. Yen Nguyen, Advanced Technologies Solutions</i>
11:00 a.m.	<p>8. Coal-fired Oxy-Fuel Technology Status and Progress to Deployment Professor Terry Wall, Asia-Pacific Partnership Oxy-fuel Working Group, and University of Newcastle, AUSTRALIA; and Jianglong Yu, Faculty of Power and Energy Engineering, Shenyang Institute of Aeronautical Engineering (and International Energy Agency), PEOPLE'S REPUBLIC OF CHINA</p>	<p>133. CO₂ Capture by Amino Acid Salts Proven under Industrial Conditions: Preliminary Pilot Test Results Dr.Ir. E.L.V. Goetheer, and Dhr. Ir. L.M. Nell, TNO Science & Industry THE NETHERLANDS</p>	<p>12. Coal/Biomass to Liquids as a Carbon Management Option for Clean Liquid Fuels Mark Ackiewicz and G. DeHoratiis, U.S. Department of Energy, Office of Fossil Energy Headquarters; Daniel Cicero, PhD., U.S. Department of Energy, National Energy Technology Laboratory; and Edward Schmetz and John Winslow, Leonardo Technologies, Inc., USA</p>	<p>109. Effect of Creep in Advanced Materials for Use in Ultrasupercritical Coal Power Plants R. Viswanathan, Electric Power Research Institute; and J Shingledecker, J.Hawk and S.Goodstine, ALSTOM Power, Inc., USA</p>	<p>92. A Fundamental Study on the Hydrogen Production through Coal Gasification Dong Kyoong Seo, Sun Ki Lee and Jeongho Hwang, Mechanical Engineering Department, Yonsei University; Won Yang, High Temperature Processing R&D Department, Korea Institute of Industrial Technology; and Jong Min Lee, and Jae Sung Kim, High Temperature Processing R&D Department, Korea Institute of Industrial Technology, KOREA</p>

11:20 a.m.	<p>14. First Test Results from Vattenfall's 30 MWth Oxyfuel Pilot Plant in Schwarze Pumpe Lars Strömberg and Göran Lindgren, Vattenfall AB; Jürgen Jacoby, Rainer Giering, and Marie Anheden, Vattenfall Research and Development AB, SWEDEN; Uwe Burchardt and Hubertus Altmann, Vattenfall Europe Generation AG & Co. KG; and Frank Kluger and Georg-Nikolaus Stamatelopoulos, Alstom Power Systems GmbH, GERMANY</p>	<p>6. Experimental Study on Blended Solvent of Chemical Absorption for CO₂ Separation from Coal-fired Flue Gas Mengxiang Fang, Zhu Dechen, Shuiping Yan, Zhen Wang, Zhongyang Luo, and Kefa Cen, State Key Laboratory of Clean Energy Utilization, Zhejiang University, PEOPLE'S REPUBLIC OF CHINA</p>	<p>79. Rheological Study of Coal Liquids Derived from Direct Coal Liquefaction Qiuqing Yang, Sharon Falcone Miller, and Bruce G. Miller, The EMS Energy Institute, Pennsylvania State University, USA</p>	<p>76. Update on the Fireside Corrosion Resistance of Proposed USC Superheater and Reheater Materials: Laboratory and Field Test Results Michael Gagliano, Ph.D., Development Engineer, Foster Wheeler North America Corp., USA</p>	<p>94. Effective Utilization of Hydrogen Membranes for CO₂ Capture Doug S. Jack, Carl R. Evenson IV, David H. Anderson, Richard Mackay, and Jesse Taylor, Eltron Research & Development Inc., USA</p>
11:40 a.m.	<p>108. Babcock & Wilcox and Air Liquide's 100 MWe Oxy-Fuel Demonstration Program Dennis K. McDonald, Power Generation Group, Inc. and Douglas DeVault, Advanced Technologies, The Babcock & Wilcox Company; and Rajani Varagani, Air Liquide, USA; Jean-Pierre Tranier, Philippe Court, and Nicolas Perrin, Air Liquide, FRANCE</p>	<p>130. Sub-Pilot Demonstration of the CCR Process: High Temperature CO₂ Capture Sorbents for Coal Fired Power Plants Bartev Sakadjian, The Babcock & Wilcox Company; William K. Wang, Songgeng Li, Shwetha Ramkumar, Siddarth Gumuluru, and Liang-Shih Fan, The Ohio State University, Department of Chemical and Biomolecular Engineering; and Robert M. Statnick, Clear Skies Consulting, USA</p>	<p>78. Coal-To-Liquid Processes for Production of Transportation Fuels, Carbons, and Coal-Based Pitch Caroline E. Burgess Clifford, Ömer Gül, Josefa Griffith, Parvana Aksoy, Gareth Mitchell, Maria Escallón, Utaiporn Suriapraphadilok, M. Solomon Nyathi, Jingwen Zhang and Harold H. Schobert, Pennsylvania State University, The EMS Energy Institute USA</p>	<p>69. Corrosion Tests of MA956 ODS Tube Specimens Archie Robertson, Michael Gagliano, Horst Hack, and Greg Stanko, Foster Wheeler North America Corp., USA</p>	<p>105. Alternative Hydrogen Carriers: Higher Alcohols from Coal-Derived Syngas James J Spivey, A. Egbebi, N. Subramanian, M. Gupta, and N. Kumar, Cain Dept. Chemical Engineering, Louisiana State University; James G. Goodwin, Jr., and Xenhua Mo, Dept. Chemical and Biomolecular Engineering, Clemson University; and Steve Overbury, and V. Schwarz, Oak Ridge National Laboratory, USA</p>
Noon	<p>112. Alstom's Oxy-Firing Technology Development -- and Demonstration - Near Term CO₂ Solutions Armand A. Levasseur, Paul J. Chapman and Nsakala ya Nsakala, Power Plant Laboratories, ALSTOM Power Inc., USA; and Frank Kluger, ALSTOM Power GmbH, GERMANY</p>	<p>31. IEF-PCM DFT Study of Solvent-based CO₂ Capture Thermochemistry Phil Jackson and Moetaz I. Attalla, CSIRO Energy Transformed Flagship, AUSTRALIA; and A. Beste, Oak Ridge National Laboratories, U.S. Department of Energy, USA</p>	<p>150. Pressurized Oxy-Fuel for Advanced Coal to Liquids Power Plant Alex G. Fassbender, P.E. and Robert S. Henry, ThermoEnergy Power Systems, LLC, USA</p>	<p>149. Elimination of Fissures in Thick Section Inconel Alloy 740 Welds John M Sanders and John A Siefert, The Babcock and Wilcox Co.; and Brian Baker and Ronald Gollihue, Special Metals Corp., USA</p>	<p>126 Pyrolysis and Gasification of Biomass and Low Grade Fuels A. K. Gupta and I. I. Ahmed, University of Maryland, Dept. of Mechanical Engineering, USA</p>

12:20 p.m.	145. Ignition of a Group of Coal Particles in Oxyfuel Combustion with CO₂ Recirculation Alejandro Molina, Escuela de Procesos y Energía, Facultad de Minas, Universidad Nacional de Colombia, Medellín, COLOMBIA ; Ethan Hecht, Aand Christopher R. Shaddix, Combustion Research Facility, Sandia National Laboratories, USA	148. Wetted-Wall Column Experiments Guiding B&W's RSAT™ CO₂ Scrubbing Development Process L. M. Rimpf, L. Ji, G.A. Farthing; Babcock & Wilcox Research Center, The Babcock & Wilcox Power Generation Group, USA	18. Effect of Different Biomass Materials on the Combustion Performance of Soma Lignite H. Haykiri-Acma and S. Yaman, Istanbul Technical University, Chemical and Metallurgical Engineering Faculty, Chemical Engineering Department, TURKEY	152. Refractory Wear During Gasification Larry Baxter, Shrinvas Lokare, and Bing Liu, Brigham Young University; and Humberto Garcia, Idaho National Laboratory, USA	127. Production of Hydrogen at Elevated Temperatures from Texas Lignite Joshua J. Stanislawski, University of North Dakota Energy & Environmental Research Center, USA
12:40 p.m.	Lunch				
<p>1:40 p.m. to 3:40 p.m. – Panel: Coal to Liquids</p> <p><i>Dr. Edmundo Vasquez, Combustion Components Associates</i></p> <ul style="list-style-type: none"> • <i>Dr. Caroline Burgess Clifford, Pennsylvania State University</i> • <i>Michael Holmes, University of North Dakota Energy & Environmental Research Center</i> • <i>Burtron Davis, Center for Advanced Energy Research, University of Kentucky</i> • <i>John C. Winslow, Leonardo Technologies, Inc.</i> <p>The purpose of the panel is to present the audience with an update/status on the “Coal to Liquids” technologies, and provide a future vision from a scientific and industrial perspective. There are two basic approaches to convert coal to a liquid fuel: Direct Liquefaction that consists in breaking coal down in a solvent at elevated temperature and pressure, followed by interaction with hydrogen gas and a catalyst; And, Indirect Liquefaction that involves first gasifying coal and then making synthetic fuels from the gas produced.</p> <p>Among its many advantages “Coal to Liquids” technology: Improves national and economic security; Uses domestic resources and produces more jobs for Americans; Provides environmental benefits, cleaner fuels, use of higher efficiency engines; CO₂ capture; Hydrogen fuel future through co-production of liquid fuels, electricity, hydrogen, etc.; Provides geographic diversity of domestic refining capacity.</p> <p>Issues: Advantages of Coal-to-Liquid Fuels; How R&D has Improved these Technologies; What is Needed to Make it Happen in the U.S.</p>					
3:40 p.m. to 4:00 p.m. – Break – Exhibit Center					



FOUR CONCURRENT TECHNICAL SESSIONS – TUESDAY AFTERNOON					
	Oxy-Fuel II – Experimental Studies <i>Dr. Ligang Zheng, CanmetENERGY and Horst Hack, Foster Wheeler North America</i>	Mercury Abatement Options for Power Plants <i>Giselle Sherman, Corning, Inc.</i>	Carbon Capture & Storage I <i>Prof.-Dr. Klaus R.G. Hein, University of Stuttgart</i>	Advanced Modeling <i>Dr. Edmundo Vasquez, Combustion Components Associates</i>	Advanced Concepts for Emissions Control <i>Dr. Yiannis Levendis, Northeastern University</i>
4:00 p.m.	65. Characterization and Prediction of Oxy-combustion Impacts in Existing Coal-fired Boilers Andrew Fry and Bradley Adams, Reaction Engineering International, USA	7. Full Scale Evaluation of Mercury Re-emission in Wet Flue Gas Desulfurization Systems Chung-li Wu, Yan Cao and Wei-Ping Pan, Institute for Combustion Science and Environmental Technology (ICSET), Western Kentucky University, USA	32. Status of Eagle Project: Multi-purpose Coal Gasification Technology Development Masaaki Shimizu, Wakamatsu Research Institute Technology Development Center, J-POWER/Electric Power Development Co., Ltd., JAPAN	116. Mechanisms of Coal Secondary Pyrolysis and Soot Formation Dong Zeng, Shengteng Hu and Alan N. Sayre, Babcock & Wilcox Power Generation Group, Inc.; and Thomas H. Fletcher, Brigham Young University, USA	144. Electrostatic Precipitation of Powdered Activated Carbon and Implications for Secondary Mercury Adsorption within ESPs Vinit Prabhu and Herek L. Clack, Department of Mechanical, Materials, and Aerospace Engineering, Illinois Institute of Technology, USA
4:20 p.m.	39. Retrofit of a 1MW PC Test Facility to Oxy-Fire with Flue-Gas Recycle Thomas K. Gale, Southern Research Institute; and Curtis L. Taylor, MAXON Corporation; USA	125. Recent Experience in Producing PAC with Hot Oxygen Lawrence E. Bool, III, Praxair, Inc., USA	34. CCS Technology Developments in Australia Paul Feron, David Harris, David Brockway, and Jim Smitham, CSIRO Energy Technology Division/Energy Transformed Flagship, AUSTRALIA	98. Fouling Evaluation of a PC-Fired Boiler Using a Comprehensive CFD Ash Prediction Tool Dr. Zhanhua Ma, Felicia Iman and Dr. Pisi Lu, RMT, Inc.; and Fran Mara, Alliant Energy, USA	135. Artificial Neural Networks Applications in Energy Control Systems Janusz Lichota, Wroclaw University of Technology, POLAND
4:40 p.m.	15. Basic Experiments and CFD Calculations of Air and Oxyfuel Firing of Lignite and Bituminous Coals in 0.5 and 1 MW Scale Combustion Test Facilities S. Rehfeldt, C. Bergins, C. Kuhr and M. Ehmman, Hitachi Power Europe GmbH; G. Scheffknecht and J. Maier, University of Stuttgart, Institute of Process Engineering and Power Plant, GERMANY; and S. Wu, Hitachi Power Systems America, Ltd, USA	118. Hg Binding on Pd Binary Alloys and Overlayers Erdem Sasmaz, Dr. Shela Aboud and Dr. Jennifer Wilcox, Stanford University, Department of Energy Resources Engineering, USA	85. Towards Zero Emissions IGCC Plants - ELCOGAS Activities Pedro Casero, Francisco García-Peña and Pilar Coca, ELCOGAS, SPAIN	134. Temporally and Spatially Resolved Calculations of a Reacting Coal Jet Using Large Eddy Simulations (LES) and Direct Quadrature Method of Moments (DQMOM) Charles, Reid, Jeremy Thornock and Phil Smith, University of Utah, USA	136. Research on the Effect of NH₄Cl addition on Mercury and NO in the Flue Gas Weiguo Pan, Jiang Wu, Wenhuan Wang, Ping He, Xuefeng Leng, Minqiang Shen, Yuying Du, Baihan Liu, Shanghai University of Electric Power, PEOPLE'S REPUBLIC OF CHINA

5:00 p.m.	<p>46. The Effects of Cofiring Biomass with PRB Coal on NO_x Formation under Air-Fired and Oxy-Fuel Conditions Scott A. Skeen, Benjamin M. Kumfer, and Richard L. Axelbaum, Department of Energy, Environmental, and Chemical Engineering, Consortium for Clean Coal Utilization, Washington University in St. Louis, USA</p>	<p>117. Understanding Mercury Binding on Activated Carbon Bihter Padak, PhD Candidate, and Dr. Jennifer Wilcox, Stanford University, Department of Energy Resources Engineering, USA</p>	<p>89. Frank Princiotta, EPA, USA</p>	<p>25. Technologies for the Efficient Design and Operation of Coal Gasification Processes Chai Bhat and Paul Talley, Aspen Technology, Inc., USA</p>	<p>137. Research on the Effect of Flow Field on Mercury Removal Efficiency in Flue Gas in Multiphase Flow Reactor Jiang Wu, Minqiang Shen, Weiguo Pan, Jianxing Ren, Ping He, Wenhuan Wang, Yun Jin, Xuefeng Leng, Xinye Wang, Yanhua Zhu, Zhen Yang, Aichen Wang, Guitong Gao, Liqun Lin, and Xuyuan Yu, School of Energy and Environmental Engineering, Shanghai University of Electric Power, PEO. REPUBLIC OF CHINA</p>
5:20 p.m.	<p>41. Coal Pyrolysis and Char Combustion under Oxy-fuel Conditions Leema Al-Makhadmeh, J. Maier, and G. Scheffknecht, Institute of Process Engineering and Power Plant Technology (IVD), University of Stuttgart, GERMANY</p>	<p>2. Reemission of Captured Mercury From FGD Gypsum Over 500 Days Richard D. West and Vivak M. Malhotra, Department of Physics, Southern Illinois University, Carbondale, USA</p>	<p>86. CCS Cost Drivers and Technology Choice Lars Stromberg, Vattenfall AB, Sweden, SWEDEN</p>	<p>122. Alternate Methods for Computing NO_x and CO Emissions for Fossil Fired Boilers T. Eldredge, E. Vasquez and S.Jangiti, Combustion Components Associates, USA</p>	<p>146. A Physical Coal Upgrading Process and Its Impact on NO_x Emissions Kevin Davis and Hong-Shig Shim, Reaction Engineering International; Stan Harding, N.S. Harding & Associates; and Rafic Minkara, Headwaters Energy Services, USA</p>
5:40 p.m.	<p>143. Control System Requirements for Recycle Gas and Oxygen Burners Eladio Ruiz de Molina, Corr Systems Inc, John E. Cover, John E. Cover Engineering, and Thomas K. Gale, Southern Research Institute, USA</p>	<p>3. Concurrent Mercury Reduction and Dewatering of Cleaned Ultrafine Coal Recovered from Waste Ponds by High Intensity Sonication Richard D. West, Timothy A. Milligan and Vivak M. Malhotra, Department of Physics, Southern Illinois University, USA</p>	<p>142. Experimental Results from a Pilot-Scale CO₂ Capture and Compression Unit (CO₂CCU) Kourosh E. Zanganeh, Ahmed Shafeen, and Carlos Salvador, Zero Emission Technologies Group, Clean Electric Power Generation, CanmetENERGY, CANADA</p>	<p>67. Modeling Coal Devolatilization in Large Eddy Simulation of Oxy-Coal Combustion Julien Pedel, Jeremy Thornock, Philip Smith, University of Utah, USA</p>	<p>153. Cryogenic CO₂ Capture to Control Climate Change Emissions Larry Baxter and Andrew Baxter (and Sustainable Energy Technologies), and Stephanie Burt, Brigham Young University, USA</p>
6:00 p.m.	<p>55. OTM Based Oxy-fuel Combustion for CO₂ Capture Jamie Wilson, Maxwell Christie, Nick Degenstein, Minish Shah and Juan Li, Praxair, Inc.; and V. Venkateswaran, ENrG Inc.; and Eric Eddings and Joseph Adams, University of Utah, USA</p>	<p>128. Assessment of Mercury Control Options for the San Miguel Electric Cooperative Power Plant John P. Kay, Brandon M. Pavlish, Michael L. Jones, and Nicholas B. Lentz, University of North Dakota Energy & Environmental Research Center; and Joseph G. Eutizi, San Miguel Electric Cooperative, Inc., USA</p>	<p>11. Depletion of Coal Reserves and Its Effect on Carbon Dioxide emissions Gary D. Stricker, and Romeo M. Flores; U.S. Geological Survey, USA</p>	<p>OPEN</p>	<p>154. Radiative Properties of Biomass and Coal Deposits in Particulate and Slag Forms Richard Reid, Joseph Hoskisson and Larry Baxter, Brigham Young University, USA</p>
6:20 p.m.	Conclusion of the Technical Program				
6:20 p.m.	Beach Party				

The 2009 Clearwater Clean Coal Conference

Wednesday, June 3, 2009

7:30 to 8:00 a.m. – **Continental Breakfast**

8:00 to 10:00 a.m.: Panel: Issues & Opportunities for Coal in Developing Countries

Dr. Yao Qiang, Professor, Tsinghua University, PEOPLE'S REPUBLIC OF CHINA

- *William S. Lawton, Senior Trade Specialist, Export Assistance Center, U.S. Department of Commerce, USA*
- *Alejandro Molina, Profesor Asociado, Facultad de Minas, Universidad Nacional de Colombia, COLOMBIA*

FIVE CONCURRENT TECHNICAL SESSIONS – WEDNESDAY MORNING

	Oxy-Fuel III – Burner Developments <i>Dr. Ligang Zheng, CanmetENERGY and Dr. Lawrence E. Bool, Praxair, Inc.</i>	Carbon Capture & Storage II <i>Prof.-Dr. Klaus R.G. Hein, University of Stuttgart</i>	Gasification Technology I <i>Josh Strege, University of North Dakota Energy & Environmental Research Center</i>	Biomass USA <i>Dr. John Doohar, Adelphi University</i>	Low NO_x Technology <i>Alan Paschedag, Siemens Energy, Inc. and J. J. Letcavits, American Electric Power</i>
10:30 a.m.	64. Utility-Scale Flexi-Burn™ CFB Power Plant To Meet the Challenge of Climate Change <i>Horst Hack, Zhen Fan and Andrew Seltzer, Foster Wheeler North America Corp., R&D, USA</i>	23. Development of CFB Technology to Provide Flexible Air/Oxy Operation for a Power Plant with CCS <i>Toni Pikkarainen, Timo Leino and Antti Tourunen, VTT Technical Research Centre of Finland; and Reijo Kuivalainen, Foster Wheeler Energia Oy, FINLAND</i>	19. Underground Coal Gasification with CO₂ Capture and Sequestration as an Alternative Source of Hydrogen for Oil Sands Upgrading: An Alberta/Canada Scenario <i>Surindar Singh, Dzung Nguyen, P. Eng., and Dr. Eddy Isaacs, Alberta Energy Research Institute, CANADA</i>	4. Fuel Selection for Cofiring Biomass in Pulverized Coal and Cyclone Fired Boilers <i>David A. Tillman and Dao N.B. Duong, Foster Wheeler NA, USA</i>	48. TDF® Low NO_x Burner and Windbox Modifications for Emissions Control on a TURBO® Furnace <i>Bonnie Courtemanche, P.E., Qingsheng Lin and Meagan L. Healy, Riley Power Inc.; and Duane L. Hill, Dairyland Power, USA</i>
10:50 a.m.	59. Experiment and Model of the Low-NO_x Swirl O₂/CO₂ Burner and NO_x/CO₂/CO Emission in 0.3MW_t Vertical Furnace <i>Liu Jingzhang, Liu Zhaohui, Kong Hongbin, Huang Xiaohong, Zhang Tai, Zhang Qian, Shi Yunye, and Zheng Chuguang, Nation Key Laboratory of Coal Combustion, Huazhong University of Science and Technology, PEOPLE'S REPUBLIC OF CHINA</i>	58. Proposal for New CO₂ Capture IGCC System <i>Yoshinobu Nakao, Central Research Institute of Electric Power Industry, JAPAN</i>	30. Steam Gasification of Woody Biomass in a Fluidized Bed for F-T Synthesis <i>Jae Hun Song, Yeon Kyung Sung, In Hwan Choi, Hyo Je Jung, Tae U Yu, and Uen Do Lee, Korea Institute of Industrial Technology, KOREA</i>	129. Comparative Emission Yields from Combustion of Beds of Various Solid Fuels <i>Yiannis A. Levendis, Mechanical and Industrial Engineering, Northeastern University, USA</i>	75. Dynamic Stability of Lean Premixed Gas Turbine Combustors Operating on Coal-Derived Syngas Fuels <i>Lorenzo Figura, Jong Guen Lee and Bryan D. Quay and Domenic A. Santavicca, Pennsylvania State University, USA</i>

11:10 a.m.	<p>1. Influence of Various O₂/CO₂-Concentrations on the Burning Behavior of Different Coals Dipl.-Ing. Stephanie Tappe and Prof. Dr.-Ing. Hans Joachim Krautz, Brandenburg University of Technology Cottbus, GERMANY</p>	<p>84. The DECARBit Project-Enabling Technologies for Pre-Combustion CCS Power Plants Nils A. Røkke and Nils Erland Haugen, SINTEF Energy Research, NORWAY</p>	<p>54. Feasibility of Hybrid Coal Gasification Units for Combined Heat and Power Donald L. Bonk, National Energy Technology Laboratory, U.S. Department of Energy; and Michael J. De Feo, P.E., Steven W. O'Neill, and Richard E. Weinstein, P.E., WorleyParsons Group, Inc., USA</p>	<p>66. Deployment of Combustion Optimization and Emission Control Technologies in Wood Stokers Edmundo R. Vasquez, Combustion Components Associates, USA</p>	<p>102. Oxygen-Enriched Combustion of a Powder River Basin Black Thunder Coal for NO_x Reduction in a Cyclone Furnace Hamid Sarv, Zumao Chen, Alan N. Sayre, and Gerald J. Maringo, The Babcock & Wilcox Company; and Rajani Varagani and Susie Levesque, American Air Liquide, USA</p>
11:30 a.m.	<p>47. Design of a Flexi-Burn™ Pulverized Coal Power Plant for Carbon Dioxide Sequestration Andrew Seltzer, Zhen Fan, and Horst Hack, Foster Wheeler North America Corp., R&D, USA</p>	<p>83. The Research Activities on Carbon Capture and Storage in Southeast University, China Changshui Zhao, Xiaoping Chen, Laihong Shen, Rui Xiao, Lunbo Duan, Yingjie Li, Chuanwen Zhao, and Qilei Song, School of Energy and Environment, Southeast University, PEOPLE'S REPUBLIC OF CHINA</p>	<p>132. HydroMax: Results and Status of DOE/NETL Pilot Demonstration Project Phillip Brown, Michael Sarin, Diversified Energy; Tom Weyand and Dale Nickels, Pittsburgh Mineral and Environmental Technology, USA</p>	<p>90. Principles of Burner Design for Biomass Co-Firing Brad Moulton, PE, Foster Wheeler North America Corp, USA</p>	<p>5. Reducing NO_x Emissions on Riley Turbo® Furnaces -- Latest Results and Experiences Craig Penterson, Bonnie Courtemanche, P.E., and Vlad Zarnescu, Ph.D, Riley Power Inc., USA</p>
11:50 a.m.	<p>93. A Numerical Study on Characteristics of Oxy-Pulverized Coal Combustion in a Corner-firing Boiler of 125 MWe Scale Taeyoung Chae, Byeong Ryeol Bang, Tae U Yu, and Won Yang, Korea Institute of Industrial Technology; and Sung Chul Kim, Power Generation Laboratory, Korea Electric Power Research Institute, KOREA</p>	<p>88. Gas Separation Membranes for CO₂- free Power Plants L. Singheiser, T. Markus, R.W. Steinbrech, and W.A. Meulenber, Forschungszentrum Jülich GmbH, Institute for Energy Research, GERMANY</p>	<p>139. Fischer-Tropsch Catalyst Testing in a Continuous Bench-Scale Coal Gasification System: Design and Early Results Joshua R. Strege, Michael L. Swanson, Bruce C. Folkedahl, Jason D. Laumb, and Joshua J. Stanislowski, University of North Dakota Energy & Environmental Research Center, USA</p>	<p>110. Chlorine Issues with Biomass Cofiring in Pulverized Coal Boilers: Sources, Reactions, and Consequences – A Literature Review Dao N.B. Duong and David A. Tillman, Foster Wheeler NA, USA</p>	<p>103. Selective Use of Oxygen and In-Furnace Combustion Techniques for NO_x Reduction in a Wall-Fired Pulverized Coal Burning Pilot Boiler Hamid Sarv, Alan N. Sayre, and Gerald J. Maringo, The Babcock & Wilcox Company; and Rajani Varagani and Susie Levesque, American Air Liquide, USA</p>



12:10 p.m.	<p>74. Development of Oxygen-Enriched High Temperature Air Combustion Burner for PC Boilers Hai Zhang, Kai Cui, Zenshan Li, Tao Wang, Hairui Yang, Qing Liu, Junfu Lu, and Guangxi Yue, Key Laboratory for Thermal Science and Power Engineering of Ministry of Education, Department of Thermal Engineering, Tsinghua University, PEOPLE'S REPUBLIC OF CHINA</p>	<p>151. Incorporation of Catalytic Dehydrogenation into Fischer-Tropsch Synthesis of Liquid Fuels to Minimize Carbon Dioxide Emissions Gerald P. Huffman, Consortium for Fossil Fuel Science and Department of Chemical & Materials Engineering, University of Kentucky, USA</p>	OPEN	OPEN	<p>70. Recent Field Experiences with the Mark III Opti-Flow™ Low NO_x Burner in Minimizing Unburned Carbon and NO_x Jiefeng Shan PhD, Nathan Hart, George Schiazza, Mark Linideman and Joel Vatsky, Siemens Environmental Systems & Services, USA</p>
12:30 p.m.	<p>Themed Luncheon – Tables of 8 where the major topics of the day will be discussed. Sign up is necessary. We will also have tables for spouses at the lunch. We'll have hosts for these tables as well.</p> <ul style="list-style-type: none"> • Phil Champagne, ASTM Standards for Coal Technology • J.J. Letcavits, American Electric Power: Low NO_x Technology • Yogesh Patel, Tampa Electric Co.: Utility Water Issues – Table Full • Chris Smyrniotis, Fuel Tech, Inc.: Slag Control – Table Full • Dr. John Doohar, Adelphi University: Biomass/Waste in Power Plants – Table Full • Dr. Horst Hack, Foster Wheeler Development Corp., Oxy-fuel – Table Full • Prof.-Dr. Klaus R.G. Hein, University of Stuttgart: Biomass/Waste in Power Plants – Table Full • Denny McDonald, The Babcock & Wilcox Company, Status of Oxyfuel – Table Full • Howard Meyer, Gas Technology Institute: Conference First Timers – Table Full • Alan Paschedag, Advanced Burner Technologies Corp.: Low NO_x Technology – Table Full • Massood Ramezan, Science Applications International Corp.: Coal to Liquids – Table Full • Dr. Nenad Sarunac, Lehigh University: Performance Improvement of Existing Power Plants – Table Full • Hamid Sarv, The Babcock & Wilcox Company, Renewable Energy – Table Full • Giselle Sherman, Corning, Inc.: Mercury Control – Table Full • Dr. Edmundo Vasquez, Combustion Components Associates: Modeling Issues – Table Full 				



Wednesday, June 3, 2009 (cont'd)

FIVE CONCURRENT TECHNICAL SESSIONS – WEDNESDAY AFTERNOON

	Oxy-Fuel IV – Emissions <i>Dr. Ligang Zheng, CanmetENERGY and Dr. Yao Qiang, Tsinghua University</i>	Computer Simulations <i>Dr. Edmundo Vasquez, Combustion, Combustion Components Associates</i>	Gasification Technology II <i>Stelios Arvelakis, University of North Dakota Energy & Environmental Research Center</i>	Carbon Capture & Storage III <i>Hamid Sarv, The Babcock & Wilcox Company</i>	Biomass Europe I <i>Prof.-Dr. Klaus R.G. Hein, University of Stuttgart</i>
2:00 p.m.	43. Particulate Matter Emission Characteristics of a Brown Coal under Oxy-fuel Combustion Liu Zhaohui, Han Jingyi, Zhang Tai, Liu Jingzhang, Huang Xiaohong, and Zheng Chuguang, State Key Laboratory of Coal Combustion, Huazhong University of Science and Technology, PEOPLE'S REPUBLIC OF CHINA	Experiments & Simulations: Quantifying Predictivity from Uncertain Measurements and Models Professor Philip J. Smith, Director, The Institute for Clean & Security Energy, The University of Utah, USA <i>(Though not in the Proceedings, this presentation was solicited to take advantage of the two slots available in this session.)</i>	123. Sorbents for Removing Trace Metal Contaminants from Coal-Derived Synthesis Gas Gokhan Alptekin, Margarita Dubovik and Bob Amalfitano. TDA Research, Inc., USA	96. The Partnership for CO₂ Capture Brandon M. Pavlish and Scott G. Tolbert, Energy & Environmental Research Center, USA	24. Biomass for Power Production in Denmark Bo Sander, DONG Energy Power, DENMARK
2:20 p.m.	138. Nitrogen Species Measurements and Modeling in Staged Oxy-Fuel Combustion Dale R. Tree, Brigham Young University; and Andrew J. Mackrory, The Babcock and Wilcox Company, USA		121. The Relationship Between Fuel Composition and Pyrolysis Kinetics Laura C. Bradley, and Sharon Falcone Miller, Earth and Mineral Sciences Energy Institute, The Pennsylvania State University, USA	71. Update on EPA Research and Regulatory GS Activities Bruce J. Kobelski, Geologist/GS Team Leader, Underground Injection Control Program – USEPA Office of Ground Water and Drinking Water, USA	72. From Lab-Scale Tests to Full Scale Operation - Liquid Biofuels Combustion in PC Boiler of 200MW Unit H H. Kruczek, J. Zuwała, Wl. Rydz, Wrocław University of Technology and IChPW, POLAND
2:40 p.m.	37. Boiler Related Aspects of Oxy-combustion of Coal and Biomass: A Thermodynamic Approach Arthur Stam and Pierre Ploumen, KEMA; and Gerrit Brem, University of Twente, Faculty of Engineering, Laboratory of Thermal Engineering, THE NETHERLANDS	95. A Computational Submodel for Prediction of Soot From Pulverized Coal Combustion Alan N. Sayre, Dong Zeng, Shengteng Hu and Hamid Sarv, Babcock & Wilcox Power Generation Group, Inc., USA	91. Lignite Gasification Testing at the Power Systems Development Facility Johnny Dorminey, John Northington, Roxann Leonard and Ruth Ann Yongue, Southern Company Services, Power Systems Development Facility	33. Investigation of a Synthetic Brown Coal Material for the Purpose of CO₂ Sequestration in Deep Coal Seams J. Dileeka and P. G. Ranjith, Monash University; and S. K. Choi, CSIRO, AUSTRALIA	57. Coal and Biomass in High Efficiency Utilities M.P. de Jong, S. van Rijen, and R. Meijer, KEMA, THE NETHERLANDS

3:00 p.m.	<p>35. Numerical Simulation of the NO_x/SO₂/CO Emission and Temperature Distribution in the 0.3MWt Vertical Furnace at the Atmosphere of O₂/N₂ and O₂/CO₂ and O₂/FGR</p> <p>Liu Jingzhang, Liu Zhaohui, Kong Hongbin, Huang Xiaohong, Zhang Tai, Zhang Qian, Shi Yunye, and Zheng Chuguang, Nation Key Laboratory of Coal Combustion, Huazhong University of Science and Technology, PEOPLE'S REPUBLIC OF CHINA</p>	<p>10. Evaluation of Furnace Nose Arch Modifications to Reduce Slag Formation on a 695 MW Utility Boiler Firing PRB Coal</p> <p>Vlad Zarnescu, Ph.D, and Mark Lewis, Riley Power Inc., USA</p>	<p>61. Fluidized Bed Gasification of Mediterranean Agricultural Residues: Effect of Pre-Treatments on the Gas Composition and Tar Production</p> <p>Dr. S. Arvelakis and Professor E. G. Koukios, Laboratory of Organic and Environmental Technologies, National Technical University of Athens, GREECE; and Asst. Prof. Truls Lilledahl and Assoc. Prof. Krister Sjoström, Royal Institute of Technology, Dept. of Chemical Technology, SWEDEN</p>	<p>119. Effects of Temperature and Pressure on CO₂ Capture using Nanoparticle Ionic Materials</p> <p>Ah-Hyung Alissa Park, Lenfest Junior Professor in Applied Climate Science and Associate Director of the Lenfest Center for Sustainable Energy, and Kunyi Andrew Lin, Department of Earth and Environmental Engineering and Lenfest Center for Sustainable Energy, Columbia University, USA</p>	<p>22. Foster Wheeler References and Tools for Biomass- and Waste-Fired CFBs</p> <p>Edgardo Coda Zabetta, Vesna Barišić, Foster Wheeler – R&D Department, FINLAND; and Brad Moulton Foster Wheeler – Power Group International, USA</p>
3:20 p.m.	<p>80. Pollutant Formation During Oxy-Coal Combustion</p> <p>Eric G. Eddings, and Liyong Wang, Dept. of Chemical Engineering, University of Utah, USA; and Astrid Sanchez and Fanor Mondragon, Dept. of Chemistry, University of Antioquia, COLOMBIA</p>	<p>101. Simulation of Oxy-Coal Combustion in Sub-Grid Scale with One-Dimensional Turbulence Model</p> <p>Yuxin Wu, Department of Thermal Engineering, Tsinghua University, PEOPLE'S REPUBLIC OF CHINA; and Philip J. Smith, and Jeremy N. Thornock, Institute for Clean and Secure Energy, University of Utah, USA</p>	<p>26. Physio-Chemical Properties of Low Rank Coal/Liquid CO₂ Slurries as Gasifier Feedstocks</p> <p>John P Doohar, Adelphi University/Dooher Institute of Physics and Energy; Marco J. Castaldi and Heide Buttermann/-Earth & Environmental Engineering Department (HKSM)/Columbia University; and Jeffrey N. Phillips, Electric Power Research Institute, USA</p>	<p>141. CO₂ Abatement Supply Curves for Coal Fired Power Plants</p> <p>Gary L. Leatherman, Ph.D. and Ralph Braccio, Booz Allen Hamilton, USA</p>	<p>40. Evaluation of the Impact of Co-Combustion on Ash Utilization, Fouling, and Corrosion by Large Scale Co-Firing of SRF in a CFB Boiler</p> <p>Aaron Fuller, Alexander Gerhardt, Jörg Maier, and G. Scheffknecht, Institute of Process Engineering and Power Plant Technology, Department of Power Plant Technology, Universität Stuttgart, GERMANY</p>
3:40 p.m.	<p>29. Homogeneous Mechanism Research on NO_x Conversion in Methane Flame under O₂/CO₂ Atmosphere</p> <p>Zhao Ran, Liu Hao, Hu Han, Yan Zhiqiang, and Qiu Jianrong, State Key Laboratory of Coal Combustion, Huazhong University of Science and Technology, PEOPLE'S REPUBLIC OF CHINA</p>	<p>77. Development of a Simulation Program for Mercury Behavior in Flue Gas Treatment System of Coal-Fired Power Plants</p> <p>Noriyuki Imada, Motoomi Iwatsuki, Hirofumi Kikkawa, Nobuo Morimoto, and Hisayuki Orita and Kure Research Laboratory, Babcock-Hitachi K.K. Masaaki Mukaide, Power & Industrial Systems R&D Laboratory, Hitachi, Ltd. Power Systems, JAPAN</p>	<p>17. Co-pyrolysis Characteristics of Low Rank Coals with Hybrid Poplar</p> <p>H. Haykiri-Acma and S. Yaman, Istanbul Technical University, Chemical and Metallurgical Engineering Faculty, Chemical Engineering Department, TURKEY</p>	<p>OPEN</p>	<p>36. Prediction of Slagging and Fouling with Enhanced Biomass Co-Firing in Dutch Utility Boilers</p> <p>Arthur Stam, KEMA; and Gerrit Brem, University of Twente, Faculty of Engineering, Laboratory of Thermal Engineering, THE NETHERLANDS</p>
4:00 p.m.	Break in the Exhibit Center				
4:15 p.m.	Tutorial on Post-Combustion Capture of CO₂ from Coal-Fired Power Plants <i>George A. Farthing, B&W Research Center, The Babcock & Wilcox Company</i>				
6:15 p.m.	Conclusion of the Technical Program				

The 2009 Clearwater Clean Coal Conference

Thursday, June 4, 2009

7:30 to 8:00 a.m. – **Continental Breakfast**

8:00 to 10:00 a.m. Panel:

The Changing Landscape of GHG Reduction: Today's Obstacles

Vince Albanese, Senior Vice President Regulatory Affairs, Fuel Tech, Inc.

- *Dave Foerter, Executive Director, Institute of Clean Air Companies – GHG Technology Demonstration and Commercial Availability Comments*
- *John Blaney, Managing Director, ICF Resources – Issues Affecting GHG Commodity Values*
- *Vince Albanese, Senior Vice President Regulatory Affairs, Fuel Tech, Inc. – Imminent GHG Control, Legislative or Regulatory Solution?*

10:00 to 10:30 a.m. – **Break**

FIVE CONCURRENT TECHNICAL SESSIONS – THURSDAY MORNING

	Oxy-Fuel V – Fundamentals & Advanced Concepts <i>Dr. Ligang Zheng, CanmetEnergy, and Dr. Christopher R. Shaddix, Sandia National Laboratories</i>	Multi Emissions Control <i>Bruce Clements, CanmetENERGY</i>	Chemical Looping <i>Bartev Sakadjian, The Babcock & Wilcox Company</i>	Biomass II <i>Prof.-Dr. Klaus R.G. Hein, University of Stuttgart</i>	Options for Improving Efficiency and Reducing Emissions <i>Dr. Nenad Sarunac, Lehigh University</i>
10:30 a.m.	53. Evaluation of Rank Effects and Gas Temperature on Coal Char Burning Rates During Oxy-Fuel Combustion Christopher R. Shaddix and Ethan S. Hecht, Combustion Research Facility, Sandia National Laboratories, USA ; Santiago Jimenez, LITEC, University of Zaragoza, SPAIN ; and Sang Min Lee, Korea Institute of Machinery & Materials, KOREA	13. Oxidative Desulfurization of Diesel Fuel Catalyzed by Phosphomolybdic Acid Mixed with Quaternary Ammonium Salt Jianghua Qiu, Guanghui Wang, Danlin Zeng, College of Chemical Engineering and Technology, and Meng Wang and Yanjun Li, College of Chemistry and Molecular Science, Wuhan University of Science and Technology, PEOPLE'S REPUBLIC OF CHINA	114. Alstom's Calcium Oxide Chemical Looping Combustion Coal Power Technology Development Herbert E. Andrus, Jr., John H. Chiu, and Paul R. Thibeault, Power Plant Laboratories, ALSTOM Power Inc., USA	45. The Application of the Dedicated Milling Concept for 100% Wood Firing at Atikokan Generating Station Les Marshall and Denym Burlock, Ontario Power Generation; and Daryl Gaudry, Atikokan GS, CANADA	63. Preliminary Results on the Characterization of Coal and Coal Combustion Products (CCP's) from a Western Power Plant Utilizing Powder River Basin Coal from the Wyodak-Anderson Coal Zone Ronald H. Affolter, Michael Brownfield, Ricardo Olea, William Betterton, and Margaret Ellis, US Geological Survey, USA



10:50 a.m.	<p>97. Radiation Modeling in Oxy-Fuel Combustion Scenarios Gautham Krishnamoorthy, Stefano Orsino, and Mehrdad Shahnam, ANSYS Inc.; and David E. Huckaby and Mehrdad Shahnam, U.S. Department of Energy, National Energy Technology Laboratory, USA; and Anura Perera, Fluent Europe Ltd., UNITED KINGDOM</p>	<p>49. Dynawave/Membrane WESP- A Low Cost Technology for Reducing SO₂, SO₃, Hg⁺², and Particulate from Coal-fired Power Plants Hardik Shah and John Caine, Southern Environmental, Inc.; and Steven F. Meyer and Andrea Trapet, MECS, Inc., USA</p>	<p>51. Syngas Chemical Looping Process for Hydrogen Production: Bench Demonstration and Process Simulation Fanxing Li, Deepak Sridhar, Andrew Tong, Hyung Kim, Liang Zeng, Fei Wang, and L. - S. Fan, Department of Chemical and Biomolecular Engineering, the Ohio State University, USA</p>	<p>73. Biomass Co-Firing Experience in the Netherlands with the Focus on Slagging and Fouling M.K. Cieplik, T.J. Zagórski, J.Kalivodová and W.L. van de Kamp, Energy research Centre of the Netherlands (ECN), THE NETHERLANDS</p>	<p>9. Generation Efficiency Improvement – No Regret Pathway to Immediate Reduction in CO₂ Emissions Nenad Sarunac, Energy Research Center, Lehigh University, USA</p>
11:10 a.m.	<p>52. Performance of the Pressurized Oxy-Fuel Combustion Power Cycle with Increasing Operating Pressures Jongsup Hong, and Ahmed Ghoniem, Department of Mechanical Engineering, and Randall Field, MIT Energy Initiative, Massachusetts Institute of Technology, USA; and Marco Gazzino, Enel Produzione SpA, ITALY</p>	<p>106. Evaluation of Oil Shale for Multi-Pollutant Emission Control from Coal Combustion- Part II Dr. Khalid Omar, Dr. Philip Martin, and Dr. Vijay Sethi, Western Research Institute; Dr. Robert Carrington, RAC Consulting Services; Dr. Richard Boardman, Fossil Energy & Waste Process Gas Treatment, Idaho National Laboratory; and Dr. Brian Higgins, Nalco Mobotec, USA</p>	<p>115. Development Status of Metal Oxides Chemical Looping Process for Coal-Fired Power Plants Corinne Beal and Laurent Maghdissian, Alstom Power Boilers SA, FRANCE; and Andreas Brautsch, ALSTOM Ltd., SWITZERLAND</p>	<p>147. Danish Experiences on Waste Incineration on Grates vs. Coal-SRF Co-Firing in Suspension Flemming J. Frandsen, Anne J. Pedersen, Hao Wu, and Peter Glarborg, Dept. of Chemical and Biochemical Engineering, Technical University of Denmark, DENMARK</p>	<p>42. Database and Model of Coal-fired Power Plants in the United States for Examination of the Costs of Retrofitting with CO₂ Capture Technology Phil Dipietro and Chris Nichols, National Energy Technology Laboratory, U.S. Department of Energy; Jeffrey Eppink and Michael Marquis, Enegis, LLC; and Lynn Manfredo, Research and Development Solutions, LLC, USA</p>
11:30 a.m.	<p>27. Flue Gas Recycle Strategies in Oxy-coal Combustion Ligang Zheng, Bruce Clements, Yewen Tan and Richard Pomalis, CANMET Energy Technology Center, Natural Resources Canada, CANADA</p>	<p>28. The Research on Preparation of Iron-oxide Desulfurizer from Steel-making Waste Dust Danlin Zeng, Guanghui Wang, Dingqiang Hu, Jianghua Qiu, Yongshen Tian, Yi Hu and Lei Tan, College of Chemical Engineering and Technology, Hubei Key Laboratory of Coal Conversion and New Carbon Material, Wuhan University of Science and Technology, PEOPLE'S REPUBLIC OF CHINA</p>	<p>120. Tailored Synthesis of Precipitated Magnesium Carbonates and Iron-based Chemical Looping Sorbents during Carbon Mineral Sequestration Ah-Hyung Alissa Park, Lenfest Junior Professor in Applied Climate Science and Associate Director of the Lenfest Center for Sustainable Energy and Huangjing Zhao, Department of Earth and Environmental Engineering and Lenfest Center for Sustainable Energy, Columbia University, USA</p>	<p>16. A Thermogravimetric Analysis on Effects of Municipal Solid Waste Blending on Combustion Characteristics of Different Rank Coal Marisamy Muthuraman and Tomoaki Namioka, Department of Environmental Science and Technology and Kunio Yoshikawa, Frontier Collaborative Research Center, Tokyo Institute of Technology, JAPAN</p>	<p>20. Potential Water Vapor Recovery Rates and Heat Rate Reductions Resulting from Condensation of Water Vapor in Boiler Flue Gas E. K. Levy, C. Whitcombe, I. Laurenzi, and H. Bilirgen, Energy Research Center, Lehigh University, USA</p>

11:50 a.m.	124. Oxy-Coal Combustion in a Small-Scale CFB Lawrence E. Bool and Stefan Laux Praxair, Inc.; and Eric Eddings, University of Utah, USA	104. Application of Commercial Sensor Manufacturing Methods for NO_x/NH₃ Mixed Potential Sensors for Emissions Control Eric L. Brosha, Rangachary Mukundan, Mark Nelson, Praveen Sekhar, Todd Williamson and Fernando H. Garzon, Los Alamos National Laboratory, Sensors and Electrochemical Devices Group, USA	131. Coal Direct Chemical Looping (CDCL) Process for Hydrogen and Power Generation Fanxing Li, Hyung Kim, Deepak Sridhar, Liang Zeng, Fei Wang, Andrew Tong, and L.-S. Fan, Department of Chemical and Biomolecular Engineering, The Ohio State University, USA	38. Effects of Biomass Co-Firing on Speciation and Availability of Trace Elements R.J. van Eijk, and A.F. Stam, KEMA, and M.K. Cieplik, ECN, THE NETHERLANDS	68. Effect of Ultrasonic Irradiation on the Electrolysis of Coal Xiaoxong Xin and Gerardine G. Botte, Department of Chemical Engineering, Russ College of Engineering and Technology, Ohio University, USA
12:10 p.m.	60. Oxy-Natural Gas Firing of the Jupiter Oxygen Oxy-Fuel Test Facility Thomas Ochs, Danylo Oryshchyn, Cathy Summers, Stephen Gerdemann, Rigel Woodside, Casey Carney, and Paul Turner, National Energy Technology Laboratory, U.S. Department of Energy; and Brian Patrick, Daniel O'Brien, and Mark Schoenfeld Jupiter Oxygen, USA	OPEN	OPEN	140. Release to the Gas Phase of Inorganic Metals, S and Cl from Waste Fractions During Combustion A. J. Pedersen, S. van Lith, F. J. Frandsen, S. D. Steinsen, and L. B. Holgersen, Department of Chemical and Biochemical Engineering, Technical University of Denmark, DENMARK	81. A Simple Burner Retrofit Opacity Solution for High Aspect Ratio Furnaces Jonathan D. Regele, Prabhat Naredi, and Majed Toqan, Creative Power Solutions Inc., USA
12:30 p.m.	Lunch/Roundtable/Wrap-up				
2:00 to 5:00 p.m. – Workshop: Converting Efficiency to Profits <i>Tony Widenman, Technological Specialist—Fuel & Fuel SME, DTE Energy.</i>					
<p>This is not a course in economics, nor will economic methods be presented. This is a seminar on fossil fuels, primarily coal, to show what factors affect the economics of burning fossil fuels. For example: effects of poor mill performance, slagging & fouling effects of blended coals vs. traditional single source coals, washed vs. unwashed coals, PRB vs. high volatile bituminous coals. The seminar will start out with an intro Q&A about fossil fuels, then move on to the basic fuel analysis and mining methods (including a mining slideshow). The second part will cover each part of detailed fuel analyses highlighting how this effects boiler operation. Lastly, we will get into the importance of scales, sampling and on-line fuel analysis to control plant costs.</p>					

The 2009 Clearwater Clean Coal Conference

Friday, June 5, 2009

7:00 a.m.

Departure of the Polk Power Plant Tour

Starting at 6:30 a.m., coffee and bakery items will be offered in Lobby 2 for those taking the tour.

Tampa Electric Company planned, engineered, built, and operates the Polk Power Plant Unit #1 Integrated Gasification Combined Cycle (IGCC) Power Plant. The project was partially funded under the Department of Energy's Clean Coal Technology Program pursuant to a Round III award.

Please note the dress requirements: you must wear **long pants and boots or a full shoe; no tennis shoes nor sandals.**

To participate you must be registered for the conference and pay an additional fee of \$125.00. Further details are at the Conference Desk.



**34th International Technical Conference on
Clean Coal & Fuel Systems
May 31 – June 4, 2009
Sheraton Sand Key
Clearwater, Florida, USA**

(Return with payment) – or call with credit card information to avoid filling out the form
You may email your information to BarbaraSak@aol.com; FAX the form to 301-294-7480; call 301-330-2256 and we'll register you over the phone; or mail the form along with your check to CTA.

Name _____

**First Name for
Badge** _____

Title _____

Company _____

Address _____

City _____ **State** _____ **Zip** _____

Country _____

Phone _____

FAX _____

Email _____

**\$895 Now through May 5th
\$995 from May 6th to June 4th**

Registration Fee: \$ _____

OPTIONAL EXTRAS:

- Field Trip (6/5/09) to Polk Power Plant **\$125.00**
- Spouse's Fee: **\$150.00**
Spouse's Name _____
- Printed Proceedings volume -- CD-Rom is included in registration fee: **\$150.00**

**GRAND TOTAL
(Registration plus options):**
\$ _____

**Pre-registration required for Tutorials:
Sunday, 10 a.m.:** _____

Sunday, 12:15 p.m.:

Sunday, 2:30 p.m.: _____

Monday: 2:30 p.m. _____

**Wednesday Themed Luncheon:
Seat me at the Table on**

**CTA reserves the right to modify the
Conference Program at any time.**

*Coal Technology Association's FEIN: 75-1486129
The registration fee covers one CD-Rom of the
Proceedings, all conference events (Sunday*

through Thursday (excluding the Polk trip and Fuel Management 101 Workshop), the Exhibit Center, 4 luncheons, 2 evening parties, all breaks, all Continental breakfasts, and all conference materials.

Method of Payment; Check One:

Check enclosed (payable to CTA; remit to 601 Suffield Drive, Gaithersburg, MD 20878);

VISA No. _____

MasterCard No. _____

VISA or MasterCard Expiration Date:

Signature: _____

Send information about the Exhibit Center.

Spouses Registration - *With so much to see and do in the Clearwater area; we don't plan specific activities for spouses. However, the \$150 fee covers the Welcome Party, four luncheons, beach party, Continental breakfasts and all refreshment breaks. The on-site spouse's fee is \$175.*

Student Registration -- *To encourage participation by full-time students currently enrolled in a college or university, the registration fee is \$295.*

Cancellations received in writing by May 10th will be refunded in full, less a \$25 administrative charge. Cancellations received after this date will not be refunded. Substitutions are welcome at any time. Fees paid by speakers are not eligible for refunds.

\$295.00 – Proceedings Purchase – *I can't attend the conference please send me the Proceedings* *CD-Rom* *Printed volume; enclosed is my payment of \$295 (\$395 post-conference). Attendees receive the CD-Rom version at check-in.*

FOR THE SPOUSES

With so much to see and do in the Clearwater area, we don't plan specific activities for spouses. However, we've invited a local artist to exhibit her watercolors. Marlene Stark is fast developing a local reputation for her brilliant colors. In addition, Jerri Letcavits will return with her fabulous jewelry pieces. We'll have also a few tables reserved for spouses at the Wednesday luncheon should your spouse be participating in the Themed Luncheon.

The \$150 fee covers the Welcome Party, four luncheons, beach party, and all refreshment breaks. **Keep in mind, the on-site spouse's registration is \$175.**

THEMED LUNCHEON

On Wednesday, June 3rd, we've organized a Themed Luncheon. We've chosen the hottest topics and the leading experts to host tables where those topics will be thrashed out. Sit with the experts to learn the latest and ask your questions. Reserve a spot at the table of your choice. Only 7 spots per table, so act quickly.



BEST STUDENT PAPER AWARD

An award will be given to the student who submits and presents a paper of high caliber. The paper will be judged on the manuscript and on the presentation in the technical session. Members of the Best Student Paper Award Committee will make the decision

CONFERENCE ATTIRE

We're encouraging all speakers and attendees to adopt a business casual dress, i.e., no jackets or ties. This covers speakers, session chairmen, panel and tutorial chairs and speakers. Almost all of the food functions are outside and a business casual dress will make the long conference day and the outdoor functions more comfortable.



SHERATON SAND KEY

Sand Key is one of the *20 Best Beaches*, according to many travel and tourism organizations. Directly on this beautiful beach is the Sheraton Sand Key, a 390-room luxury hotel. Each of the hotel's newly refurbished rooms overlooks either the Gulf of Mexico or Clearwater Bay. Its seven secluded acres of white sandy beach set a tropical holiday mood for registrants to meet and discuss timely topics with colleagues from all over the globe. Rates for single or double rooms: \$177/night.

Sheraton Sand Key
1160 Gulf Boulevard
Clearwater, Florida
Phone: 727-595-1611; FAX: 727-596-8488
\$177/night – Single or Double

Visit <http://www.beachsand.com> for information about the Sheraton Sand Key. Or go directly to their on site reservations created specifically for us. Go to www.coaltechnologies.com click Conferences and then click on the hotel site reference.



Getting to Clearwater & The Sheraton Sand Key:

The Sheraton Sand Key (on the Pinellas Sun Coast) in Clearwater, Florida, is approximately 21 miles from Tampa International Airport. Limousine Shuttle Service (\$24/person) is available at the airport that will take you directly to the hotel.

In addition, service is increasing at the Clearwater/St. Petersburg Airport; so please check with your carrier to see if you can fly in there because it is closer to the Sheraton than Tampa International.

Climate: June is a beautiful time to be in Florida on the Gulf Coast. During the day the temperature is perfect for the beach and

the evenings are balmy. In addition, a baseball cap or hat is advisable for times when we are outside.

THE EXHIBIT CENTER

We can add an additional 2 spaces to the 22 already reserved. Current exhibitors:

- Aspen Technology
- ASTM International
- ATK
- The Babcock & Wilcox Company
- Babcock Power, Inc.
- Brigham Young University
- Clean Air Instrument Rental
- Coal Technology Association
- Combustion Components Associates
- Consortium for Clean Coal Utilization
- Energy & Environmental Research Center, University of North Dakota
- Fuel Tech, Inc.
- Illinois Clean Coal Institute
- LECO Corporation
- Pennsylvania State University
- Reaction Engineering International
- Taylor & Francis
- Technomics, Inc.
- Tsinghua University
- U.S. Geological Survey
- U.S. Department of Commerce
- World Coal Magazine

THE CLEARWATER CLEAN COAL CONFERENCE COMMITTEE

The Conference Committee seeks papers from all countries worldwide that deal

with: technical solutions to problems; specific strategies; projects; innovations; industry trends; and/or regulatory compliance. The goal is to present an extensive overview of emerging, evolving, and innovative technologies, fuels and/or equipment in the power generation industry, through the presentation of accomplishments, opportunities and challenges in the major technological areas. Through their efforts we present this year's excellent technical program.

Air Products & Chemicals

Philip Winkler

American Electric Power,

J.J. Letcavits

American Society of Mechanical Engineers' Power Div.:

Dr. Ashwani Gupta, University of Maryland

Arizona State University

Dr. Andrew V.G. Chizmeshya

The Babcock & Wilcox Company

Stanley J. Vecci, (Chairman)

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Bonnie Courtemanche, P.E.

CanmetENERGY

Dr. Ligang Zheng

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Corning, Inc.

Giselle Sherman

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Dr. Edmundo Vásquez

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Anthony Widenman

Foster Wheeler North America Corp.

Dr. Horst Hack

Fuel Tech Inc.

Chris Smyrniotis

Gas Technology Institute

Howard Meyer

Illinois Clean Coal Institute

Joseph Hirschi

Massachusetts Institute of Technology

Dr. Janos M. Beer

Pennsylvania State University

Bruce G. Miller

Praxair, Inc.

Dr. Lawrence Bool

Savannah River National Lab

Richard Marczewski

Science Applications International Corp.

Massood Ramezan

Siemens Energy, Inc.

Alan Paschedag

Tampa Electric Co.

Yogesh M. Patel

Tsinghua University

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University of Stuttgart

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U. S. Geological Survey

Dr. Romeo Flores



COAL:

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THE CLEARWATER CLEAN COAL CONFERENCE

