INSIDE THIS EDITION:

> Advantages of Coal-Based Generation
> Optimization of Fuel Costs
> Beneficial Uses of Reclaimed Land
> Clean Coal Technologies

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A Message from ACC President

Andy Blumenfeld, Arch Coal, Inc.

Welcome to the inaugural issue of American Coal, the American Coal Council's Annual Magazine and Membership Directory. We are excited to launch this timely and informative publication addressing key issues in our industry. It is our hope that you will find the directory and the articles both informative and useful. I would like to thank those of you who contributed articles to the first edition; your efforts are a fine example of sharing information that is critical to the coal industry.

The first full year of the American Coal Council as a national organization looks to be both promising and challenging. Our Western Coal Council roots were planted in providing solid educational programming for our membership. Now that we are a national organization, we are looking to not only expand on our programming activities but also incorporate new services and products - such as this magazine and directory.

Our two primary conferences, the "Spring Coal Forum" and "Coal Market Strategies" are set for May 19-21 (San Antonio) and October 13-15 (Atlanta), respectively. We have traditionally provided top quality presentations at these gatherings and this year will be no exception. The "Spring Coal Forum" will feature J. Brett Harvey, President & CEO of CONSOL Energy, Richard Abdoo, Chairman, President & CEO, Wisconsin Energy, Jack Gerard, President & CEO, National Mining Association and David G. Hawkins, Director-The Climate Center of the National Resources Defense Council.

We work hard to provide experts on timely topics who offer informative, insightful, newsworthy and sometimes even controversial presentations - a trait that distinguishes the conferences of the American Coal Council from all others. These events provide both a formal and informal setting in which to exchange ideas and views. Our goal is to provide our membership with information they can use to advance the industry and their business interests.

In addition to our two primary conferences, we are continuing with our series of specialized seminars, including the very popular "PRB Coal Use" seminar, which will take place in Detroit beginning June 25. This popular seminar has evolved to become a definitive resource on PRB coal use.

This year, we have added a seminar entitled "Mercury & Multi-Emissions Compliance" that will be hosted in Charlotte, North Carolina, March 26-27. This seminar is critical and timely, considering the effects that new emissions regulation will have on our industry. At this event, you'll learn about what laws are being promulgated and what mitigation options and technologies are available. This seminar will provide a working knowledge on mercury for coal producers, consumers and any company that services the coal supply and power generation industry.

Our top-flight meetings are not the only aspect of the American Coal Council that we are expanding. We're looking to build on our business agenda by offering new products and services. We're already supporting the Ash Special Interest Group, which has made great strides in developing the market for post-combustion products. We are also in the initial phases of organizing committees to explore and promote Risk Management and Trading and advocacy for clean coal technologies.

Finally, in recognition of the unique business and management needs of eastern and western utility-coal markets, we are establishing two committees - an Eastern Utility-Coal Committee and a Western Utility-Coal Committee. Each committee will provide members with an interest in either eastern or western coal supply, consumption and transport to address issues unique to their respective regions.

As you know, the coal industry is at a critical juncture with pressures coming from new legislation that could limit coal use, the proliferation of natural gas generating stations (despite its being a limited resource), and the basic issue of domestic energy policy - especially given concerns for energy security.

Looking farther out, emerging technologies, such as coal gasification/liquefaction and fuel cells, need to be evaluated and explored. Our industry must also begin to assess the implications of a hydrogen economy on our respective business sectors. The American Coal Council is an excellent conduit to provide information exchange that will help further each of our businesses.

The enclosed Membership Directory serves as a Who's Who of key contacts in our industry. If you're not a member of the ACC, I invite you to join our growing and thriving association. To our current members, I encourage you to get involved. We're forming committees now; your participation, efforts and enthusiasm will not only ensure a more robust, meaningful committee activity but enable you to become a major player in providing for the continued vitality of the coal industry.

We're doing more this year to help you meet your business needs. Thank you for your support of the American Coal Council. I look forward to seeing you at our meetings this year.

Andy Blumenfeld
Arch Coal, Inc.
ACC President
American Coal Council
2003 Board of Directors

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American Coal Council

Vision Statement
To be the pre-eminent business voice of the American coal industry.

Mission Statement
The American Coal Council (ACC) is dedicated to advancing the development and utilization of coal as an economic, abundant and environmentally sound energy fuel source. The Association promotes the lawful exchange of ideas and information regarding the coal industry. It serves as an essential resource for companies that mine, sell, trade, transport or consume coal. The ACC provides educational programs, advocacy support, peer-to-peer networking forums and market intelligence that allow members to advance their marketing and management capabilities.

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With this, the inaugural issue of American Coal, we celebrate the innovativeness, vitality and stewardship of the American utility-coal industry. The articles in this magazine span the many diverse challenges and opportunities that our industry faces and detail the efforts underway to address them.

The challenges are monumental. Increasing environmental regulation, improving mine safety and demanding productivity and profit-ability goals are just a few of the challenges addressed in these pages. On the opportunities side of the ledger is the promise of clean coal technologies, increased coal combustion product utilization and new approaches to enhancing our nation's energy infrastructure.

This issue of American Coal is designed to provide our readers with a snapshot of these issues. We appreciate the efforts, expertise and insights of our authors. They and the leadership of the American Coal Council (ACC) welcome your comments and feedback. We're grateful, as well, to Jeff Watkins, President of Hill & Associates for his guidance in outlining key editorial topics to be addressed.

We're also thankful for the participation of our advertisers. Their contributions have made it possible for us to publish this magazine and get timely, factual information on our business out to industry associates, public policy makers, community leaders and the media.

American Coal is just one of the efforts of the ACC to advance understanding of vital industry issues and to facilitate business relationships between various sectors of the utility-coal industry. The magazine also includes information on our upcoming conferences and seminars, which continue to provide industry-leading technical, marketing and strategic education. Our membership, website resources and committee activities continue to expand, as does our voice as an advocate for coal as an economic, abundant and environmentally sound fuel source.

The strength of our Association continues to reside in the diversity and inclusiveness of our membership base. The participation of coal suppliers, coal consumers, energy traders, transportation companies, ports and terminals and coal support service firms enriches our programs, activities and networking.

Your membership is valued. With your support, we look forward to the continued growth and prosperity of the American Coal Council for years to come.

Janet Gellici
Executive Director
American Coal Council
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American Coal Council 2003 Events

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<td>Westin La Cantera Resort, San Antonio, Texas</td>
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<td>&quot;Coal: The Nation’s Power &amp; Security&quot;</td>
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<td>PRB Coal Use: Risk Management Strategies &amp; Tactics</td>
<td>June 25-26</td>
<td>The Hyatt Regency, Detroit, Michigan</td>
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<td>Coal Market Strategies</td>
<td>October 13-15</td>
<td>The Chateau Elan, Atlanta, Georgia</td>
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Join the nearly 130 COMPANIES that recognize the importance of belonging to an Association that serves as the pre-eminent business voice of the American coal industry and advocates for coal as an abundant, economic and environmentally sound fuel source.

The American Coal Council (ACC) is an alliance of coal, utility, trading, transportation, terminal and coal support service companies, advocating a non-adversarial, partnering approach to business.

The ACC facilitates the lawful exchange of ideas and information regarding the American coal industry. It serves as an essential resource for companies that mine, sell, trade, transport or consume American coal. The ACC also serves as a resource for those wishing to expand or enhance business relationships in North American and international coal markets.

Membership benefits include educational programming and technical seminars, advocacy support, broad-based networking, Web site, electronic and printed membership directory inclusion, newsletter and members-only electronic updates, database resources, policy input, referrals and event discounts.

Join the American Coal Team!

YES, please send me membership information!

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12 American Coal Council
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Spring Coal Forum 2003

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Richard A. Abdoo
*Chairman, President & CEO*
Wisconsin Energy Corp.

Jack N. Gerard
*President & CEO*
National Mining Association

David G. Hawkins
*Director - The Climate Center*
National Resources Defense Council

The 2003 Spring Coal Forum program focuses on critical issues and their implications for future coal-based generation. Topics to be addressed include:

- Coal Generation & Environmental Advocacy: Seeking Common Ground
- Mercury & Multi-Emissions Compliance
- Water Resources Availability: Implications for Coal-based Generation
- The Interplay Between Coal & Natural Gas
- Transmission & FERC’s Standard Market Design
- Energy Trading & Brokering
- Power Sector Financing & Investment

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Quick quiz - name the year: Americans groan at high gas prices.

Heating oil prices soar in the Northeast. Schools and homes are forced to compete against business for scarce, pricey natural gas. The President tells the nation that domestic energy is vital for security and independence.


Every few years, we are reminded that energy underpins our fragile economy… that price matters both for industry and individuals… that we need a diversity of fuels, understanding that each has its inherent strengths… and that balanced environmental and energy policymaking is vital - and too often neglected.

The solution is straightforward. Maximize utilization of America’s existing coal-based plants and encourage development of new coal-based plants. This two-pronged initiative carries four enormous benefits for society. Done right, it ensures:

- Affordable electricity for all Americans
- A strong economy
- A clean environment
- A secure nation

Events of recent years - terrorist acts, multiple energy crises and a global focus on sustainable development - only emphasize the relevance of these principles. Let’s explore each in detail.

**Coal-based Generation Keeps Energy Costs Low For All Americans**

Bad energy policies (or no policies) make for headlines, talk-show fodder and inside-the-beltway wrangling. Lost in all of this, though, is the bottom line. Bad policies hurt people. Consider these recent lessons.

During the last energy crisis, middle-class Americans faced average energy costs equaling 4.6% of their incomes while low-income Americans were forced to pay 19.5% of their income on energy.

Because most electricity comes from low-cost sources… coal, nuclear and hydro… low-income Americans who relied on electricity for their primary fuel source paid just 13% of their income on home energy costs, while
those who used natural gas paid more than double… 29% of their income. A survey in the winter of 2002 of just 19 states and the District of Columbia showed that at least 4.3 million low-income households were at risk of having power or gas shut off because they couldn’t afford to pay. The study emphasized that this, in turn, can lead to homelessness, malnutrition, heat stroke, children removed from homes because of living conditions, senior citizens forced to sell their homes, and children whose education is disrupted by changing residences.

High energy prices amount to a regressive tax on Americans, affecting most severely those who are least able to gain a voice and most likely to be hurt if proper policies aren’t enacted. Consider that 60% of American households earn less than $32,000 per year. Their average of $400 per month in discretionary income can quickly be consumed by rising energy costs like natural gas, which during the winter of 2003 more than doubled from the prior year.

Increasing coal use boosts income, improves lifestyles and lengthens lives.

A recent study shows that removing coal use from the energy mix would lead to 14,000 to 25,000 premature adult deaths in America each year, and could contribute to as many as 100,000 more adult deaths annually through increased unemployment.

Coal-based Generation is Vital for a Healthy Economy

Twenty of the nation’s 25 lowest cost steam generating plants in 2001 were fueled by coal. And, for the first 30 months of the decade, coal’s delivered cost to generators was 70 percent less than that of natural gas.

States that chose coal for generation have been rewarded by low-cost electricity. The 10 states that use the highest percentage of coal enjoy electricity rates 40% lower than the 10 states that use the largest percentage of other fuels.

Long before September 11, 2001, America was well on its way to recession, driven by price spikes in gasoline, natural gas, electricity and home heating oil. Businesses and factories were closed, and out-of-work citizens faced the double impact of soaring energy bills. The present Administration inherited an energy crisis. We all must work to prevent the next one.

A recent Penn State study reveals that the average annual benefit of coal-based electricity to the U.S. economy is $411 billion per year - more than $5,000 per household - taking into account wages, taxes and the benefits of low-cost electricity.

Energy policies create real results that ripple through the economy. Lack of abundant and affordable electricity influences corporate decisions about where to locate offices and whether to grow their operations. As the chief executive of one of California’s largest companies stated in 2001: "As long as California is a Third World country, we won’t build $2 billion manufacturing plants there."

The nation’s energy needs continue to grow. The recent downturn in the economy has barely masked the major needs for new energy infrastructure. Economic growth will again highlight our energy needs.
The Department of Energy projects a 45% increase in electricity demand over the next 20 years... 50% for natural gas... and 30% for oil. It estimates that we will need 1,300 to 1,900 new power plants over that time. And we need high-tech transmission lines to serve as the interstate highways to most efficiently deliver electrons where they are needed.

To meet these demands, we need all forms of energy - coal, nuclear, oil, hydro and renewables. We need clear laws and regulations that enable reasonable long-term investments in infrastructure for pipelines, transmission lines and generating plants.

**Coal-based Generation Leads Environmental Improvements**

Coal is a growing environmental success story, both in mining and use. Peabody, for instance, has received more than 30 awards in the past five years for environmental excellence. We are driven by our mission statement, which states that when the mining is complete, we will leave the land in a condition equal to or better than we found it. And clean coal technologies and continuous improvements in emissions from coal-based generation provide a bright path to ensure clear skies.

Nationally, coal use has more than tripled in the last 30 years even as emissions have improved dramatically. Through continuous emissions improvements at coal-based electricity generating plants and greater use of advanced technologies, we'll continue to progress toward the goal of near-zero emissions.

Consider the U.S. Department of Energy's Vision 21 coal-based power plant of the future that would be among the cleanest major coal-based plants east of the Mississippi River and overcomply with federal Clean Air Act standards. For instance, the plants would take native coal with a sulfur dioxide content of 8 to 9 lbs. per million Btu and reduce emissions to approximately 0.167 lbs. per million Btu.

Prudent policymaking also requires careful action regarding climate change, as well. America should:

- Continue to improve the scientific understanding of the existence and cause of climate change;
- Develop a better understanding of the ability of plant life and oceans to serve as carbon-absorbing sinks;
- Advance technologies that would chemically or physically capture and sequester carbon dioxide;
- Promote increases in efficiencies to reduce energy input needed to create electricity;
- Expand the measurement of carbon emissions and uptakes; and
- Increase voluntary measures to reduce carbon intensity.

Balance is crucial here. Considered in a vacuum, climate change responses could also hurt people.

As International Energy Agency Executive Director Robert Priddle noted at the 2002 Global Sustainable Development conference, "Single issue advocates simply threaten other essential components of the solution. Renewable (energy sources) alone do not offer us a path to a sustainable future within our present span of vision. Policies to meet targets have costs - excessive costs if the targets are ill-judged."

**Coal-based Generation Contributes To National Security**

Coal is America's most abundant domestic energy resource and, in 2002, again fueled more electricity generation than all other sources combined.
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TECHNOLOGIES
for fly ash quality
• Ammonia Removal
• Carbon Fixation

Introducing
PRODUCTS
for increasing ash utilization
• Mortars and Stuccos
• FlexCrete Aerated Concrete
• SwiftCrete Concrete and Asphalt Repair Material

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Recent surveys show strong support for coal-based generation, particularly when Americans are reminded that coal is abundant, affordable and environmentally sound. A quick review of five President's comments shows that this support is also longstanding and bipartisan.

Coal is, simply, America's biggest energy treasure, with more reserves than any other nation. The energy value in Montana's coal reserves, for instance, are greater than the oil reserves in Saudi Arabia, Kuwait, Iran and Iraq combined.

In 1979, President Carter called our reliance on foreign oil "the moral equivalent of war." He called for America to switch to other fuels, "especially coal, our most abundant energy source." Since then, America has increased our reliance on foreign oil to 56%, compared with just 36% in 1988. Foreign direct investment has grown to 96% for uranium and 23% for coal. Our energy trade deficit has ballooned from $42 billion a decade ago to $109 billion in 2001.

The nation's scarce natural gas reserves are being rapidly depleted. Natural gas imports have more than tripled since the 1980s, and are expected to continue to increase. As Secretary of Energy Spence Abraham has stated, "We are well on our way toward dangerous dependency on a single, depletable, source of electricity: natural gas."

Amid the supply, price and security limits of competing fuels, coal boosts America's energy security while benefiting average Americans, strengthening the economy and improving the environment.

The Keys To Success: Education, Advocacy and Action

Coal's strengths directly align with the core principles of sustainable development -societal, economic and environmental - embodied in the 2002 United Nations World Summit on Sustainable Development. But several elements are needed to maximize utilization of existing plants and ensure that new coal-based plants are developed.

We must educate ourselves on the new, pleasant truths of coal and coal-based generation, even as we continually search for new ways to improve our core strengths.

We must be the advocates and messengers, and this message needs to be carried with the urgency of a nation desperate for affordable electricity... a strong economy... a clean environment... and a secure nation.

And we must take action to research the technologies, obtain the capital, install the equipment and improve the transmission that puts jobs in the community and clean, low-cost electricity in the economy.

Thousands of years ago, it was written that it was far better to light a candle than to curse the darkness. This applies to our education, our advocacy and our action. That candle is now electric. And that electricity - today and tomorrow - is fueled by coal.

Peabody Energy (NYSE: BTU) is the world's largest private-sector coal company, with 2002 sales of 198 million tons of coal and $2.7 billion in revenues. Its coal products fuel more than 9 percent of all U.S. electricity generation and more than 2 percent of worldwide electricity generation. Vic Svec notes that, were Peabody a country, it would rank ninth in the world in coal reserves (or oil, in equivalent energy). Peabody Energy: www.peabodyenergy.com.
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Coal blending for power generation is not a new concept. Traditionally, blending at the power station has been performed for a variety of reasons, including coal quality blending to meet emissions requirements and boiler operating characteristics. Additional benefits can be gained from combining a flexible coal handling system with precise, real-time control of the blending operations. Many times this may require the installation of new capital equipment, modification of existing facilities, or simply examining and enhancing operating practices. Overall, the apparent contradiction of lower fuel costs and increased unit utilization can be achieved through one or more of these means.

Market Volatility: An Opportunity if You’re Prepared

Price differences between higher and lower quality coals can vary greatly and these differences can be exaggerated during times of high market volatility. Figure 1 illustrates this point by comparing price differences between higher and lower sulfur coals during the market upswing of 2001.

As can be seen from this figure, the price premium for lower sulfur eastern bituminous coal over the longer term is in the range of $0.20/MBtu. This difference nearly doubled during the 2001 coal market. Coal consumers with sufficient flexibility in their coal blending and handling systems (as well as adequate leeway in their commercial contracting arrangements) were able to take advantage of this enhanced difference.

Capitalizing on these opportunities requires not only adequate receiving and blending facilities, but also sufficient precision in the blending operation to ensure that boiler and emissions requirements are met. Such blending capabilities provide more options for the coal consumer to take advantage of competitive pricing situations, including "sale" prices of certain coals and the ability to utilize lower-priced "problem" quality coals in the blend. In addition, the power station operator has the opportunity to use higher quality coals (while allowing lower quality coals to remain in inventory) during peak periods to increase station output when electricity sales margins may be highest.

Unit Performance: You're Good, Now Make it Better

From a power plant operator's viewpoint, precision blending offers several advantages. Not only can the lowest cost coal be utilized with the resulting savings in fuel costs, but a consistent known coal quality can be provided to the pulverizer and boiler. This has the obvious advantages of more consistent and continuous boiler performance.
the avoidance of unexpected and unpleasant derates and emissions excursions, and a reduction in outages due to fouling and slagging. To make the most of these systems, both management and operations personnel must be open to changing the way that they view their fuel supplies.

**Precision Blending: What it Takes**

The key components of a precision blending system include:

1. the ability to determine the quality of the incoming coal
2. facilities capable of sorting and stockpiling the incoming coal by quality
3. the ability to reclaim coal from stockpiles by controlled means
4. the capability to analyze the coal feed to the pulverizers on a real-time basis
5. a precision feedback mechanism to adjust the blend based on actual coal feed relative to targeted blends.

Figure 2 conceptually illustrates such a system. In this case, the quality of each incoming coal shipment is determined by an on-line analyzer, but received coal quality could also be determined at the point of shipment. Incoming coals are segregated into three separate stockpiles based on quality. As coal is fed to the pulverizers an on-line analyzer provides real-time blended coal quality information, and the draw rate from each stockpile is adjusted to meet specific coal feed quality requirements.

The results and benefits of such a system are illustrated by the following two case histories. The power station in each case was presented with unique problems that were solved through the application of precision blending systems.

**Success Story: TransAlta’s Sundance Station**

TransAlta’s Highvale Mine supplies coal to the 2100 MW Sundance and 800 MW Keephills Stations. Highvale coal is produced from multiple seams with varying qualities. TransAlta historically performed in-pit blending in an attempt to produce a uniform quality of coal to the stations. While mostly successful, Sundance and Keephills still encountered unit performance problems such as stack opacity emission derates, pulverizer feeder trips and fouling from inconsistent feed coal quality. This resulted in significant boiler derates, lost potential power sales revenues and associated operating problems and costs.

In the mid-1990’s TransAlta implemented a blending program to provide more consistent coal qualities to the Sundance and Keephills boilers. This included the stockpiling of separate coal qualities and the use of blending software to more closely monitor and adjust the coal quality fed to the boilers.

The results of this enhanced blending operation on boiler performance were dramatic, as shown in Figure 4. Within two years derates attributable to coal blending problems decreased from a peak of over 200,000 MWH in 1994 to less than 10,000 MWH. TransAlta has been pleased with the results of this blending program, and a precision coal processing and blending system is currently being designed for the Sundance Station to reap additional benefits.

**Success Again: PacifiCorp’s Hunter Station**

PacifiCorp owns and operates the Hunter Station located near Price, Utah. Hunter has historically been supplied by several local coal mines including PacifiCorp’s own Deer Creek Mine. Coal received at Hunter is segregated into three different stockpiles according to quality, and an on-line analyzer provides real-time coal quality data (heating value, sulfur, ash content, ash mineral analysis, etc.) for the coal blend being fed to the plant.

Figure 3 shows the general arrangement of the blending facilities at Keephills. Figure 5 shows the general arrangement of this facility. Plant operators are able to use the real-time information to adjust blends on-line, thus allowing for continuous monitoring and adjustment of coal feed quality and boiler performance.
As with TransAlta's Sundance and Keephills plants, implementation of real-time blending capabilities at Hunter have provided dramatic results. Figure 6 shows the average hourly availability of Hunter Units 1 and 2 before and after the implementation of precision blending. Overall average generation availability has increased 2-5%. More importantly, continuous coal quality control has resulted in more continuous operation of Hunter's units with accompanying improvements in overall operating and maintenance costs.

We're All Human

An important aspect of implementing real-time quality control at both PacifiCorp and TransAlta was the buyin and integration of these concepts to the day-to-day management of the station. Plant personnel were committed from the top down to a focus on increased availability of generation. This required not only the systems and hardware that provide the required facilities capabilities, but the cooperation and commitment of coal suppliers, transportation companies, and plant management and operations personnel to accomplish this objective.

Summary

Optimizing coal supply and the benefits of blending requires considerable flexibility in a power station's coal purchasing philosophies, receiving and blending facilities, and the mindset of all personnel involved in fuel purchasing and utilization. Providing this flexibility may require the installation of new capital equipment, modification of existing facilities, and/or changes in operating philosophies and practices. The rewards of such an effort can be substantial in the form of lower delivered fuel costs, increased boiler performance, decreased unit derates, and enhanced emissions compliance. Clearly, this is one situation where the power plant operator can "have his cake and eat it too."

Norwest Corporation is an established and respected company within the energy and mineral resource industry. The Company's extensive experience enables it to offer practical and cost effective services related to energy, minerals, mining and the environment, in North America and throughout the world. Norwest Corporation: www.norwestcorp.com.

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TransAlta is Canada's largest non-regulated electric generation and marketing company, with approximately $9 billion in assets and over 9,000 megawatts of capacity either in operation or under construction. As one of North America's lowest-cost operators, our growth is focused on developing coal- and gas-fired generation in Canada, the U.S. and Mexico. TransAlta: www.transalta.com
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On the 25th anniversary of the Surface Mining Control and Reclamation Act in the U.S., land reclamation has become an integral part of the mining process. Despite recent court cases that have spawned some misinformation regarding reclamation in some regions, most people do not realize the level of care and concern coal operators place on planning for future activity on properties that were recently mined. Coal producers fully realize that mining comes with the responsibilities of returning the land to a condition that is, at least, as good as it was before mining. The coal operators are also well aware that excellence in reclamation is not only critical to profitability but also to their legacy.

Reclamation is more than a legal requirement set fourth forth in law; it is a source of pride and ingenuity. Oftentimes, mining companies "compete" for coveted reclamation awards bestowed by the U.S. government, as well as by many state and private organizations.

Mining is Important to America

The United States contains over 275 billion tons of recoverable coal reserves located from the Appalachian Mountains to the Pacific coast. Much of America's history has developed around these vast and important deposits. Coal has allowed the U.S. economy to prosper and grow as a readily available fuel, first for space heating then to fuel steam locomotives, watercraft and industrial machinery and now for electric power generation.

Obviously mining requires disturbing the land. That does not mean, however, that producing companies are not mindful of what remains following the mining process. Extracting coal from the ground is just one part of the process; reclamation is an equally important part of the planning and engineering of a modern coal mine.

Mining companies work in collaboration with federal and local governments, as well as with academic institutions and other regional organizations to make sure that the reclaimed property fits the needs of the surrounding community.

Post-mining Land Use Means Many Things

In many parts of the U.S., mining and reclamation have different interpretations and implications. In Appalachia, post-mining land use can either be a restoration of what was there before mining commenced or provide property with a more gentle topography. Thus allowing for recreational or industrial development. In the central and western regions of...
the U.S., reclamation typically is geared toward returning the land to its prior use. Many times this leads to an improvement in the land over what was there prior to mining.

Reclamation in Appalachia

A growing number of counties in Appalachia are adopting the practice of developing former mine sites into expedient, affordable economic development projects. One example, is the Mingo County Redevelopment Authority (MCRA), which has orchestrated a number of new projects to diversify the economy working in cooperation with coal producers.

Among the MCRA-assisted economic development projects are a fish hatchery, new championship golf course, various industrial parks, and a proposal for a new airport and a vineyard. The fish hatchery was constructed on a reclaimed mine site and uses the pure cold water that is abundant on the site. Arctic char are cultivated at this aquaculture facility, which is unique to this part of the country. The salmon-like fish are considered a delicacy and are already in high demand in the New England and East Coast seafood markets.

A wildlife census is undertaken frequently on reclaimed property in Appalachia to ensure that the land provides a habitat for many U.S. native species, including rabbits, turkey, deer, fox, owls, hawks and Black bears. Many of these animals benefit from the open fields and diverse terrain that exists after mining. In addition, waterfowl and aquatic species populate and make use of the lakes, ponds and wetlands that are created.

Reclamation in the Midwest and the West

In the Midwest, most surface coal-mining activity takes place on agricultural property. In this situation, reclamation involves removing then preserving the topsoil so it can be reapplied near the end of the reclamation process. Reclaimed agricultural land typically has improved crop yields because of better water management and careful soil conservation efforts.

In addition to crops, mining companies have been on the vanguard in developing highly functional wetlands. In Illinois alone, mining companies have developed over 3,000 acres of wetlands. These wetlands support large wildlife habitats and provide both educational and recreational value to nearby communities.
the mining process. New techniques and knowledge gained from previous programs will be applied to the next generation of reclaimed land. Additionally, lessons learned from one site are being shared and applied to other sites and with other companies, underscoring the mission of the entire coal industry that all mined land be reclaimed to very high standards.

Mining companies routinely go beyond the basic requirements established by the Surface Mine Control and Reclamation Act to help ensure a promising future for previously mined properties. These projects all become the heritage of the company that was active there, thus and this also enables enabling those the companies to remain achieve successful in the future. Responsibility and pride in reclamation is are now a cornerstones for coal producers.

Out west, herds of elk, mule deer and pronghorn antelope thrive on previously mined lands. These herds benefit from more plentiful water sources and vegetative cover. Within a few seasons, these lands become virtually indistinguishable from the surrounding terrain. Wetlands in the West are oftentimes included in the reclamation projects, which has aided and improved wildlife populations of many species in this region.

Other examples of post-mining land use are parks, wildlife preserves, and forestry. Mining companies are responsible for planting millions of trees on previously mined property - in some cases for future harvesting, in other cases to restore property to its pre-mining character.

With the assistance of many universities, mining companies are often leaders in the study of property restoration. Many of the techniques learned on once disturbed reclaimed mining land, assist in the management of land that has been damaged by fire, flood, or other natural occurrences.

**Making Progress**

In the future, reclamation will continue its role as a pivotal part of...
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We Energies plans to test a new technology for removing over 90 percent of the mercury emissions at one of its power plants. The project was recently selected by the Department of Energy (DOE) to receive $25 million, or about half the project cost, from President Bush's "clean coal" program. Eight other clean coal projects were also selected for funding this year as part of this government program that is expected to allocate $2 billion to projects over 10 years.

Despite the growth of natural gas and renewable energies, coal will remain an important fuel source for power plants nationally. The DOE expects that coal production will increase 5.9 percent in the next five years. And coal consumption is predicted to increase by at least 22 percent by 2020, driven by an expected annual increase of 2.4 percent in electricity demand.

The good news is that coal is relatively inexpensive and in abundant supply, with at least 200 years worth of reserves in the ground. And now, the new clean coal technologies claim to cut harmful emissions by between 90 and 99 percent. It is therefore understandable why the Bush administration has taken the position it has toward the future of coal as one of our key energy sources.

More than Just Talk

The Clean Air Act of 1990 requires that sulfur dioxide (SO2) emissions be capped at 8.9 million tons a year and that nitrous oxide (NOx) emissions be limited to 2 million tons annually starting in 2008. This NOx requirement will necessitate close to an 85 percent reduction over what is currently allowable. The power plant industry is taking action to clean up the environment. It's doing something about it by applying new technologies to existing and new generators. All told, between 1970 and 1998, SO2 emissions dropped by 76 percent, NOx emissions have been cut by 58 percent, and particulate matter has fallen by 96 percent, says the Energy Information Administration.

"There is a documented need for building additional power plants, and the need for finding a way to do that with a lower pollution profile," says Chris Rowlands, CEO of Charleston, W.Va.-based CENfuel FPU Ltd., which is working on commercializing a process for cleaning coal of its impurities prior to combustion. All future plants "cannot be built with natural gas. The infrastructure is simply not there, and supply issues could raise prices for everyone if so many natural gas facilities were put online."

The "Clean Coal" Technologies

"Clean coal" is a term used when referring to a wide variety of technologies that enable sulfur removal, nitrous oxide control and mercury control. A new coal-fired power plant will employ certain of these technologies, while an existing coal plant would employ others, those that can be "bolted" on, so to speak, to the plant's framework.

Coal gasification is a clean coal technology that is considered for use in new plants. Rather than burning coal directly, coal is first converted into a combustible gas by combining coal and steam at high temperatures and pressures. The process breaks coal's chemical structure apart forming a mixture of hydrogen and carbon monoxide. The technology is reported to cut the pollutants regulated under the Clean Air Act by as much as 99 percent. The process also creates by-products that can be separated and turned into useful products such as chemicals and fertilizers.

Fluidized-bed combustion is another method that improves the combustion characteristic of coal. The technology burns fuel at temperatures of 1,400 to 1,700 degrees Fahrenheit, well below the temperature - about 2,500 degrees Fahrenheit - at which nitrous oxides form. The mixing action of a fluidized
bed controls sulfur emissions as well by bringing flue gases into contact with a sulfur-absorbing material, such as limestone or dolomite. More than 95 percent of the sulfur pollutants in coal can be captured inside the boiler by the sorbent.

The popularity of the fluidized bed combustion method is largely attributed to the fact that the technology can work with almost any combustible material, from coal to municipal waste. Sulfur dioxide and nitrogen oxide emission standards can be met without expensive add-on controls.

Existing power plants require retrofit solutions to lower their NOx emission levels. One approach called "low NOx burners" reduces the formation of nitrogen oxides by firing fuel in stages while carefully controlling the presence of air, which is a major source of nitrogen, during the hottest combustion periods when the pollutants form. Nearly 75 percent of the nation's coal-fired utility capacity now uses low-NOx burners to reduce air emissions.

Another way of controlling NOx is the Selective Catalytic Reduction (SCR) method. Closely related is its cousin, the Selective Noncatalytic Reduction - SNCR - method. In SCR systems, ammonia vapor is injected into the flue gas stream, reducing NOx emissions 80-90 percent. The SNCR process is similar to the SCR approach but uses a reagent, typically urea, to react with the NOx to form nitrogen (N2) and water (H2O).

**Mercury Emissions**

The regulation of mercury emissions now appears to be a certainty. High levels of this element can have a toxic effect on the nervous system in humans. Mercury can be found in coal, which when burned will release mercury gases into the air. About 5,000 tons of mercury is released each year globally, with the United States accounting for about three percent of that total.

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**Efficiency Rate Increase**

Today's coal-fired plants are about 33-35 percent efficient. With the new technologies such as coal gasification, however, that efficiency rate is said to increase to 45-50 percent, and potentially as much as 60 percent. The cost: about $1,200 per kilowatt compared to $900 for U.S. coal-fired power plants contribute just one percent of the worldwide mercury emissions. While small, the Environmental Protection Agency determined in 2000 that coal-fired plants must work to reduce those levels beginning in 2003, although it has yet to specify to what level. Existing pollution control devices such as electrostatic precipitators can remove up to 30 percent of oxidized mercury and up to 60 percent of elemental mercury. Meanwhile, wet scrubbers are effective at reducing overall mercury levels by 55 percent. Currently other technologies are being tested, such as the injection of activated carbon to "catch" mercury in the power plant exhaust.
conventional coal plants.

Altogether, a total of 70 coal-fired plants in North America have been proposed with a planned generating capacity of at least 50,000 megawatts, according to research completed by UtiliPoint International. While not all of those facilities will actually get built, coal's resurgence into the market place is undeniable.

Economic Trend

Economics is driving this "back to coal" trend. When the price of natural gas exceeds that of coal by three times, it may become less expensive to build and operate coal-fired power plants. Coal currently delivers a million BTUs for $1 to $1.50. Natural gas, in comparison, costs about $5.00 per million BTUs. Soon, coal-fired projects are projected to cost less and be more productive than those facilities that are fueled by competing energy sources.

"Coal is more expensive in the short-run - perhaps a decade or longer - than a typical gas-fired plant, but there are definite long-term benefits," says Richard Benedict, Reliant Energy's director of business development. Those benefits are even more attractive now that the Bush administration has placed coal front and center in its effort to ease the threat of power shortages, which have been well publicized in California and New York, as well as in the New England states. In its energy blueprint released in 2001, the administration said 1,300 new power plants are needed over the next 20 years, which equates to a total capacity of roughly 650,000 megawatts on top of the 770,000 that currently exist. Coal, the White House says, will play an important role in fulfilling that mission.

Because of possible supply shortages and the U.S. dependency on overseas' sources of fuel to help meet demand, the price of natural gas over a long-term period will remain high relative to coal. Coal, because it is plentiful and cheap, must be a part of any long-term energy plan. Moreover, power generators don't want to be dependent on any one fuel source.

Some now feel that coal can help produce more power - without harming the environment. The National Coal Council says that about 40,000 megawatts of increased electrical production capability is possible in the next three years by modifying existing coal-fired generators. Such increased supply can occur, it adds, without increasing emissions - all because of new clean coal technologies.

If coal can be an environmentally-friendly fuel source, says Robert Beck, head of the Washington-based coal council, then such "regulation should be harmonized with the energy and national security goals of the country," which call on even greater use of coal to prosper.

Many utilities will stick with coal. The commodity itself has always been cost competitive but now the technologies are emerging to make it much cleaner. The new dynamics will likely assure it of playing an integral role in the nation's energy picture for some time to come.

UtiliPoint International, Inc. (www.utilipoint.com) is a prominent consulting firm serving the energy industry for more than 70 years. UtiliPoint also publishes IssueAlert™, the leading e-news source for daily in-depth analysis on the energy sector.
A suite of high technology solutions has emerged over the past 20-plus years designed to remove 95 to 98 percent of a coal-fueled electricity generating plant’s sulfur dioxide (SO₂) emissions and some 75 percent of nitrogen oxides (NOₓ). The goal is to drive toward eliminating emissions over the next two decades.

The latest commercial technologies representing “Best Available Control Technology” would be applied at Peabody’s Thoroughbred and Prairie State Energy Campuses. The plants are designed to be among the cleanest and lowest cost major coal plants in the Midwest.

STEAM GENERATOR
Electric utilities use coal to fuel more than 50 percent of America’s electricity generation while continuing to employ technologies for cleaner, more efficient electricity. Coal-fueled generation begins in a large chamber called a boiler, which is lined with pipes containing very pure water. Finely ground coal and air are injected into the boiler through a nozzle and combusted to heat water into steam that drives a turbine.

BURNER
The burner is a nozzle device generally located near the bottom of the boiler, which mixes air and finely ground coal efficiently in order to reduce nitrogen oxide and carbon monoxide emissions.

NITROGEN OXIDE (NOₓ) CONTROLS
New controls called low-NOₓ burners impede the formation of nitrogen oxides by staging the introduction of the combustion air, thereby lowering the temperature of the flame to control the way coal combusts. Today, three-fourths of the nation’s coal-fueled electricity capacity is equipped with low-NOₓ burners. This technology typically removes 75 percent of a plant’s NOₓ emissions. Selective catalytic reduction is another method that controls NOₓ emissions by injecting ammonia into the flue gas as it passes over a bed of catalyst, causing the NOₓ to be converted to nitrogen and water.

Dust particulate removal devices include electrostatic precipitators (ESP’s) and advanced fabric filters, also known as baghouses, that remove 99.9 percent of the solid particles from the boiler flue gas. ESP’s also help remove mercury. Dry ESP’s use electrodes to place an electric charge on the fly ash particles, which can then be collected on an oppositely charged plate. A baghouse consists of banks of cloth bags that filter the particles from the flue gas.

STATE-OF-THE-ART COMPUTER SYSTEM
A state-of-the-art computer system optimizes plant efficiency and monitors emissions. The system controls the fuel, air and reagent feeds within the various emission control technologies.
Among the proven technologies are flue gas desulfurization systems, called “scrubbers,” which remove SO₂ from the combustion gas exiting the steam generator. The latest scrubber designs typically reduce emissions by up to 98 percent, depending on the coal’s sulfur content. Scrubbing is also a system for controlling mercury.

The systems work by injecting a dry or wet calcium-based mixture such as lime or limestone into the flue gas, where it reacts to capture the SO₂. The SO₂ and calcium mixture can be converted into a marketable by-product called gypsum that is typically used to manufacture wallboard. The controls in use today have already reduced 12 million tons of emissions on an annual basis.

A turbine consists of fan-type blades attached to a shaft that is rotated by steam, converting the kinetic energy of the steam into mechanical energy.

Continuous stack monitors ensure emissions compliance. The only visible emission is harmless steam.

A second wet ESP removes additional fine particulate matter. Wet ESPs wash the electrodes with water, capturing particulates in a solid form.

The generator is a machine that transforms the mechanical energy of the turbine into electric energy. A 1,500 megawatt plant can serve 1.5 million homes with clean, inexpensive electricity.

Graphic courtesy of Peabody Energy - St. Louis, MO
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In this time of deregulatory change, Kiewit has the industry know-how to manage change, providing a leading edge over our competitors. In coal supply, management and value-added services, consulting, construction and joint ventures, we develop solutions that target your specific needs.

Kiewit Mining Group is one of North America’s leaders in high-quality, low sulfur coal production, dedicated to making everything - the coal, the services, the projects - succeed. It’s our business and we do it well.

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Kiewit Mining Group
Coal Marketing
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For more information, contact:

Kiewit Mining Group
Coal Marketing
1000 Kiewit Plaza
Omaha, NE 68131
402-342-2052
FAX 402-271-2008

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The American Coal Council (ACC) is proudly celebrating its 21st Anniversary this year!

The ACC's predecessor organization, the Western Coal Council (WCC), was founded in 1982 as the Western Coal Export Council (WCEC), a private industry trade group formed to promote exports of western U.S. coal to the Pacific Rim. The WCEC grew out of the efforts of a multi-national Task Force formed under the auspices of the Western Governors' Association (WGA). In 1981, that Task Force published a study on "Western U.S. Steam Coal Exports to the Pacific Basin." Three nations - Japan, Taiwan and South Korea - along with more than 40 U.S. companies participated in the study group.

In 1986, the Western Coal Export Council changed its name to the Western Coal Council to more accurately reflect the organization's support for expansion of both foreign and domestic markets for western U.S. coal. The strengths and practices established in those early years - including a broad-based membership, a partnering, non-adversarial approach to business, excellence in educational programming, and an eagerness to work closely with other groups to advocate for the coal industry's interests - continued to foster the WCC's growth and development.

In the Spring of 2002, the WCC undertook the next step in its development as the membership voted overwhelmingly to transition from a regional to a national organization. The American Coal Council (ACC) continues to be dedicated to advancing the development and utilization of coal as an economic, abundant and environmentally sound fuel source. The Association's national focus and its increasingly close ties with national and state organizations and other industry groups will enhance its advocacy efforts in the future.

Our membership base includes coal suppliers, consumers, energy traders, transportation companies, ports and terminals and coal support service firms. Over the last 10 years, the ACC has increased its membership by nearly 500%. Today, the nearly 130 member companies of the American Coal Council have combined their respective voices to serve as the pre-eminent business voice of the American coal industry.

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Writing this the day after the loss of the Columbia space shuttle is a grim reminder of mankind's inability to create a perfect system.

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Risk is with us literally every minute of our lives. In our homes, in our yards, in our cars, and yes, in our workplaces.

Coal mining unarguably is fraught with risk. The underground mining environment is dark. It is confined. It contains geologic hazards that often can't be discerned from the two-dimensional vantage point of the miner. Not the friendliest environment in which to be operating equipment. Surface mines, considerably safer, nevertheless have their own set of risks, often related to the equipment being used.

The United State's coal mines-long synonymous in people's minds with high fatality rates-experienced an unprecedented low of 27 fatalities in 2002, compared to the previous low of 29 in 1998. Although no thinking person would argue that continued improvement isn't needed, the coal industry's record in this regard during the past several decades is one of noteworthy improvement.

History of Mine Safety Regulation

Federal laws regarding the coal industry date back to 1910, when the Bureau of Mines was created, albeit with no regulatory or enforcement authority. The first enforcement provisions were enacted in 1952, when mandatory safety standards were put in place for underground coal mines. Although additional legislation was enacted in the intervening years, 1969, with the passage of the Federal Coal Mine Health and Safety Act, clearly was the watershed year for mine safety. This was followed by the creation of the Mining Enforcement and Safety Administration by administrative action in 1973. This agency, a part of the Department of the Interior, assumed the safety and health enforcement functions that previously were vested in the Bureau of Mines.

MESA was superceded in 1977 with the passage of the Federal Mine Safety and Health Act, which created the Mine Safety and Health Administration (MSHA), an agency of the Department of Labor. Throughout these several decades, each act brought an increasing emphasis on mine safety.

In considering mine safety, it is most informative to relate fatalities to a common benchmark. The two most commonly used are the rate per 100,000 full-time employees and the rate per 200,000 employee hours. Whichever is used, the relationship is termed the incidence rate. The industry's gains during the past 40 years are illustrated by decade in Figure 1.

Figure 2 graphically illustrates the relationship between the incidence rate and the number of employees on an annual basis for the same period. What are the factors behind this improvement?

During the 1970's, there is no question that the implementation of the 1969 Act brought striking improvements in an industry where underground mines predominated. Results were mixed during the 1980's, although overall there were gains. This decade will long be remembered for the difficult economic times experienced by the coal industry, as the entire spectrum of the energy industry reeled from the stagnation of the nation's economy. In an industry in which both operators and miners were struggling to survive, safety issues weren't always in the forefront of people's minds. During the 1990's, the incidence rate became less volatile, with gradual but steady improvement experienced throughout the decade.

Improvement during the past two decades can be attributed to a number of factors. Three of the most significant are:

- Technological improvements
- Proportional increases in surface mining
- Increasing emphasis on safety by mine operators

The impact of technological improvements is profound, and any number of articles could be (and have been) written solely on this subject. It is sufficient here to acknowledge the role of these improvements.

Similarly, there has been a steady increase in the proportion of coal produced at surface mines, increasing from around 55 percent of total U.S. production in the mid-1970's to around 66 percent in 2001. In an interesting aside, it is worth noting that many of those who advocate banning surface mining because of its environmental impact suggest that much of the coal lost in this fashion could be mined by underground methods, clearly the more dangerous of the two alternatives for the coal miner.

The third factor, and one of considerable significance, is the increasing emphasis by mine operators on safety. This is not only because it is the right thing to do, but because operators long ago learned...
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that safe mines are productive mines. One of the most telling set of statistics in the coal industry during the past several decades is the relationship between the triumvirate of employment, productivity and safety. This relationship can be summarized in one sentence: Fewer miners are producing more coal at increasingly safer levels.

Looking Ahead

However, there is much more to be accomplished, and no one, not the mine manager, not the section foreman, not the belt cleaner, can afford to forget this. Because in the end, safety is accomplished one person and one task at a time.

Training is important, as is providing the right equipment.

Emphasizing safety at every level of the operation and in every area of the workplace is important.

Some operators use a carrot - rewarding safety with bonuses.

Some operators use a stick - rewarding unsafe acts with disciplinary action.

Most use both.

And yet, it is up to the individual to make his or her own work environment safe. Short of assigning a safety inspector to every employee, management can't stop a miner from walking beyond the last row of roof bolts. What are the odds that you will be killed if you do that?

Figure 2 - Incidence Rate versus Employment

Pretty low. Lower, perhaps, than the chances of being killed driving your car. But someone always does it, and most of the time nothing happens. But occasionally the odds don't matter. It is no consolation that the roof fall that got you was statistically unlikely.

The fact is, as in every human endeavor, individuals are at once the strength and the weakness of the coal industry. Skilled workers, trained in their tasks and constantly reminded to create a safe working environment, will increasingly lower the incidence rate. But there will also be lapses, whether in the mine, or at an equipment manufacturing facility, or in the inspection system, and there will be accidents.

But miners are nothing if not the eternal optimist (else they wouldn't be in this industry) and the majority will continue to fight just as hard to create a safe workplace as they do to increase production.

And the incidence rate will continue to decline. ■

Alan Stagg, a professional geologist who has spent almost 40 years in the mining industry, is the president of Stagg Resource Consultants, Inc., of Cross Lanes, West Virginia. Stagg Resource Consultants, Inc., a natural resource consulting firm, provides a broad range of services to the coal, oil and gas, and mineral industries throughout the U.S. and internationally. Our client base includes the mining, utility, energy, and financial sectors, the legal profession, government agencies and individuals. Stagg Resource Consultants: www. sesiusa.com
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During the past few years a great deal has been learned about the capabilities and limitations of various technologies for controlling mercury for coal-fueled boilers. New operating and performance data from full-scale installations can provide guidance on determining the most cost-effective approach for a particular plant.

New data and continued analysis of available information corrects many of the early misconceptions about mercury control. For example, it was once believed that wet scrubbers could be used to provide dependable high-levels (90%) of mercury control. We have since learned that mercury removal in scrubbers varies significantly from plant to plant and is dependent upon coal characteristics and boiler operating conditions. It was also speculated that the addition of Selective Catalytic Reduction technology (SCR) could guarantee effective removal of mercury in a downstream scrubber. Recent tests have demonstrated that this is untrue.

Recent full-scale demonstrations have proven the effectiveness of powdered activated carbon (PAC) injection for reducing mercury emissions from all types of coal, it appears unlikely that compliance with pending mercury reduction regulations will result in significant fuel switching.

Mercury Emissions from Coal-fueled Boilers

Coal contains trace levels of mercury that are released when coal is burned. The mercury forms various chemical species in the boiler depending on the coal characteristics and the boiler operating conditions. Elemental mercury, also referred to as mercury zero (Hg0), is not water-soluble and therefore cannot be captured in wet scrubbers. Oxidized mercury, also known as reactive mercury, ionic mercury, mercury chloride, and mercury plus two (Hg++) is water-soluble and can be captured in wet scrubbers. While oxidized mercury can be captured, it may not necessarily be fully retained due to subsequent reactions leading to some re-emission of elemental mercury.

During 1999, EPA conducted an Information Collection Request (ICR) program in which approximately 40,000 samples of coal were analyzed to determine the concentration of mercury and chlorine. The ICR data demonstrated that there is not a great deal of difference in the coal types nor is there a large supply of "low-mercury" coal. Therefore, in contrast to the situation with coal-sulfur content, coal switching will not be a widespread option to meet a mercury regulation.

This data also showed that there was a significant difference between the chlorine content of Eastern and Western coals. The Western coals, both bituminous and subbituminous, have very low chlorine levels with most having less than 100 ppm. The Eastern bituminous coals have very high chlorine levels, many exceeding 1000 ppm. Because of this the speciation of mercury in Western fuels favors the elemental form whereas the Eastern coals have a higher concentration of the oxidized forms of mercury.

Emerging Regulations

New air pollution control regulations that include limitations for mercury emissions from coal-fueled boilers are coming from a variety of fronts. EPA announced in December of 2000 that they would proceed to develop a Maximum Achievable Control Technology (MACT) Standard for the industry. A draft regulation will be submitted by December 2003 with full implementation in 2007. The MACT process does not allow emissions trading, and could establish different limits according to the type of coal and type of air pollution control equipment at each plant.
Several bills are being debated in the Senate and the House that would require reducing mercury emissions. The bills differ in the level of mercury reduction required (50 to 90%), the timing of the reduction (2008-2018), and whether emissions trading will be permitted. In addition, several states have either passed new regulations for mercury control or are in the process of drafting regulations. The most aggressive have been the New England states where mercury control will be required in Massachusetts and New Hampshire by 2006.

**Mercury Control in Existing Equipment**

The ICR program also provided insight on the capabilities of existing Activated Powdered Carbon (APC) devices to control mercury and the impact of coal characteristics. For every type of APC device, mercury capture was higher for bituminous coals than for subbituminous coals. This is due to the higher levels of oxidized mercury, higher concentrations of HCl, and higher levels of carbon in the ash. It also showed that fabric filters enhance the capture of mercury compared to electrostatic precipitators (ESPs).

The ICR tests confirmed that wet and dry scrubbers, which are located on 25% of the power plants, could be effective for removing mercury from some coals. However, scrubbers are only effective at removing one form of mercury, mercury chloride, and cannot remove elemental mercury. Because of this limitation, mercury control with scrubbers varies from less than 10% up to 90% removal. They work best on bituminous coals with high chlorine levels and they are quite ineffective on western subbituminous coals. This will severely restrict fuel flexibility at plants that depend upon scrubbers for mercury control. Following the ICR tests, additional test programs have been sponsored by EPRI and U.S. Department of Energy (DOE) to determine if SCR catalysts installed for NOx control are effective at oxidizing mercury to enhance removal in scrubbers. Their results show that while fresh catalysts can oxidize some elemental mercury to mercury chloride, performance depended upon coal characteristics. The test also demonstrated that the amount of oxidation decreases as temperature and gas flow increase, was inhibited by the addition of ammonia, and decreased rapidly over time at normal operating conditions. Several full-scale SCR units showed no appreciable mercury oxidation.

One of the most difficult applications for controlling mercury will occur at plants that burn Western fuels and use dry scrubbers for SO2 control. Analysis of units using fabric filters has shown that for subbituminous coal, the mercury removal on plants with spray dryers (~5-39%) was lower than for plants without spray dryers (~55-82%). This inhibition of mercury removal appears to be caused by the elimination of HCl from the gas stream. Tests conducted by EPRI confirmed that these trends also occur when activated carbon is added to enhance mercury capture. For example, at a PAC feedrate sufficient for 90% mercury capture, mercury removal was reduced to 50% by the presence of a spray dryer.

Tests have shown that iodated carbon is capable of 90% mercury removal in this application. Although the iodated sorbent is prohibitively expensive, it does indicate that the problem might be solved with modified sorbents. EPRI has performed full-scale tests adding chloride compounds to the gas stream with some limited success. Issues related to corrosion and deposition must be addressed for this to be a viable approach.
Activated Carbon Injection

Injecting a sorbent such as powdered activated carbon (PAC) into the flue gas represents one of the simplest and most mature approaches to controlling mercury emissions from coal-fired boilers. This technology has been used for decades to control mercury emissions from boilers burning waste. Figure 1 is a photograph of the sorbent silo and feed train designed to inject PAC to treat a 150 MW boiler. The gas phase mercury in the flue gas contacts the sorbent and attaches to its surface. The sorbent with the mercury attached is then collected by the existing particle control device, either an electrostatic precipitator (ESP) or fabric filter (FF).

The most commonly used sorbent for mercury control has been activated carbon. Activated carbon is carbon that has been "treated" to produce certain properties such as surface area, pore volume and pore size. Activated carbon can be manufactured from a variety of sources, (e.g. lignite, peat, coal, wood, etc.).

Full-Scale Demonstrations of Activated Carbon

Under a cooperative agreement from the DOE National Energy Technology Laboratory, ADA-ES worked in partnership with PG&E, We Energies, Alabama Power, Ontario Power, TVA, First Energy, EPRI, Hamon, Arch Coal and Kennecott Energy on a field test program of sorbent injection technology for mercury control. The test program took place at four different sites during 2001 and 2002.

Figure 2 presents full-scale data from three test sites, one with a FF on a bituminous coal, and two with ESPs, one bituminous and the other PRB. This plot also includes reduced-scale FF tests conducted by EPRI on a PRB coal. In all cases, mercury removal increases with increased rates of carbon injection. The best results occur on units with fabric filters as removal levels as high as 90% are achieved at much lower sorbent rates than that required for an ESP. It also shows that the performance in a FF appears to be independent of the type of coal.

With the ESPs, there does appear to be somewhat different results for bituminous and PRB coals (i.e. up to 90% removal in the bituminous case). However, because of the costs associated with the higher sorbent rates for ESPs, the practical limit for PAC injection with ESPs for all coals is 50 to 70% removal.

These tests also demonstrated that for all coals and both APC devices, collection efficiency was nearly identical for both elemental and oxidized mercury. These results validate the capability of PAC to capture all forms of mercury from both bituminous and subbituminous coals.

The data presented in Figure 2 can be used to estimate the impact of various mercury control regulations. The only practical way of assuring 90% mercury removal would be to inject PAC upstream of a FF. However, currently only 10% of existing plants have FFs. Thus 90% regulations would require most plants to install these devices at a capital cost of $40/kW. However, a regulation requiring 50-70% removal could be met by many plants with PAC injected upstream of existing APC equipment.

Mercury in Coal Combustion Byproducts

Since the purpose of controlling emissions from coal-fired boilers is to reduce potential buildup of mercury compounds in lakes and streams, the stability of mercury captured is a critical component of the overall control scheme. In addition, there is a concern over the impact of PAC on ash being sold for use in concrete.

Currently there are a number of programs being conducted by DOE, EPRI and the Environmental Protection Agency (EPA) to evaluate the stability of mercury captured in flyash and scrubber sludge. These programs are establishing a number of new protocols to evaluate the susceptibility of these materials to leaching and volatilization of mercury compounds under "worst-case" environmental conditions. To date results have been very promising, as the captured mercury appears to be unlikely to reenter the biosystem. Although the ash appears to be stable, tests have confirmed that the presence of even trace amounts of PAC rendered the ash unacceptable for use in concrete. This would not be an issue for the two/thirds of the plants that landfill their ash, but is an important
economic factor for those plants that do sell their ash.

Several approaches are being considered to insure that the ash remains marketable such as separation, combustion and chemical deactivation of the PAC in the ash. One straightforward approach that is currently commercially available is the arrangement in which PAC is injected upstream of a secondary baghouse located downstream an ESP. With this configuration, the ash is collected upstream of the carbon injection and remains acceptable for sale. ADA-ES has begun work on two long-term full-scale demonstration programs of this configuration at the Alabama Power Gaston Station burning bituminous coal, and at the We Energies Presque Isle Station burning PRB coal.

Conclusions

The power industry in the US is faced with meeting new regulations to reduce the emissions of mercury compounds for coal-fired plants. These regulations are directed at the existing fleet of nearly 1100 existing boilers. A reliable retrofit technology is needed for these plants that minimizes the amount of new capital equipment while providing continued flexibility in fuel selection. However, mercury removal in wet scrubbers has been proven to vary significantly from plant to plant and is dependent upon coal characteristics and boiler operating conditions. It is also becoming more obvious that the addition of an SCR does not guarantee effective removal of mercury in a downstream scrubber. On the other hand, recent full-scale demonstrates have proven the effectiveness of activated carbon injection for reducing mercury emissions. This technology is simple and near-term and provides the capability of removal of all species of mercury from both Eastern and Western coals.

Additional information on mercury control can be found on the NETL (www.netl.doe.gov) and ADA-ES (www.adaes.com) websites.

ADA Environmental Solutions, LLC (ADA-ES) is an environmental technology and specialty chemical company headquartered in Littleton, Colorado. The company brings 25 years of experience to improve profitability for electric power and industrial companies through proprietary products and systems that mitigate environmental impact while reducing operating costs. ADA-ES is a subsidiary of Earth Sciences, whose common stock trades on the OTCBB under the symbol ESCI.
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On July 31, 2002, the Federal Energy Regulatory Commission (FERC or the Commission) issued a Notice of Proposed Rulemaking (NOPR) entitled "Remedying Undue Discrimination through Open Access Transmission Service and Standard Electricity Market Design" (SMD NOPR). This NOPR represents the culmination of the Commission's efforts to remedy undue discrimination in transmission. Its aim is to establish a standardized transmission service and wholesale electric market design that will provide a level playing field for all entities that seek to participate in wholesale electric markets. The fundamental goal of SMD is to create 'seamless' wholesale power markets that allow sellers to transact easily across transmission grid boundaries and that allow customers to receive the benefits of lower cost and more reliable electric supply.

The SMD NOPR is one of many orders initiated by the FERC to promote the benefits of competitive wholesale power markets. In 1996, FERC issued Order No. 888, which required that all public utilities provide open access transmission as a remedy for undue discrimination. In 1999, the Commission issued Order No. 2000, which encouraged public utilities to voluntarily place their transmission facilities under the control of a regional transmission organization (RTO). Order No. 888 and Order No. 2000 set the principles upon which to create regional transmission institutions and competitive electricity markets. However, in FERC's view, unduly discriminatory transmission practices continue to occur and non-standard market design and administration of short-term energy markets has resulted in both pricing and market inefficiencies.

**Standard Market Design Overview**

In this proceeding, the Commission proposes to replace the existing pro forma tariff and provisions for point-to-point and network service with a single network access service (NAS), institute a standard market design for wholesale electricity markets, and assert FERC jurisdiction over the transmission component of bundled retail transactions. Specifically, the Commission seeks to establish standardized spot markets, market-based congestion management, regional resource reserves, increased flexibility in transmission service, unbiased operation of the transmission system and a strong market oversight function. The Commission proposes to provide new choices for market participants through a flexible transmission service, and an open and transparent spot market design that provides the right pricing signals for investment in transmission and generation facilities.

The following are the fundamental building blocks of the Standard Market Design (SMD):

1. A single, flexible tariff designed to eliminate discrimination between bundled and unbundled transmission services;
2. Require all public utilities that own, control, or operate interstate transmission facilities to become an Independent Transmission Provider (ITP), turn over their facilities to an ITP or contract with an ITP to operate their facilities. An ITP cannot have a financial interest, either directly or through an affiliate, in any market participant in the region in which it provides transmission service;
3. Development of financially binding day-ahead and real-time spot markets (short-term markets), supported by a Locational Marginal Pricing (LMP) approach to congestion management;
4. Establish an access charge to recover embedded transmission costs that would be a demand charge billed on a customer's load ratio share of the transmission provider's cost, and would be paid by any customer taking power off the grid;
5. Require minimum standards for the design and operation of wholesale power markets, with particular emphasis on minimizing the current "seams" problems;
6. Establishment of a long-term resource adequacy requirement with a minimum of 12% reserve margin;
7. Establishment of a formal role for state representatives to participate in the decision-making process of the ITP. Each ITP will have a Regional State Advisory Committee which will have direct contact with the ITP's governing board;
8. Implementation of market oversight requirement. The FERC is proposing a market plan that consists of three mandatory measures and a fourth voluntary one:
   a) Identification of the generators that can exercise local market power and the conditions under which they can. For these generators, the ITP will develop bid caps to apply under these assessed conditions.
   b) A safety-net bid cap, similar to the $1,000/MWh cap in the Northeast markets and Texas.
c) A resource adequacy requirement.
d) Examination and mitigation of bids of individual suppliers when non-competitive situations exist (similar to the Automatic Mitigation Procedures approved in the NYISO).

The FERC views these mitigation measures as applying solely to the spot markets operated by the ITP and not to bilateral contracts.

In the SMD NOPR, the FERC asserts its jurisdiction over transmission whether bundled or unbundled, both wholesale and retail. This has generated significant opposition from many public utility commissions (PUC), especially in the Northwest and Southeast. The concern is whether low-cost power states such as those in the Northwest and the Southeast would end up subsidizing states in the Midwest and Northeast where electricity is typically priced higher. Low-cost states believe that they would have to pay for new power lines that are necessary to ensure a seamless transmission grid and Western states don’t want to lose their inexpensive hydropower to other regions.

What’s Ahead

So far, there have been many delays in regards to the implementation timeline of FERC’s SMD. The original timeline required initial implementation by September 2004. However, such an implementation timeline is no longer feasible given all the delays, and given that a final rule will not be issued until sometime during summer 2003. The Commission will issue a white paper on its proposed Standard Market Design (SMD) rule in April 2003, with a public comment period to follow. FERC would review the comments prior to publication of a final rule sometime this summer.

This NOPR and other regulatory initiatives by the Federal Energy Regulatory Commission are continuing to unfold at the present time, and it is not possible to predict how far or how fast they will go. However, the direction of regulatory policy at the Commission at the present time appears generally positive for continued progress toward competitive wholesale electricity markets.

Since its creation in 1986, Edison Mission Energy has established a solid reputation as a responsible, progressive power generator. Through economically, environmentally and technologically sound projects, EME has developed and acquired a portfolio of 76 assets, with a net generating capacity of nearly 19,000 megawatts. And along the way, EME has earned its reputation as a superior operator of environmentally sound projects covering the globe from Australia, Italy and New Zealand, to Thailand, Puerto Rico and the Philippines. Edison Mission Energy: www.edison.com.
Environmetally beneficial, cost-effective, abundant - coal combustion products (CCPs) offer significant environmental and economic benefits for the utility-coal industry. CCPs are no longer a "waste" product, but a valuable commodity for the building trades.

CCPs are produced by the combustion of coal in a boiler. They include fly ash, bottom ash, boiler slag and flue gas desulfurization (FGD) material, as well as other less plentiful materials. CCPs vary in chemical and physical properties according to the type of coal burned, the combustion method and the type of air emission systems used by a power plant.

CCP Utilization

The utilization of CCPs has increased steadily since data on usage was first collected in the mid-1960s. Of the 117 million total tons produced in 2001, approximately 37 million tons were used beneficially - a cumulative use of 31.5%. Of this amount, more than 12 million tons were used in blended cements, concrete and grouting applications.

Other leading applications for CCPs are as raw feed for cement clinker, in structural fills, in waste stabilization and solidification, and as road base and sub-base materials. Nearly 5.7 million tons of FGD materials were used in the manufacture of wallboard. Other uses include agricultural applications, flowable fills, soil modification, mineral fillers, snow and ice control, blasting grit, roofing granules and mining uses. Unfortunately, nearly 80 million tons of CCPs were placed in landfills in 2001.

Increasing CCP Utilization

In late 2002, the Environmental Protection Agency (EPA), working in partnership with the American Coal Ash Association (ACAA) and the Utility Solid Waste Activities Group (USWAG), initiated a program known as the Coal Combustion Products Partnership, or C2P2. This challenge program is designed to increase the use of CCPs in a variety of transportation applications. These applications include use of fly ash in concrete mix designs, using CCPs in structural fills, road stabilization, flowable fills and as base materials.

Although initially targeted at highway and construction activities, it is anticipated that C2P2 will be expanded to other arenas in the future. The primary tools being used in C2P2 are educational awareness through printed materials and workshops. With support from the Department of Energy (DOE), the Federal Highway Administration and other governmental agencies, C2P2 will identify barriers or perceived barriers to CCP use and help clarify opportunities for increased utilization.

Along with support from governmental agencies, the upward trend in utilization is bolstered by research and development activities. The CCP industry is optimistic that utilization will continue to increase as new technologies emerge to address barriers to ash utilization. Awareness of the physical and chemical properties of CCPs, their behavior in specific engineered applications and the value of using them will allow the industry to increase CCP usage.

For example, companies, inventors and researchers have successfully taken fly ash that contains higher levels of carbon or post-emission residues and integrated this type of ash into viable products. Using portland cement and non-quality fly ash, various processes have produced aerated mixes that are lightweight, have insulating properties and can be easily placed. Other testing has resulted processes to...
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Committed to the environment and the responsible use of coal to meet our electricity needs.
manufacture wallboard and aggregates using fly ash that contains dry flue gas desulfurization residue and high carbon fly ash. Several companies have developed ways to use any kind of dry CCP and compact it into a variety of block-like products that exhibit similar characteristics to traditional concrete products (such as tilt up walls, sound barriers, masonry blocks, etc.). Various other efforts are exploring additional uses for the post-combustion affected ash.

Funding has also been made available from the Department of Energy through the Combustion Byproducts Recycling Consortium (CBRC) to develop emerging CCP utilization technologies. Universities, utilities and ash marketers have formed partnerships to explore potential new products and markets. In some cases, the results are dramatic. The Visitor’s Center constructed by the North Dakota Lewis & Clark Foundation at Fort Mandan is an outstanding example of how a variety of CCPs can be used to blend environmental sensitivity, technology and economics into a national landmark.

**CCP Benefits**

Placing CCPs into commerce decreases the space needed for landfills, helps reduce greenhouse gas emissions and conserves natural materials for other uses. The recycling of material that would otherwise be sent to a landfill is, quite obviously, a better alternative than disposal.

When used to replace cement in concrete, CCPs offer significant environmental benefits. In fact, for each ton of CCP used in lieu of cement in concrete, a reduction of one ton of CO2 occurs. Today, about 10 million tons of CO2 emissions are being displaced through the use of CCPs in concrete applications. CCP use also conserves natural resources. By using fly ash instead of portland cement, less cement is produced and fewer natural materials are mined to produce the cement.

Significant economic advantages accrue to producers and end-users of CCPs in terms of avoided landfill disposal costs and displacement of higher-cost materials. Beneficial CCP utilization demonstrates financial and environmental stewardship.

In a ranking of the abundance of mineral commodities, CCPs place third behind sand and gravel and crushed stone, and just ahead of portland cement and iron ore. The abundance of CCPs ensures an adequate, long-term supply for future building material and other applications.

The value of CCPs cannot be overstated - the impact on the nation, the economy and the environment is too important to ignore. Ash use makes good sense.

The American Coal Ash Association (ACAA) is a trade association dedicated to advancing the management and use of coal combustion products (CCPs) in ways that are technically sound, commercially competitive and environmentally safe. ACAA: www.acaa-usa.org.
plants. Knowing that the Foundation needed to upgrade its visitor facilities at Fort Mandan, Christianson came up with the idea to construct the building entirely of coal combustion products. Working with Foundation President David Borlaug, he marshaled the resources of the energy and construction industries, securing in-kind and cash donations to help fund the facility. Members of the Lignite Energy Council were the first to step up with cash donations. Fund-raising efforts continue, with special sponsorship opportunities available, according to Borlaug.

In addition to fly ash and bottom-ash donations, Great River Energy provided one of the lead cash donations to the project. ISG Resources, a Headwaters Company, of Salt Lake City donated all of the FlexCrete, mortar and stucco for the building. The facility is comprised of two round structures, inspired by a Mandan Indian earthlodge design. All of the concrete used in construction included 30-70 percent fly ash.

Other major cash donors to the project have included:

- MDU Resources Group
- Basin Electric Power Cooperative
- Minnkota Power Cooperative
- Westmoreland Coal Company
- Minnesota Power
- BNI Coal
- Otter Tail Power Company
- Industrial Contractors Inc./API Group
- Bucyrus International
- Butler Machinery
- Border States Electric
- Northern Improvement
- Xcel Energy Foundation
- Western Region Ash Group
- Coronado Products

In addition to GRE and ISG, products used in the construction, many of which were donated, included:

- Fly ash-based rock for exterior walls and interior fireplaces from Cultured Stone and Strata Corporation
- Fly ash-based backing on carpeting from Mannington Carpets
- Synthetic gypsum (from sludge) wallboard from Standard Gypsum and Tennessee Valley Authority
- Other CCP products included ceiling tile, ceramic tile and shingles

The story of Lewis and Clark, with its strong multi-cultural message, is drawing the world to North Dakota and Fort Mandan,” says Borlaug. “Now, with this wonderful new facility, those visitors will not only become enlightened by history, they will learn more about the environmental stewardship of the energy and construction industries. This is a great partnership that our Foundation is proud of, and we invite others to join us as we continue our fund-raising efforts.”

For more information on the Fort Mandan Visitor Services Center project, contact David Borlaug at 877-462-8535 or e-mail him at dborlaug@fortmandan.org. More details on the Foundation and its facilities can be found at www.fortmandan.com.
Despite the "Dot.Com Bust", the internet has survived as a viable market place for a vast array of products. Manufacturers, merchants and consumers alike find it to be a convenient and efficient market place for very standardized products.

Similarly in the coal industry, despite the headline grabbing demise of most of the energy trading companies over the last 18 months or so, it appears that the over-the-counter (OTC) market for forward coal contracts and derivatives has survived. However, while OTC market participation by utilities seems to be growing, albeit slowly, there is very limited activity among coal producers.

Inherent in the coal industry are a multitude of factors that result in both price and volumetric risks for coal producers, e.g., variable mining conditions, regulatory uncertainty and weather. One would expect coal producers to embrace the OTC markets, as have their producing counter-parts in the agricultural and petroleum industries. But to date that has not been the case in the domestic coal industry. A coal supplier can, however, use the OTC market and various trading tools to help minimize risk and optimize its production portfolio.

In fact, a producer can utilize the OTC market for the following purposes:

- Manage Price Risk
  - Forward Contracts
  - Options
- Balance Producing System
- Manage Basis
- Price Discovery

A producer is faced with a multitude of challenges, any one of which can mean the difference between a financially successful or dismal year. However, while many are within the producer's control, market prices generally are not. It is possible, however, for a producer to use the OTC markets to serve as a temporary substitute, if not outright replacement, for a portion of the sales for his future production.

For example, a producer may want to take advantage of rising prices by increasing production, either by adding additional shifts or mining units. But, in order to ensure the margin on the increased production, the producer must find a sale for the coal before prices decline. As a temporary substitute for a sale to an end-user, the producer can "lock in" the price utilizing a forward contract on the OTC market. Later, after arranging a sale to an end-user, he can buy an offsetting contract in the OTC market, thereby satisfying his obligations under the original OTC contract. If structured and executed properly, the producer's margin will remain intact, even if prices have fallen by the time the end-user sale is negotiated.

Producers can also use OTC options to manage price risk as an alternative to forward contracts. If a producer believes that prices will continue to rise, but needs to establish a floor price if the market in fact falls, he can purchase a put option with a strike price and contract premium that ensures that the coal can be sold at a minimum of the desired floor price. Normally the contract premiums, which must be paid up front, appear expensive, but similar to insurance claims, will be well worth the expense in a steeply falling market. Producers can also employ more complex strategies, such as selling calls to offset the cost of buying puts, thereby creating a costless collar, to minimize or eliminate the cost of option protection.

Producers may also discover that
- International coal producer and importer

- Mines in every major coal basin able to meet the quality requirements of most utility and industrial customers

- State of the art technology

- Producing in excess of 70 million tons annually
the OTC market provides a ready mechanism to balance variability in supply and demand. During a period in which a producer is faced with production upsets, OTC purchases can be used to supplement supply and meet customer demand. In times of low market prices, the producer may find it actually less expensive to buy coal via OTC contracts than it is to have crews work overtime to meet shortfalls in production. Conversely, a producer may also find it financially advantageous to sell off excess supply via spot OTC contracts, as opposed to stockpiling the coal for later delivery under an existing contract.

Coal companies can also use OTC swaps to take advantage of changes in basis differentials or customer opportunities. For example, a producer with production on the Norfolk Southern, but with a market opportunity on the CSX can use the OTC market to change the "effective" loading point of his coal, by selling the NS and buying CSX contracts. By doing so, the producer has now reduced his long position at his mine, while at the same time, secured the supply on the CSX needed to meet his customer's requirements. Similar pairs transactions can be used to change compliance coal into >1%, rail into barge, etc.

Lastly, the OTC is a very useful and objective tool for developing one's view of forward prices. By dedicating some portion of his production to the OTC market, a producer will tap into an ongoing viable source of bids and offers for his coal. Independent producers without a large sales force might use this approach as a particularly cost-effective method of staying abreast of changing market prices. And for producers of all sizes, OTC pricing will serve as an "arms length" source of price information for use in transacting with the capital markets.

In summary, similar to producers of other "commodity like" products, coal producers can utilize the OTC markets as an efficient and low cost tool to manage a variety of market based tasks, from price risk management to price discovery. Most producers will find that the "standard" OTC contracts don't necessarily conform to their actual product specifications, but still will serve as a valuable tool in their overall marketing plan.

**Alliance Resource Partners, L.P. (ARLP)** is a diversified producer and marketer of coal to major United States utilities and industrial users. ARLP’s predecessor companies began mining operations in 1971 and ARLP has since grown through acquisitions and internal development to become the eighth-largest coal producer in the eastern United States. Alliance Coal: www.arlp.com

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The new Calvert City Terminal (CCT) provides a gateway for receiving, blending and transloading western coals and Illinois Basin coals.

The terminal is a joint project between Southern Coal Handling, a Madisonville, Kentucky-based coal handling, engineering and operations organization, and Ashley Capital, a New York-based investment firm.

The new partnership, known as SCH Services, has made CCT the first of what is expected to be several large-scale bulk-material handling facilities.

CCT, which began operations this past February, is located at Mile 14 on the lower Tennessee River on the Paducah and Louisville Railroad in a large industrial park near Calvert City, Kentucky. This central location provides ready access to BNSF, CNIC, UP, NS and CSX railroads as well as the Tennessee, Cumberland, Ohio and Mississippi rivers.

The stockpile stacking and reclaiming system travels on 1,200 feet of track. Running through the center of the stockpile area, it can stack coal on both sides. The new terminal is also capable of receiving 3,500 tons per hour of rail-delivered coal on a 150-car loop track and has storage capacity in excess of 1 million tons of various quality coals.

With the terminal operating 24/7, SCH already has commitments for throughput of approximately 6 million tons per year. It offers state-of-the-art weighing, blending and sampling equipment. The abilities to blend and reload coal back into railcars and unload and blend coal from barges are additional features that will soon be available.

SCH is marketing the remaining capacity to utilities on the inland river system as a new avenue for receiving PRB and other western coals and for blending coals with Illinois Basin coals. CCT has a long-term contract to transload, stockpile and blend coal for the Tennessee Valley Authority (TVA).

CCT, with its capacity of approximately 10 million tons per year, is actively seeking new customers. Parties interested in the terminal’s services can call (800) 547-9918.
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Computerized Blending

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CCT is an SCH Services Facility. For more information call (800) 547-9918
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American Coal Council

Vision Statement
To be the pre-eminent business voice of the American coal industry.

Mission Statement
The American Coal Council (ACC) is dedicated to advancing the development and utilization of coal as an economic, abundant and environmentally sound energy fuel source. The Association promotes the lawful exchange of ideas and information regarding the coal industry. It serves as an essential resource for companies that mine, sell, trade, transport or consume coal. The ACC provides educational programs, advocacy support, peer-to-peer networking forums and market intelligence that allow members to advance their marketing and management capabilities.

American Coal Council
2003 Events

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<td>May 19-21</td>
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<td>&quot;Coal: The Nation’s Power &amp; Security&quot;</td>
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<td>PRB Coal Use: Risk Management Strategies &amp; Tactics</td>
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American Coal Council
2003 Board of Directors

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Arch Coal, Inc.
ACC President 2003

JIM CAMPBELL
Senior Vice President
Sales & Marketing
Peabody Energy
ACC Vice President Suppliers 2003

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TOM KRAMER
General Manager
KCBX Terminals Company
The American Coal Council (ACC) is proudly celebrating its 21st Anniversary this year!

The ACC’s predecessor organization, the Western Coal Council (WCC), was founded in 1982 as the Western Coal Export Council (WCEC), a private industry trade group formed to promote exports of western U.S. coal to the Pacific Rim. The WCEC grew out of the efforts of a multi-national Task Force formed under the auspices of the Western Governors' Association (WGA). In 1981, that Task Force published a study on "Western U.S. Steam Coal Exports to the Pacific Basin." Three nations - Japan, Taiwan and South Korea - along with more than 40 U.S. companies participated in the study group.

In 1986, the Western Coal Export Council changed its name to the Western Coal Council to more accurately reflect the organization's support for expansion of both foreign and domestic markets for western U.S. coal. The strengths and practices established in those early years - including a broad-based membership, a partnering, non-adversarial approach to business, excellence in educational programming, and an eagerness to work closely with other groups to advocate for the coal industry's interests - continued to foster the WCC's growth and development.

In the Spring of 2002, the WCC undertook the next step in its development as the membership voted overwhelmingly to transition from a regional to a national organization. The American Coal Council (ACC) continues to be dedicated to advancing the development and utilization of coal as an economic, abundant and environmentally sound fuel source. The Association's national focus and its increasingly close ties with national and state organizations and other industry groups will enhance its advocacy efforts in the future.

Our membership base includes coal suppliers, consumers, energy traders, transportation companies, ports and terminals and coal support service firms. Over the last 10 years, the ACC has increased its membership by nearly 500%. Today, the nearly 130 member companies of the American Coal Council have combined their respective voices to serve as the preeminent business voice of the American coal industry.

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<tr>
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<td>Railroad Financial Corporation</td>
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<td>Sandwell Engineering Inc.</td>
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<td>Savage Industries, Inc.</td>
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<td>Sphere Services, Inc.</td>
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<td>Stagg Resource Consultants, Inc.</td>
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<td>TECO Transport Corporation</td>
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<tr>
<td>Waller Lansden Dortch &amp; Davis</td>
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<td>We Energies</td>
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<td>Weir International Mining Consultants</td>
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<td>Western Fuels Association, Inc.</td>
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<td>WPS Resources</td>
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<tr>
<td>Xcel Energy</td>
</tr>
</tbody>
</table>
ACC Members Directory

Fuel Suppliers

Alliance Coal, LLC
PO Box 22027
Tulsa OK 74121-2027
918-295-7617
Fax: 918-295-7360
Gary Rathburn
Sr. Vice President Marketing
gary.rathburn@arlp.com
www.arlp.com

Alliance Coal, LLC
PO Box 22027
Tulsa OK 74121-2027
918-295-7611
Fax: 918-295-7360
Vince Stroud
Vice President Coal Sales
vince.stroud@arlp.com
www.arlp.com

AMCI/Tanoma Energy, Inc.
2137 Vermillion Street
Hastings MN 55033
651-437-9455
Fax: 651-437-9496
Frank Kelly
Manager Business Development
frank.kelly@tanoma.com

AMCI/Tanoma Energy, Inc.
PO Box 839
Price UT 84501
435-637-8650
Fax: 435-637-8653
Ron Ross
GM Western Region
rross@tanoma.com

ANDALEX Resources, Inc.
45 W 10000 S Ste 401
Sandy UT 84070
801-568-8914
Fax: 801-568-8930
Karl E. Yoder
General Manager, Marketing
kyoder@andalex.com
www.andalex.com

Arch Coal, Inc.
City Place One Dr Ste 300
St. Louis MO 63141
314-994-2876
Fax: 314-994-2719
Andy Blumenfeld
Vice President Market Research
ablumenfeld@archcoal.com
www.archcoal.com

Arch Coal, Inc.
for Canyon Fuel Company LLC
One City Place Drive Ste 300
St. Louis MO 63141
314-994-2852
Fax: 314-994-2719
Paul Warner
Regional VP West Region
pwarner@archcoal.com
www.archcoal.com

Bowie Resources, Limited
PO Box 1488
Paonia CO 81428
970-527-7808
Fax: 970-929-5272
Lou Grako
Manager Human Resources
lou_grako@hotmail.com

Bowie Resources, Limited
PO Box 1488
Paonia CO 81428
970-527-7782
Fax: 970-929-5280
Keith Sieber
Senior Vice President - Western Operations
khsbowie@aol.com

CONSOL Energy, Inc.
1800 Washington Road - Consol Plaza
Pittsburgh PA 15241-1421
412-831-4401
Fax: 412-831-4594
Robert Pusateri
Vice President - Sales
bopusateri@consolenergy.com
www.consolenergy.com

Drummond Coal Sales, Inc.
530 Beacon Parkway West
Birmingham, AL 35209
205-945-6410
Fax: 205-945-6440
George E. Wilbanks
President
gewilbanks@drummondco.com
www.drummondco.com

ITOCHU Coal International Inc.
555 Seventeenth Street Ste. 845
Denver CO 80202
303-297-9890
Fax: 303-297-9868
Tsutomu (Tom) Niwa
President & CEO
tsutomu.niwa@itochucoal.com

ITOCHU Coal International Inc.
555 17th St Ste 845
Denver CO 80202
303-297-9890
Fax: 303-297-9868
Dietz Fry
Vice President Finance & Administration
dietz.fry@itochucoal.com

Kennecott Energy Company
505 S Gillette Ave. PO Box 3009
Gillette WY 82717-3009
307-687-6053
Fax: 307-687-6009
Kelly Cosgrove
Vice President Marketing & Sales
cosgrove@kenergy.com
www.kenergy.com

Kennecott Energy Company
505 S Gillette Ave. PO Box 3009
Gillette WY 82717-3009
307-685-6121
Fax: 307-687-6009
Mike Kelley
Director, Trading & Direct Sales
kelleym@kenergy.com
www.kenergy.com

Commonwealth Coal Services, Inc.
5413 Patterson Ave Ste 200
Richmond VA 23226-2023
804-282-9836
Fax: 804-282-9836
Wallace Taylor
Vice President
wallacetaylor@commonwealthcoal.com

Commonwealth Coal Services, Inc.
5413 Patterson Ave Ste 200
Richmond VA 23226-2023
804-282-9822
Fax: 804-282-9836
Robert H. Scott
President
bobscott@commonwealthcoal.com
KFx Inc.
3300 E 1st Ave Ste 290
Denver CO 80206
303-293-2992
Fax: 303-293-8430
Ted Venners
Chairman & CEO
tvenners@kfx.com
www.kfx.com

Kiewit Mining Group, Inc.
1000 Kiewit Plaza
Omaha NE 68131
402-271-2822
Fax: 402-271-2908
Linden Swensen
Vice President
lswensen@kmg.kiewit.com
www.kiewit.com

NexGen Coal Services, Ltd.
3300 S Parker Rd Ste 520
Aurora CO 80014
303-751-9230
Fax: 303-751-9210
Charles McNeil
President
cmneil@nexgen-group.com
www.nexgen-group.com

NexGen Coal Services, Ltd.
500 S Taylor St Unit 246
Amarillo TX 79101-2446
806-371-7341
Fax: 806-371-7528
Jon Kelly
Manager
jonkelly@aol.com
www.nexgen-group.com

Oxbow Carbon & Minerals, Inc.
7901 Southpark Plaza, Suite 202
Littleton, CO 80120
303-795-0413
Fax: 303-795-1524
Jay Bruton
Vice President of Mid West Sales
jay_bruton@denver.oxbow.com
www.oxbow.com

Oxbow Carbon & Minerals, Inc.
7901 S Park Plaza Suite 200
Littleton CO 80120
303-795-0413
Fax: 303-795-1524
Paul Fritzler
VP Operations
paul_fritzler@denver.oxbow.com
www.oxbow.com

Peabody Energy
701 Market St Ste 900
St. Louis MO 63101-1826
314-342-7520
Fax: 314-342-7529
James Campbell, Jr
Sr. Vice President Sales & Marketing
jcampbell@peabodyenergy.com
www.peabodyenergy.com

Pittsburg & Midway Coal Mining Co.
4601 DTC Blvd, Ste 662
303-930-4060
Fax: 303-930-4043
James DeMino
General Manager - Sales
jdemino@chevrontexaco.com
www.chervontexaco.com

Progress Fuels Corporation
410 S. Wilmington Street
Raleigh NC 27601
919-546-7430
Fax: 919-546-7756
Alfred Verardi
Senior Vice President
fred.verardi@pgnmail.com
www.progressfuels.com

RAG energy sales, Inc.
391 Inverness Parkway, Ste 333
Englewood CO 80112
303-749-8434
Fax: 303-749-8449
Bruce Taylor
Vice President Regional Sales
btaylor@rag-american.com
www.rag-american.com

The North American Coal Corporation
14785 Preston Rd Ste 1100
Dallas TX 75254-7891
972-448-5470
Fax: 972-387-1031
Clark A. Moseley
Vice President Business Development Engineering
clark.moseley@nacoal.com
www.nacoal.com

Triton Coal Company, LLC
113 S Gillette Ave Ste 203
Gillette WY 82716
307-687-2062
Fax: 307-687-3178
Steve Sears
Director, Sales and Marketing
Sears@triton-coal.com

Triton Coal Company, LLC
9200 W Cross Dr Ste 321
Littleton CO 80123
303-904-8797
Fax: 303-904-8799
W. Mark Pettibone
Senior Vice President Sales
wmpettibone@prodigy.net

Western Fuels Association, Inc.
The ACC Members Directory contains information on various organizations and their contact details. Here are some excerpts from the directory:

- **American Coal Council**
  - PO Box 33424, Denver CO 80233-3424
  - Fax: 303-450-1042
  - Robert Norrgard, General Manager
    - bob@wfadenver.org
    - www.westernfuels.org

- **Western Fuels Association, Inc.**
  - PO Box 33424, Denver CO 80233
  - Fax: 303-450-1042
  - Murari Shrestha, Director Engineering & Contracts
    - murari@wfadenver.org
    - www.westernfuels.org

- **Westmoreland Coal Company**
  - 2 North Cascade Ave. 14th Fl, Colorado Springs CO 80903
  - Fax: 719-442-5802
  - Todd A. Myers, President
    - todd.myers@westmoreland.com
    - www.westmoreland.com

- **Fuel Consumers**
  - **Alliant Energy**
    - 4902 N Biltmore Ln - PO Box 77007, Madison WI 53707-1007
    - Fax: 608-283-6954
    - John Carr, Manager Fossil Fuel Procurement
      - john carr@alliantenergy.com
      - www.alliantenergy.com

  - **Ameren Energy Fuels & Services Co.**
    - 1901 Chouteau Ave.
    - St. Louis MO 63166-6149
    - Fax: 314-554-4174
    - Mike Mueller, Vice President
      - mike_g.mueller@ameren.com
      - www.ameren.com

  - **American Electric Power**
    - PO Box 16036, Columbus OH 43216-0036
    - Fax: 614-583-1617
    - Mike DeBord, Manager Fuel Procurement
      - smdebor@aep.com
      - www.aep.com

  - **Basin Electric Power Cooperative**
    - 1717 E Interstate Ave
    - Bismarck ND 58503
    - Fax: 701-224-5332
    - Ted Humann, Sr. Vice President Transmission
      - thumann@bepc.com
      - www.basinelectric.com

  - **Basin Electric Power Cooperative**
    - 1717 E Interstate Ave
    - Bismarck ND 58503
    - Fax: 701-223-0441
    - Ted Humann, Sr. Vice President Transmission
      - thumann@bepc.com
      - www.basinelectric.com

  - **Dominion Energy**
    - 5000 Dominion Blvd
    - Glen Allen VA 23060
    - Fax: 804-273-3266
    - Keith Drohan, Director Market Origination
      - keith_drohan@dom.com
      - www.dom.com

  - **DTE Coal Services**
    - 425 S Main Ste 201
    - Ann Arbor MI 48104
    - Fax: 734-994-5842
    - Jim O’Neil, President
      - oneilj@dtecs.com
      - www.dtecs.com

  - **Edison Mission Energy Fuel Services**
    - 440 S. La Salle St. Ste 3500 - One Financial Place
    - Chicago IL 60605
    - Fax: 312-583-6041
    - R Michael Bales, Director Fuels
      - mbales@mwgen.com
      - www.mwgen.com

Mentioned organizations include American Electric Power, Alliant Energy, Ameren Energy Fuels & Services Co., Basin Electric Power Cooperative, Dominion Energy, DTE Coal Services, Edison Mission Energy Fuel Services, and others. Each entry includes the organization’s name, address, phone numbers, and contact information.
<table>
<thead>
<tr>
<th>Company</th>
<th>Address</th>
<th>Phone Numbers</th>
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<tr>
<td>American Coal Council</td>
<td>440 S. La Salle St. Ste 3500</td>
<td>312-583-6068</td>
<td><a href="mailto:lsi@mwgen.com">lsi@mwgen.com</a></td>
<td><a href="http://www.mwgen.com">www.mwgen.com</a></td>
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<tr>
<td>Entergy</td>
<td>1100 White Bluff Rd</td>
<td>501-688-7119</td>
<td><a href="mailto:jmarbur@entergy.com">jmarbur@entergy.com</a></td>
<td><a href="http://www.entergy.com">www.entergy.com</a></td>
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<tr>
<td>Gainesville Regional Utility</td>
<td>PO Box 147117 Station A137</td>
<td>870-698-4950</td>
<td><a href="mailto:alfordkc@gru.com">alfordkc@gru.com</a></td>
<td><a href="http://www.gru.com">www.gru.com</a></td>
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<td>Gainesville Regional Utility</td>
<td>PO Box 147117 Station A137</td>
<td>870-698-4950</td>
<td><a href="mailto:alfordkc@gru.com">alfordkc@gru.com</a></td>
<td><a href="http://www.gru.com">www.gru.com</a></td>
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<tr>
<td>Great River Energy</td>
<td>17845 E Highway 10 - PO Box 800</td>
<td>763-241-2490</td>
<td><a href="mailto:csulzer@grenergy.com">csulzer@grenergy.com</a></td>
<td><a href="http://www.grenergy.com">www.grenergy.com</a></td>
</tr>
<tr>
<td>Jacksonville Electric Authority</td>
<td>21 W. Church St. JEA Tower</td>
<td>904-665-7289</td>
<td><a href="mailto:hoodtj@jea.com">hoodtj@jea.com</a></td>
<td><a href="http://www.jea.com">www.jea.com</a></td>
</tr>
<tr>
<td>Lakeland Electric</td>
<td>501 E Lemon St</td>
<td>863-834-6586</td>
<td><a href="mailto:rsquast@midamerican.com">rsquast@midamerican.com</a></td>
<td><a href="http://www.midamerican.com">www.midamerican.com</a></td>
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<tr>
<td>MidAmerican Energy Company</td>
<td>106 E 2nd St</td>
<td>563-333-8131</td>
<td><a href="mailto:pefreund@midamerican.com">pefreund@midamerican.com</a></td>
<td><a href="http://www.midamerican.com">www.midamerican.com</a></td>
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</tbody>
</table>
ACC Members Directory

American Coal Council

8480 E Orchard Rd Ste 4000
Greenwood Village CO 80111
303-796-8600
Fax: 303-773-0461
Mike Ruffatto
President
mruffatto@napg-ltd.com
www.napg-ltd.com

Omaha Public Power District
444 S 16th St Mall
Omaha NE 68102
402-514-1041
Fax: 402-514-1043
Ronald Boro
Manager Fossil Fuels
rboro@oppd.com
www.oppd.com

Ontario Power Generation
PO Box 2000
Nanticoke ON CANADA N0A 1L0
519-587-2201x3653
Fax: 519-587-4655
Rob Perttula
Dept. Manager - Fuel, Ash & Site Services
robert.perttula@opg.com
www.oppd.com

Orlando Utilities Commission
PO Box 3193
Orlando FL 32802
407-384-4081
Fax: 407-384-4067
Jan Aspuru
Director Fuel Services
jaspuru@ouc.com
www.ouc.com

Orlando Utilities Commission
PO Box 3193
Orlando FL 32802
407-384-4081
Fax: 407-384-4067
Fred Haddad
fhaddad@ouc.com
www.ouc.com

PacifiCorp
201 S Main St Ste 2200
Salt Lake City UT 84111
801-220-4577
Fax: 801-220-4028
Rod Roberts
Manager Engineering/Environmental
roberts.rod_k@pacificorp.com
www.pacificorp.com

Portland General Electric
121 SW Salmon St
Portland OR 97204
503-464-7399
Fax: 503-464-2605
Tom Shewski
Manager, Coal & Transportation
Tom_Shewski@pgn.com
www.portlandgeneral.com

PPL Energy Plus
2 N 9th St - GENN5
Allentown PA 18101
610-744-5500
Fax: 610-774-5141
Ben Stothart
Manager-Coal Supply & Transportation
bestothart@pplweb.com
www.pplweb.com

Progress Energy, Inc.
PO Box 1551
Raleigh NC 27502
919-546-2622
Fax: 919-546-2590
Bud Walker
Manager Coal Procurement
bud.walker@pgnmail.com
www.pplweb.com

Progress Energy, Inc.
PO Box 52025
Phoenix AZ 85072-2025
602-236-4311
Fax: 602-236-4322
Randy Dietrich
Manager Fuels
rgdietri@srpnet.com
www.srpnet.com

Salt River Project
Mail Station POB001 PO Box 52025
Phoenix AZ 85072-2025
602-236-4311
Fax: 602-236-4322
Les Presmyk
Senior Mining Engineer
wpresmy@srpnet.com
www.srpnet.com

Salt River Project
PO Box 52025
Phoenix AZ 85072-2025
602-236-4311
Fax: 602-236-4322
Les Presmyk
Senior Mining Engineer
wpresmy@srpnet.com
www.srpnet.com

Southern Company
PO Box 2641
Birmingham AL 35291-8162
205-257-7228
Fax: 205-257-7795
Ken Jenkins
General Manager
kjenkins@southernco.com
www.southernco.com

Southern Company
PO Box 2641 / 14N-8162
Birmingham AL 35291-8162
205-257-7228
Fax: 205-257-7795
Roger Slater
Senior Fuel Buyer
raslater@southernco.com
www.southernco.com
TransAlta Corp.  
PO Box 1900 Station M  
Calgary AB CANADA T0L 0W0  
403-267-7325  
Fax: 403-267-7202  
Paul Clark  
Director, Fuel Supply  
paul_clark@transalta.com  
www.transalta.com

We Energies  
333 West Everett Street Room A226  
Milwaukee WI 53203  
414-221-2620  
Fax: 414-221-2683  
Klaus Mylotta  
Team Leader Coal  
klaus.mylotta@we-energies.com  
www.we-energies.com

Westar Energy  
818 Kansas Ave PO Box 889  
Topeka KS 66601  
785-575-8140  
Fax: 785-575-8173  
Randall Rahm  
Director - Fuel Services  
randy_rahm@wr.com  
www.wr.com

Xcel Energy  
600 S Tyler #2604  
Amarillo TX 79170  
806-378-2505  
Fax: 806-378-2790  
Karen Roberts  
Regional Manager Coal Supply  
karen.roberts@xcelenergy.com  
www.xcelenergy.com

Energy Traders

Arizona Public Service Company  
PO Box 53999 MS 9831  
Phoenix AZ 85072-3999  
602-250-3350  
Fax: 602-250-3719  
Steven Wellhausen  
Coal Marketer  
swellhau@apsc.com  
www.apsc.com

Arizona Public Service Company  
PO Box 53999 MS 9831  
Phoenix AZ 85072  
602-250-4372  
Fax: 602-250-3719  
Jeff Waltman  
Coal Trader  
z96810@apsc.com  
www.apsc.com

Coal Network, Inc.  
117 W Main St  
Mason OH 45040-1707  
513-398-2625x105  
Fax: 513-398-5419  
Gerald Quitter  
Executive Vice President  
jguitter@uscoalnet.com

Coal Network, Inc.  
117 W Main St  
Mason OH 45040-1707  
513-398-7143  
Fax: 513-398-5419  
Ramesh Malhotra  
President  
rmalhotra@uscoalnet.com

Dynegy Marketing & Trade  
1000 Louisiana St # 5800  
Houston TX 77002  
713-767-6082  
Fax: 713-767-6695  
West Boettger  
Director Energy Marketing  
west.boettger@dynegy.com  
www.dynegy.com

ACC Members Directory
<table>
<thead>
<tr>
<th>Company Name</th>
<th>Address</th>
<th>Phone Number</th>
<th>Fax Number</th>
<th>Contact Person</th>
<th>Email Address</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evolution Markets LLC</td>
<td>10 Bank Street</td>
<td>914-323-0200</td>
<td>914-328-3701</td>
<td>Stephen Nesis</td>
<td><a href="mailto:snesis@evomarkets.com">snesis@evomarkets.com</a></td>
<td><a href="http://www.evomarkets.com">www.evomarkets.com</a></td>
</tr>
<tr>
<td></td>
<td>White Plains NY 10606</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Koch Carbon LLC</td>
<td>20 East Greenway Plaza</td>
<td>713-544-5678</td>
<td>713-544-6052</td>
<td>Brad Speer</td>
<td><a href="mailto:speerb@kochind.com">speerb@kochind.com</a></td>
<td><a href="http://www.kochind.com">www.kochind.com</a></td>
</tr>
<tr>
<td></td>
<td>Houston, TX 77046-2002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millennium Environmental Group, Inc.</td>
<td>Mail Stop UE201; PO Box 711</td>
<td>360-891-0590</td>
<td>360-882-3185</td>
<td>Mike Ferguson</td>
<td><a href="mailto:mferguson@unisourceenergy.com">mferguson@unisourceenergy.com</a></td>
<td><a href="http://www.unisourceenergy.com">www.unisourceenergy.com</a></td>
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<td>Tucson AZ 85702</td>
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<tr>
<td>Natsource, LLC</td>
<td>140 Broadway 30th Fl</td>
<td>212-232-5305</td>
<td>212-232-5353</td>
<td>Rick Thomas</td>
<td><a href="mailto:rthomas@natsource.com">rthomas@natsource.com</a></td>
<td><a href="http://www.natsource.com">www.natsource.com</a></td>
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<td>New York NY 10005</td>
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<td>Prebon Energy, Inc.</td>
<td>101 Hudson St</td>
<td>201-557-5330</td>
<td>201-557-5030</td>
<td>Larry Lacosta</td>
<td><a href="mailto:llacosta@prebon.com">llacosta@prebon.com</a></td>
<td><a href="http://www.prebon.com">www.prebon.com</a></td>
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<td>Jersey City NJ 07302</td>
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<td>SSM Coal Americas, LLC</td>
<td>1221 Lamar Street 7th Fl</td>
<td>713-371-8403</td>
<td>713-371-8160</td>
<td>Charles Routree</td>
<td><a href="mailto:charles.routree@rweamericas.com">charles.routree@rweamericas.com</a></td>
<td><a href="http://www.ssmcoal.com">www.ssmcoal.com</a></td>
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<td>Houston TX 77010</td>
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<tr>
<td>The C. Reiss Coal Company</td>
<td>2525 Harrodsburg Road, Ste 130</td>
<td>859-296-2100</td>
<td>859-224-0782</td>
<td>Fletcher Dennis</td>
<td><a href="mailto:dennisf@kochind.com">dennisf@kochind.com</a></td>
<td><a href="http://www.kochcarbon.com">www.kochcarbon.com</a></td>
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<td>United Power, Inc.</td>
<td>187 Danbury Rd.</td>
<td>203-762-8493</td>
<td>203-761-9525</td>
<td>Ian Tapsall</td>
<td><a href="mailto:itapsall@unitedpwr.com">itapsall@unitedpwr.com</a></td>
<td><a href="http://www.unitedpower.com">www.unitedpower.com</a></td>
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<td>Wilton CT 06897</td>
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<td>United Power, Inc.</td>
<td>5801 Ledgestone Dr.</td>
<td>812-473-5013</td>
<td>812-473-5813</td>
<td>Daniel Vaughn</td>
<td><a href="mailto:dvaughn@upicoal.com">dvaughn@upicoal.com</a></td>
<td><a href="http://www.unitedpower.com">www.unitedpower.com</a></td>
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<td>Evansville IN 47711</td>
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<td>United Power, Inc.</td>
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<td>203-762-8493</td>
<td>203-761-9525</td>
<td>Ian Tapsall</td>
<td><a href="mailto:itapsall@unitedpwr.com">itapsall@unitedpwr.com</a></td>
<td><a href="http://www.unitedpower.com">www.unitedpower.com</a></td>
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<tr>
<td>Burlington Northern Santa Fe Railway Co.</td>
<td>PO Box 961051</td>
<td>203-762-8493</td>
<td>203-761-9525</td>
<td>Ian Tapsall</td>
<td><a href="mailto:itapsall@unitedpwr.com">itapsall@unitedpwr.com</a></td>
<td><a href="http://www.unitedpower.com">www.unitedpower.com</a></td>
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<tr>
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<td>Ft. Worth TX 76161-0051</td>
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<tr>
<td>Canadian National-Illinois Central Railroad</td>
<td>17641 S Ashland Ave</td>
<td>708-647-3888</td>
<td>708-647-3673</td>
<td>William Lyness</td>
<td><a href="mailto:william.lyness@cn.ca">william.lyness@cn.ca</a></td>
<td><a href="http://www.cn.ca">www.cn.ca</a></td>
</tr>
<tr>
<td></td>
<td>Homewood IL 60430-1345</td>
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</table>

**Transportation Companies**

- **Burlington Northern Santa Fe Railway Co.**
  - PO Box 961051
  - Ft. Worth TX 76161-0051
  - 817-867-6242
  - Fax: 817-352-7940
  - Ian Tapsall
  - Manager, Coal Services
dvaughn@unitedpower.com
  www.unitedpower.com

- **United Power, Inc.**
  - 5801 Ledgestone Dr.
  - Evansville IN 47711
  - 812-473-5813
  - Fax: 812-473-5813
  - Daniel Vaughn
  - Manager, Coal Services
dvaughn@upicoal.com
  www.unitedpower.com

- **Canadian National-Illinois Central Railroad**
  - 17641 S Ashland Ave
  - Homewood IL 60430-1345
  - 708-647-3888
  - Fax: 708-647-3673
  - William Lyness
  - Assistant VP Coal (USA)
  - william.lyness@cn.ca
  - www.cn.ca

- **CSX Transportation**
  - 500 Water Street J120
  - Jacksonville FL 32202
  - 904-359-5693
  - Fax: 904-359-3443
  - Chris Jenkins
  - Sr. Vice President - CSG
  - chris_jenkins@csx.com
  - www.csx.com
CSX Transportation
500 Water Street, J842
Jacksonville FL 32202
904-359-3380
Fax: 904-359-4890
Dennis Damron
VP Coal Sales & Marketing
dennis_damron@csx.com
www.csx.com

Dakota, Minnesota & Eastern Railroad Corp.
140 N. Phillips Ave. PO Box 1260
Sioux Falls SD 57101
605-782-1206
Fax: 605-782-1299
Kevin Schieffer
President & CEO
kvs@dmerail.com
www.dmerail.com

Dakota, Minnesota & Eastern Railroad Corp.
140 North Phillips Ave. PO Box 1260
Sioux Falls SD 57101
605-782-1234
Fax: 605-782-1299
Lynn Anderson
Vice President, Marketing
landerson@dmerail.com
www.dmerail.com

Interlake Steamship Company
4199 Kinross Lakes Parkway
Richfield OH 44286
330-659-1402
Fax: 330-659-1445
John Hopkins
Vice President - Marketing
jhopkins@interlake-steamship.com
www.interlake-steamship.com

Kansas City Southern Railway
427 W 12th St Cathedral Square
Kansas City MO 64105
816-983-1944
Fax: 816-983-1637
Jeffrey Sheldon
Assistant Vice President
Jeffrey.D.Sheldon@ksrs.com
www.ksrs.com

Norfolk Southern Corporation
110 Franklin Rd SE
Roanoke VA 24042-0026
540-985-6740
Fax: 540-985-6398
J.W. (Bill) Fox
Sr. VP Coal Services
jwfox@nscorp.com
www.nscorp.com

Norfolk Southern Corporation
2001 Market St 29th Floor
Philadelphia PA 19103
215-209-4243
Fax: 215-209-4240
Ronald Listwak
Assistant VP Utility Coal North
ralistwa@nscorp.com
www.nscorp.com

Savage Industries Inc.
6340 South 3000 E Suite 600
Salt Lake City UT 84121
801-944-6600
Fax: 801-944-6520
Todd Savage
Executive VP Coal & Power Generation
todds@savageind.com
www.savageind.com

Savage Industries Inc.
6340 South 3000 E Suite 600
Salt Lake City UT 84121
801-944-6629
Fax: 801-944-6520
Charlie Monroe
Sr. Vice President Business Development
charliem@savageind.com
www.savageind.com

TECO Transport
PO Box 790
Metropolis IL 62960
618-524-6026
Fax: 618-524-8562
Michael J. Monahan
Vice President
mjmonahan@tecoenergy.com
www.tecoenergy.com

Union Pacific Railroad Company
1416 Dodge St Rm 500
Omaha NE 68179
402-271-6272
Fax: 402-271-3378
Lance Fritz
Vice President & General Manager
lfritz@up.com
www.up.com

Union Pacific Railroad Company
1416 Dodge St Rm 500
Omaha NE 68179
402-271-6272
Fax: 402-271-3378
James Lorenz
Sr. Business Manager Energy
jalorenz@up.com
www.up.com

Ports & Terminals

AEP/Cook Coal Terminal
PO Box 870
Metropolis IL 62960
618-524-9345
Fax: 618-524-2031
Thomas Anderson
Manager
Thomas_A._Anderson@aep.com
www.aep.com

Cahokia Marine Services
1441 Hampton Ave
St. Louis MO 63139
314-647-7529
Fax: 314-647-5240
John Brereton
VP Marketing
cmsterminal@compuserve.com
www.slay.com
## ACC Members Directory

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Address</th>
<th>Phone</th>
<th>Fax</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cahokia Marine Services</td>
<td>1441 Hampton Ave</td>
<td>St. Louis MO 63139</td>
<td>314-647-7529</td>
<td>Glen Slay</td>
</tr>
<tr>
<td>Midwest Energy Resources</td>
<td>PO Box 787 W Winter &amp; Abex Road</td>
<td>Superior WI 54880</td>
<td>715-395-3506</td>
<td>Daniel McDonald</td>
</tr>
<tr>
<td>KCBX Terminals Company</td>
<td>3259 E 100th St</td>
<td>Chicago IL 60617</td>
<td>773-375-3700</td>
<td>Tom Kramer</td>
</tr>
<tr>
<td>Kinder Morgan Bulk Terminals, Inc.</td>
<td>1801 Milford St</td>
<td>Charleston SC 29405</td>
<td>843-722-2878</td>
<td>Michael Ferguson</td>
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<tr>
<td>Westshore Terminals Ltd.</td>
<td>1 Roberts Bank</td>
<td>Delta BC CANADA V4M 4G5</td>
<td>604-946-3400</td>
<td>John Hogg</td>
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<tr>
<td>Orba-Johnson Transshipment Co.</td>
<td>3254 Mississippi River Rd</td>
<td>Keokuk IA 52632</td>
<td>319-524-6841</td>
<td>W. Breen Turley</td>
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<tr>
<td>SCH Terminal Co., Inc.</td>
<td>2850 N. Main Street</td>
<td>Madisonville KY 42431</td>
<td>423-899-0591</td>
<td>Gary Quinn</td>
</tr>
<tr>
<td>SCH Terminal Co., Inc.</td>
<td>2850 N. Main Street</td>
<td>Madisonville KY 42431</td>
<td>270-821-5149x131</td>
<td>Bill Rager</td>
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<tr>
<td>Thunder Bay Terminals Ltd.</td>
<td>95 St Clair Avenue West, Suite 1101</td>
<td>Toronto ON CANADA M4V 1N6</td>
<td>416-515-7449</td>
<td>Hilary Goldenberg</td>
</tr>
<tr>
<td>WorldPort Los Angeles</td>
<td>425 S Palos Verdes St; PO Box 151</td>
<td>San Pedro CA 90733-0151</td>
<td>310-732-3870</td>
<td>Jim MacLellan</td>
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<td>Coal Support Services</td>
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<td>ADA Environmental Solutions, Inc.</td>
<td>8100 SouthPark Way Unit B</td>
<td>Littleton CO 80120</td>
<td>303-734-1727</td>
<td>Ronda Zivalich</td>
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<tr>
<td>Name</td>
<td>Address</td>
<td>Phone</td>
<td>Fax</td>
<td>Email</td>
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<td><strong>Charah Environmental, Inc.</strong></td>
<td>PO Box 813&lt;br&gt;Madisonville KY 42431&lt;br&gt;270-825-3677&lt;br&gt;Fax: 270-821-6364</td>
<td>Malcolm Thomas&lt;br&gt;Executive Vice President</td>
<td><a href="mailto:mthomas@charah.com">mthomas@charah.com</a>&lt;br&gt;www.charah.com</td>
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<td><strong>Commercial Testing &amp; Engineering Company SGS</strong></td>
<td>4665 Paris St B-200&lt;br&gt;Denver CO 80239-3117&lt;br&gt;303-373-4772&lt;br&gt;Fax: 303-373-4884</td>
<td>Lloyd Taylor&lt;br&gt;President &amp; CEO</td>
<td><a href="mailto:lloyd.taylor@sgs.com">lloyd.taylor@sgs.com</a>&lt;br&gt;www.sgs.com</td>
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<td><strong>Standard Laboratories, Inc.</strong></td>
<td>7072 Salt Creek Rte #8&lt;br&gt;Casper WY 82601&lt;br&gt;307-234-9957&lt;br&gt;Fax: 307-234-0013</td>
<td>Steve Miladinovich, Jr.&lt;br&gt;Western Division Manager</td>
<td><a href="mailto:smiladinovich@standardlabs.com">smiladinovich@standardlabs.com</a>&lt;br&gt;www.standardlabs.com</td>
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<tr>
<td><strong>Coal Support Services Equipment &amp; Materials Suppliers</strong></td>
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<td><strong>ALSTOM Power, Performance Projects</strong></td>
<td>2000 Day Hill Rd&lt;br&gt;Windsor CT 06095&lt;br&gt;860-285-5012&lt;br&gt;Fax: 860-285-9676&lt;br&gt;Dave O’Neill&lt;br&gt;General Manager</td>
<td>Dave O’Neill&lt;br&gt;General Manager</td>
<td>dave.o'<a href="mailto:neill@power.alstom.com">neill@power.alstom.com</a>&lt;br&gt;www.power.alstom.com</td>
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<td><strong>David J. Joseph Company</strong></td>
<td>300 Pike St&lt;br&gt;Cincinnati OH 45202&lt;br&gt;513-621-8770&lt;br&gt;Fax: 513-345-4374&lt;br&gt;Trey Savage&lt;br&gt;Regional Manager</td>
<td>Trey Savage&lt;br&gt;Regional Manager</td>
<td><a href="mailto:tsavage@jjoseph.com">tsavage@jjoseph.com</a>&lt;br&gt;www.djj.com</td>
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<td><strong>Fuel Tech, Inc.</strong></td>
<td>512 Kingsland Dr&lt;br&gt;Batavia IL 60510&lt;br&gt;630-845-4461&lt;br&gt;Fax: 630-845-4501&lt;br&gt;Chris Smyrniotis&lt;br&gt;Director Marketing &amp; Technology</td>
<td>Chris Smyrniotis&lt;br&gt;Director Marketing &amp; Technology</td>
<td><a href="mailto:csmyrniotis@fueltechnv.com">csmyrniotis@fueltechnv.com</a>&lt;br&gt;www.fueltechnv.com</td>
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<td><strong>GE Betz</strong></td>
<td>4636 Somerton Rd&lt;br&gt;Trevose PA 19053-6783&lt;br&gt;215-942-3494&lt;br&gt;Fax: 215-953-5757&lt;br&gt;Bryce Uytiepo, PE&lt;br&gt;Sr. Project Engineer</td>
<td>Bryce Uytiepo, PE&lt;br&gt;Sr. Project Engineer</td>
<td><a href="mailto:bryce.a.uytiepo@betzdearborn.com">bryce.a.uytiepo@betzdearborn.com</a>&lt;br&gt;www.gebetz.com</td>
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<td><strong>Johnstown America Industries</strong></td>
<td>20 N Wacker Dr Ste 2200&lt;br&gt;Chicago IL 60606&lt;br&gt;312-516-2900&lt;br&gt;Fax: 312-516-2909&lt;br&gt;Ed Whalen&lt;br&gt;Vice President</td>
<td>Ed Whalen&lt;br&gt;Vice President</td>
<td><a href="mailto:ed.whalen@jacorp.com">ed.whalen@jacorp.com</a>&lt;br&gt;www.johnstownamerica.com</td>
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<td><strong>Metro East Industries, Inc.</strong></td>
<td>P.O. Box 3220&lt;br&gt;Fairview Heights IL 62208&lt;br&gt;618-271-7210&lt;br&gt;Fax: 618-874-3785&lt;br&gt;Walt Andrews&lt;br&gt;Vice President</td>
<td>Walt Andrews&lt;br&gt;Vice President</td>
<td><a href="mailto:wjamei@aol.com">wjamei@aol.com</a></td>
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<td><strong>ONDEO Nalco Company</strong></td>
<td>Ondeo Nalco Center&lt;br&gt;Naperville IL 60563-1439&lt;br&gt;630-305-2464&lt;br&gt;Fax: 630-305-2879&lt;br&gt;David Macedon&lt;br&gt;Product Manager</td>
<td>David Macedon&lt;br&gt;Product Manager</td>
<td><a href="mailto:dmacedon@ondeo-nalco.com">dmacedon@ondeo-nalco.com</a>&lt;br&gt;www.ondeo-nalco.com</td>
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<td><strong>ORICA USA Inc.</strong></td>
<td>33101 East Quincy Avenue&lt;br&gt;Watkins, CO 80137&lt;br&gt;303-268-5034&lt;br&gt;Fax: 303-268-5134&lt;br&gt;David Bullis&lt;br&gt;Director, Nitrogen Products - Americas</td>
<td>David Bullis&lt;br&gt;Director, Nitrogen Products - Americas</td>
<td><a href="mailto:david.bullis@orica.com">david.bullis@orica.com</a>&lt;br&gt;www.oricaexplosives.com</td>
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<td><strong>Sphere Services, Inc.</strong></td>
<td>123 Leinart St Ste 205&lt;br&gt;Clinton TN 37716&lt;br&gt;865-388-0921&lt;br&gt;Fax: 865-463-2491&lt;br&gt;Tracy Wandell&lt;br&gt;President</td>
<td>Tracy Wandell&lt;br&gt;President</td>
<td><a href="mailto:tracy@sphereservices.com">tracy@sphereservices.com</a>&lt;br&gt;www.sphereservices.com</td>
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</table>
Sphere Services, Inc.
123 Leinart St Ste 205
Clinton TN 37716
865-388-1346
Fax: 865-463-2491
Mark Lane
Vice President
mark@sphereservices.com
www.sphereservices.com

The Raring Corporation
12117 NE 99th St Ste 1920
Vancouver WA 98682
360-892-1659
Fax: 360-892-1624
David Raring
President
draring@raringcorp.com
www.raringcorp.com

Kathleen Putek
Office Manager
kputek@raringcorp.com
www.raringcorp.com

CIT Rail Resources
1211 Ave of the Americas
New York NY 10036
212-536-9333
Fax: 212-536-9397
Steve McClure
President
stephen.mcclure@cit.com
www.cit.com

Bill O'Brien
Assistant Vice President
william.obrien@cit.com
www.cit.com

DTE Rail Services
350 Indiana St Ste 600
Golden CO 80401
303-216-4264
Fax: 303-216-4281
John Pfisterer
President
pfister@dtets.com
www.dtets.com

ISG Resources, Inc.
10653 S Riverfront Parkway, Ste 300
South Jordan UT 84095
801-984-9400
Fax: 801-984-9410
R. Steve Creamer
Chairman & CEO
screamer@isgresources.com
www.isgresources.com

Coal Support Services
Financial Capital & Marketing Associates

Boral Material Technologies
45 NE Loop 410 Ste 700
San Antonio TX 78216
210-349-4069
Fax: 210-349-8512
Harry Roof
Manager Utility Relations
harry.roof@boral.com
www.boral.com

CIT Rail Resources
1211 Ave of the Americas
New York NY 10036
212-536-9333
Fax: 212-536-9397
Steve McClure
President
stephen.mcclure@cit.com
www.cit.com

DTE Rail Services
350 Indiana St Ste 600
Golden CO 80401
303-216-4264
Fax: 303-216-4281
John Pfisterer
President
pfister@dtets.com
www.dtets.com

DTE Rail Services
350 Indiana St Ste 600
Golden CO 80401
303-216-4264
Fax: 303-216-4282
Nick Keys
Director Sales
nkeys@dtets.com
www.dtets.com

GE Capital Rail Services
161 N Clark St
Chicago IL 60601
312-853-5232
Fax: 312-853-5494
Ann Hoffmann
Director Market Development
ann.hoffmann@ge.com
www.gecapital.com

GE Capital Rail Services
161 N Clark St 7th Fl
Chicago IL 60601
312-853-5935
Fax: 312-853-5023
James Zoellick
Asset Manager
james.zoellick@ge.com
www.gecapital.com

Great Northern Power
Development L.P.
Great Northern Properties L.P.
1658 Cole Blvd Ste 260
Golden CO 80401
303-235-8242
Fax: 303-235-8244
Gerald (Jerry) E. Vaninetti
President
vaninetti@gr-northern.com

Helm Financial Corporation
One Embarcadero Center Ste 3700
San Francisco CA 94111
415-398-4510x316
Fax: 415-398-4816
Ed Garvey
Sr. Vice President
mzuercher@hlmx.com
www.hlmx.com

ISG Resources, Inc.
10653 S Riverfront Parkway, Ste 300
South Jordan UT 84095
801-984-9400
Fax: 801-984-9410
R. Steve Creamer
Chairman & CEO
screamer@isgresources.com
www.isgresources.com
ISG Resources, Inc.
10653 S Riverfront Parkway, Ste 300
South Jordan UT 84095
801-984-9441
Fax: 801-984-9410
John Ward
VP Marketing & Communications
jward@isgresources.com
www.isgresources.com

PNC Bank, N.A.
249 Fifth Ave
Pittsburgh PA 15222-2707
412-762-2540
Fax: 412-705-3232
Christopher Moravec
Senior Vice President
christopher.moravec@pncbank.com
www.pncbank.com

PricewaterhouseCoopers LLP
1850 N Central Ave, #700
Phoenix AZ 85004-4545
602-364-8193
Fax: 602-364-8005
Steve Ralbovsky
steve.ralbovsky@us.pwcglobal.com
www.pwcglobal.com

Railroad Financial Corporation
676 N. Michigan Ave, Suite 2800
Chicago IL 60611
312-222-1383
Fax: 312-222-1470
Anthony Kruglinski
President
tkruglinski@railfin.com

Railroad Financial Corporation
676 N. Michigan Avenue, #2800
Chicago IL 60611
312-222-1383
Fax: 312-222-1470
David Nahass
Senior Vice President
dnahass@railfin.com

Coal Support Services Technical & Economic Consultants

Air Control Science, Inc.
6560 Odell Pl
Boulder CO 80301
303-530-2985
Fax: 303-530-7208
Peter Fischer
Vice President
ptfischer@aol.com
www.airscience.com

Air Control Science, Inc.
6560 Odell Pl
Boulder CO 80301
303-530-2985
Fax: 303-530-7208
John Fischer
CEO & President
jfischer@solid-system.com
www.airscience.com

Black & Veatch
11401 Lamar Ave
Overland Park KS 66211
913-458-9740
Fax: 913-458-2934
April Anderson-Higgs
Fuels Consulting Project Manager
anderson-higgsaa@bv.com
www.bv.com

Black & Veatch
11401 Lamar Ave
Overland Park KS 66211
913-458-4606
Fax: 913-458-2934
Gene King
Marketing Specialist
kingg@bv.com
www.bv.com

Coal Combustion, Inc.
340 South Broadway, Ste 101
Lexington KY 40508
859-258-9595
Fax: 859-243-0210
Rod Hatt
President
rodhatt@compuserve.com

Coal Combustion Inc.
340 South Broadway Ste. 101
Lexington KY 40508
859-258-9595
Fax: 859-243-0210
Dave Kessler
Vice President
davekessler@msn.com

Hazen Research, Inc.
4601 Indiana St
Golden CO 80403
303-279-4501
Fax: 303-278-1528
Robert Reeves
Sr. Project Manager
reevesra@hazenusa.com
www.hazenusa.com

Hazen Research, Inc.
4601 Indiana St
Golden CO 80403
303-279-4501
Fax: 303-279-1528
Charles W. (Rick) Kenney
Vice President
kenneycw@hazenusa.com
www.hazenusa.com

Hellerworx, Inc.
4803 Falstone Avenue
Chevy Chase, MD 20815
301-654-180 Cell: 202-425-3524
Fax: 301-718-1878
Jamie Heller
President
jamie@hellerworx.com
www.hellerworx.com

Hill & Associates, Inc.
PO Box 3475
Annapolis MD 21403
410-263-6616
Fax: 410-268-0923
Jeff Watkins
President
jwatkins@hillandassociates.com
www.hillandassociates.com

Hill & Associates, Inc.
PO Box 3475
Annapolis MD 21403
410-263-6616
Fax: 410-268-0923
Forrest Hill
Chairman
f.hill@hillandassoc.com
www.hillandassoc.com

International Strategic Information Services
207 High St
Newburyport MA 01950-3828
978-462-2733
Fax: 978-465-4395
Manfred Raschke
President
isis@isisnbpt.com

John T. Boyd Company
1500 Corporate Drive Suite 100
Canonsburg PA 15317
724-873-4454
Fax: 724-873-4401
James J. Schaeffer, Jr.
Vice President
jjs@jtboyd.com
www.jtboyd.com

Marston & Marston
3300 Nacogdoches Rd Ste 115
San Antonio TX 78217
210-655-1185
Fax: 210-655-0818
Kip Bate
Vice President & Senior Geological Consultant
kwilliams@marston.com
www.marston.com

Marston & Marston
13515 Barrett Parkway Dr. Ste 260
St Louis MO 63021
314-984-8800
Fax: 314-984-8770
Bill Meister
Senior Vice President & Senior Mining Consultant
bmeister@marston.com
www.marston.com

MRC Rail Services, LLC
5215 Old Orchard Road Ste 505
Skokie IL 60077
847-581-3832
Fax: 847-581-3831
Michihiro Nose
President
mnose@mrc-rail.com
www.mrc-rail.com

MRC Rail Services, LLC
5215 Old Orchard Road
Skokie IL 60077
847-581-3833
Fax: 847-581-3831
Harry Zander
Vice President, Sales & Marketing
hzander@mrc-rail.com
www.mrc-rail.com

Norwest Corporation
136 E South Temple 12th Fl
Salt Lake City UT 84111
801-539-0044
Fax: 801-539-0055
Donovan Symonds
President
dsymonds@norwestcorp.com
www.norwestcorp.com

Norwest Corporation
136 E South Temple 12th Fl
Salt Lake City UT 84111
801-539-0044
Fax: 801-539-0055
Kirk Weber
VP Business Development
kweber@norwestcorp.com
www.norwestcorp.com

PA Consulting Group
1750 Pennsylvania Ave NW Ste 1000
Washington DC 20006
202-442-2543 Cell: 703-628-7217
Fax: 202-442-2448
Jerry M. Eyster
Jerry.Eyster@paconsulting.com
www.paconsulting.com

Pincock, Allen & Holt
274 Union Blvd Ste 200
Lakewood CO 80228
303-986-6950
Fax: 303-987-8907
John Kyle
Sr. Mine Engineer

Platts Research & Consulting/RDI
3333 Walnut St.
Boulder CO 80301
720-548-5487
Fax: 720-548-5100
Betsy Vaninetti
Senior Consultant
betsy_vaninetti@platts.com
www.platts.com

Platts Research & Consulting/RDI
3333 Walnut St.
Boulder CO 80301
720-548-5515
Fax: 720-548-5100
Ellen Ewart
Principal
ellen_ewart@platts.com
www.platts.com

Roberts & Schaefer Company
5225 Wiley Post Way, #300
Salt Lake City UT 84116
801-364-0900 Cell: 801-560-3595
Fax: 801-364-0909
Mark Collett
Vice President Project Development
markc@eni.com
www.rs.com

Roberts & Schaefer Company
5225 Wiley Post Way, #300
Salt Lake City UT 84116
801-364-0900
Fax: 801-364-0909
Joel Grace
Project Manager
joelg@eni.com
www.rs.com
Sandwell Engineering, Inc.
2690 Cumberland Parkway, Suite 300
Atlanta GA 30339
770-437-7727
Fax: 770-319-1961
Chris Hoover
VP Transportation & Industrial Facilities
choover@sandwell.com
www.sandwell.com

Sandwell Engineering, Inc.
700-1045 Howe Street
Vancouver BC CANADA V6Z 2A9
604-684-9311
Fax: 604-685-7946
Gordon Zonailo
VP Engineering & Technology
gzonailo@sandwell.com
www.sandwell.com

Stagg Resource Consultants, Inc.
5457 Big Tyler Rd PO Box 7028
Cross Lanes WV 25356
304-776-6660
Fax: 304-776-7867
Alan Stagg
President
astagg_stagg@charterbn.com
www.sesiusa.com

Troutman Sanders LLP
401 9th St NW Ste 1000
Washington DC 20004-2134
202-274-2959
Fax: 202-654-5603
John Molm
jrm@troutmansanders.com
www.troutmansanders.com

Troutman Sanders LLP
401 9th St NW Ste 1000
Washington DC 20004-2134
202-274-2957
Fax: 202-654-5603
Sandra Brown
sandra.brown@troutmansanders.com
www.troutmansanders.com

Waller Lansden Dortch & Davis, PLLC
511 Union Street, Suite 2100
Nashville TN 37219
615-850-8876
Fax: 615-244-6804
Michael Stagg
Attorney
mstagg@wallerlaw.com
www.wallerlaw.com

Weir International Mining Consultants
1431 Opus Pl Ste 210
Downers Grove IL 60515
630-968-5400
Fax: 630-968-5401
Dennis Kostic
President & CEO
dkostic@weirimc.com
www.weirimc.com

Weir International Mining Consultants
1431 Opus Pl Ste 210
Downers Grove IL 60515
630-968-5400
Fax: 630-968-5401
John W. Sabo
Senior Vice President
jsabo@weirimc.com
www.weirimc.com

Center for Energy & Economic Development (CEED)
PO Box 288
Franktown CO 80116
303-814-8714
Fax: 303-814-8716
Terry Ross
VP West Region
tross@ceednet.org
www.ceednet.org

Western Region Ash Group (WRAG)
ISG Resources, Inc.
950 Andover Park E #24
Tukwila WA 98188
206-394-1364
Fax: 206-394-1366
Richard Halverson
rhalverson@isgresources.com
www.wrashg.org

Western Region Ash Group (WRAG)
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501
701-222-7804
Fax: 701-222-4875
Duane Steen
Administration & Project Manager
duane.steen@mdu.com

www.wrashg.org

Walters & Joyce PC
2015 York Street
Denver, CO 80205
303-322-1404
Fax: 303-377-5668
Bill Walters
bwalters@waltersjoyce.com

American Coal Council
Holliday Building, Suite 18
5765 Old Wadsworth Blvd.
Arvada, CO 80002
303-431-1456
303-431-1606
Janet Gellici
info@americancoalcouncil.org
www.americancoalcouncil.org

American Coal Council
Holliday Building, Suite 18
5765 Old Wadsworth Blvd.
Arvada, CO 80002
303-431-1626
Fax: 303-431-1606
Linda Bernson
lbernsen@americancoalcouncil.org
www.americancoalcouncil.org

ACC Executive Director
American Coal Council
Holliday Building, Suite 18
5765 Old Wadsworth Blvd.
Arvada, CO 80002
303-431-1626
Fax: 303-431-1606
Linda Bernson
lbernsen@americancoalcouncil.org
www.americancoalcouncil.org

ACC Conference Coordinator
American Coal Council
Holliday Building, Suite 18
5765 Old Wadsworth Blvd.
Arvada, CO 80002
303-431-1626
Fax: 303-431-1606
Linda Bernson
lbernsen@americancoalcouncil.org
www.americancoalcouncil.org

Contributing Supporters

Center for Energy & Economic Development (CEED)
PO Box 288
Franktown CO 80116
303-814-8714
Fax: 303-814-8716
Terry Ross
VP West Region
tross@ceednet.org
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**Roberts & Schaefer Company**

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Salt Lake City, UT 84116
801-364-0900 phone
801-364-0909 fax
www.r-s.com
markc@eni.com