



18th International **Low-Rank Fuels Symposium**

June 24–26, 2003
Holiday Inn Grand Montana
Billings, Montana

Final Program

Sponsored by:

UND Energy & Environmental Research Center
U.S. Department of Energy National Energy Technology Laboratory
EPRI



Conference Objective

The goal of the 18th International Low-Rank Fuels Symposium is to provide a forum in which industry, government, and research organizations can share up-to-date information on the role of low-rank fuels in meeting current and future energy demands. Low-rank fuels have unique properties that present challenges and opportunities related to meeting future environmental regulations and in the development and application of advanced technologies.

Conference Overview

Tuesday, June 24, 2003		
7:30 a.m.	Registration	
8:30 a.m.	Welcomes and Keynote Address – Grand Montana Ballroom	
10:15 a.m.	Opening Panel – Challenges and Opportunities for Low-Rank Fuels – Grand Montana Ballroom	
12:00 p.m.	Luncheon Keynote Address: U.S. Senator Conrad Burns, U.S. Senator Byron Dorgan via Satellite	
	Stream One – Fuel Properties and Environmental Issues	Stream Two – Fuel Utilization
	Grand Montana Ballroom	Grand Montana Ballroom
1:30 p.m.	Session 1A: Low-Rank Fuel Properties and Upgrading	Session 2A: Gasification Systems
5:30 p.m.	Western BBQ and Rodeo	
Wednesday, June 25, 2003		
	Grand Montana Ballroom	Grand Montana Ballroom
9:00 a.m.	Session 1B: Environmental Issues and Control Technologies	Session 2B: Combustion and Advanced Power Systems
5:00 p.m.	Poster Session and Exhibit Social	
Thursday, June 26, 2003		
	Grand Montana Ballroom	Grand Montana Ballroom
8:30 a.m.	Session 1C: Coalbed Methane	Session 2C: Fuel By-Products Utilization

Technical Coordinators

If you have any questions regarding the technical content of the conference, please contact one of the individuals below:

Thomas A. Erickson, Associate Director for Research
Energy & Environmental Research Center
Grand Forks, North Dakota
(701) 777-5153; terickson@undeerc.org

Steven A. Benson, Senior Research Manager
Energy & Environmental Research Center
Grand Forks, North Dakota
(701) 777-5177; sbenson@undeerc.org

John C. McDowell, Project Manager
U.S. Department of Energy National Energy Technology
Laboratory
Pittsburgh, Pennsylvania
(412) 386-6175; john.mcdowell@netl.doe.gov

David O'Connor, Manager, Combustion/Performance
EPRI
Palo Alto, California
(650) 855-8970; doconnor@epri.com

Exhibit Hours

The exhibits will be in the symposium break area and do not compete with the technical program sessions.

Monday, June 23	6:30 p.m. – 8:30 p.m.	Exhibits Open
Tuesday, June 24	8:00 a.m. – 8:30 a.m.	Exhibits Open
	9:45 a.m. – 10:15 a.m.	Exhibits Open
	3:00 p.m. – 3:30 p.m.	Exhibits Open
Wednesday, June 25	8:00 a.m. – 8:30 a.m.	Exhibits Open
	10:00 a.m. – 10:30 a.m.	Exhibits Open
	3:00 p.m. – 3:30 p.m.	Exhibits Open
	5:00 p.m. – 7:00 p.m.	Exhibits Open

**English Is the
Official
Language
of This
Conference!
Dress is
Casual.**

Technical Program Schedule

Monday, June 23, 2003

6:30 – 8:30 p.m.

Early Registration/Social and Cash Bar – Exhibits Open

Tuesday, June 24, 2003

8:30 – 9:45 a.m.

Opening Session – Grand Montana Ballroom

Welcome and Introductions

Thomas Erickson, Associate Director for Research, University of North Dakota Energy & Environmental Research Center, Low-Rank Fuels Symposium Technical Coordinator

David O'Connor, Manager, Combustion/Performance, EPRI

Gerald Groenewold, Director, University of North Dakota Energy & Environmental Research Center (EERC). Gerald Groenewold has served as the Director of the EERC since 1987, where he leads a multidisciplinary science and engineering research team focused on the development, demonstration, and commercialization of energy and environmental technologies. The EERC has been involved in research and development of clean coal technologies for over 50 years and has become the world leader for low-rank coals (LRCs).



Keynote Address

Rita Bajura, Director, U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL). Rita Bajura was named Director of NETL in 1996, where she oversees the implementation of major science and technology and development programs in fossil energy and environmental technologies, including advanced power generation; environmental control; ultraclean fuels; natural gas exploration, production, and processing; and environmental technologies to clean up DOE's former nuclear production sites.



9:45 – 10:15 a.m.

Break

10:15 a.m. – 12:00 p.m.

Panel on Challenges and Opportunities for Low-Rank Fuels

Panel Moderator: **Dr. Everett Sondreal**, Principal Research Advisor, Energy & Environmental Research Center

Dr. Sondreal previously held positions as the Director of the U.S. Department of Energy Grand Forks Energy Technology Center, where he directed the planning and implementation of the DOE-led mission for western U.S. low-rank coals. Also, between 1984 and 1991, Dr. Sondreal served as President of Coal Energy Technology Consultants, Inc., in Grand Forks, North Dakota. This firm provided consulting services on coal properties and technologies. Dr. Sondreal's principal areas of interest and expertise are in energy research and development, coal properties, and clean coal technology.



Panel Participants

David Brockway, Chief Executive Officer
Cooperative Research Centre for Clean Power from Lignite
Mulgrave, Victoria, Australia

Philippe Champagne, Project Leader – Coal Utilization, Operations Support
SaskPower
Regina, Saskatchewan, Canada

Tony Facchiano, Area Manager, NO_x and Boiler Performance
EPRI
Palo Alto, California

Ron Harper, CEO and General Manager
Basin Electric Power Cooperative
Bismarck, North Dakota

Gary Stiegel, Product Manager
U.S. Department of Energy National Energy Technology Laboratory
Pittsburgh, Pennsylvania

12:00 – 1:30 p.m. Lunch/Luncheon Keynote Addresses



The Honorable Conrad Burns, U.S. Senator (R-Montana), Washington, D.C. Senator Burns was elected to the Senate in 1989 and is now in his third term. With a seat on the powerful Senate Appropriations Committee, he has been able to bring in over \$1 billion in federal funds to the state. He has pursued new markets for agricultural producers and secured millions of dollars in grants for research and marketing improvements. Serving as Chairman of the Senate Interior Appropriations subcommittee, Senator Burns has jurisdiction over the country's federal lands and the National Park Service. On the national level, he has criticized America's dependence on foreign oil supplies, calling on Congress to increase domestic production and research in fuel cell technology.



The Honorable Byron Dorgan, U.S. Senator (D-North Dakota), Washington, D.C. Senator Dorgan was reelected to the U.S. Senate in 1998 by an overwhelming majority after serving one term in the U.S. Senate and six terms in the U.S. House of Representatives. In 1998, he was named the Chairman of the Democratic Policy Committee—the first North Dakotan ever to hold this position or to serve in the Democratic leadership. From 1996–1998, he served in the Democratic leadership as Assistant Floor Leader. Currently, he is a member of four Senate standing committees—Appropriations; Commerce, Science, and Transportation; Energy and Natural Resources; and Indian Affairs—and eleven subcommittees, including ranking member of the Subcommittee on Water and Power and, most recently, ranking member of the Subcommittee on Interior.

STREAM ONE
Fuel Properties and Environmental Issues

Session 1A – Low-Rank Fuel Properties and Upgrading

Session Coordinator

Christopher Zygarlicke, Senior Research Manager, EERC, Grand Forks, North Dakota

Session Chairs:

Dennis James, Fuel Quality Administrator, The North American Coal Corporation, Underwood, North Dakota

Bruce Folkedahl, Research Manager, EERC, Grand Forks, North Dakota

Presenters:

1:30 p.m. “Low-Intensity Treatment of Low-Rank Coals and Hybrid Wood to Obtain Liquid Fuel and Products of Added Value,” Ronald Timpe, Research Manager, with M. Jensen, EERC, Grand Forks, North Dakota

2:00 p.m. “Biomass Cofiring: Feasibility Study for Low-Rank Coal and District Energy Cogeneration,” Christopher Zygarlicke, Senior Research Manager, with D. Schmidt, EERC, Grand Forks, North Dakota

2:30 p.m. “Mechanical Thermal Expression of High-Moisture Lignite,” David Brockway, Chief Executive Officer, Cooperative Research Centre for Clean Power From Lignite, Mulgrave, Victoria, Australia

STREAM TWO
Fuel Utilization

Session 2A – Gasification Systems

Session Coordinator

Michael Swanson, Senior Research Manager, EERC, Grand Forks, North Dakota

Session Chairs:

Gary Stiegel, Product Manager, U.S. Department of Energy National Energy Technology Laboratory, Pittsburgh, Pennsylvania

Johan van Dyk, Principal Scientist, R&D Divison, Syngas and Coal Technologies, Sasol Technology, Sasolburg, South Africa

Presenters:

“Gasification of Victorian Lignites in a Pressurised Fluidized-Bed Gasification Process Development Unit,” Sankar Bhattacharya, Project Manager – Gasifier PDU Projects, with I. Beaupeurt, Technology Development Group, Cooperative Research Centre for Clean Power from Lignite, Mulgrave, Victoria, Australia

“Low-Rank Coal Gasification Studies at the PSDF,” J. Matthew Nelson, Transport Reactor Process Engineer, with O. Davies, B. Davis, X. Guan, R. Leonard, G. Liu, W. Peng, D. Romans, and P. Vimalchand, Southern Company, Wilsonville, Alabama; P. Smith, Kellogg Brown & Root, Inc., Wilsonville, Alabama; and J. Longanbach, U.S. Department of Energy National Energy Technology Laboratory, Morgantown, West Virginia

“Lignite Gasification in an Advanced Transport Reactor Gasifier,” Michael Swanson, Senior Research Manager, with D. Hajicek, EERC, Grand Forks, North Dakota

3:00 – 3:30 p.m. Break

3:30 p.m. “Combining Technologies to Make Lignite into a Premium Fuel; Using an Integrated Air and Magnetic Separation Process,” Richard Weinstein, Engineering Manager, Falkirk Mining Company, Underwood, North Dakota; with R. Snoby, Allminerals, LLC, Alpharetta, Georgia; and R. Oder, EXPORTech Company, Inc., New Kensington, Pennsylvania

“Suitability of Feedstocks for the Sasol-Lurgi Fixed Bed Dry Bottom Gasification Process,” Johan van Dyk, Principal Scientist, with M. Keyser and J. van Zyl, R&D Divison, Syngas and Coal Technologies, Sasol Technology, Sasolburg, South Africa

Tuesday, June 24, 2003 (continued)

- 4:00 p.m.** “Characterization of Inorganic Material (Discard) in Secunda Coal and the Effect of Washing on Coal Properties,” Johan van Dyk, Principal Scientist, with M.J. Keyser, R&D Division, Syngas and Coal Technologies, Sasol Technology, Sasolburg, South Africa
- “Evaluation of Lignite Gasification for Electricity Generation,” Dennis Taylor, Manager of Generation Engineering, Great River Energy, Elk River, Minnesota; with D. Galpin, Stone & Webster, Centennial, Colorado
- 4:30 p.m.** “Thermal Upgrading of Selected Lignites,” Sibel Ozdogan, Faculty of Engineering, Department of Mechanical Engineering, Marmara University, Istanbul, Turkey, and Marmara Research Centre, Energy Systems and Environmental Research Institute, Kocaeli, Turkey; with D. Uzun, Marmara Research Centre, Energy Systems and Environmental Research Institute, Kocaeli, Turkey
- “Improved Refractories for Slagging Gasifiers,” Kyei-Sing Kwong, Ceramic Engineer, with C. Dogan, and J. Bennett, Albany Research Center, U.S. Department of Energy, Albany, Oregon

5:30 p.m. Load Buses in Front of Holiday Inn for Western BBQ and Rodeo

Wednesday, June 25, 2003

STREAM ONE **Fuel Properties and Environmental Issues**

Session 1B – Environmental Issues and Control Technologies

Session Coordinator:

Thomas Erickson, Associate Director for Research, EERC, Grand Forks, North Dakota

Session Chairs:

Robert Romanosky, Power Systems Advanced Research Product Manager, U.S. Department of Energy National Energy Technology Laboratory, Morgantown, West Virginia

Harvey Ness, Director of Research & Development, North Dakota Lignite Energy Council, Bismarck, North Dakota

Presenters:

9:00 a.m. “Impacts of EPA’s Changes to the Air Quality Permit Program on Power Generation Facilities,” Harold Robbins, President, Bison Engineering, Inc., Helena, Montana

9:30 a.m. “Mercury Removal Trends and Options for Coal-Fired Power Plants Burning Low-Rank Fuels,” Richard Schlager, Vice President of Contract Research and Development, with S. Sjoström, J. Bustard, and M. Durham, ADA Environmental Solutions, LLC, Littleton, Colorado; R. Chang, EPRI, Palo Alto, California; and S. Glesmann, Emissions Strategies, Severna Park, Maryland

10:00 – 10:30 a.m. Break

10:30 a.m. “Mercury Emissions Control Options for Electric Utilities Burning Low-Rank Coals,” Michael Holmes, Senior Research Advisor, with J. Pavlish, EERC, Grand Forks, North Dakota

11:00 a.m. “Effect of Coal Blending on Mercury Removal,” Vitali Lissianski, with P. Maly, R. Seeker, V. Zamansky, G. England, and L. Ho, GE Energy and Environmental Research Corporation, Irvine, California

STREAM TWO **Fuel Utilization**

Session 2B – Combustion and Advanced Power Systems

Session Coordinator:

Jason Laumb, Research Manager, EERC, Grand Forks, North Dakota

Session Chairs:

David Brockway, Chief Executive Officer, Cooperative Research Centre for Clean Power from Lignite, Mulgrave, Victoria, Australia

Philippe Champagne, Project Leader – Coal Utilization, Operations Support, SaskPower, Regina, Saskatchewan, Canada

Presenters:

“Membrane Processes for Non-Cryogenic Oxygen Production and Separation of Hydrogen from Coal Gasification Products,” Arun Bose, Senior Project Manager, with G. Stiegel, U.S. Department of Energy National Energy Technology Laboratory, Pittsburgh, Pennsylvania; and J. Tennant, U.S. Department of Energy National Energy Technology Laboratory, Morgantown, West Virginia

“Ash Behavior in SCR Catalysts,” Steven Benson, Senior Research Manager, with J. Laumb, EERC, Grand Forks, North Dakota

“Advanced Power Systems in the Pulp and Paper Industry,” Kevin Whitty, Research Associate, Department of Chemical and Fuels Engineering, University of Utah, Salt Lake City, Utah

“Taking Advantage of High-Reactivity Coal – Upgrading Low-Rank Fuels with the Controlled Spontaneous Reactor,” Douglas Hajicek, Research Manager, EERC, Grand Forks, North Dakota; with M. Mann, Department of Chemical Engineering, University of North Dakota, Grand Forks, North Dakota; and S. Selle, Northwest Research, Inc., Grand Forks, North Dakota

Wednesday, June 25, 2003 (continued)

Session 1B (continued)

11:30 a.m. "Why Mercury Compliance Will Cost Around \$5,000 Per lb. of Hg Removed, Not \$50,000," Sidney Nelson, President, with Q. Zhou, R. Landreth, and J. Miller, Sorbent Technologies Corporation, Twinsburgh, Ohio

12:00 – 1:30 p.m. Lunch

1:30 a.m. "Mercury Removal from Coal-Fired Flue Gas Using a Plasma-Enhanced Electrostatic Precipitator," John Montgomery, Senior Engineer, with C. Whitworth, J. Reynolds, I. Ray, B. Altshuler, and W. Buckley, Croll-Reynolds Clean Air Technologies, Inc., Westfield, New Jersey; and R. Attman, EPRI, Chattanooga, Tennessee; and D. Battleson, MSE Technology Application, Inc., Butte, Montana

2:00 p.m. "Biochemical Upgrading of Low-Rank Coals," Mow Lin, Chemist, with E. Premuzic and W. M. Zhou, Brookhaven National Laboratory, Energy Science and Technology Department, Energy Resources Division, Upton, New York

2:30 p.m. "The Occurrence and Behaviour of Polycyclic Aromatic Hydrocarbons in Coal Tar Produced in the Sasol-Lurgi Fixed Bed Dry Bottom Gasifiers," Hermanus Louwrens, Chief Scientist, with E. Schuin and D. Green, Sasol Technology, R&D Division, Sasolburg, South Africa

3:00 – 3:30 p.m. Break

3:30 p.m. "Lignite Fuel Enhancement," Charles Bullinger, Engineering Services Leader, Great River Energy, Coal Creek Station, Underwood, North Dakota

4:00 p.m. "Carbon Trading and Sequestration Options," Mark Lindberg, Agriculture and Energy Officer, Governors Office, Helena, Montana

4:30 p.m. "Long-Term Mercury Monitoring to Determine Concentrations, Speciation, and Variability of Mercury Emissions for North Dakota Lignite with Respect to Plant Operations and Configuration," Jeffrey Thompson, Research Scientist, EERC; with H. Ness, Lignite Energy Council; A. Stomberg, Montana-Dakota Utilities; and J. Graves, Minnkota Power Cooperative Inc., Bismarck, North Dakota; and D. Laudal, EERC, Grand Forks, North Dakota

5:00 p.m. Poster Session and Exhibit Social in Atrium

Posters

"The Approaches of Utilizing Low-Rank Coal in Yunnan Province of China," Chen Ying, Vice Director, Senior Engineering, with H. Tao, Coal Research Institute of Kunming, Kunming, Yunnan Province, P.R. China; and W. Zhuyong and L. Shan, National Coal Water Slurry Engineering Technology Research Center, China Coal Research Institute, Beijing, P.R. China

"Coal Fly Ash Utilization to Improve Feedlot Surfaces," Debra Pflughoeft-Hassett, Research Manager, with L. Heebink, B. Dockter, D. Hassett, J. Solc, and T. Berland, EERC, Grand Forks, North Dakota; V. Anderson, Carrington Research Extension Center, North Dakota State University, Carrington, North Dakota; and A. Stewart, Power Products Engineering Inc., Eden Prairie, Minnesota

"The Treatment of Mercury-Bearing Activated Carbon from a Gas-Cleaning System by Electro-Oxidation: The Ultimate Solution," Luis Sobral, with

Session 2B (continued)

"An Overview of Technology R&D on Novel Coal-Fired Power Generation Systems," Archie Robertson, Senior Research Associate, Foster Wheeler Power Group, Inc., Livingston, New Jersey; with A. Bose, U.S. Department of Energy National Energy Technology Laboratory, Pittsburgh, Pennsylvania; and D. Bonk, U.S. Department of Energy National Energy Technology Laboratory, Morgantown, West Virginia

"Simplified Indices for Predicting Ash Behavior for Low-Rank Coals," Margaret Laumb, Research Engineer, with S. Benson, Microbeam Technologies, Inc., Grand Forks, North Dakota

"Guidelines for Solving Ash Deposition Problems," Bruce Folkedahl, Research Manager, with C. Zygarlicke, EERC, Grand Forks, North Dakota; and D. O'Connor and A. Mehta, EPRI, Palo Alto, California

"Combustion of Victorian and South Australian High-Moisture Lignites in a Circulating Fluidized-Bed Combustion Pilot Plant," Sankar Bhattacharya, Project Manager-Gasifier PDU Projects, Technology Development Group, with A. Kosminski, H. Yan, and H. Vuthaluru, Cooperative Research Centre for Clean Power from Lignite, Mulgrave, Victoria, Australia

"Low-Rank Fuels in a Zero-Emission Carbon Strategy," Alan Johnson, Managing Director, ZECA Corporation, Calgary, Alberta, Canada; with H.-J. Ziock, Los Alamos National Laboratory, Los Alamos, New Mexico

"Critical Importance of Robust, High-Temperature Fuel Cells to Low-Rank Fuels Industry," Hans-Joachim Ziock, Staff Member, Los Alamos National Laboratory, Los Alamos, New Mexico; with A. Johnson, ZECA Corporation, Calgary, Alberta, Canada

"Dry Magnetic Separation of Ash, Sulfur, and Mercury from a Southwestern Wyoming Coal," Robin Oder, President, EXPORTEch Company, Inc., New Kensington, Pennsylvania

R. Santos, and B. Rosemberg, Centre for Mineral Technology (CETEM), Brazil; S. Khosravy, Lulea University, Sweden; M. Horvat, Joseph Stefan Institute, Slovenia; and Z. Spiric, Ina Naftaplin, Croatia

"Development of Mercury CEMs for Emission Gases," Alvin Chua, Business and Technical Manager, with K. Tanida, Nippon Instruments Corporation, Osaka, Japan; M. Takaoka, Kyoto University, Kyoto, Japan; and N. Noda, Central Research Institute of Electric Power Industry, Kanagawa, Japan

"Modeling of Mercury Oxidation for Low-Rank Coals," Robert Jensen, Research Manager, EERC, Grand Forks, North Dakota

STREAM ONE

Fuel Properties and Environmental Issues

Session 1C – Coalbed Methane

Session Coordinator:

John Harju, Associate Director for Research, EERC, Grand Forks, North Dakota

Session Chair:

John Harju, Associate Director for Research, EERC, Grand Forks, North Dakota

STREAM TWO

Fuel Utilization

Session 2C – Fuel By-Products Utilization

Session Coordinator:

Debra Pflughoeft-Hassett, Research Manager, EERC, Grand Forks, North Dakota

Session Chairs:

Al Christianson, Project Coordinator, Great River Energy, Coal Creek Station, Underwood, North Dakota

Debra Pflughoeft-Hassett, Research Manager, EERC, Grand Forks, North Dakota

Presenters:

- 9:00 a.m.** “Coal Bed Methane Production and the Environment: Issues and Challenges,” Roger Koelsch, Environmental Engineer, Exponent, Inc., Boulder, Colorado
- 9:30 a.m.** “Coalbed Methane Resources of North America – Past, Present, and Future,” Charles Nelson, Research Advisor, EERC, Golden, Colorado
- 10:00 a.m.** “Physical Limitations on Coalbed Gas Content of Low-Rank Coals, North Slope, Alaska: An Apparent Widespread Depletion of Coalbed Gas in Permafrost,” Charles Barker, Senior Research Geologist, USGS, Denver, Colorado; with J Clough, Alaska Division of Geological and Geophysical Surveys, Fairbanks, Alaska; S. Roberts and A. Clark, USGS, Denver, Colorado; and B. Fisk, Bureau of Land Management, Anchorage, Alaska

Presenters:

- “Dry Floating Beneficiation of Fly Ash by Electrostatic/Triboelectrostatic Precipitators,” Hajrudin Pasic, Professor, with H. Khan, Department of Mechanical Engineering, Ohio University, Athens, Ohio
- “State of Ash Utilization in Montana,” Jason Vollmer, General Manager, ISG Resources, Inc., Billings, Montana
- “Bottom Ash vs. Scoria and Sand as a Winter-Road Traction Agent,” Thomas Wiscomb, Senior Environmental Analyst, PacifiCorp, Salt Lake City, Utah

10:30 – 11:00 a.m. Break

- 11:00 a.m.** “Reclaiming Naturally Occurring Sodic Soils and Its Application to Utilizing CBM Discharge Water for Irrigation,” Neal Fehringer, Consulting Agronomist, Fehringer Agricultural Consulting, Billings, Montana
- 11:30 a.m.** “Zero Emission Carbon Technology and Coal-Bed Methane Production,” John Ruby, Engineer, Nexant, Inc., San Francisco, California; with A. Johnson, ZECA Corporation, Calgary, Alberta, Canada; and H.-J. Ziock, Los Alamos National Laboratory, Los Alamos, New Mexico

- “Ash Handling at Coal Creek Station,” Al Christianson, Project Coordinator, Great River Energy, Coal Creek Station, Underwood, North Dakota
- “Washburn Municipal Airport Improvement Project to Construct Runway, Taxiways, Apron-Grading, PPC Pavement, and Edge Drains,” Lynn Bergman, Senior Engineer, Kadrmass, Lee, & Jackson, Bismarck, North Dakota

12:00 p.m. Lunch

Organizing Sponsors

Energy & Environmental Research Center



The Energy & Environmental Research Center (EERC) at the University of North Dakota is recognized internationally for developing, field-testing, demonstrating, and commercializing technologies in energy conversion, pollution prevention, environmental control, and waste remediation and utilization and has a rapidly growing customer base worldwide, specializing in multiclient consortia and serving as a broker in government-industry partnerships. Approximately 70% of its contracts are with industrial clients. The EERC offers comprehensive technical support with its highly experienced specialists, state-of-the-art facilities for chemical and physical testing, and advanced analytical capabilities and can provide a variety of field demonstration sites and systems analysis to identify technologies with the greatest potential for deployment and commercialization. As the world's leading research and development center for low-rank coals and, arguably, the leading center for all ranks of coal, the EERC manages numerous programs within the Coal Utilization Technologies Center. The EERC has been involved in research and development of clean coal technology for over 50 years, pursuing a scientific understanding of the physical, chemical, and mineralogical nature of coal as the foundation for predictively engineering coal conversion technologies and power systems. The EERC pioneered research on liquefaction of low-rank coal, and it continues to advance gasification technologies and combined-cycle systems. In addition, it is developing new tools to help the energy industry more effectively operate its existing fleet of coal-based power plants.

U.S. Department of Energy National Energy Technology Laboratory



The National Energy Technology Laboratory (NETL) plans and implements its programs to accomplish the overall goals and objectives of the U.S. Department of Energy (DOE). NETL serves as the focal point for science and technology development in fossil energy and related environmental control technologies.

Contributing Sponsors

Wells Fargo



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Our product: SERVICE. Our value-added: FINANCIAL ADVICE.
Our competitive advantage: OUR PEOPLE.

Through the new Strategic Center for Natural Gas (SCNG), NETL will drive an integrated planning process for natural gas technologies within DOE and will coordinate DOE's natural gas programs in gas supply, transmission, distribution, reliability, and end use. SCNG will identify research and policy support gaps; plan programs to fill these gaps; initiate research to meet future natural gas supply deliverability, reliability, and utilization requirements; and provide strong support for DOE's development of natural gas-related policies. With the four focus area leads, NETL will provide leading-edge research and development (R&D) leadership in gas energy systems dynamics, carbon sequestration, computational energy science, and ultraclean fuels. Through partnerships, NETL will continue to utilize the full resources of the laboratory system to address fossil energy-related issues. NETL concentrates on the application of science and engineering principles to execute its mission.

EPRI



EPRI creates science and technology solutions for the global energy and energy services industry. The institute provides a wide range of innovative products and services to more than 1000 energy-related organizations in 40 countries. EPRI's multidisciplinary team of scientists and engineers in environmental sciences, power generation, and delivery and use draws on a worldwide network of technical and business expertise to help solve today's toughest energy and environmental problems. A collaborative program in Strategic Research and Public Benefit Research, including environmental quality, public health, energy efficiency, renewables, and infrastructure reliability, is complemented by focused programs in business-critical technologies, including proprietary ventures. A wide variety of applications, training, and technical consulting services are available to supplement participants' in-house capabilities. EPRI has developed over 6000 hardware, software, and information products that can be provided individually. Ranging from advanced power technology to operating and maintenance manuals to environmental assessments, these products are valuable tools a participant can use to enhance its operations or improve its market position. EPRI's Lignite Users Group identifies and performs lignite-specific research and development activities. Current activities include assessments of upgraded lignite, database development, mercury control implications, and capturing highlights of international R&D activities. The Lignite Users Group membership is open to lignite users, producers, and government agencies.

Big Sky Economic Development Authority



At Big Sky EDA, our mission is to facilitate the development of business that supports our community and way of life. In doing this, we help to expand, grow, and diversify the economy of the Billings region and Yellowstone County. Business—whether large or small, public or private, or nonprofit—is what keeps the economy of Billings and Yellowstone County strong. Big Sky EDA has a wealth of services and resources—most free of charge—to help in every phase of development.

Bring your family along to the 18th Low-Rank Fuels Symposium and

Explore the Gateway to the West

The majestic mountains, rolling plains, and cultural and historic attractions in and around Billings provide the ingredients for the perfect summer vacation. Here are a few of the things to see and do while staying in the Billings area.

Custer's Last Stand Reenactment

June 20–22, 2003, Hardin, Montana

The Battle of the Little Bighorn, General George Armstrong Custer's Last Stand against the Sioux and Cheyenne warriors, is reenacted in several performances 45 miles south of Billings. The performances take place during Little Big Horn Days in Hardin, June 19–22, where visitors revel in the sights and sounds of this "Living History" event.



Pompeys Pillar National Historic Monument

Montana retains the only remaining permanent physical evidence of the legendary Lewis and Clark Corps of Discovery—William Clark's signature etched in a sandstone cliff just 28 miles from Billings. Clark carved his name in a towering rock formation a few yards from the Yellowstone River and named it after Sacagawea's son, whom he had nicknamed Little Pomp.



The Great Outdoors

The trademark rimrocks of Billings offer stunning vistas of mountain ranges and rolling plains and vintage hiking, biking, horseback-riding, and camping opportunities. The nearby Yellowstone, one of America's last free-flowing rivers, and other legendary rivers provide world-class fishing opportunities, and area lakes offer access to water sports. Big Sky Country is teeming with wildlife, and Montana lists 113 wildlife-viewing sites. Explore on your own or venture to ZooMontana, the state's only wildlife park. Nestled in 70 acres of plush Montana green, this zoological and botanical park also features a turn-of-the-century Montana Homestead petting zoo in a farm and ranch setting.

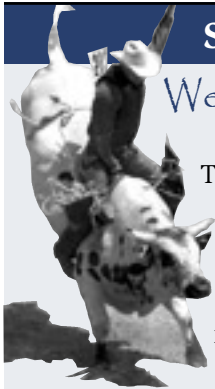


SYMPOSIUM EVENT

Western BBQ and Rodeo

June 24, 2003, Billings, Montana

This evening's conference dinner is in conjunction with an old-fashioned, action-packed rodeo! Get the true western experience with an authentic chuck wagon BBQ, then attend the rodeo at the Horse Palace in Billings. The rodeo includes a lineup of National Rodeo Association bronco riders, the infamous rodeo clown, bull riding, calf roping, and bareback riding. Tickets are available upon conference registration, and there are plenty of spots available. Bring your family and make a night of it!



Indian Memorial at the Little Bighorn

June 25, 2003

This monument, authorized by Congress in 1991, will be dedicated at the Little Bighorn Battlefield National Monument in recognition of Indians who fought on either side to preserve their land and culture.



Shopping

Montana's largest city is home to the state's two largest shopping centers: Rimrock Mall and West Park Plaza. Unique shops, western and recreation outfitters, and antique dealers are also found along the city's historic downtown shopping districts. Just 60 miles away, the small, historic former mining village of Red Lodge is brimming with antique and western stores, boutiques, and fine restaurants.

For more information about activities in the area, please contact the Billings Area Chamber of Commerce Visitor Center at 1-800-735-2635 or visit www.billingscvb.visitmt.com.



18th International
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