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CAPTURE TECHNOLOGY MEETING

June 23-26, 2015 • Pittsburgh



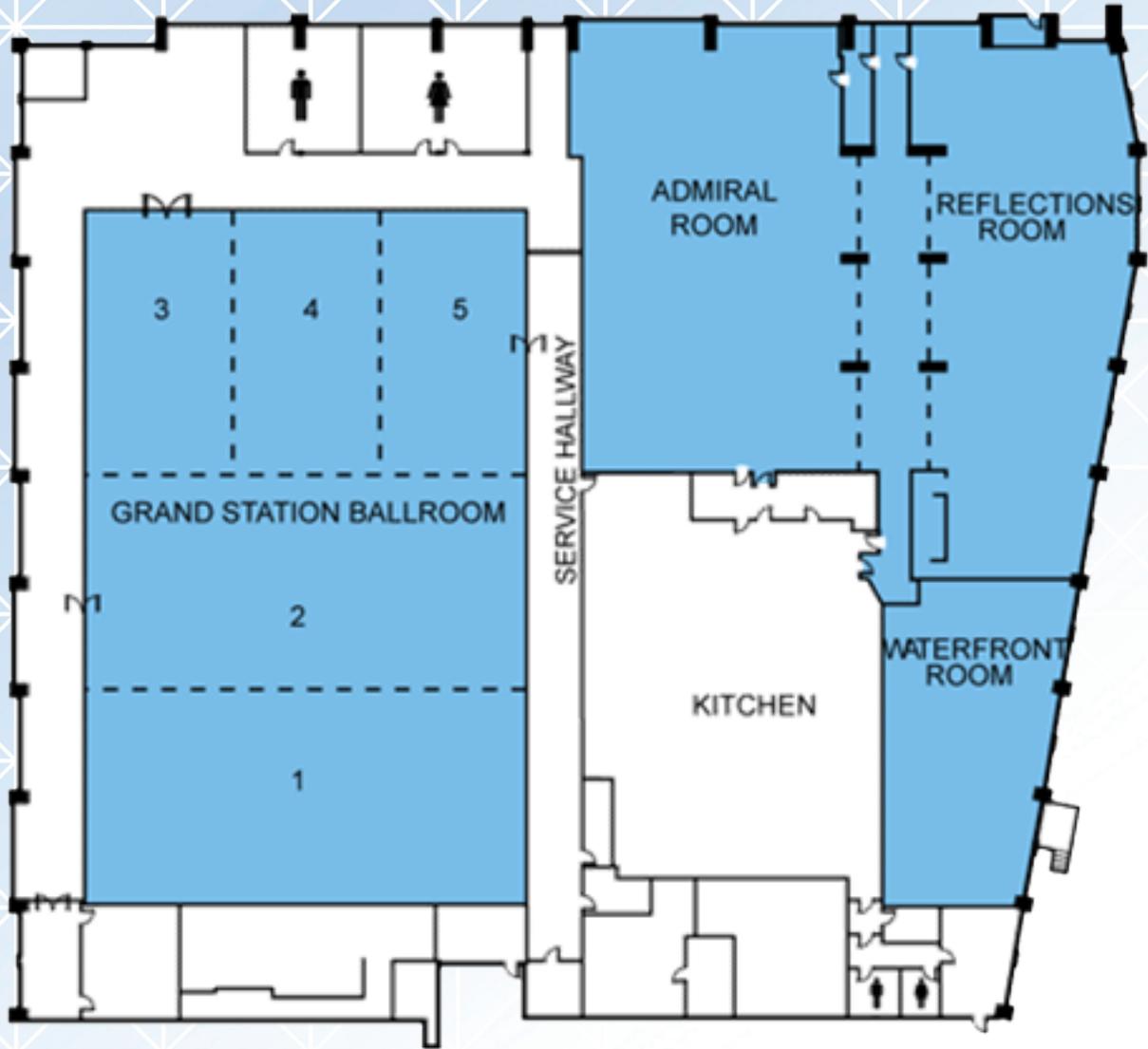
U.S. DEPARTMENT OF
ENERGY



National Energy
Technology Laboratory

Sponsored by:
U.S. Department of Energy
Office of Fossil Energy
National Energy Technology Laboratory

▶ SHERATON STATION SQUARE FLOOR PLAN



FIRST FLOOR

DETAILED PROGRAM

TUESDAY, JUNE 23RD

REGISTRATION

7:00 AM – 8:00 AM Grand Station Foyer

CONTINENTAL BREAKFAST

7:00 AM – 8:00 AM Grand Station III

GRAND STATION I & II

OPENING SESSION

MODERATOR: *Lynn Brickett*, U.S. Department of Energy, National Energy Technology Laboratory

8:00 AM Welcoming Remarks and NETL Overview
Grace M. Bochenek, Ph.D., Director, U.S. Department of Energy, National Energy Technology Laboratory

8:20 AM DOE's Clean Coal & Carbon Management RD&D Program
David Mohler, Deputy Assistant Secretary for Clean Coal and Carbon Management
Office of Fossil Energy, U.S. Department of Energy

8:50 AM **Revitalizing CCS: Bringing Scale and Speed to CCS Deployment**
Jeffrey N. Phillips, Electric Power Research Institute

9:10 AM **Emerging CO₂ Capture Technologies and Their Cost Reduction Potential**
Jasmin Kemper, IEAGHG

9:30 AM **CO₂ Capture Project (CCP)–Phase 3 Results and Phase 4 Program Development**
Raja Jadhav, Chevron Energy Technology Company

9:50 AM **BREAK - Grand Station III**

SYSTEMS STUDIES AND MODELING

MODERATOR: *David Lang*, U.S. Department of Energy, National Energy Technology Laboratory

10:10 AM **New Technology Options in the IECM Power Plant Simulation Model**
Edward S. Rubin, Carnegie Mellon University

10:25 AM **Systems Analysis Guidance**
James C. Fisher II, U.S. Department of Energy, National Energy Technology Laboratory

11:00 AM **An Assessment of Carbon Capture Technologies for IGCC Power Plants**
James C. Fisher II, U.S. Department of Energy, National Energy Technology Laboratory

DETAILED PROGRAM

TUESDAY, JUNE 23RD

SYSTEMS STUDIES AND MODELING

MODERATOR: *David Lang*, U.S. Department of Energy, National Energy Technology Laboratory

11:25 AM **Carbon Capture Simulation Initiative: Accomplishments and Opportunities**
David C. Miller, U.S. Department of Energy, National Energy Technology Laboratory

12:10 PM **LUNCH - Reflections & Waterfront Room**

POST-COMBUSTION MEMBRANE-BASED CAPTURE

MODERATOR: *José Figueroa*, U.S. Department of Energy, National Energy Technology Laboratory

1:40 PM **Bench Scale Development of a Hybrid Membrane-Absorption CO₂ Capture Process**
Brice Freeman, Membrane Technology & Research, Inc.

2:05 PM **Novel Inorganic/Polymer Composite Membranes for CO₂ Capture**
Winston Ho, The Ohio State University

2:30 PM **Electrochemical Membranes for CO₂ Capture and Power Generation**
Hossein Ghezeli-Ayagh, FuelCell Energy, Inc.

2:55 PM **Mixed Matrix Membranes for Post-Combustion CO₂ Capture**
Surendar Reddy Venna, U.S. Department of Energy, National Energy Technology Laboratory

3:20 PM **BREAK - Grand Station III**

MODERATOR: *José Figueroa*, U.S. Department of Energy, National Energy Technology Laboratory

3:40 PM **Pilot Testing of a Membrane System for Post-Combustion CO₂ Capture**
Tim Merkel, Membrane Technology & Research, Inc.

4:05 PM **Pilot Test of a Nanoporous, Super-Hydrophobic Membrane Contactor Process for Post-Combustion CO₂ Capture**
S. James Zhou, Gas Technology Institute

4:30 PM **CO₂ Capture by Cold Membrane Operation**
Trapti Chaubey, Air Liquide

4:55 PM **ADJOURN**

▶ DETAILED PROGRAM

WEDNESDAY, JUNE 24TH

REGISTRATION

7:00 AM – 8:00 AM Grand Station Foyer

CONTINENTAL BREAKFAST

7:00 AM – 8:00 AM Grand Station III

GRAND STATION I & II

POST-COMBUSTION SOLVENT-BASED CAPTURE

MODERATOR: *Andrew O’Palko*, U.S. Department of Energy, National Energy Technology Laboratory

8:00 AM **An Advanced Catalytic Solvent for Lower Cost Post-Combustion CO₂ Capture in a Coal-Fired Power Plant**
Cameron Lippert, University of Kentucky Center for Applied Energy Research

8:25 AM **Development of Mixed-Salt Technology for CO₂ Capture from Coal Power Plants**
Indira S. Jayaweera, SRI International

8:50 AM **Low Energy CO₂ Capture Enabled by Biocatalyst Delivery System**
Alex Zaks, Akermin, Inc.

9:15 AM **Bench-Scale Development of a Nonaqueous Solvent CO₂ Capture Process**
Marty Lail, RTI International

9:40 AM **Development of a Novel Gas Pressurized Stripping (GPS)-Based Technology for CO₂ Capture from Post-Combustion Flue Gases**
Shiaoguo (Scott) Chen, Carbon Capture Scientific, LLC

10:05 AM **BREAK - Grand Station III**

MODERATOR: *Bruce Lani*, U.S. Department of Energy, National Energy Technology Laboratory

10:25 AM **Evaluation of Concentrated Piperazine for CO₂ Capture from Coal-Fired Flue Gas**
Katherine Dombrowski, AECOM

10:50 AM **Low-Energy Solvents for CO₂ Capture Enabled by a Combination of Enzymes and Vacuum Regeneration**
Sonja Salmon, Novozymes North America, Inc.

11:15 AM **Combined Pressure, Temperature Contrast, and Surface-Enhanced Separation of CO₂ for Post-Combustion Carbon Capture**
Zhen Wang, Rice University

11:40 AM **National Carbon Capture Center: Post-Combustion**
Patrick Crossley, Southern Company Services, Inc.

12:05 PM **LUNCH - Reflections & Waterfront Room**

DETAILED PROGRAM

WEDNESDAY, JUNE 24TH

POST-COMBUSTION SOLVENT BASED-CAPTURE

MODERATOR: *Andrew Jones*, U.S. Department of Energy, National Energy Technology Laboratory

1:35 PM **Ion Advanced Solvent CO₂ Capture Pilot Project**
Nathan Brown, Ion Engineering, LLC

2:00 PM **Pilot-Scale Silicone Process for Low-Cost CO₂ Capture**
Benjamin Wood, GE Global Research

2:25 PM **Waste Heat Integration with Solvent Process for More Efficient CO₂ Removal from Coal-Fired Flue Gas: 2015 Update**
Jerrad Thomas, Southern Company Services, Inc.

2:50 PM **Application of Heat Integrated Post-Combustion CO₂ Capture System with Hitachi Advanced Solvent into Existing Coal-Fired Power Plants**
Jesse Thompson, University of Kentucky Center for Applied Energy Research

3:15 PM **BREAK - Grand Station III**

MODERATOR: *Steve Mascaro*, U.S. Department of Energy, National Energy Technology Laboratory

3:35 PM **Slipstream Pilot-Scale Demonstration of a Novel Amine-Based Post-Combustion Technology for CO₂ Capture from Coal-Fired Power Plant Flue Gas**
Krish R. Krishnamurthy, Linde, LLC

TRANSFORMATIONAL TECHNOLOGIES

MODERATOR: *Steve Mascaro*, U.S. Department of Energy, National Energy Technology Laboratory

4:00 PM **Bench-Scale Process for Low-Cost CO₂ Capture Using a Phase Changing Absorbent**
Tiffany Westendorf, GE Global Research

4:25 PM **Accelerating the Development of "Transformational" Solvents for CO₂ Separations**
David Heldebrant, Pacific Northwest National Laboratory

4:50 PM **Supersonic Post-Combustion Inertial CO₂ Extraction System**
Anthony Castrogiovanni, Acent Laboratories

5:15 PM **ADJOURN**

5:30 PM **Poster Session / Reception - Grand Station III**

DETAILED PROGRAM

THURSDAY, JUNE 25TH

REGISTRATION

7:00 AM – 8:00 AM Grand Station Foyer

CONTINENTAL BREAKFAST

7:00 AM – 8:00 AM Grand Station III

GRAND STATION I & II

TRANSFORMATIONAL TECHNOLOGIES

MODERATOR: *Andrew Aurelio*, U.S. Department of Energy, National Energy Technology Laboratory

8:00 AM **New Materials Development for Carbon Capture Applications**
Hunaid Nulwala, Carnegie Mellon University, U.S. Department of Energy,
National Energy Technology Laboratory

8:25 AM **Microencapsulation and Advanced Manufacturing to Enable New Solvents for Carbon Capture**
Joshuah Stolaroff, Lawrence Livermore National Laboratory

POST-COMBUSTION SORBENT-BASED CAPTURE

MODERATOR: *Andrew Aurelio*, U.S. Department of Energy, National Energy Technology Laboratory

8:50 AM **Bench Scale Development and Testing of Aerogel Sorbents**
Redouane Begag, Aspen Aerogels, Inc.

9:15 AM **Rapid Pressure Swing Adsorption for CO₂ Capture**
James A. Ritter, University of South Carolina

9:40 AM **Advanced Solid Sorbents and Process Designs for Post-Combustion CO₂ Capture**
Thomas Nelson, RTI International

10:05 AM **BREAK - Grand Station III**

MODERATOR: *Mike Mosser*, U.S. Department of Energy, National Energy Technology Laboratory

10:25 AM **Evaluation of Solid Sorbents as a Retrofit Technology for CO₂ Capture**
Sharon Sjostrom, ADA-ES, Inc.

10:50 AM **Optimizing the Costs of Solid Sorbent-Based CO₂ Capture Processes Through Heat Integration**
Sharon Sjostrom, ADA-ES, Inc.

11:15 AM **Sorbent-Based Post-Combustion CO₂ Slipstream Testing**
Jeannine Elliott, TDA Research, Inc.

DETAILED PROGRAM

THURSDAY, JUNE 25TH

POST-COMBUSTION SORBENT-BASED CAPTURE

MODERATOR: *Mike Mosser*, U.S. Department of Energy, National Energy Technology Laboratory

11:40 AM **Pilot-Scale Evaluation of an Advanced Carbon Sorbent-Based Process for Post-Combustion Carbon Capture**
Marc Hornbostel, SRI International

12:05 PM **LUNCH - Reflections & Waterfront Room**

MODERATOR: *Mike Mosser*, U.S. Department of Energy, National Energy Technology Laboratory

1:35 PM **A New Sorbent-Based Post-Combustion Carbon Capture Process**
Gokhan Alptekin, TDA Research, Inc.

2:00 PM **Rapid Temperature Swing Adsorption Using Polymeric-Supported Amine Hollow Fiber Material**
Ryan P. Lively, Georgia Institute of Technology

PRE-COMBUSTION CAPTURE PROJECTS

MODERATOR: *Elaine Everitt*, U.S. Department of Energy, National Energy Technology Laboratory

2:25 PM **Robust and Energy Efficient Dual Stage Membrane-Based Process for Enhanced CO₂ Recovery**
Richard Ciora, Media and Process Technology, Inc.

2:50 PM **CO₂ Capture from IGCC Gas Streams Using the AC-ABC Process**
Anoop Nagar, SRI International

3:15 PM **High-Temperature Polymer-Based Membrane Systems for Pre-Combustion CO₂ Capture**
Kathryn A. Berchtold, Los Alamos National Laboratory

3:40 PM **BREAK - Grand Station III**

MODERATOR: *Elaine Everitt*, U.S. Department of Energy, National Energy Technology Laboratory

4:00 PM **Hydrophobic Solvents for Pre-Combustion CO₂ Capture**
Nicholas Siefert, U.S. Department of Energy, National Energy Technology Laboratory

4:25 PM **Pre-Combustion Carbon Capture at the NCCC**
John Socha, Southern Company Services, Inc.

DETAILED PROGRAM

THURSDAY, JUNE 25TH

PRE-COMBUSTION CAPTURE PROJECTS

MODERATOR: *Elaine Everitt*, U.S. Department of Energy, National Energy Technology Laboratory

4:50 PM **Development of a Pre-Combustion CO₂ Capture Process Using High-Temperature PBI Hollow Fiber Membranes**
Indira S. Jayaweera, SRI International

5:15 PM **Pilot Scale Evaluation of Pre-Combustion Carbon Capture Process**
Gokhan Alptekin, TDA Research, Inc.

5:40 PM **ADJOURN**

FRIDAY, JUNE 26TH

REGISTRATION

7:00 AM – 8:00 AM Grand Station Foyer

CONTINENTAL BREAKFAST

7:00 AM – 8:00 AM Grand Station III

GRAND STATION I & II

OXY-COMBUSTION AND CHEMICAL LOOPING

MODERATOR: *Steve Richardson*, U.S. Department of Energy, National Energy Technology Laboratory

8:00 AM **Commercialization of the Iron-Based Coal Direct Chemical Looping Process for Power Production with In-Situ CO₂ Capture**
Luis G. Velazquez-Vargas, The Babcock & Wilcox Power Generation Group, Inc.

8:25 AM **Alstom's Chemical Looping Combustion Technology with CO₂ Capture for New and Existing Coal-Fired Power Plants**
Ray Chamberland, Alstom Power, Inc.

8:50 AM **Staged, High Pressure Oxy-Combustion Technologies: Development and Scale-Up**
Richard Axelbaum, Washington University, St. Louis

9:15 AM **Advanced Oxy-Combustion Technology Development and Scale-Up for New and Existing Coal-Fired Power Plants**
William Follett, Aerojet Rocketdyne

9:40 AM **Praxair's Oxygen Transport Membrane Technology for Syngas and Power Applications**
Juan Li, Praxair, Inc.

10:05 AM **ADJOURN**

POSTER PRESENTATIONS

Lab and Bench Scale Testing of CO₂ Capture Using Physical Sorbents

Ravi Jain, InnoSeptra, LLC

Cryogenic Carbon Capture

Larry Baxter, Sustainable Energy Solutions

Electrochemical Stripping for Improved CO₂ Capture

Rich Masel, Dioxide Materials

Carbon Capture Overview at NETL-ORD

David Hopkinson, U.S. Department of Energy, National Energy Technology Laboratory

Improving the Processability and Mechanical Properties of Polymers for Use in Gas Separation Membranes

Lawrence Hill, U.S. Department of Energy, National Energy Technology Laboratory

Conversion of Captured CO₂ to Alkyl Carbonates

C.B. Panchal, E3Tec Service, LLC

Integrated Membrane Reactor for Pre-Combustion CO₂ Capture

Ashok Damle, Techverse, Inc.

Supported Ionic Liquid Membranes for Pre-Combustion Carbon Capture

Megan Macala, AECOM

Development of High Throughput Computational and Experimental Screening Programs for Carbon Capture Materials

Jan Steckel and Victor A. Kusuma, U.S. Department of Energy, National Energy Technology Laboratory

High Capacity Sorbent and Process for CO₂ Capture

Srivats Srinivasachar, Envergex, LLC

Basic Immobilized Amine Sorbents (BIAS) for Post-Combustion CO₂ Capture

James Hoffman, U.S. Department of Energy, National Energy Technology Laboratory

Design and Synthesis of Low Viscosity CO₂ Binding Organic Liquids

Phillip Koech, Pacific Northwest National Laboratory

Molecular Design of Transformational Solvent Systems

Vanda Glezakou, Pacific Northwest National Laboratory

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