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Carbon Storage R&D Project Review Meeting

Transforming Technology through Integration and Collaboration

U.S. Department of Energy

Fossil Energy and National Energy Technology Laboratory

August 18–20, 2015

Sheraton Station Square, Pittsburgh, Pennsylvania

TUESDAY, AUGUST 18, 2015 – GRAND STATION BALLROOM

7:00 a.m. **Meeting Registration/Continental Breakfast**

PLENARY SESSION – KEYNOTE PRESENTATIONS

Moderator: Traci Rodosta, U.S. Department of Energy, National Energy Technology Laboratory

8:00 a.m. **Welcoming Remarks and NETL Overview**
Grace M. Bochenek, Ph.D., Director, National Energy Technology Laboratory

8:20 a.m. **DOE Clean Coal R & D Program**
Mark Ackiewicz, Office of Fossil Energy, U.S. Department of Energy

8:30 a.m. **Overview of the Norwegian RD&D CCS Program (CLIMIT)**
Hans Jörg Fell, Gassnova

8:50 a.m. **IEAGHG Monitoring Network Panel Discussion**
Tim Dixon, Manager Technical Programme, and CCS and Regulatory Affairs
Panel: Katherine Romanak, University of Texas at Austin; Tom Daley, Lawrence Berkeley National Laboratory

9:15 a.m. **BREAK - Grand Station III – IV**

9:30 a.m. **International Monitoring Panel**
Representatives from major international projects
Panel Chair: Tim Dixon
Panel: TBD

10:10 a.m. **Department of Interior – Bureau of Ocean Energy Management (BOEM)**
Melissa Batum, U.S. DOI, BOEM

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PLENARY SESSION – Regional Carbon Sequestration Partnerships Saline Injection Large-Scale Field Projects

Moderator: Bill Aljoe, U.S. Department of Energy, National Energy Technology Laboratory

10:30 a.m. **Illinois Basin – Decatur Project, Midwest Geological Sequestration Consortium**
Sallie Greenberg, Illinois State Geological Survey

11:15 a.m. **Citronelle Project, Southeast Regional Carbon Sequestration Partnership**
TBD

12:00 p.m. **LUNCH – Reflections and Waterfront**

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PARALLEL SESSIONS - TUESDAY, AUGUST 18, 2015

Room	Haselton 1 & 2		Brighton 3 & 4		Ellwood 1 & 2	
Session Moderator	Geomechanics 1 Bill Aljoe		Associated Storage (EOR) 1 Brian Dressel		Capacity/Storage Efficiency Bill O'Dowd	
1:00 PM	P1	A Coupled Geomechanical, Acoustic, Transport and Sorption Study of Caprock Integrity in Carbon Dioxide (CO ₂) Sequestration - Colorado School of Mines - Manika Prasad	P1	A Nonconventional CO ₂ -Enhanced Oil Recovery Target in the Illinois Basin: Oil Reservoirs of the Thick Cypress Sandstone - University of Illinois - Nathan Webb	P1	Optimizing and Quantifying CO ₂ Storage Resource in Saline Formations and Hydrocarbon Reservoirs - University of North Dakota – Charles Gorecki
1:25 PM	P2	Quantitative Characterization of Impacts of Coupled Geomechanics and Flow on Safe Permanent Geological Storage of Carbon Dioxide (CO ₂) in Fractured Reservoirs - Colorado School of Mines - Philip Winterfeld	P2	Improved Characterization and Modeling of Tight Oil Formations for CO ₂ Enhanced Oil Recovery Potential and Storage Capacity Estimation - University of North Dakota - Jim Sorensen	P2	Enhanced Analytical Simulation Tool for CO ₂ Storage Capacity Estimation and Uncertainty Quantification - University of Texas at Austin - Seyyed Hosseini
1:50 PM	P3	Geomechanical Monitoring for CO ₂ HUB Storage: Production and Injection at Kevin Dome - Montana State University – Lee Spangler	P3	Bakken CO ₂ Storage and Enhanced Recovery Program— Phase I - University of North Dakota - Jim Sorensen	P3	Commercial Scale CO ₂ Injection and Optimization of Storage Capacity in the Southeastern United States - Advanced Resources International, Inc.- George Koperna
2:15 PM	P4	A Probabilistic Assessment of the Geomechanical Response to CO ₂ Injections in Large Igneous Provinces - Northern Illinois University – Ryan Pollyea	P4	Carbon Life Cycle Analysis of CO ₂ -EOR For Net Carbon Negative Oil (NCNO) Classification - University of Texas at Austin - Vanessa Nunez-Lopez	P4	Resource Assessment - National Energy Technology Laboratory - Angela Goodman

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2:40 PM	P5	Geomechanical Properties of Mesozoic Rift Basins: Applications for Geosequestration - Sandia Technologies LLC - Daniel Collins	P5	Identification of Residual Oil Zones in the Williston and Powder River Basins - University of North Dakota - Charles Gorecki	P5	Optimizing Accuracy of Determinations of Carbon Dioxide Storage Capacity and Permanence, and Designing More Efficient Carbon Dioxide Storage - University of Wyoming – Fred McLaughlin
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3:05 p.m.

BREAK - Grand Station III – IV

Room	Haselton 1 & 2		Brighton 3 & 4		Ellwood 1 & 2	
Session Moderator	Geomechanics 2 Karen Kluger		Associated Storage (EOR) 2 Bruce Brown		Modeling 1 Mary Sullivan	
3:30 PM	P1	Integrated Characterization of CO ₂ Storage Reservoirs on the Rock Springs Uplift Combining Geomechanics, Geochemistry, and Flow Modeling - University of Wyoming - John Kaszuba	P1	Development of Swelling-Rate-Controllable Particle Gels to Enhance CO ₂ Flooding Sweep Efficiency and Storage Efficiency – University of Missouri Science and Technology - Baojun Bai	P1	Simplified Predictive Models for CO ₂ Sequestration Performance Assessment - Battelle Memorial Institute - Srikanta Mishra
3:55 PM	P2	Characterizing and Interpreting the In Situ Strain Tensor During CO ₂ Injection - Clemson University - Larry Murdoch	P2	Optimizing CO ₂ Sweep Based on Geochemical and Reservoir Characterization of the Residual Oil Zone of Hess Seminole Unit - University of Texas at Austin – Ian Duncan	P2	Model Complexity and Choice of Model Approaches for Practical Simulations of CO ₂ Injection, Migration, Leakage, and Long-term Fate - Princeton University - Karl Bandilla
4:20 PM	P3	Geomechanical Framework for Secure Carbon Dioxide CO ₂ Storage in Fractured Reservoirs and Caprocks for Sedimentary Basins in the Midwest United States - Battelle Memorial Institute - Joel Sminchak	Carbon Use/Reuse Bruce Brown		P3	Optimal Model Complexity in Geological Carbon Sequestration: A Response Surface Uncertainty Analysis - University of Wyoming - Mingkan Zhang

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4:45 PM	P4	Development of Geomechanical Screening Tools to Identify Risk: An Experimental and Modeling Approach - University of Texas at Austin – Mary Wheeler	P1	Utilization of CO ₂ in High Performance Building and Infrastructure Products – Solidia - Larry McCandlish	P4	Science of CO ₂ sequestration - Los Alamos National Laboratory - Rajesh Pawar
5:10 PM	P5	Microseismic toolset for fault detection and seismicity mitigation - Lawrence Livermore National Laboratory - Josh White	P2	Catalytic Conversion of CO ₂ to Industrial Chemicals - National Energy Technology Laboratory - Doug Kauffman	--	----

6:00 p.m. **Poster Session (CORE R&D, NRAP, and RCSPs) – Grand Station III–V**

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WEDNESDAY, AUGUST 19, 2015 – GRAND STATION BALLROOM

7:00 a.m. **Meeting Registration/Continental Breakfast**

8:00 a.m. **Welcome**

PLENARY SESSION

Moderator: Mark Ackiewicz, U.S. Department of Energy, Office of Fossil Energy

8:05 a.m. **Energy Frontier Research Centers**
Larry Lake, University of Texas, Austin; Scott Frailey, University of Illinois at Urbana-Champaign; and Donald DePaolo, Lawrence Berkeley National Laboratory

8:35 a.m. **Subsurface Technology and Engineering Research, Development, and Demonstration (SubTER) Crosscut initiative**
Thiyaga P. Thiyagarajan, U.S. Department of Energy, Office of Basic Science
Elena Melchert, U.S. Department of Energy, Office of Fossil Energy, Oil and Gas Research
Eric Hass, U.S. Department of Energy, Geothermal Technologies Office

9:05 a.m. **National Risk Assessment Partnership**
Executive Committee Members

9:35 a.m. **BREAK - Grand Station III – IV**

PLENARY SESSION – Regional Carbon Sequestration Partnerships Associated Storage Large-Scale Field Projects

Moderator: Bruce Brown, U.S. Department of Energy, National Energy Technology Laboratory

9:50 a.m. **Cranfield Project, Southeast Regional Carbon Sequestration Partnership**
Kimberly Sams-Gray, Southern States Energy Board
Panel: Sue Hovorka, Seyyed Hossieni, and Changbing Yang; University of Texas at Austin, Bureau of Economic Geology

10:35 a.m. **Bell Creek Field Project, Plains CO₂ Reduction Partnership**
Charles Gorecki, Energy & Environmental Research Center
Panel TBD

11:20 a.m. **Farnsworth Unit, Southwest Regional Partnership on Carbon Sequestration**
Reid Grigg, New Mexico Institute of Mining and Technology
Panel: Robert Balch, New Mexico Institute of Mining and Technology and Brian McPherson, University of Utah

12:05 p.m. **LUNCH – Reflections and Waterfront**

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PARALLEL SESSIONS – WEDNESDAY, AUGUST 19, 2015

Room	Haselton 1 & 2		Brighton 3 & 4		Ellwood 1 & 2	
Session Moderator	MVA Geophysics Bill Aljoe		Wellbore Integrity Josh Hull		Reservoir Management Andrea McNemar	
1:15 PM	P1	Monitoring the Extent of CO ₂ Plume and Pressure Perturbation - National Energy Technology Laboratory - Bill Harbert	P1	Statistical Analysis of CO ₂ Exposed Wells to Predict Long Term Leakage Through the Development of an Integrated Neural-Genetic-Algorithm - University of Louisiana at Lafayette - Boyun Guo	P1	Economic and Regulatory Evaluation of Water Extraction - Argonne National Laboratory - Chris Harto
1:40 PM	P2	Distributed Fiber Optic Arrays: Integrated Temperature and Seismic Sensing for Detection of CO ₂ Flow, Leakage and Subsurface Distribution - Electric Power Research Institute Inc. - Rob Trautz	P2	Wellbore and seal integrity - Los Alamos National Laboratory – Bill Carey	P2	Active CO ₂ Reservoir Management – Lawrence Livermore National Laboratory - Tom Buscheck
2:05 PM	P3	Pressure-Based Inversion and Data Assimilation System (PIDAS) for CO ₂ Leakage Detection - University of Texas at Austin - Alex Sun	P3	Systematic Assessment of Wellbore Integrity for Geologic Carbon Storage Projects Using Regulatory and Industry Information - Battelle Memorial Institute - Mark Moody	P3	Reservoir and Seal Performance - National Energy Technology Laboratory - Dustin Crandall
2:30 PM	P4	----	P4	Implications of Stress State Uncertainty on Caprock and Well Integrity - Lawrence Livermore National Laboratory - Josh White/Susan Carroll	P4	Optimization Framework for Improved CO ₂ Injectivity, Storage Permanence, Monitoring, and Utilization - Lawrence Berkeley National Laboratory - Jens Birkholzer

2:55 p.m.

BREAK - Grand Station III – IV

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Room	Haselton 1 & 2		Brighton 3 & 4		Ellwood 1 & 2	
Session Moderator	Geophysics 2 Karen Kluger		Tracers Erik Albenze		Geomechanics 3 Mary Sullivan	
3:20 PM	P1	Field Testing of Emerging Technologies - Lawrence Berkeley National Laboratory - Barry Freifeld	P1	D&D of MVA Tools - Gas detection from EOR and coal beds - Los Alamos National Laboratory - Sam Clegg	P1	Impact of Microstructure on the Containment and Migration of CO ₂ in Fractured Basalts - Washington University - Daniel Giammar
3:45 PM	P2	Deep Controlled Source Electro-Magnetic Sensing: A Cost Effective, Long-Term Tool for Sequestration Monitoring - Multi Phase Technologies LLC - Douglas LaBrecque and Russell Brigham	P2	Monitoring Groundwater Impacts - National Energy Technology Laboratory - Christina Lopano	P2	Geomechanics of CO ₂ Reservoir Seals - University of Texas at Austin - Peter Eichhubl
4:05 PM	P3	Scalable Automated, Semipermanent Seismic Method for Detecting CO ₂ Plume Extent During Geological CO ₂ Injection - University of North Dakota - Charles Gorecki	P3	Monitoring of Geological CO ₂ Sequestration Using Isotopes and PF Tracers - Oak Ridge National Laboratory - David Graham	P3	Enhanced Simulation Tools to Improve Predictions and Performance of Geologic Storage Coupled Modeling - Massachusetts Institute of Technology - Ruben Juanes
4:30 PM	--	----	P4	Radiocarbon as a Reactive Tracer for Tracking Permanent CO ₂ Storage in Basaltic Rocks - Columbia University - Martin Stute	P4	Geophysical and Mineralogical Controls on the Rheology of Fracture Slip and Seal Breaching - Pennsylvania State University - Derek Elsworth

5:30 p.m. **Poster Session (SubTER, NRAP, and EFRCs) – Grand Station III–V**

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THURSDAY, AUGUST 20, 2015 – GRAND STATION BALLROOM

7:00 a.m. **Meeting Registration/Continental Breakfast**

8:00 a.m. **Welcome**

PLENARY SESSION – Regional Carbon Sequestration Partnerships Carbonates Large-Scale Field Projects

Moderator: Andrea McNemar, U.S. Department of Energy, National Energy Technology Laboratory

8:05 a.m. **Michigan Basin, Midwest Regional Carbon Sequestration Partnership**
Neeraj Gupta, Battelle

8:50 a.m. **Kevin Dome, Big Sky Regional Carbon Sequestration Partnership**
Lee H. Spangler, Energy Research Institute, Montana State University

9:35 a.m. **Session ends – Parallel sessions begin at 9:40**

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PARALLEL SESSIONS - THURSDAY, AUGUST 20, 2015

Room	Haselton 1 & 2		Brighton 3 & 4		Ellwood 1 & 2	
Session Moderator	Modeling 2 Andrea McNemar		Geologic Storage 1 Bruce Brown		Real-Time Monitoring Kylee Rice	
9:40AM	P 1	Reactive Transport Models with Geomechanics to Mitigate Risks of Carbon Dioxide Utilization and Storage - University of Utah - Milind Deo	P 1	International Energy Agency (IEA) Greenhouse Gas (GHG) Weyburn-Midale CO ₂ Monitoring and Storage Program - Petroleum Technology Research Centre - Kyle Worth	P 1	Real-Time In-Situ Carbon Dioxide Monitoring Network for Sensitive Subsurface Areas in Carbon Capture and Storage - Intelligent Optical Systems Inc. - Jesus Delgado-Alonso
10:05 AM	P 2	Multiscale Modeling of Carbon Dioxide Migration and Trapping in Fractured Reservoirs with Validation by Model Comparison and Real-Site Applications - Princeton University - Karl Bandilla	P 2	Small-Scale Field Test Demonstrating CO ₂ Sequestration in Arbuckle Saline Aquifer and by CO ₂ -EOR at Wellington Field, Sumner County, Kansas - University of Kansas Center for Research – Lynn Watney	P 2	Advanced Monitoring Technologies - Lawrence Berkeley National Laboratory - Tom Daley
10:30 AM	P 3	CO ₂ storage in fractured carbonate reservoirs - Lawrence Livermore National Laboratory - Susan Carroll	--	Enhanced Coal Bed Methane Production and Sequestration of CO ₂ in Unmineable Coal Seams - CONSOL, Inc. Research and Development - Jim Locke	P 3	An Advanced Joint Inversion System for Carbon Dioxide Storage Modeling with Large Data Sets for Characterization and Real-Time Monitoring-Enhancing Storage Performance and Reducing Failure Risks under Uncertainties - Stanford University – Peter Kitanidis

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Room	Haselton 1 & 2		Brighton 3 & 4		Ellwood 1 & 2	
Session Moderator	Mitigation Brian Dressel		Geologic Storage 2 Erik Albenze		MVA Surface/Atmosphere Kylee Rice	
11:00 AM	P1	Field Test and Evaluation of Engineered Biomineralization Technology for Sealing Existing Wells - Montana State University - Al Cunningham	P1	Central Appalachian Basin Unconventional (Coal/Organic Shale) Reservoir Small Scale CO ₂ Injection Test - Virginia Polytechnic Institute and State University - Nino Ripepi	P1	Surface and Airborne Monitoring Technology for Detecting Geologic Leakage in a CO ₂ -Enhanced Oil Recovery Pilot, Anadarko Basin, Texas - Oklahoma State University - Peter Clark
11:25 AM	P2	Wellbore Seal Repair Using Nanocomposite Materials - University of New Mexico - John Stormont	P2	Shales as Seals and Unconventional Reservoirs for CO ₂ - National Energy Technology Laboratory – Robert Dilmore	P2	Greenhouse Gas Laser Imaging Tomography Experiment (Green Lite) - Exelis, Inc. - Jeremy Dobler
11:50 AM	P3	Novel Materials for Robust Repair of Leaky Wellbores in CO ₂ Storage Formations - University of Texas at Austin - Matt Balhoff	P3	Utilization in Unconventional Reservoirs - Pacific Northwest National Laboratory - Pete McGrail	--	----

12:20 p.m. **LUNCH – Reflections and Waterfront**

Concluding Remarks and Future R&D Activities – GRAND STATION BALLROOM
 Traci Rodosta, Carbon Storage Technology Manager, DOE NETL