ENERGY OUTLOOK

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A WORD FROM THE NEW DIRECTOR

Dr. Malcolm J. McPherson

The VCCER has been through some turbulent times over the past few years. In August of 1995, the previous Director, Dr. John Randolph, resigned in order to become Head of the Department of Urban Affairs and Planning at Virginia Tech. The Center owes a great debt to Dr. Randolph for his nearly ten years of dedicated service as Director. He was joined by Associate Director Dr. Carl E. Zipper on July 1, 1989. Their partnership produced multiple studies and reports of significant importance, with lasting impacts on the coal and energy industries in the Commonwealth.

As has been the case for many other state-financed organizations, however, funding for the VCCER has been reduced significantly over recent years. This has necessitated a streamlining of operations and a restructuring of Center staffing. This difficult task was undertaken primarily by Dr. Michael Karmis, Head of the Department of Mining and Minerals Engineering at Tech, who took over as Interim Director until my appointment on July 1, 1996. Dr. Karmis also negotiated the move from the Center's long-term but expensive, rented accommodations to a spacious and convenient space on the campus of Virginia Tech.

The VCCER staff. Back row - Carl Zipper, Malcolm J. McPherson, Ian Loomis; front row - Lisa Blankenship, Johanna Jones.

Now we turn our faces to the future with renewed optimism and confidence. The article which follows provides additional information on the background of our reorganization - but first, allow me to offer my own introduction to the new team. Although our office will be manned throughout normal working hours, we are all part-timers - a consequence of the financial constraints under which we now operate. I am delighted that Dr. Zipper will continue as Associate Director. Carl's outstanding work with the VCCER and the Powell River Project has resulted in his attaining a well-earned and excellent reputation in the coalfields. That reputation also continues to reflect on the standing of the Center.

Johanna Jones, our award-winning author of many past Energy Outlook articles, also continues with us, albeit on a reduced basis. Like Carl, Johanna is proving invaluable in maintaining continuity during this transitional period. Also, in addition to myself, we have two new members of our staff. Research Associate Ian M. Loomis has a background in mining engineering, and spent several years in the nuclear-waste-repository business before coming to Virginia Tech in order to pursue advanced degrees. He is in the final stages of his Ph.D. work, and will not officially commence his appointment at the Center until January 1, 1997. Lisa Blankenship of the Department of Mining and Minerals Engineering has also joined the team, providing not only secretarial support but also an invaluable knowledge of 'how to get things done at Virginia Tech.' Unfortu-

Virginia Tech
VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

nately, we also have lost a past member of staff; Barbara Johnson has joined the administrative staff of the Research and Graduate Studies Group at Tech. Always a popular member of the VCCER team, we wish her well in her new position.

So what does all of this restructuring mean in terms of the future role and emphasis of the Center? This is a question to which we are giving a great deal of attention. Fortunately, we are not alone in our efforts to find the answers. The VCCER has an Advisory Board, appointed by the Virginia Tech Board of Visitors and comprised of high-level representatives of the coal, energy and transportation industries, state agencies and academia. This summer, I am spending time visiting as many Board Members as I can in their own offices, in order to discuss this question and to solicit their views on the ongoing work of the Center.

Using the input from those meetings, we are already in the process of developing operational plans. Our goals at this point are necessarily preliminary, but there is one thing is that is certain. We shall continue to be faithful to the mission of the VCCER, as outlined in the following article, and responsive to issues relating to coal and energy that are raised within the Commonwealth. We believe in the importance of the Center to Virginia, and look forward to meeting the challenges ahead.

VCCER REORGANIZED

Johanna Jones
Publications and Information Director

Created by an Act of the Virginia General Assembly in 1977, the Virginia Center for Coal and Energy Research (VCCER) was envisioned as an important "interdisciplinary study, research, information and resource facility for the Commonwealth of Virginia." Served first by director Dr. Walter Hibbard, who was succeeded by Dr. John Randolph in 1988 and by Interim Director Dr. Michael Karmis after Randolph's resignation in 1995, the Center continues to function in that capacity. In recent years, important research on coal mining, electrical-power transmission, and weatherization of low-income homes has shared the spotlight with such pursuits as an analysis of household water supply impacts on underground mining, and the use of solar-powered energy sources at state agencies. Amendments to Virginia's Gas and Oil Act were the direct result of a study conducted last year, while the most recent VCCER research report, "Effects of Virginia Employment Enhancement Tax Credit Legislation," played a significant role in determining the economic future of the Commonwealth's historically vital coal industry.

Now, the leadership of the VCCER will be undertaken by Dr. Malcolm McPherson, A. T. Massey Professor of Mining and Minerals Engineering and a member of Virginia Tech's Department of Mining and Minerals Engineering faculty since 1992. Dr. McPherson received his doctoral degree from the University of Nottingham, England, and is one of the world's foremost authorities on mine ventilation. Continuing as Associate VCCER Director will be Dr. Carl Zipper, who has held that position since 1989. Also functioning as Associate Director for the Powell River Project, Dr. Zipper's broad areas of expertise include land reclamation, resource economics and environmental policy. He is on the faculty of Virginia Tech's Department of Crop and Soil Environmental Sciences.

A new addition to the VCCER staff is Research Associate Ian M. Loomis, who holds an M.S. degree from Virginia Tech's Department of Mining and Minerals Engineering and will soon complete his Ph.D. dissertation, "Recovery Enhancement of Coalbed Methane." Ian worked for five years as a mining engineer at the Waste Isolation Pilot Plant for underground storage of defense-related nuclear waste in New Mexico. Center publications will continue to be overseen by yours truly - Johanna Jones, a six-year veteran of the VCCER - with secretarial support to be provided by Lisa Blankenship.

Derived from its legislative mandate and almost 20 years of experience, the mission of the VCCER will continue to involve three primary functions: to conduct research on interdisciplinary coal and energy issues of importance to the Commonwealth; to coordinate coal and energy research at Virginia Tech; and to disseminate coal and energy statistics and research information to users of these resources throughout the state. The VCCER will remain unbiased, nonpartisan, and dedicated to coal- and energy-related research that can be utilized in a number of ways by a diversity of entities. Specific new directions, however, are foreseen as well.

To begin with, the Center will join the electronic age, initiating a site on the World Wide Web within the next year. This site, as yet unnamed, will eventually allow the VCCER to make all of its publications and research available on-line. (Center publications include the popular annual *Virginia Coal,* a complete data reference for all of the state's licensed mines and natural-gas information.) New research projects are in the offing as well, with areas of potential future study including the coke trade and the effects of advancements in coal-mining technology. Meanwhile, VCCER research into SO_x trading emissions under the Clean Air Act is ongoing, and results will be available shortly.

The Virginia Center for Coal and Energy Research has been repeatedly challenged over the last half-decade by budget shortfalls at the state level, necessitating difficult administrative decisions and the reprioritizing of many Center activities. As the VCCER moves into a new era, however, it is hoped that much of this uncertainty is in the past. Over the next several months, the Center staff will be relocating into a spacious new office suite in Virginia Tech's Femoyer Hall. Mail can be addressed to VCCER, Virginia Tech, Blacksburg, VA 24061-0411, and the Center can be reached by telephone at either (540) 231-5038 or (540) 231-8108.

COAL SHOW:
HIGHLIGHTS FROM RICHLANDS

Cosponsored annually by the Virginia Coal Council and the Richlands (Virginia) Chamber of Commerce, the Richlands Coal Show offers opportunities to those involved with the coal industry to interact, socialize, and - perhaps most importantly - to find out about the latest coal-related developments in mine operation, research and legislation. This July's successful, three-day gathering on the campus of Southwest Virginia Community College was no exception. While exhibitors showed off the newest innovations in mining, coal-production and processing equipment, meetings of the Remining Ad Hoc Committee of the Virginia Department of Mines, Minerals and Energy, the Powell River Project Advisory Committee, and subcommittees of both the Virginia Department of Economic Development and the Virginia Coal and Energy Commission discussed events of the past year, and considered new initiatives.

Located in the heart of the southwestern Virginia, the small, closely knit town of Richlands is considered by many to be the perfect site for this annual gathering; the natural camaraderie of those who have made their lives in the coalfields is supplemented by a serious dedication to the coal industry, extending all the way to Richmond and beyond. Although the Richlands show, as always, allowed participants such enjoyable diversions as a golf tournament at the Tazewell Country Club and a special Friday night "Coal Miners' Shrimp Fest Party," there were also paper sessions featuring presentations on such topics as international coal markets, improving current mining and remining methods, and clean-air power initiatives. Some of these talks became serious debates between those with different hopes for the future of coal.

The two administrators of the Virginia Center for Coal and Energy Research, Malcolm McPherson and Carl Zipper, both brought the benefits of their work and experience to the Richlands Coal Show. Dr. McPherson, in his discussion of "Underground Coal Mining Systems for the 21st Century," presented the 2000+ System, a plan for mining deep, thin-seam coal which provides enough flexibility to handle multiple geological variations, an ability to consistently maximize output, and which aims to eliminate virtually all effects on the surface environment. Suggesting that his audience "stand back and take a new look" at the mining of deep coal, McPherson noted that the development of room-and-pillar and longwall mining methods has been gradual and incremental, while the mining systems of the future "are unlikely to resemble anything" in use today. Among the interesting features of the 2000+ mining system, he explained, are mining and back-stowing by the same machine, underground coal preparation - an alternative to the negative environmental impacts and lengthy coal-haulage requirements of current operations - and the use of mined openings for "long-term safe storage of all waste generated at the mine, plus other industrial, commercial, and municipal waste." McPherson concluded his talk by challenging those in the audience to consider whether Virginia mines can, should, or will take advantage of any of these evolving technological developments.

During the same session, Dr. Zipper presented the meeting with his research on "Remining and Other Initiatives." Zipper noted that valuable coal reserves are still available in Virginia's previously mined (and now abandoned), unreclaimed areas, but that the current regulatory structure can discourage remining by threatening new operators with liability for damage caused by the old. He then

REMINING FOR REAL

A STATEMENT OF INTENT TO DEVELOP ECONOMIC AND ENVIRONMENTAL REMINING INCENTIVES

(This statement of intent, developed by the Virginia Department of Mines, Minerals, and Energy and the United States Office of Surface Mining Reclamation and Enforcement, was signed by representatives from all ten agencies of the Powell River Project on May 8.)

We recognize that remining represents a potential opportunity to clean up thousands of acres of abandoned mined lands in Virginia at no expense to the government or taxpayers. The Virginia Department of Mines, Minerals, and Energy and the Office of Surface Mining Reclamation and Enforcement recognize that improvement in remining technology provides coalfield communities the opportunity for increased economic and environmental benefits while maximizing the recovery of valuable coal resources from previously mined lands. In order to promote the reclamation of mined areas left with inadequate reclamation prior to the enactment of the Surface Mining Control and Reclamation Act of 1977 and which continue, in their unreclaimed condition, to substantially degrade the quality of the environment, prevent or damage the beneficial use of water resources, or endanger the health or safety of the public, we agree in principal to the following:

Collectively, we will work to develop incentives that will encourage economically viable, environmentally beneficial remining operations that will reclaim abandoned mined land sites. We will encourage reclamation of environmental problem areas that are not normally mitigated by current remining practices such as contiguous AML features and AMD discharges.

We will seek involvement and support of the industry, the environmental community, the public, and the regulatory community in achieving our goals.

We will operate within the framework of the existing Laws and Regulations to achieve our goals and will use our experience and successes to recommend changes to the Act and Regulations when appropriate.

Our efforts will serve as a model for remining programs nationwide and the Office of Surface Mining Reclamation and Enforcement Remining for Real initiatives.

We will promote, where possible, the use of remined areas which may present significant opportunities for economic development, including commercial and residential development, and job creation.

discussed the recent work of the Powell River Project and U.S. Office of Surface Mining Director Robert Uram, the advocacy of the progressive Nature Conservancy, and the efforts of the Virginia Department of Mines, Minerals, and Energy ("*the* essential party") in addressing remining at both the state and national levels (see box.) With remining as not only a potential economic boon, but also "the only feasible means of reclaiming" many of the state's abandoned mined lands, Zipper concluded that the major challenge is to seek creative solutions to the problems which prevent economically viable remining from taking place in the abandoned mines that contain marketable coal and are in the greatest need of reclamation. He also discussed the role of reforestation in the reclamation process.

Other noteworthy speakers at the Richlands Coal Show included Dan Carson, head of American Electric Power's Virginia and Tennessee operations, who addressed the Virginia Coal and Energy Commission's Coal Subcommittee regarding retail competition in the electric power industry. (An interview with Mr. Carson appears below).

Sam Napilatano of the U.S. Environmental Protection Agency (EPA) spoke on the topic of the Clean Air Power Initiative, describing a system of pollution controls which would, he said, have an impact upon the coal and utility industries but which would ultimately help the southeast's economy as well as its environment. The delicate environment/economy balance was also addressed by John Paul of the Center for Energy and Economic Development, who stated that the restrictions being discussed by the EPA would mean the loss of hundreds of thousands of jobs nationwide without bringing about promised environmental gains.

The 1996 Richlands Coal Show thus lived up to all expectations; it offered a buyers' market for the latest in mining equipment, a congenial place for "coal people" of all kinds to meet, and an arena in which diverse individuals and groups with a stake in the industry could face off. While planning has already begun for the 1997 meeting, repercussions of this year's Coal Show are likely to felt for some time after that.

THE FUTURE OF THE ELECTRIC UTILITY INDUSTRY

R. Daniel Carson
Virginia President, American Electric Power

What developments can we expect in the electric utility industry over the next few years? In a nutshell, the prospects for change are excellent. American Electric Power, or AEP - which, with its subsidiaries, was realigned to produce a single company organization in January - has taken a position of support of retail competition and customer choice, and is working toward an industry structure which would meet certain parameters that we believe are necessary. We don't have all the answers yet, but we believe that retail competition is inevitable. We have learned a great deal from the revolutionary changes of 1992, when passage of the Energy Policy Act introduced competition and its benefits to wholesale suppliers and consumers of power.

It is our contention today that competition is technically feasible - it is already here for the wholesale sector of our business, and retail competition is a goal which should be pursued both carefully and aggressively. When we speak of competition in the electric utility industry, we're speaking about the *generation* function of the business, the *production* of the energy. The transmission and distribution of that energy should, at least as we see it today, continue to be regulated, monopoly functions.

The Energy Policy Act effectuated a competitive market for wholesale customers and suppliers, and empowered the Federal Energy regulatory Commission to require utilities to open their transmission systems for use by these buyers and sellers at regulated, cost-based rates for transmission services. Our experience with wholesale competition has been enlightening, if not been altogether positive. I, for one, did not imagine that we would lose sales to our traditional wholesale customers by being undercut on price by another utility, but this is exactly what happened. We have since gained sales in this market - which accounts for approximately 10% of our business - and have also learned some valuable lessons on the importance of price to the customer, and on the need to actively seek fair and equitable public-policy results for retail competition.

While the Energy Policy Act created a structure for competition at the wholesale level, it left the question of retail competition to the states; initiatives of one form or another are now underway in 47 states. Two important initiatives are underway in Virginia. First of all, the SCC is involved in a formal inquiry into competition and industry restructuring, and will soon release its report. Second, and importantly, the Virginia General Assembly is conducting its own inquiry. It has been suggested that competition will produce both winners and losers, and a major determinant will be the public policy by which the market operates.

Though Congress effectively said in 1992 that it would take a hands-off approach to retail competition, a long-anticipated bill mandating retail competition by the end of the year 2000 was, in fact, introduced in the House this July. Generally speaking, AEP is an advocate of allowing the individual state initiatives to move forward independent of any federal action, because we believe that such initiatives have already proven constructive in the development of a workable, competitive model. An exception requiring federal attention will be the issue of assuring equal interstate access to markets, or reciprocity by the states.

AEP supports retail customer choice in generation services - in a structure which provides that the benefits of competition and choice are simultaneously available to all customers, and in which there is a level playing field among the service suppliers. The latter is necessary because of the tax and financing differences and preferences among investor-owned, government-owned, and government-subsidized providers of generation. AEP believes that a goal of fair and efficient competition, with customer access to a large body of generating companies and resources, can best be accomplished by the creation of Independent System Operators (ISOs). Conceptually, ISOs would assume independent operating control, not ownership, of the transmission systems of utilities encompassing multiple states and multiple systems. Pricing for energy transmission within the region would be simplified and cost-based. An ISO could thereby, to a large degree, define the boundaries of a regional market for generation services.

Today, AEP is working with several other utilities which have joined together on a strictly voluntary basis in attempting to form an ISO, establishing objectives and negotiating to resolve the many, inevitable issues and questions. To complement the ISO, we also envision the establishment of a Regional Power Exchange (RPX), which would be independent of all buyers and sellers of energy. Generators would offer their supplies to the RPX, thus facilitating a spot market for generation in which price was determined by supply and demand. It would also facilitate bilateral transactions - or transactions between individual buyers and sellers - which could be expected to be numerous. Commercial and residential customers could in this structure be served by local distribution companies (or marketers) which would potentially purchase generation from a combination of sources, including the spot market and individual generators. Understandably, there are concerns about the price and quality of service in a competitive regime, but research has shown that significant customer benefits, including price reductions, have been derived with the introduction of competition and regulatory reform in the natural gas, telecommunications, and other industries.

Finally, what may be the most significant issue among utilities in the competition debate is that of stranded investments (or stranded costs). These may include investments in generating facilities which were built for the purpose of serving the now-departing customer. In the transition to competition, stranded costs must be addressed in a way that eases the burden on affected utilities without defeating the benefits of competition. While a number of mechanisms have been suggested for allowing utilities to recover these costs from their customers, considerable difficulty lies in the determination and application of stranded cost remedies. This issue not withstanding, it is hoped that the legislative and regulatory bodies in Virginia will conclude in their studies what seems self-evident to AEP: that a competitive market would be of benefit to Virginia's citizens and businesses, and should be pursued as deliberately and promptly as is practical.

KEEPING UP WITH CTC...

Our spring issue featured an article on the Coal Technology Corporation (CTC) of Bristol, Virginia, holder of the sole patent on a new continuous-coking technology with the ability to create high-quality, high-density and uniform coke in only two-to-four hours. Traditional coke ovens require between 24 and 30 hours to accomplish a similar task, and the final product lacks the uniformity of CTC's consistently proportioned briquettes.

August saw a second CTC shipment of its foundry-sized coke briquettes to General Motors (GM), to be used for testing in a GM furnace located in Marquette, Michigan. The first shipment of 20 tons was successfully tested in April at GM's Defiance, Ohio plant, using a mixture of 50 percent CTC coke with conventional foundry coke. (It was a similar test, on a much smaller scale, which was reported in the last *Energy Outlook*.) The Michigan test, however, would be notable because it represented the first furnace test in this country to use 100 percent manufactured-form coke briquettes; CTC dubbed this the "Wright Brothers' Kitty Hawk First Flight Test," and noted that it might well "usher in a new generation of environmentally clean cokemaking technology."

CTC is now in the final phase of designing and financing the first commercial plant to utilize its continuous char and cokemaking procedure. Several sites in Virginia and West Virginia are being evaluated, and a consortium of companies has agreed to participate (through a limited liability organization) in construction. CTC officials report that the plant will process over 70,000 tons of coal in the first year , and will eventually be able to process over ten times that amount annually into char, coal liquids, and coke products. Once the first plant is in full operation, more are expected to follow.

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MALCOLM J. McPHERSON

A Personal Profile of the New VCCER Director

When Malcolm McPherson began working in the coal mines of central England in 1953, he was following a family mining tradition of several generations. The men on both sides of his family had been Scottish coal miners since the early part of the 19th century. After five years in the mines, he became an undergraduate in the Department of Mining Engineering, University of Nottingham, and graduated with First Class Honors in 1962. He stayed on as a graduate student, conducting research on the thermodynamics of mine fans, and gained his Ph.D. for this work in 1965. However, during his period as a graduate student, and as a side interest, he also began to develop programs for mine-ventilation planning using the then-newly emerging digital computers. These were the first steps along a path that was to revolutionize methodologies of underground ventilation design around the world.

For the rest of the 60's and throughout the 70's, McPherson remained based in England but became increasingly involved in major projects in other countries. His reached out from the United Kingdom, first to the countries of eastern and western Europe, then to South Africa, Australia, the United States, Canada and India. In 1981, he moved to the University of California at Berkeley, where he became involved in the design of deep geologic repositories for nuclear waste.

Still, the pull of coal mining remained undimmed in McPhersons's psyche. In January of 1992, he took up his present post at Virginia Tech. Subsequently appointed as the Director of the Generic Center for Mine Systems Design and Ground Control, he has spent the past several years overseeing much of the mining research conducted in American universities. He has also authored or co-authored some 150 papers, and recently published a comprehensive textbook on subsurface ventilation and environmental engineering.

The Virginia Center for Coal and Energy Research is the most recent organization to benefit from McPherson's sturdy dedication to coal-related issues, with his appointment as Director this July. For despite being the recipient of a number of international awards, Malcolm McPherson truly remains a down-to-earth coal miner at heart.