PROCEEDINGS

OF THE

ILLINOIS MINING INSTITUTE

FOUNDED FEBRUARY 1892

1997

PROCEEDINGS

OF THE

ILLINOIS MINING INSTITUTE

FOUNDED FEBRUARY 1892

1997

Annual Meeting
Collinsville, Illinois
September 25-26, 1997

Illinois Mining Institute, Champaign, Illinois

Published by
Illinois Mining Institute, 615 E. Peabody Drive, Champaign, Illinois 61820
May 1998

Editing by Heinz H. Damberger and Phyllis Godwin
Typesetting by Phyllis Godwin

Printed by United Graphics, Inc., 2916 Marshall Avenue,
P.O. Box 559, Mattoon, Illinois 61938

John Lanzerotte

PRESIDENT 1996-97

THE COAL MINER

TRUE—he plays no grandstand role in life
But his importance is vital, great and just:
For without his toil in earth's caverns deep,
Civilization would soon crumble into the dust.
AD 1964 From his poem – Vachel Davis

(Dedicated on State Capitol Lawn, Springfield, Illinois, October 16, 1964)

IN MEMORY

of

All Deceased Members

of the

ILLINOIS MINING INSTITUTE

Kenneth E. Clegg
James J. Scott

OFFICERS 1996-97

PRESIDENT
John Lanzerotte
Monterey Coal Company
Carlinville, Illinois

FIRST VICE PRESIDENT
Gregg Bierei
Arch of Illinois, Inc.
Percy, Illinois

SECOND VICE PRESIDENT
John Hill
AMAX Coal Company
Keensburg, Illinois

SECRETARY-TREASURER
Heinz H. Damberger
Illinois State Geological Survey
615 East Peabody Drive
Champaign, Illinois 61820
(217) 333-5115
e-mail: heinz@geoserv.isgs.uiuc.edu

ADMINISTRATIVE ASSISTANT
Phyllis Godwin
P.O. Box 20
Pesotum, Illinois 61863
(217) 867-2791
e-mail: d-godwin@uiuc.edu

EXECUTIVE BOARD

Joseph Angleton ('99)
Darrell Auch ('99)
Gregg Bierei ('98)
Fred Bowman, *ex officio*
Mike Caldwell ('97)
Y. Paul Chugh ('99)
John Devon ('97)
Jim Folkerts ('97)
Bert Hall, *ex officio*
Jeff Hayden ('98)
Steve Rowland ('98)
Joseph S. Spivey, *ex officio*
John Wilson ('99)
David Whitcomb ('97)

IMI COMMITTEE CHAIR PERSONS FOR 1996-97

ADVERTISING COMMITTEE
Jim Zwahlen, *Co-Chairman*
Joe Pileggi, *Co-Chairman*

HONORARY MEMBERSHIP COMMITTEE
Paul Chugh, *Chairman*

NOMINATING COMMITTEE
David Whitcomb, *Chairman*

SCHOLARSHIP COMMITTEE
John Devon, *Chairman*

AUDITING COMMITTEE
Jim Folkerts, *Chairman*

PROGRAM COMMITTEE
Jeff Hayden, *Chairman*

OFFICERS 1997-98

PRESIDENT
Gregg Bierei
Arch of Illinois, Inc.
Percy, Illinois

FIRST VICE PRESIDENT
Steve Rowland
Kerr-McGee Coal Corp.
Harrisburg, Illinois

SECOND VICE PRESIDENT
Mark Cavinder
Old Ben Coal Co.
Coulterville, Illinois

SECRETARY-TREASURER
Heinz H. Damberger
Illinois State Geological Survey
615 East Peabody Drive
Champaign, Illinois 61820
(217) 333-5115
e-mail: heinz@geoserv.isgs.uiuc.edu

ADMINISTRATIVE ASSISTANT
Phyllis Godwin
P.O. Box 20
Pesotum, Illinois 61863
(217) 867-2791
e-mail: d-godwin@uiuc.edu

EXECUTIVE BOARD

Joseph Angleton ('99)
Darrell Auch ('99)
Gregg Bierei ('98)
Will Border ('00)
Terry Bouvet ('00)
Mark Cavinder ('98)
Y. Paul Chugh ('99)
Jeff Hayden ('98)
John Lanzerotte, *ex officio*
Richard Mottershaw, *ex officio*
Phillip Ott ('00)
Steve Rowland ('98)
Joseph S. Spivey, *ex officio*
John Wilson ('99)

IMI COMMITTEE CHAIR PERSONS FOR 1997-98

ADVERTISING COMMITTEE
Jim Zwahlen, *Co-Chairman*
Joe Pileggi, *Co-Chairman*

HONORARY MEMBERSHIP COMMITTEE
Terry Bouvet, *Chairman*

NOMINATING COMMITTEE
Darrell Auch, *Chairman*

SCHOLARSHIP COMMITTEE
John W. Wilson, *Chairman*

AUDITING COMMITTEE
Will Border, *Chairman*

PROGRAM COMMITTEE
Mark Cavinder, *Co-Chairman*
Phil Ott, *Co-Chairman*

PRESIDENTS OF ILLINOIS MINING INSTITUTE*

1892-93	JAMES C. SIMPSON, Consolidated Coal Co., St. Louis, MO
1893-94	JAMES C. SIMPSON, Consolidated Coal Co., St. Louis, MO
1894-95	WALTON RUTLEDGE, State Mine Inspector, Alton, IL
1895-1911	Institute Inactive
1912-13	JOHN P. REESE, Superior Coal Co., Gillespie, IL
1913-14	THOMAS MOSES, Bunsen Coal Co., Georgetown, IL
1914-15	J. W. STARKS, State Mine Inspector, Georgetown, IL
1915-16	WILLIAM BURTON, Illinois Miners, Springfield, IL
1916-17	FRED PFAHLER, Superior Coal Co., Gillespie, IL
1917-18	PATRICK HOGAN, State Mine Inspector, Carbon, IL
1918-19	WILLIAM HALL, Miners Examining Board, Springfield, IL
1919-20	WILLIAM HALL, Miners Examining Board, Springfield, IL
1920-21	FRANK R. TIRRE, North Breese Coal & Mining Co., Breese, IL
1921-22	H. H. STOEK, Mining Dept. University of Illinois, Urbana, IL
1922-23	JOHN G. MILLHOUSE, State Mine Inspector, Litchfield, IL
1923-24	D. D. WILCOX, Superior Coal Co., Gillespie, IL
1924-25	H. E. SMITH, Union Fuel Co., Springfield, IL
1925-26	E. G. LEWIS, Chicago-Sandoval Coal Co., Sandoval, IL
1926-27	WILLIAM E. KIDD, State Mine Inspector, Peoria, IL
1927-28	JAMES S. ANDERSON, Madison Coal Corp., Glen Carbon, IL
1928-29	JOHN E. JONES, Old Ben Coal Corp., West Frankfort, IL
1929-30	A. C. CALLEN, University of Illinois, Urbana, IL
1930-31	JOSEPH D. ZOOK, Illinois Coal Operators Assn., Chicago, IL
1931-32	GEO. C. MC FADDEN, Peabody Coal Co., Chicago, IL
1932-33	CHAS. F. HAMILTON, West Virginia Coal Co., St. Louis, MO
1933-34	HARRY A. TREADWELL, C.W. & F. Coal Co., Benton, IL
1934-35	C. J. SANDOE, West Virginia Coal Co., St. Louis, MO
1935-36	T. J. THOMAS, Valier Coal Co., Chicago, IL
1936-37	W. J. JENKINS, Consolidated Coal Co., St. Louis, MO
1937-38	H. H. TAYLOR, JR., Franklin County Coal Corp., Chicago, IL
1938-39	PAUL WEIR, Consulting Mining Engineer, Chicago, IL
1939-40	ROY L. ADAMS, Old Ben Coal Corp., West Frankfort, IL
1940-41	M. M. LEIGHTON, State Geological Survey, Urbana, IL
1941-42	J. A. JEFFERIS, Illinois Terminal Railroad Co., St. Louis, MO
1942-43	CARL T. HAYDEN, Sahara Coal Co., Chicago, IL
1943-44	BEN H. SCHULL, Binkley Mining Co., Chicago, IL
1944-45	GEORGE F. CAMPBELL, Old Ben Coal Corp., Chicago, IL
1945-46	JOSEPH E. HITT, Walter Bledsoe Co., St. Louis, MO
1946-47	ROBERT M. MEDILL, Dept. Mines & Minerals, Springfield, IL
1947-48	HARRY M. MOSES, H. C. Frick Coal Co., Pittsburgh, PA
1948-49	J. ROY BROWNING, Illinois Coal Operators Assn., Chicago, IL
1949-50	T. G. GEROW, Truax-Traer Coal Co., Chicago, IL
1950-51	G. S. JENKINS, Consolidated Coal Co., St. Louis, MO

*Affiliations listed at time of presidency.

1951-52	CLAYTON G. BALL, Paul Weir Co., Chicago, IL
1952-53	WILLIAM W. BOLT, Pawnee, IL
1953-54	HAROLD L. WALKER, University of Illinois, Urbana, IL
1954-55	J. W. MAC DONALD, Old Ben Coal Corp., Benton, IL
1955-56	EARL SNARR, Freeman Coal Mining Corp., Hindsdale, IL
1956-57	PAUL HALBERSLEBEN, Sahara Coal Co., Harrisburg, IL
1957-58	H. C. LIVINGSTON, Truax-Traer Coal Co., Chicago, IL
1958-59	A. G. GOSSARD, Snow Hill Coal Corp., Terre Haute, IN
1959-60	H. C. MC COLLUM, Peabody Coal Co., St. Louis, MO
1960-61	STUART COLNON, Bell & Zoller Coal Co., Chicago, IL
1961-62	ROBERT J. HEPBURN, United Electric Coal Co., Chicago, IL
1962-63	JOHN P. WEIR, Paul Weir Co., Chicago, IL
1963-64	E. T. (GENE) MORONI, Old Ben Coal Corp., Benton, IL
1964-65	JOHN W. BROADWAY, Bell & Zoller Coal Co., Chicago, IL
1965-66	B. R. GEBHART, Freeman Coal Mining Corp., Chicago, IL
1966-67	C. A. BROECKER, Ayrshire Collieries Corp., Indianapolis, IN
1967-68	JOSEPH CRAGGS, Peabody Coal Co., Taylorville, IL
1968-69	CLAYTON F. SLACK, Sahara Coal Co., Chicago, IL
1969-70	JOSEPH Q. BERTA, Truax-Traer Coal Co., Pinckneyville, IL
1970-71	R. F. DONALDSON, United Electric Coal Co., Chicago, IL
1971-72	CECIL C. BAILIE, Old Ben Coal Corp., Benton, IL
1972-73	E. MINOR PACE, Inland Steel Coal Co., Sesser, IL
1973-74	ARTHUR L. TOWLES, Zeigler Coal Co., Johnston City, IL
1974-75	DALE E. WALKER, Southwestern Illinois Coal Corp., Percy, IL
1975-76	M. V. (DOC) HARRELL, Freeman United Coal Mining Co., Chicago, IL
1976-77	JOHN J. SENSE, Tosco Mining Corp., Pittsburgh, PA
1977-78	BILL F. EADS, Monterey Coal Co., Collinsville, IL
1978-79	WILLIAM E. WILL, Peabody Coal Co., Evansville, IN
1979-80	CHARLES E. BOND, Consolidation Coal Co., Springfield, IL
1980-81	WALTER S. LUCAS, Sahara Coal Co., Inc., Harrisburg, IL
1981-82	JACK A. SIMON, Illinois State Geological Survey, Urbana, IL
1982-83	H. ELKINS PAYNE, AMAX Coal Co., Indianapolis, IN
1983-84	JAMES D. CHADY, Old Ben Coal Co., Benton, IL
1984-85	ROBERT M. IZARD, Midland Coal Co., Farmington, IL
1985-86	DAVID A. BEERBOWER, Freeman United Coal Mining Co., Mt. Vernon, IL
1986-87	MACK H. SHUMATE, Zeigler Coal Co., Fairview Heights, IL
1987-88	M. E. HOPKINS, Peabody Development Co., St. Louis, MO
1988-89	GEORGE L. MAY, Monterey Coal Co., Carlinville, IL
1989-90	RICHARD R. SHOCKLEY, Illinois Department of Mines & Minerals, Springfield, IL
1990-91	DAN G. WOOTON, White County Coal Corp., Carmi, IL
1991-92	MICHAEL K. REILLY, Zeigler Coal Co., Fairview Heights, IL
1992-93	J. ROBERT DANKO, Peabody Coal Co., Marissa, IL

1993-94	ROBERT W. SHANKS, Arch of Illinois, Inc., Percy, IL
1994-95	DAVID L. WEBB, Freeman United Coal Mining Co., Springfield, IL
1995-96	BERT HALL, Lane Erectors, Inc., Harrisburg, IL
1996-97	JOHN LANZEROTTE, Monterey Coal Co., Carlinville, IL

SECRETARIES AND SECRETARY-TREASURERS

1892-95	JOHN S. LORD, Chicago and Kansas City Coal Co.
1895-1911	Institute Inactive
1911-23?	MARTIN BOLT, Illinois Department of Mines and Minerals
1923?-29	FRANK R. TIRRE, St. Louis, MO
1929-54	B. E. SCHONTHAL, B. E. Schonthal & Co.
1954-63	GEORGE M. WILSON, Illinois State Geological Survey
1963-68	JACK A. SIMON, Illinois State Geological Survey
1968-75	M. E. HOPKINS, Illinois State Geological Survey
1975-78	HAROLD J. GLUSKOTER, Illinois State Geological Survey
1978-	HEINZ H. DAMBERGER, Illinois State Geological Survey

LIST OF HONORARY MEMBERS*

Listed are honorary members from the beginning of the Institute as far as our records reveal. Honorary members were not approved or elected every year. According to the IMI Constitution and Bylaws adopted June 24, 1913, Article II, Section 2: *"Any person of distinction in mining may be elected an honorary member of the Institute by two-thirds vote...."* In 1983, this section of the Constitution was amended to: *"Annually, one or more members recommended by a committee and approved by the Executive Board, who has rendered outstanding service to the Illinois Mining Institute, and thereby to the coal industry of the state, may be elected as an Honorary Member with dues being waived."*

1928	A. J. Moorshead, La Jolla, CA
	Hugh Murray, Equality, IL
	John Rollo, North Breese Coal Mining Co., Breese, IL
1929	Frank Tirre, St. Louis, MO
1932	Thomas R. Stockett, Spring Canyon Coal Co., Spring Canyon, UT
1939	John F. Goally, Morris, IL
	Eugene McAuliffe, Union Pacific Co., Omaha, NB
	Thomas Moses, Bunson Coal Co., Danville, IL
1940	F. E. Weissenborn, IL Coal Operations Association, St. Louis, MO
1945	J. A. Jefferis, IL Terminal Railroad, St. Louis, MO
	W. J. Jenkins, Consolidated Coal Co., St. Louis, MO
1948	J. W. Starks, IL Department of Mines & Minerals, Springfield, IL
	L. E. Young, Mining Engineer, Pittsburgh, PA
1949	John E. Jones, Old Ben Coal Corp., West Frankfort, IL
	F. S. Pfahler, Superior Coal Co., Chicago, IL
	B. E. Schonthal, B. E. Schonthal Co., Inc., Chicago, IL
	Paul Weir, Paul Weir Co., Chicago, IL
	D. D. Wilcox, Superior Coal Co., Gillespie, IL
1955	George C. McFadden, Carmac Coal Co., Chicago, IL
1958	D. W. Buchanan, Jr., Old Ben Coal Corp., Chicago, IL
1961	Fred S. Wilkey, IL Coal Operators Association, Chicago, IL
1963	George M. Wilson, IL State Geological Survey, Urbana, IL
1965	M. M. Leighton, IL State Geological Survey, Urbana, IL
1966	Carl T. Hayden, Sahara Coal Co., Chicago, IL
1968	John W. Broadway, Bell & Zoller Coal Co., Chicago, IL
	Jack A. Simon, IL State Geological Survey, Urbana, IL
1969	B. H. Schull, Benkilley Mining Co., Marion, IL
1970	J. W. MacDonald, Consultant, Benton, IL
1971	H. C. McCollum, Peabody Coal Co., St. Louis, MO
1972	Frank Nugent, Freeman United Coal Mining Co., Chicago, IL
1973	Paul Halbersleben, Sahara Coal Co., Inc., Harrisburg, IL

1974	Clayton G. Ball, Paul Weir Co., Evanston, IL
1975	C. C. Conway, National Mine Service, Nashville, IL
	M. E. Hopkins, IL State Geological Survey, Urbana, IL
1976	Nate G. Perrine, Peabody Coal Co., St. Louis, MO
1978	Cletus A. Broecker, AMAX Coal Co., Indianapolis, IN
1979	Thomas L. Garwood, Freeman United Coal Mining Co., Benton, IL
1980	George C. Lindsay, Coal Mining & Processing, Chicago, IL
1981	Joseph Schonthal, J. Schonthal & Associates, Highland Park, IL
1982	J. A. Bottomley, Sahara Coal Co., Inc., Harrisburg, IL
1983	Betty Conerty, Illinois Mining Institute, Urbana, IL
	Joe Craggs, Peabody Coal Co., Taylorville, IL
1984	E. T. Moroni, Old Ben Coal Co., Herrin, IL
	E. Minor Pace, Inland Steel Coal Co., Mt. Vernon, IL
1985	Russell T. Dawe, Inland Steel Coal Co., Valier, IL
1986	E. H. Roberts, Inland Steel Coal Co., Mt. Vernon, IL
1987	William E. Will, Peabody Coal Co., St. Louis, MO
1988	Lanny Bell, Roberts & Schaefer Co., Chicago, IL
1989	M. V. (Doc) Harrell, Freeman United Coal Mining Co., Mt. Vernon, IL
1990	John C. Bennett, Peabody Coal Co., Belleville, IL
1991	Richard R. Shockley, Center for Research on Sulfur in Coal, Carterville, IL
1992	Walter E. Brandlein, Roberts & Schaefer Co., Chicago, IL
	Dayton McReaken, Zeigler Coal Co., Fairview Heights, IL
	Thomas Sadler, Old Ben Coal Co., Benton, IL
	Raymond C. Taucher, Consolidation Coal Co., Pinckneyville, IL
1993	Fred Rice, Peabody Coal Co., Beaver Dam, KY
1994	Walter S. Lucas, Sahara Coal Co., Harrisburg, IL
1995	William H. Mullins, Freeman United Coal Mining Co., West Frankfort, IL
1996	Michael K. Reilly, Zeigler Coal Holding Company, Fairview Heights, IL
1997	Fred Bowman, IL Office of Mines and Minerals, Springfield, IL
	Heinz H. Damberger, IL State Geological Survey, Champaign, IL

*Affiliations listed are at time of award.

CONTENTS

President John Lanzerotte iii
The Coal Miner iv
In Memory of v
Officers, 1996-97 vi
Officers, 1997-98 vii
Presidents viii
Secretary-Treasurers xi
Honorary Members xii

ANNUAL MEETING

THURSDAY MORNING

TECHNICAL SESSION I

Welcome–John Lanzerotte 1
Technical Session I–Jeff Hayden, Chairman 2
Continuous Haulage–David Garbacz 4
The Merits of Battery Haulage–Philip Bennett 9
Bridge Type Continuous Haulage: Merits and Usage–Jerry Lovitz ... 13
Development of Continuous Miners for Highwall Mining–
Ian Carr 18
Super Units–Phil Ott 22

FRIDAY MORNING

BUSINESS MEETING

Business Meeting–John Lanzerotte 27
Secretary-Treasurer's Report–Heinz H. Damberger 27
Honorary Membership Committee Report–Paul Chugh 28
Advertising Committee Report–Heinz H. Damberger 29
Nominating Committee Report–John Lanzerotte 29
Scholarship Committee Report–John Lanzerotte 29

TECHNICAL SESSION II

Technical Session II–Jeff Hayden and Jim Folkerts, Co-Chairmen 33
Mine Roof Control: Past, Present and Future–John C. Stankus and Robert B. Pride 35
Preventive/Predictive Maintenance with Infrared Imaging–Jim Lancaster 41
Training for Emergency Communication: The Communication Triangle–Charles Vaught 44
Powder River/Illinois Basin Coal Demand Under New Environmental Laws–John T. Hanou 47

LUNCHEON MEETING

President John Lanzerotte, Presiding 59
Introduction of Officers and Guests–John Lanzerotte 59
Scholarship Certificate Presentations–John Lanzerotte 60
Reclamation and Safety Awards–Sam Vancil 62
Memorial–John Lanzerotte 64
Honorary Membership Awards–Y. Paul Chugh 64
Luncheon Address–Darrell Auch, "Illinois Coal in the Next Century: Phase II of the 1990 Clean Air Act and Its Impact" 67
Raffle Drawing–Jim Zwahlen 71
The Presidents 72

Membership List 73

EXHIBITORS AND ADVERTISERS

IMI Advertising Committee 105
Exhibitors of the Annual Meeting 106
Advertisements 109
Advertiser Products and Services Index 207
Advertiser Alphabetical Index 216

PROCEEDINGS
OF THE
ILLINOIS MINING INSTITUTE

ANNUAL MEETING
105th YEAR
Collinsville, Illinois
Thursday and Friday, September 25-26, 1997

The opening session of the 105th Annual Meeting of the Illinois Mining Institute was convened at 10:00 A.M., Thursday, September 25, 1997, in the LaSalle Room of the Gateway Center. John Lanzerotte, President of the Institute, presided.

OPENING REMARKS

John Lanzerotte: Good morning. My name is John Lanzerotte, President of the IMI. I would like to welcome you all to the 1997 Annual Meeting of the Illinois Mining Institute. We have a technical session coming up this morning chaired by Jeff Hayden of White County Coal Corporation, a technical session tomorrow morning and a luncheon to wrap up our annual meeting. Darrel Auch, Vice President of Illinois and West Kentucky Operations will be our luncheon speaker. His topic is "Illinois Coal in the Next Century, Phase II of the 1990 Clean Air Act and Its Impact." Also during the luncheon, the Office of Mines and Minerals is going to be presenting awards for both mine safety and reclamation, looking back over the prior year. And tonight, for the fun part of the IMI, I would like to invite everybody to come to the fellowship between 5:00 and 7:00 p.m. in the main exhibit hall, where you will get a chance to enjoy some good food, a few drinks, meet some old friends and hopefully, some new ones.

Tomorrow morning will be our business meeting starting at 9:00 a.m. During the business meeting we will review the business of the Illinois Mining Institute, talk about the election of new officers and board members and discuss finances, as well as hear about the scholarships, which are a very essential part of the IMI. I would also like to request any of you that are aware of any of our members who have passed away since the last meeting, to let Heinz Damberger or Phyllis Godwin or anyone at the reception desk know. We would like to include recognition of those individuals at our luncheon tomorrow, as well as include their names in our annual proceedings volume.

Also, there are guards posted at the entrances of the exhibit hall and they have been instructed not to let anyone in unless that person has been properly registered. Again, that is one of the main components of our

financial support for the IMI; as you all know the fee is very reasonable and we ask that you become registered before trying to enter the hall.

Another way of adding to the revenue income for the IMI is to help sponsor the essential programs, not only of this meeting, but also the scholarship fund, and we do that through our raffle. This year we are going to be raffling away two airline tickets to anywhere in the U.S. The tickets have been made possible by donations from the Office of Mines and Minerals, Peabody Coal Company, Construction Machinery Company and Mine Supply Company. We will also raffle a set of golf clubs which again have been donated by Jim Justice of DuQuoin Iron & Supply. So, be generous; the money sure goes for a good cause and you may benefit by being one of the lucky winners.

I would like to now turn the meeting over to Jeff Hayden. He is going to chair the technical sessions this morning. Jeff is the Manager of Operations for White County Coal and I know that he and his co-chairman, Jim Folkerts, have worked hard to put together a session focused on operations, which I am sure you will find enjoyable and informative. Jeff.

TECHNICAL SESSION: PROGRESS IN MINE OPERATIONS I

Thursday, September 25, 1997
Mississippian Room, Gateway Center

Jeff Hayden: Thank you, John. Welcome, glad you are here. I was concerned that the attendance might be down this year as we know a lot of operations continue to close down in the Illinois Basin, but there seems to be about the average attendance. I thank you for coming and I'm sure our speakers do as well.


Jeff Hayden opens first technical session.

As Jim and I talked about what kind of program to put together, we agreed that it needed to be something focused on operations; that seems to be of interest to everyone. Today's speakers will concentrate predominately on productivity, face efficiency, coal haulage from the face, highwall mining from a surface application and super-sections. Tomorrow, there is an equally operations-oriented program with preventative maintenance techniques that are quite unique (we use them over at our facility and they have paid off handsomely), roof control, and an interesting speaker on the Illinois Basin

market, which I think everybody is interested in hearing what someone's crystal ball says about our industry in the Illinois Basin. I hope you will stay for those tomorrow.

Now I would like to introduce our first speaker. He is from Joy Mining, Dave Garbacz. He is the manager of haulage at Joy in Franklin, Pennsylvania.

Dave Garbacz: Good morning. I would like to thank you for the opportunity to be here and very much appreciate your attendance.

CONTINUOUS HAULAGE

DAVID A. GARBACZ

Joy Mining Machinery
Franklin, Pennsylvania

INTRODUCTION

Joy Mining Machinery is intensely engaged in product development and support activities regarding haulage products and is moving forward on a broad and active basis. This is true of both the batch haulage curriculum involving shuttle cars and battery-powered articulated haulers, as well as the continuous haulage side of the equation made up by the continuous chain systems (CHS) and the flexible conveyor train (FCT) products. It is a multi-directional effort aimed at providing the best match of product to each mining application.

The extensive features offered on the various models within each product line allow Joy to provide the industry with dependable and productive equipment and services that allow the operator to produce coal at low cost over sustained periods of time. The focus here will be on continuous haulage.

EQUIPMENT ROLES

The basic role of face haulage equipment is straight forward: to remove the cut material from the working face and transport it to the next link in the transportation chain. Continuous haulage systems remove the cut material from the working face and onto the mine panel belt without impeding the material flow or the performance of the continuous miner. These two roles require a seamless, continuous interface with the mine infrastructure (panel belt). Interactive systems rather than stand-alone individual pieces of equipment are called for. Continuous means an unbroken flow, without interruption; steadily receiving and transporting material; "system" refers to a group of units combined in such a manner as to form a whole entity and to operate in unison.

PRODUCT DEVELOPMENT

Joy's continuous haulage products have resulted from many years of development and testing. Increasingly, computers and the computer-aided design technology are employed. A well-established and far-reaching network of sales and field support helps the company understand the market and the operating requirements.

Flexible Conveyor Train (FCT)

The FCT is a unique form of continuous haulage which uses a specially designed, Joy-patented composite rubber belt as the conveying medium. It is a highly flexible and maneuverable system capable of being utilized in a wide variety of mine plans and conditions. The FCT can be constructed up to 550 feet long, although the most common length currently in service is 300 feet. It is capable of conveying material and tramming simultaneously. It is manned by a single operator using a remote control unit. The operation is very simple. The only functions are: to tram forward or backward, occasionally steer the front end, and turn the belt on or off. Enhancing these functions is an onboard display provided by the J.N.A.-controlled PLC network. Various status displays and machine diagnostic screens are available. The result is a very reliable and productive unit which has demonstrated 50 to 100 percent gains in production over other types of haulage in comparable operating conditions.

The specific product specifications are based around the 37-inch wide conveyor belt which is troughed at 40 degrees. When operated at the 700 feet per minute (fpm) speed (optional speeds are 600 and 635 fpm), the rated carrying capacity at a material density of 55 pounds per cubic foot (pfc) is approximately 19 tons per minute (tpm). This represents a capacity improvement of about 40 percent that was achieved in the last 18 months.

The heart of the conveyor design is the ability of the belt to handle the tension differential that is created in the belt as it goes around turns and over rolling or undulating bottom. This is handled by the inherent design characteristics of the belt to manage a controlled bend around its neutral axis, as well as the strategic design and placement of the edge rollers. The resulting trough of the belt and, thus, the carrying capacity, is maintained regardless of the terrain being traversed by the unit itself.

The system is capable of making multiple turns in any combination of direction and radius around a tight 28 foot turning radius. Since the overall machine width is a very narrow 48 inches, this combination allows for ample room to maneuver in 90 degree cross cuts in narrow 14 feet wide entries. Most current applications, however, are operating with 60 degree turns in order to further facilitate rapid advancements.

The lower half of the unit that forms the independent traction system is capable of advancing the unit forward or back at 65 to 70 fpm, with minimum ground disturbance. The ground pressure is in the range of three to four psi. The key to the system is its ability to navigate a chosen path repetitively; it does not wander, stray nor try to straighten in the turns. This is because the crawlers, although they act as a single unit, are actually separated into 60-foot segments. Each has a sprocket at both ends with adjacent sprockets that are driven from the same gearcase. This links all of the crawler chains together so they all drive at the same speed and in the same relative path.

The FCT loads onto the panel belt by tramming above it on a roadway structure and discharging down. This eliminates spillage because the material is in line and at coordinated speed with the belt.

The FCT offers one additional unique feature in its ability to rapidly move up the roadway, including the mine tail pulley for the panel belt. A system of hydraulic cylinders raises the entire assembly and pulls it forward in 10-foot steps. Within minutes, a move to the next intersection is accomplished and mining can continue.

Currently, several Joy FCTs are operating in the high-material-density Trona fields of Wyoming; several more are operating in the coal fields of central Illinois. In the current configuration, the FCT is best adapted to the seams of medium to high thickness (64 inches minimum). Wider, higher-capacity units with refined control circuits are under development.

Continuous Chain Haulage

Joy Mining Machinery's second entry into the continuous haulage market is a chain haulage system. Here a series of crawler-mounted mobile bridge carriers are linked by a series of long (30 or 39 feet) bridges. The result is a chain of cascading members which permit a continuous material flow from the miner to the panel belt.

Chain haulage systems are certainly not new to the industry, and Joy was not the originator of the basic concept. However, by clearly identifying customer needs and taking a focused approach, Joy has developed a rugged and dependable system that is capable of operating in difficult mining environments. Product longevity, reliability and productivity were key design criteria. Knowledge and technology acquired in the production of continuous miners could be applied here. Many parts are common and interchangeable with continuous miners. System features include:

- Narrowest machine for a given conveyor width in the industry.
- Conveyor widths of 30 and 38 inches available.
- Chain speed of 360 fpm.
- Conveying capacity (@ 55 lbs pcf)
  30-inch chain = 16 to 22 tpm
  38-inch chain = 22 to 34 tpm.
- Good operator visibility forward and to the rear through a hydraulically adjustable floating and swing operator's platform.
- Onboard operator communication system.
- Swinging front conveyor on each mobile bridge carrier greatly improves maneuverability and decreases spillage at the transfer points.
- Proven conveyor chain drives.
- Proven parts, components and technology from the Joy continuous miners.
- Superior maneuverability.
- Ease of maintenance.
- Robust design intended for many years of service.
- Optional high-capacity lump breakers.

Joy continuous chain haulage systems are currently operating in the United States, Australia and South Africa. Seam heights vary from 40 inches to over ten feet. Its advantages are its versatility, ease of operation and ability to deal with variable conditions

The system interfaces with the panel belt through a specially designed, low-frame structure. The flow from one to the other is efficient, spillage is limited, and a good match is provided.

SYSTEM APPROACH

Even the most diligent of design efforts can be wasted unless they result in a system in which the individual pieces work together in harmony. Therefore, much time is spent in fine-tuning the interaction of each aspect of the system. This is not limited to the equipment. The focus is on mining cycles, equipment selection and mine plans.

Mining Cycles

Computer simulation of the mining cycles is used extensively to optimize the process. Parameters such as the sump and shear depths and rates are varied to achieve an overall continuous haulage process. High instantaneous surges followed by low valleys do not mix well with continuous haulage.

Equipment Selection

Haulage equipment must be chosen to match the operating conditions. All section parameters must be taken into consideration, including an understanding of how they will change over time as the section advances. Haulage equipment and continuous miner must be chosen so they complement each other.

Mine Plans

While both Joy's FCT and CHS (especially enhanced by the swinging front end) can navigate 90 degree cross cuts, lower angle cuts facilitate the flow of material (reduce chance of spillage), and ease equipment travel; this maximizes tram speeds and minimizes ribbing damage. While the dimensions of pillars and rooms must remain within structural requirements, some fine-tuning can be done, such as creating entries in lengths that match multiples of the length of the haulage equipment unit. This permits full cuts and helps minimize move times. Also, the cut sequence can be optimized to reduce move times and distances for both the men and equipment.

CONCLUSION

In the current extremely competitive environment mining companies work in, design integrity and efficiency are essential. Equipment must perform as planned, efficiently and reliably over increasingly longer life cycles. Joy is squarely focused on this mission with its products, service and support, including the many related facets of continuous haulage as applied to underground mining around the world.

Jeff Hayden: Thank you, Dave. Our next set of speakers' subject closely ties to continuous haulage. We have a tag-team duo from Lake Shore Mining: Jerry Lovitz and Phil Bennett. They bring to us the merits of battery haulage and continuous haulage.

Phil Bennett: I've been attending these meetings for about 30 years and it never ceases to amaze me that they turn the podium over to a salesman and then get him to amplify his voice; most of you out here dealing with sales people know that this generally is not necessary.

THE MERITS OF BATTERY HAULAGE

PHILIP BENNETT

Lake Shore Mining Equipment, Inc.
Lexington, Kentucky

INTRODUCTION

Over the last decade the coal industry has seen major improvements in continuous miner efficiencies with current day units offering greatly improved cutting and load rates. These improvements have shifted the production limitation to the face haulage systems supporting these new breeds of continuous miners.

Historically, the most popular form of haulage has been the cable shuttle car. Because of past cutting and load rates, these haulage units were able to keep up with the continuous miner production. Today, however, both coal operators and equipment manufacturers recognize the need to improve the efficiency in face haulage.

BACKGROUND

Battery haulage has been in underground mines since the mid 1950s and has progressed from battery shuttle cars, tractors with self-unloading trailers, scoops and ram-cars, to the current battery hauler designs. Today's haulers have numerous value-added features and benefits that make these units very attractive as the primary haulage system. These features provide substantially more capacity, flexible operating parameters and more than competitive operating costs.

Continuous haulage systems (CHS) first appeared in the late 1950s utilizing a bridge conveyor attached to a loading machine and discharging onto a chain conveyor. These systems have evolved into the current-day bridge-type CHS, incorporating both mobile conveyor and bridge conveyor units.

The concept behind both systems of battery coal haulage and continuous haulage is to keep the continuous miner in the face cutting and loading coal with little or no interruptions. The gains in production come from reducing or eliminating haulage change-out time behind the miner.

The new high-capacity Stamler battery haulers and high volume continuous haulage systems help meet this increased production rate.

How do you determine whether battery haulage or continuous haulage is best suited for your mining application? It is not necessarily an open and closed issue. Jerry and I intend to point out the areas you need to consider to help make this important decision.

BATTERY HAULAGE

First, when considering battery haulage application, flexibility and versatility immediately come to mind. You must consider the following points relative to their particular use.

Conditions. Many features are offered with todays haulers such as

- Vertical articulation, to negotiate difficult roadways.
- Oscillating ball-bearing center section to keep all wheels on the ground.
- On command trailer traction assist, four wheel drive.
- 110 degree steering, for 90 degree turns.
- Lift from grade battery changing system for ease of battery change and handling; should you require changing in midshift; common when rolling resistance high, such as grades, soft bottoms, etc.

With these features, battery haulers can handle varying bottom and seam conditions, such as soft or muddy to undulating and tilting roadways and can negotiate 16-foot entries. Grades over 10 percent should be avoided because of the negative affect on battery life and drive and electrical components.

Good top conditions typically means deep miner cuts. Because the Stamler battery hauler trailer design is longer than shuttle cars' distance to operator canopy, an 8-foot to 10-foot deeper cut can be achieved, a major plus for battery haulage.

Length of Panels. This is not a determining factor because battery haulers can operate efficiently in both short or long panels, such as longwall development.

Routing. The most notable areas are:

- Ease of multi-car use without route restrictions.
- Loop routing.
- Change-out at last open cross cut.
- 10 to 20 percent additional volume capacity with faster dump time.

All of these factors add up to greater load time by miner, and therefore greater production.

Pillaring. Battery haulers, because of their greater flexibility and the cableless operation, are well suited to both conventional and perimeter pillaring.

Number of Entries and Block Sizes. The number of entries and block sizes will determine the number of cars required for efficient routing; average sized blocks and five to seven entries require three battery cars; with eight entries or more, a fourth car may be utilized. Belt moves should be made at three to four breaks, depending on cross-cut dimensions.

Super Sections. Battery haulers are ideally suited for use with multi-entry super sections, utilizing multiple haulers. I am sure Phil Ott will cover

this in detail in his presentation. This mining system is gaining much popularity in the Illinois coal basin.

Roadway Width. Battery haulers can operate down to 16 feet in all entries, including the belt entry, and 90 degree turning angles.

Management Commitment. Should you choose to use battery haulers, a commitment to operator training, such as backing into miner and feeder, routing and change-out efficiency, battery and charger preventive maintenance and battery station moves, will affect hauler production and performance. The flexibility of choosing the time to move your belt up and setting up charging stations can also be a negative, if allowed to advance so far from the operating face that tram time and change-out of cars cause the miner to wait to load.

MERITS OF BATTERY HAULERS

Other merits and value-added features and design benefits of the Stamler battery hauler design, other than those mentioned in the application data just reviewed are:

- Operating range from 35 inches up with two models.
- Capacity - from 230 to 675 cubic feet.
- Ergonomics - ergonomically friendly with superior operator comfort and ride, controls easily accessible and excellent line of sight.
- Operation cost - Typically up to 50 percent of diesel or shuttle car units with elimination of high mechanical wear areas, i.e., cables, flights, etc.
- Production increases - Production increases of 10 to 30 percent are being achieved because of capacity, ease of multi-car use, and increasing miner load time.
- Face congestion - Considerably reduced when multiple cars are utilized because cables are eliminated.
- Flexible use - Battery haulers are designed to perform other tasks in underground mining; i.e., supply, and cleanup at the face and feeder and other support tasks.
- Machine conversion - Battery haulers are designed for easy conversion to operate in different seam heights, lower or higher, without major capital reinvestment. This is typically accomplished by tire and rim, gear change and the possible addition or deletion of sideboards. Battery AMP hour capacity and height must also be considered.
- No special ventilation - No special ventilation is required to operate battery haulers in the face area.
- Ease of maintenance - Haulers are designed with major components accessible from side of frame to facilitate maintenance in low conditions.
- IGBT controls - New transistor controls are now standard with Stamler haulers; these are the latest in controls, offering benefits of added low-end torque, diagnostics for ease of troubleshooting, and more efficient use of battery current, giving better battery shift life.

Now that I have presented battery haulers as a viable method of meeting haulage demands, Jerry will give you a different look, continuous haulage, which has its merits and advantages.

Jerry Lovitz: Jeff, I liked that introduction of a tag-team; it sounds more like a wrestling match than discussion on battery and continuous haulage.

BRIDGE TYPE CONTINUOUS HAULAGE MERITS AND USAGE

JERRY LOVITZ

Lake Shore Mining Equipment, Inc.
Lexington, Kentucky

INTRODUCTION

As most of you know, the concept behind continuous haulage is to keep your miner in the face cutting and loading coal and transferring the coal onto your belt conveyor with no interruptions. With continuous haulage, the gains in coal production are realized by eliminating car change-out time behind the miner. Your miner is allowed to cut an entire place without stopping and starting repeatedly while cars are being cycled. And with Stamler's High Capacity Haulage System, rated up to 51 tons per minute, your miner's output is not restricted by a haulage system that cannot convey the coal as quickly as the miner can load it out. The improvements in production with continuous haulage can be significant, usually 25 percent to 30 percent, with a large number of coal producers realizing significantly more.

BACKGROUND

Since some of you have never had the opportunity to see a haulage system in operation, I would like to begin my discussion by reviewing the two types of continuous haulage systems available, define the machinery used in a bridge type continuous haulage system, explain how the system works, and look at some of the requirements for using continuous haulage.

Over the past 20 years or so, several manufacturers have offered a haulage system that utilizes a single belt or conveyor chain that runs the full length of the system for conveying mined material. This type of system has generally been referred to as a "snake" because it resembles a large snake as it tries to move from entry to entry. The benefit of this type system is that it requires only one person for operation. The concept sounds good, but in reality, the machines are extremely complex and require a tremendous amount of maintenance. Their performance over the years has been lackluster because of maintenance requirements and because their through-put capacity is less than half of what is available with some bridge type systems. Only a handful of these systems are still in operation today.

BRIDGE TYPE CONTINUOUS HAULAGE SYSTEM

A bridge type continuous haulage system consists of a series of mobile bridge modules (MBMs) and conveyor bridge modules (CBMs), which are

connected together in alternating fashion that allows your mined material to flow continuously, in a cascading fashion, from one module to the next until it is discharged onto your belt conveyor. In what is referred to as a "detached system," the haulage system is not connected to the continuous miner in any way.

The inby MBM is equipped with a small hopper that accepts coal from your miner. This module can also be equipped with a breaker unit to size mined material. When equipped with a breaker, this unit is referred to as a breaker car module. With an "attached system," the inby MBM is eliminated as well as one operator. A CBM is connected to the continuous miner at all times. The miner's trailing cable and water line is incorporated into the haulage system's cable handling system. A breaker unit is not utilized with an attached system, and an attached system is about 30 to 33 feet shorter, so the attached system has less reach.

The discharge end of the most outby CBM is attached to a tail dolly that rides on a track built into the Rigid Haulage Structure (RHS). This allows the coal to be transferred from the haulage system to your panel belt. Your panel belt rides in the RHS. The RHS is actually a very long tailpiece, complete with a tail pulley, and is the same length as the entire haulage system and your continuous miner. This arrangement allows the system to advance and retreat during the cut sequences. The RHS is nearly always located at the center entry. When the miner and system are changing places, the haulage system backs down the belt entry parallel to the RHS and then advances to the next place.

When the cut sequence in all faces has been completed and the system is "bridged out," the miner backs down to the inby end of the RHS and connects to it via a chain, then pulls it up to the next cross cut. Additional belting is added, normally with a belt storage unit, and additional belt structure is installed outby the RHS. Move time should typically take no more than 30 minutes.

The number of modules required for the system depends on the number of entries mined, mining centers, cross cut angles, and roadway width. Typically, the system should have enough reach to permit driving the outside entries just past the cross cut. Again, depending on mining centers, the RHS normally has to be advanced after each set of cross cuts are developed.

A detached, four-pair system, the most widely used, consists of four MBMs and four CBMs. It can mine a variety of centers and entries. For example, a four-pair system can drive seven entries on 55 feet by 80 feet centers, or it could be used to drive nine entries on 50 foot centers. Of course, selecting centers and number of entries depends on your particular reserves, but the system does offer flexibility. Each MBM requires one operator; thus a four-pair system used in this example would require a total of four operators.

Bridge type continuous haulage systems will not work in every mine. That is why Lake Shore markets Stamler continuous haulage systems and battery powered coal haulers. When discussing continuous haulage with potential users, we must consider a number of areas relative to their particular operation.

Seam Conditions. Good top permits deep cuts. The deeper the cut, the more productive continuous haulage is over other means of coal haulage. The miner is allowed to stay in the face longer cutting and loading coal thus eliminating additional car change-out time that would be required with rubber-tired vehicles. Draw rock, in-seam rock, or large lumps of coal coming off the miner indicates the need for a breaker car module. The breaker will size the material and allow it to pass freely through the system's transfer points and through the belt conveyor system. Hard, level bottom benefits any means of haulage. Unfortunately, mother nature didn't bless many of you with seams with good bottom. But with Stamler's unique dual motor/dual pump tram system, our haulage system has adequate power to tram through bad bottom and up and down grades. To negotiate rolls, the Stamler Mobile Module's receiving and discharge conveyor booms are pinned together in the middle of the machine to allow raising and lowering of the booms and connecting BCMs. Seam height, combined with bottom conditions and the presence and magnitude of rolls, will determine if enough clearance is available to operate the system.

Length of Panels. If reserves are small, if you are mining a mountain top seam, or if you have an old mine that has been mined extensively with only pockets of coal left, chances are you will have to drive short mains and panels. If this is the case, you should definitely purchase battery powered coal haulers. Since the rate of advancement is so fast with continuous haulage, long panels are required, typically in excess of 1,500 to 2,000 feet. Short panels will require too much move and set-up time. Ideally, continuous haulage should be set up in panels that will allow it to operate for long periods of time.

Pillaring. If you plan to do pillaring, and our friends in government will allow it, continuous haulage should allow you to set production records. When pillaring, the RHS must be pulled back every one or two sets of breaks (depending on centers). The RHS is usually pulled back with a winch, but some operators use a scoop and cable. Haulage systems are used extensively in the eastern U.S. for pillar work with excellent results.

Number of Entries and Mining Centers. These two factors determine the number of module pairs and operators that will be required. A pair consists of one MBM and one BCM. Most systems in use today are three-, four-, or five-pair systems with four-pair systems being the dominating choice. Any of these will allow you to mine a variety of different combinations of entries and centers. But keep in mind, the correct number of pairs will allow you to drive your outside entries just past the last cross-cut.

Roadway Width and Cross Cut Angles. The wider the road and the less abrupt the turns, the easier it is to maneuver the system. Roadways in all entries other than the belt entry should be at least 16 feet wide. The most common is 20 feet wide. The belt entry is normally 20 to 22 feet wide, depending on the overall width of the haulage system. Remember, the system must at times be parallel to the RHS in the belt entry. The system will work on 90 degree cross cuts, but it is much easier to operate through 60, 70, or 75 degree turns.

Super Sections. Continuous haulage is not designed for use on a super section. But will it produce as much as a super section? To find out, I recently spoke to an operator in West Virginia who just started running a true super section with two continuous miners, two miner operators, and six cars in one section, and one continuous miner and one four-pair haulage system in another section of the same mine. Conditions in both sections are identical. He runs very high tonnages on both sections and said the haulage section will produce 85 percent of the super section's numbers. You can do the math, but his cost per ton is higher on the super section because he has five more people on each shift on the super section. Two shifts a day–that's ten extra people that he pays salary, benefits, and exposes to underground hazards and potential workers compensation claims and lawsuits.

Longwall Development. Longwalls have become so efficient that timely panel development is a problem for a number of producers. Haulage systems can be used to drive longwall panels depending on block sizes and the number of entries mined. We currently have a Stamler system in eastern Kentucky that was used to develop longwall panels and since their reserves have been depleted, is currently driving three entry projections in former longwall barrier blocks and pillaring on retreat. A Stamler system is on order now that will be used solely for developing longwall panels in a mine in Alabama.

Management Style. This is probably the most important factor to consider in deciding to use continuous haulage. Management has to be aggressive and pro-active because operating haulage systems successfully will demand planning. If you are successful with your current means of haulage, this usually indicates that management is deeply involved with the daily operation of the mine and you will most probably be very successful with continuous haulage.

CONCLUSION

Bridge type continuous haulage systems are one of the most productive and dependable means of producing coal today. I hope I have given you a fairly clear picture of how they operate and where they can be used. And I hope that I have helped you decide if a haulage system may have a place in your mine.

Although Phil and I have tried to avoid making this presentation an "infomercial" on Stamler's battery powered coal haulers and continuous

haulage systems, we did want to make you aware that we are in the market place with very competitive machines. Since continuous miner manufacturers continue to offer new machines with increased cut and load rates, the industry is demanding more productive coal haulage equipment. Lake Shore Mining Equipment is meeting this demand by offering our innovative Stamler coal haulers and continuous haulage systems. These state of the art systems offer flexibility, large capacities, and reliability, and we will continue to enhance the performance of our machines. For example, in addition to our current continuous haulage systems, we are developing a new, high capacity, high quality, low seam system with features not found on any of our competitors' systems. Several experienced continuous haulage system engineers recently joined our staff and we can now say that we have the most experienced haulage system engineering staff in the world today. Hold on, this new low height system will be ready early next year.

Jerry Lovitz: Any questions?

Question: What is the height requirement and capacity of your system?

Jerry Lovitz: Our current system requires a minimum of 60 inches and has a capacity of up to 51 tons per minute. Our new low system will operate in seams down to 30 inches and will convey up to 35 tons per minute.

Jeff Hayden: Thank you Phil. Thank you Jerry. Our operation in White County has had the pleasure and pain of having shuttle cars, Joy FTCs, Stamler Ram cars; I don't know what else in the past three or four years, and I am sure there are many of you that want to have a lively discussion with these people. If this atmosphere is not comfortable to do that, I'm sure that any of them will meet with you afterward.

Our next speaker's topic is regarding some of the surface applications of mining although his subject is really a combination of surface and underground mining. Ian Carr comes to us from Ashland, Kentucky. He is the Manager of Engineering with Mining Technologies, and he is going to be bringing the highwall mining subject to us, particularly the advancements and improvements with the miners used in that application. Ian.

Ian Carr: Good morning, ladies and gentlemen. This is my chance to use my Kentucky accent. I've been working on it for 17 years, and I'm obviously very unsuccessful. Today, I would like to talk about the development of continuous miners as used in a highwall miner application.

DEVELOPMENT OF CONTINUOUS MINERS FOR HIGHWALL MINING

IAN CARR
Mining Technologies
Ashland, Kentucky

INTRODUCTION

By early 1992, Mining Technologies had moved the development of the Addcar System well down the path toward a finished machine. There had been significant advancement in the overall structural design of the Launch Vehicle, Addcars, and Stacker Conveyor. The mechanical, electrical and hydraulic components of each part of the system had become reliable and standardized. A total of six Addcar Systems had been constructed, each being a further step in the evolution toward a finished product. Over time, it became obvious that the continuous miner was the production bottleneck in most applications, for several reasons.

The duty cycle experienced in underground mining applications dictated the design of the continuous miner over the previous 20 years. Mining would occur for an average of 20 minutes of every hour, allowing plenty of time for the machinery to cool off and receive minor servicing or maintenance. By the mid- 1980s, the continuous miner had become more efficient than it's support equipment. The evolution of the machine was slowed by continuing downturns in the U.S. coal mining industry and a decreased market for continuous miners.

In the highwall mining application, however, the duty cycle is much more demanding. The efficiency of the Addcar System means the continuous miner can start into operation and produce non-stop for up to eight hours at a time. Off-the-shelf continuous miners were not built for this level of duty cycle, so a need was identified for a more durable machine. Continuous rated electrical motors instead of motors that had a one-hour duty cycle, oversized pins and bushings in the pivot points, and improved maintenance characteristics and costs were identified as crucial areas. Increased sump rates provided by the propulsion cylinders required a jump in cutter motor horsepower to prevent stalling, and gear cases would need to be strengthened to accommodate this horsepower change. To address this need, Mining Technologies sought proposals from U.S. manufacturers of continuous miners, but ended up being disappointed with the responses. Each of the manufacturers responded with slight modifications to existing machines. Negotiations eventually narrowed the choices to accepting a compromised design or designing our own continuous miner.

The proposed machine was to have double the productivity and horsepower of the current machines, and be designed for continuous duty, extended maintenance intervals, and longer rebuild cycles than the standard miner. The resulting machine was the Highwall Hog (fig. 1). This machine was prototyped in the United States in 1995 and quickly proved to be successful.

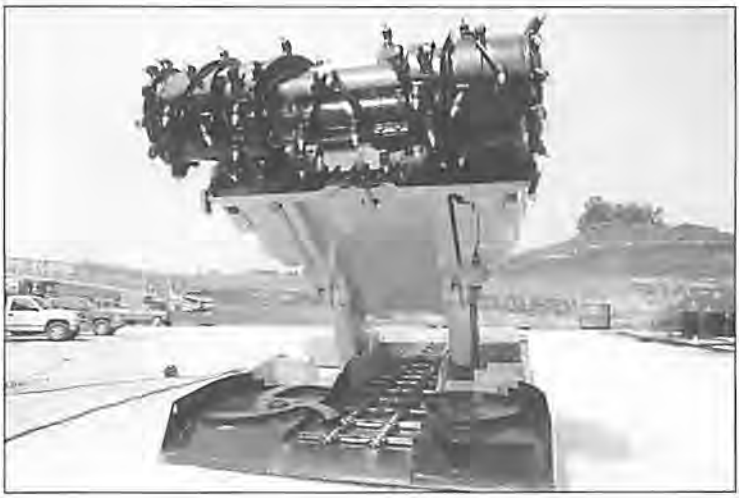


Figure 1. The Highwall Hog.

THE HIGHWALL HOG

The Hog cutterhead is powered by 700 continuous horsepower at 4160v, with 48-inch to 60-inch cutting diameter. The machine has a 46-inch wide, tail-driven conveyor which extends to the front edge of the gathering pan. The crawlers are 20 inches wide. The machine electrics are simple. Visibility is enhanced by a 15,000 cfm scrubber fan.

As with any other piece of prototype equipment, there were a series of modifications and redesigns before the machine performance was fully realized. Of these changes, the gathering head modifications proved to be the most challenging, because the large amount of coal that was being cut had to be removed quickly to enable the head to operate freely.

With success in the United States of the prototype machine being confirmed, a second generation Highwall Hog was built which incorporates all the design changes. This machine was sent to Australia, where it was commissioned at Moura Mine in January of this year, along with a new electrical control system developed by the company. A third Highwall Hog

was built this year and commissioned at Exxon's Ulan Mine earlier this month. A fourth Highwall Hog is currently under construction and scheduled to be in operation in December of this year at Capcoal in Queensland, Australia.

Success with the Highwall Hog has led to development work on a Mid-Seam Hog (fig. 2), which more accurately addresses the mining heights typically encountered in the United States. The machine will be a smaller version of the Highwall Hog, with a 42-inch cutting diameter. A decision was made to design, build, and test a cutterhead on an existing chassis.

Figure 2. The Mid-Seam Hog

THE MID-SEAM HOG

The new head went into production in June of this year, and has yielded impressive results - mining 330,000 tons in 54 days. It is powered by 550 continuous horsepower, and like its larger parent, has proven capable of overloading conventional gathering systems. The next step will be the development of a frame and conveying system suited to this increased production.

At very nearly the same time as the Mid-Seam head was being developed, Mining Technologies was faced with producing a Low-Seam continuous miner. This was largely due to the inability of existing small miners to produce coal at a rate suitable for highwall mining, coupled with the immediate need to mine in seams below 30 inches. This new machine would also be required to cut rock as the need arose. The result is a new-style chainless cutterhead with 400 horsepower driving 30-inch drums. As with

the Mid-Seam head, the initial focus has been on the cutterhead, which was mounted on an existing frame. Results have been promising so far, especially considering that the machine has had to cut through considerable amounts of rock.

Jeff Hayden: Thank you, Ian. We have one more speaker. His name is Phil Ott; he is from Freeman United's Crown III Mine; he is the Superintendent there. He is going to share with you some advances in productivity he and his company have enjoyed recently.

Phil Ott: Good afternoon. Is everybody ready for lunch?

SUPER UNITS

PHIL OTT

Crown III Mine, Freeman United Coal Mining Co.
Farmersville, Illinois

INTRODUCTION

The Crown III Mine is owned and operated by Freeman United Coal Mining Company and is located near Farmersville, Illinois on the Montgomery/Macoupin County line. We mine the Herrin (No. 6) Coal with 142 UMWA workers and 25 company employees. The coal is about 370 feet deep. The mine was opened in 1981, closed in 1982, reopened in 1985, ran until 1987, and finally reopened in 1990.

Super units are not a new concept. Everyone started super units back in the early 1980s when many mines were downsizing from 12, 13, 15 unit mines to 4 and 5 unit mines. We had extra equipment available that was easy to put into a super section.

The question today is whether buying a new continuous miner and the other equipment necessary to operate a super section can be justified. It was different when we already had the equipment. But could a super unit's performance justify the required capital expenses?

BACKGROUND

We had an opportunity which was better than normally exists in this industry nowadays, to increase production from 1.2 to 2.0 million tons per year, and, of course, we wanted to do it in the most cost-effective manner. We started studying different mining methods. We did a longwall feasibility study, but due to the prime flat farmland in our area, which sells for about $4,000 per acre, and the fact that we control no subsidence rights, coupled with the large capital investment for the longwall equipment, we decided longwalling was not feasible. To spend that much capital while presently surviving on the open market (no long-term contracts) would not be prudent.

We then looked at continuous haulage. We found that it was very condition-dependent, and we didn't have those mining conditions. We had tried it at our sister mine; they had some success with it, but our mining conditions do not allow forty-foot cuts. We did time studies. We were averaging cuts of 21 to 23 feet per place. We concluded that we would have the same problems or delays with continuous haulage that we are having with our present single miner sections. It meant we were cleaning up and moving very frequently, and the continuous haulage would not help us improve these delays.

We then studied super units. We decided that they were very flexible and would allow us to mine through bad conditions.

We also considered additional single miner units. We knew it would require more manpower, more ventilation and more company personnel. So, that is when we made our decision to focus on super units.

We wanted increased production and increased productivity through the addition of four men in each unit. We would stay a two-unit coal mine but make the units super units.

DESIGNING A SUPER UNIT

In designing a super unit, a lot of things must be considered. There are several different types of super units. First, we looked at the haulage. How many haulage units would we want in a super unit? We have been using three Joy 10SC32 shuttle cars in a unit, but we had to make a decision. Did we want to stay with cable cars? Ours were in need of a rebuild. Did we want to go to battery cars? What type of capacity did we want on our cars? We knew increased capacity would help increase our load time and increase our production. We had to look at the cost of our unit. When we looked at battery ram cars, we had to make a decision on how many batteries we would buy. We also had to look at our feeder's capacity. We decided on four battery ram cars. We knew if we had four, then we would also have three running, especially since once per day they change out batteries. The battery cars added more flexibility and eliminated the limitation of cables. We have widened our panels, and we go a little farther before a belt move. We knew that even if we got the same capacity as we were getting with cable cars, we would increase the flexibility by getting rid of the trailing cables.

We decided on three batteries for each of the four ram cars. We would operate with one on the car, one charging and one cooling. Out of six available unit shifts, we would run five shifts a day, and we knew that there would be some days when we run two days in a row around the clock. We knew we had to have three sets of batteries to stay up. If we had an idle shift every day we could probably get away with two batteries per car. But, we knew we were going to have to have three because we sometimes triple-shift several nights in a row.

Since we had to increase the capacity and through-put of the feeder, we had to purchase a new feeder.

The next design question was ventilation. Did we want to go with fishtail ventilation or did we want to stay with the single split ventilation? The fishtail would require more construction work, more overcasts, plus more stopping lines in the running sections, which would require much more manpower. Since we were really after increasing our tons per man, we decided on the single split. I think some call it a modified super unit.

The next design criteria was staffing, and there was a lot of controversy over this. We had operated with one foreman, two miner operators, three shuttle car operators, one utility man, one repairman and two roof bolters

full time, with an additional two roof bolters added roughly 80 percent of the time. We added four men: one shuttle car operator, two miner operators and one utility man. The controversy was with the addition of two miner operators. Should we classify them as repair mechanics who would assist the miner operators or should we classify them as miner operators? We classified them as miner operators with the agreement that they would service the miner during each shift.

Due to our mining conditions, we make 20 to 25 foot deep cuts. The miners are moving frequently, about every 20 minutes, and it is important to have two people there to move the machine. If we were getting 40-foot cuts, we probably would have looked at different operating alternatives. I think it depends very much on mining conditions what system one chooses and why.

We considered that other operations take one mine operator back and forth. However, with our frequency of moves and given their additional responsibilities, such as moving up pull curtains, servicing miners each shift and changing bits and sprays without losing time, we chose four miner operators.

The last design criteria was the layout of our super unit. We presently mine nine entries at a time on 60 by 60 foot centers. We also work nine rooms at a time when advancing on the return side and nine at a time when retreating on the intake side. The single miner sections averaged an 800 foot slice of coal with a panel. We are now mining a 1,200 foot wide slice of coal. We have increased the area of coal mined from the belt, decreased the number of seals and decreased the number of stoppings for the area mined.

PRODUCTIVITY

Whenever you are looking at continuous haulage, you have to look at the total mining system—look at the total manpower required for the system.

We had a base case that was mining around 1,100 clean tons per shift. We felt the super unit should get us 1,700 clean tons per unit shift—a 55 percent improvement! Our time studies showed this, and so far, we have averaged 1,700 clean tons per unit shift as soon as the first super unit was started. We just started our second super unit on August 25. That caused a decrease of our average for the mine; but we have been continually increasing production each month. The time studies showed we would get a 14 percent improvement from our place change times; due to our short cuts, we move more often.

If the miner is down in a single miner unit, this unit is completely down, while in a super unit, the other machine would continue to operate. This results in a 12 percent increase in availability. Also, the change out time, with always having a ram car available to be loaded, equates to a six percent improvement. And, conditions due to taking short cuts, bolting immediately, not cutting doubles, no triples, just overall condition improvement, and lower reject, we expected that we would haul more coal, not rock and see a nine percent overall improvement.

For the 14 percent improvement for cleanup time, we thought we would be able to start up the second miner while the first miner was cleaning up, as long as we did not turn the head on and cut any coal or hit the face with it. But, we were not allowed to do that. We are presently pursuing a petition to MSHA to allow us to do that. That represents an additional 14 percent we hope to pick up real soon.

PROJECT IMPLEMENTATION

The UMWA worked with us very well on project implementation. We had an LMPCP program in place at the time. We looked at different mines, and they were very instrumental in helping us. We currently hold Continuing Improvement Process (CIP) training to continually improve our operations. We had ram car training. Stamler Corporation came in and gave demonstrations for the underground employees which helped them learn their haulage routes. The loading of ram cars is very different from loading shuttle cars.

We have several rules. We limit our cuts to 25 feet, which is actually longer than we were averaging when we could have taken 40 foot cuts. We do not allow doubles or triples to be cut. We focus on getting our bolters into the cut immediately. We have found our reject consistently lower. We also keep our battery charging area within 1,200 feet of the face. We feel that is very important. I know some mines keep their charging areas at the mouth of the panels, but we did not want that; we keep it close to where our operators are. They change batteries once a day and are not gone from the face more than 15 minutes; that is important.

JUSTIFICATION

Does it pay to purchase the additional equipment required for a super unit? Like previously stated, our base case was 1,100 clean tons per unit shift. We increased that to 1,700 tons. We would have had to spend about 1.2 million dollars to have our shuttle cars rebuilt. We were looking at a 4.7 million dollar expenditure to go to super units, the cost for two super units, that is two additional continuous miners, eight new ram cars with three sets of batteries for each ram car, as well as two new feeders to handle the increased through-put. That gave us an incremental variance of $3.5 million. It all translated into an internal rate of return of 141 percent (see table 1). So our answer was, yes; it does make economic sense.

Table 1. Justification.

	Base Case	Super Section	Incremental Variance
Raw tons/shift	1,572	2,429	857
Clean tons/shift	1,100	1,700	600
Clean tons/shift	5,500	8,500	3,000
Tons/man	36.22	47.28	11.06
Incremental Capital Cost	<$1,200,000>	$4,730,000	$3,530,000
IRR	——	——	141%

CONCLUSION

I want to emphasize that the super unit is not the answer for all coal mines. It depends on mining conditions and time studies. If you are looking or thinking in this manner, you need to do a lot of time studies to see what you have and where you can go with it. I would say that if we were averaging 30 feet or better per cut, we would not be looking at the installation of super units. If your load time is good enough that you could not increase that time, then I think you would be looking at continuous haulage, or other alternatives, or would stay with single miner units.

Jeff Hayden: Thanks to all the speakers and thank you for your patience and sitting here and enjoying their conversations. Tomorrow our lineup is equally impressive with respect to an operations theme. We have roof control: past, present and future; preventive maintenance techniques using infrared technology; teaching mine emergency communications and last, but not least, a market outlook for the Illinois Basin. So I hope you can join us tomorrow. I would like to turn the program back over to John, if he is here, or Heinz:

Heinz Damberger: Just want to remind you before you go for lunch to make sure to visit our exhibitors; they are waiting for you.

John Lanzerotte: Just want to thank you all for being here.

Jeff Hayden: Exhibits are open from now until 7:00 p.m. Thank you all.

FRIDAY MORNING

BUSINESS MEETING

John Lanzerotte: Good morning. Thank you for coming to our business meeting this morning. I am John Lanzerotte, President of the IMI this year. Our first order of business this morning is the report of the Secretary-Treasurer, Heinz Damberger.

SECRETARY-TREASURER'S REPORT

Heinz Damberger: Well, this is the first year that we have really seen the effects of the mine closings. I had expected it to happen before now . The problem is that this all shows up in our income. Essentially all of our income sources, advertising, members dues, and exhibits are down; and so is attendance. At this point we have about 440 persons registered, about 160 exhibitors and 280 others. Some more will come in this morning, so we may still reach 600, which is considerably fewer than last year [*actual attendance this year was 502*].

In terms of dollars, our advertising is down over $700; dues are down about $1,100; income from exhibits has dropped about $7,000; registration fees are down about $1,200. Even with an increase in donations of about $2,000, this all adds up to about $9,000 less income. At the same time, our expenses are holding steady.

The Board yesterday talked about various ways to remedy our financial problems. Several income-raising actions were taken or considered. The Board decided to raise the dues by $5 which should generate about $3,000. We will approach coal companies, utilities, service companies and ask them for general sponsorship of the IMI. This year we received contributions of $1,400 support for the raffle and the fellowship hour. Also, to reduce cost, we will reduce the space that we rent in this facility. The Board also talked about a number of other options, for instance cooperation with the Indiana Coal Mining Institute or the Illinois Aggregate Association, particularly in the area of exhibits, and about getting the state's mine rescue competition to Collinsville to increase attendance and make the meeting more attractive to our exhibitors. The following actions to reduce expenses were taken or considered: reduce the meeting to one day; publish Proceedings with soft cover instead of hard cover; reduce scholarships; look for additional ways to reduce operating expenses, e.g., move out of this expensive facility back to a hotel.

Obviously, the Institute is unable to continue to sustain losses of the magnitude of the last year. I have always felt that we should not be below a balance of $20,000 in the course of a year; but our projections for the coming year indicate that if we don't do anything, our balance will drop below $4,000 at one point.

I have here copies of the financial report for anyone to look at. The report has been audited and approved by the Auditing Committee. If there are any questions, I would be happy to try to answer them.

FINANCIAL STATEMENT SUMMARY

Cash Balance Beginning 9/1/96	$30,251	Cash Balance Ending 8/31/97	$22,826
INCOME		EXPENSES	
Advertising	17,034	General Operating Expense	25,203
Annual Dues	16,115	Annual Meeting Expense	23,413
Luncheon Receipts	2,190	Publication Expense-Proceedings	11,476
Exhibit Fees	17,953	Scholarships	10,000
Registration Fees	2,920	Mining History Fund	67
Short Course	0	Subtotal Expenses	70,158
Interest	1,069		
Mining History Fund	0		
Souvenirs	146		
Convention Raffle	1,141		
Miscellaneous	321		
Vendor Fees	1,125		
Convention Cash	700		
Subtotal Income	62,733		
TOTALS	$92,984		$92,984

ASSETS AS OF AUGUST 31, 1997		
Fixed Assets		
Equipment & Furniture	$15,257	
Liquid Assets		
Cash	22,826	
Bonds	500	
	23,326	
TOTAL ASSETS ON 9/1/97	38,583	
TOTAL ASSETS ON 8/31/96	46,008	
1996-97 LOSS	$7,425	

John Lanzerotte: At this time I would like to ask Dr. Paul Chugh to report on the Honorary Membership Committee

HONORARY MEMBERSHIP COMMITTEE REPORT

Paul Chugh: Good morning. The members of the Honorary Membership Selection Committee were Steve Rowland, Mike Caldwell and myself. This year we have selected Mr. Fred Bowman as our honorary member and he will be honored at the luncheon today. Our committee has suggested

that we should slightly change the process of selection of honorary members. We are suggesting that we publish the qualifications for honorary members in the IMI Proceedings and we will seek nominations from the general membership. The committee will screen all the nominations; the Committee will submit its recommendations to the Executive Board for approval.

Yesterday, at the Board meeting, the Board approved this process. A committee will develop specific guidelines for selecting honorary members. We hope to implement the new procedure for the 1997-98 selection process.

John Lanzerotte: Before the Scholarship Committee report, Heinz would you like to report anything from the Advertising Committee?

ADVERTISING COMMITTEE REPORT

Heinz Damberger: Well, I already mentioned that the Committee has been a particularly good one in recent years. They talked at some length about our precarious financial situation as well and suggested the establishment of a corporate membership with a significant annual dues fee. The Board discussed this proposal and accepted it in principle. The Committee's strength, I am sure, helped us in maintaining a significant level of advertising in our Proceedings, with only minor losses each year. With a less active Committee, this loss would have been significantly higher, I am sure.

John Lanzerotte: Thank you. I would just like to recognize the Committee for the tremendous job they do.

NOMINATING COMMITTEE REPORT

President Lanzerotte presented the slate for officers and board members as proposed by the Nominating Committee.

President:	Gregg Bierei, Arch of Illinois
First Vice President:	Steve Rowland, Kerr-McGee Coal Co.
Second Vice President:	Mark Cavinder, Old Ben Coal Co.
Secretary-Treasurer:	Heinz Damberger, IL State Geological Survey
Executive Board Members:	Will Border, Joy Mining Machinery
	Terry Bouvet, Peabody Coal Co.
	Mark Cavinder, Old Ben Coal Co. (to complete C. K. Lane's term to 1998)
	Phil Ott, Freeman United Coal Co.
	Sam Vancil, IL Office of Mines & Minerals

The slate was approved by voice vote.

SCHOLARSHIP COMMITTEE REPORT

John Lanzerotte: The next report is from the Scholarship Committee. John Devon is not here, so I'll just say the Scholarship Committee is a very

important part of the Illinois Mining Institute. We are all aware that the corporate support has dwindled and IMI scholarships are a key factor in attracting and retaining qualified mining engineers. The budget for 1997 was $10,000: $4,500 was awarded to SIU-Carbondale, $3,500 to University of Missouri-Rolla, $1,500 to Illinois Eastern Community Colleges, and $500 to Rend Lake College. At this time, I would like to ask each of the representatives of these four institutions to come up and give a brief status report. We will start with Dr. Paul Chugh.

Paul Chugh: Thank you, John. On behalf of SIU-Carbondale, let me begin by thanking the Illinois Mining Institute for significant support of the department and its students. Without the financial support of the IMI, we would have very limited scholarship support during these tough times. And I would hope that IMI could continue to support the schools at the present level. I know the IMI is going through some tough times, but I am willing to do whatever I can within my power to raise some money so that you can continue to support our schools at the current level. At this meeting, I usually give a brief report of our department, and I am happy to report that the department is in extremely good health and alive and well and kicking.

More specifically, let me go into the undergraduate education part. We had 28 juniors and seniors in the fall of 1997, which would be equivalent to a 60 to 70 student enrollment in other departments. We graduated eight students during 1996-97 and all of them were placed. We also placed more than 20 students for summer jobs throughout the U.S.

In the graduate education area, we have 15 Master's and Ph.D. students. We graduated five master's people in 1996-97 and we will also have two Ph.D. students coming out; one has already finished and one will come out in May 1998.

We have a strong research program in support of our coal industry. There are three areas in which we are doing a lot of work. One is management of coal combustion byproducts: fly ash, scrubber sludge, and bottom ash. We had a coal grant from DOE. We have developed a technology for paste back filling. Based on the success we have achieved, the state of Illinois has given us a project to demonstrate this technology in an active mine to pump 20,000 tons and increase coal extraction by five to eight percent. This project will be done in collaboration with Freeman United Coal Mining Co., and was approved less that two weeks ago. We believe that if this project is successful, we can reduce the cost of coal production by about $2.50 to $3.00 a ton; a very substantial reduction.

We will also be demonstrating a fly ash container within the next two weeks. You will be able to get fly ash in and out of the container at about 100 tons an hour. You will be able to control dust and, in addition, it is cheaper. We have run the economics of this technology as compared to truck transport and pneumatic cars, and it is by far the least expensive. You will be able to put it on a flatbed rail car, you will be able to put it on a flatbed truck chassis, and you will be able to put it on a barge.

Another area that we are doing well in is coal processing. Dr. Honaker is working on optimization of coal processing plants.

In the service area, I think we are again extremely active. In collaboration with MSHA we provided some support in the area of mine health and safety. We had a very large conference on the management of coal combustion byproducts, which went extremely well. We are working very closely with the U. S. Office of Surface Mining (OSM) to develop a technical manual on management of coal combustion byproducts. So we are a very active department.

Let me just share with you one more item. As I reported to you last year, the Bureau of Mines was abolished, and it was basically merged with National Institute for Occupational Safety and Health. Now within NIOSH, they created a position for Associate Director for Mine Health and Safety. Only yesterday, they announced the appointment of Dr. Larry Grayson as Association Director, who is with us today. He will move to Washington to become another bureaucrat, effective November 3, 1997. Larry would you stand up and be recognized. [APPLAUSE].

Your financial support of $4,500 last year went to five students; three of them are already working. we give our scholarships a year behind. Chris Russell will be here for the luncheon.

In summary, the Department is doing well, with your support, and I hope you will continue your support. Thank you.

John Lanzerotte: Thank you, Dr. Chugh. Is there anyone here from the University of Missouri?

Larry Grayson: I am probably going to do a horrible job, pinch-hitting for John Wilson. First, it has been a pleasure for the past year and a half being in the Department of Mining Engineering at UMR. We currently have 81 undergraduates, excluding a bumper crop of 31 freshmen, bringing our undergraduate total to 112. We also have 11 graduate students, giving us a total of 123 students in the department. And, finally, we have three post doctoral fellows.

We have four exchange students studying at UMR from Western Australian School of Mines (Kalgoorlie), and one of our local Missouri students is studying in Kalgoorlie this semester. John has three or four other exchange programs being set up that will provide opportunities for our students to study and work at other international mining universities.

Now, jobs. For the past few years, we have been graduating between 18 and 25 students; however, this year, we went down a little bit and only 16 students graduated. Of those 16 graduates, all but one were placed. That individual did not have any summer job experiences despite the strong advice we give about the importance of some mining experience. Many of you are very kind in hiring the summer students, as when they come back to the classroom, they keep the professors honest as well! So, one did not get placed, and that was the main reason. The other 15 were spread out among all the various sectors of the mining business. A total of three went to coal this time; that varies each year, sometimes it may be as many as a

third of the graduates go to coal. There were eight who went to industrial minerals, there were a number in hard rock, both surface and underground–a pretty wide diversity. It is pleasing that there indeed were jobs, as most of the students had two and three offers.

The scholarship recipients from IMI this year come from Arlington Heights, Decatur, New Berlin, and Lincoln, all from the state of Illinois. There were one freshman, one sophomore and two seniors. Again, we are very appreciative of this Institute's support.

A number of other research projects are going on. Dr. Wilson has been involved in the coal pipeline project for several years now. It is slightly futuristic, but it is moving along, and we are up to the point where we are testing six-inch logs running in trains through a pipeline loop that is approximately 350 feet in length. There is continuing funding for probably another year for this project. This project has been ongoing for seven years at about $80,000 to $100,000 per year. We have just recently finished, temporarily, we hope, the Illinois Clean Coal Institute project on fine coal drying and briquetting. We are currently working with Komarek, Inc., down in Alabama and hope to eventually take this process to one of the preparation plants here in Illinois. To continue the project from the ICCI point of view, we must start a trial at a coal prep plant and demonstrate that we can make robust briquettes with 8 percent moisture and 4 percent weight loss in the briquettes.

Another interesting project is the use of soybean oil for development of explosives. This has been tested underground already at the UMR experimental underground mine. Dr. Paul Worsey, the person responsible for this research project, is here at this meeting today.

There are other research projects being carried out at the Rock Mechanics Center involving water jetting and rock cutting; however, I am not sufficiently knowledgeable in these projects to report. Thank you for your continued support.

John Lanzerotte: Thank you, Larry, for that report. Now I would like to call on John Howard of Illinois Eastern Community Colleges.

John Howard: Thank you, John. A week ago last Tuesday, I was coming back from a Board of Trustees meeting about 11:00 o'clock , and I could not resist the temptation to take exit 34 and drive up to Monterey No. 2 Mine. I went down the side road, stopped the car—I don't want this to sound maudlin—got out and looked at the lights of the preparation plant with the conveyors unlighted and no drone from the mine fans; weeds about a foot tall in the parking lot–it was a somber moment. It has been repeated too many times in the last few years.

On the other hand, there are some, relatively speaking, bright spots. We are, in the last month and coming weeks, doing four new miner classes–albeit the people who have been laid off and have been recalled–and for some actual new hires. In fact, our lead instructor for the Southeastern Illinois College site in Harrisburg was planning to be here to introduce all three of our scholarship recipients, but was called Wednesday night to do a new miner class starting Thursday morning. So there are some bright

spots. I commented last year, and I think it is perhaps more appropriate today, that despite the grim news, there are still people who are pursuing careers in the mining industry. And those who are, like Larry said, without a doubt committed and dedicated students and have a purpose. Whether it is for family tradition or for reasons we don't understand, they want to mine coal.

As a result, we are successfully maintaining a two-year associate degree program. Part of the incentive is the Capstone program with SIU-Carbondale which permits people to transfer into a baccalaureate program as a full-fledged junior. But another incentive is for people who want to upgrade skills, programmable controllers, for example, and other areas where they are looking for legitimate skills to help the industry–and to help themselves.

On behalf of our four locations–Marissa, Girard, John A. Logan College and Southeastern Illinois College–on behalf of the administration, faculty and staff and students our support people, once again I want to thank the Illinois Mining Institute for its continued support.

John Lanzerotte: Is there anyone here from Rend Lake? Is there any other business or any other issues that anyone would like to bring up at this time? Before we close, I would like to remind everyone to stick around. The technical session is going to start in about 15 minutes in this room. Jeff Hayden, the Chairman of our technical session group, has put together a good program this morning. Also, we have our luncheon meeting at noon, at which Darrell Auch, Vice President of West Kentucky Operations, Consolidation Coal Company, is going to give a keynote address about the future of the Illinois coal business. So we should have an entertaining morning and afternoon ahead. So, with that, we appreciate your attendance, and that concludes this morning's meeting.

TECHNICAL SESSION: PROGRESS IN MINE OPERATIONS II

Friday, September 26, 1997
Mississippian Room, Gateway Center

Jeff Hayden: Thank you and welcome to the 105th annual meeting of the IMI. Today's technical session should be one that pleases you. It is one that we tried to make an operations theme, too. One that will bring the operations people out to the IMI. Fortunately, the topics today are not 105 years old; they are current topics. They should help improve our operations. We start out with roof control and go onto some preventative maintenance, into some safety, and then we wind up with a market outlook, which I am sure everybody is interested in. After the technical sessions are over, there is a luncheon. Darrell Auch will be the keynote speaker there, also speaking on the Illinois Basin coal market.

So, thank you for coming. We have a good lineup today. Our first speaker scheduled was John Stankus from Jennmar Corporation. But, he

had a very intense project that came up that he had to be there for, and stepping up for him is Bob Pride. Bob is fully qualified to give this talk and knows the subject matter very well. Please welcome Bob Pride.

Robert Pride: Thank you, Jeff. I am really pleased to be here. I want to extend John's thanks and his sincere apology for not being able to be here today. What he is actually doing is similar to some of the things you will be seeing in the presentation. He had to be present for a cut-through on a pre-driven roof that has no free-standing support. If you have any questions during this presentation, please talk to me afterwards.

MINE ROOF CONTROL: PAST, PRESENT AND FUTURE

JOHN C. STANKUS
ROBERT B. PRIDE
Jennmar Corporation
Pittsburgh, Pennsylvania

INTRODUCTION

The mining industry in the United States has experienced considerable change over the past 20 years. As mining methods change, the mine environment, ventilation, haulage, transportation and roof control must change with it. Roof control has been and will continue to be the most visible and critical element of change in order to accomplish both safe and cost-effective mining. As mining becomes more advanced, ventilation can be adapted by installing larger fans or more fan shafts. Conveyor haulage can adapt by simply going to a wider, stronger belt, and increasing horsepower. Roof control, however, is still integral to the mining cycle. Both the rate of mining and the ground conditions must be dealt with adequately. The amount of support provided must be carefully considered depending on the stress conditions and geology. Also to be considered are the conditions induced by the mining method, and the time required for the entry to remain safe for passage of personnel, equipment and ventilation. The theme of this paper focuses on ground control engineering in the past, engineering that is currently available, and then what the future holds as we head into the year 2000.

PAST

In the past, a simple pull test has been used to confirm that a particular roof bolt will anchor in the strata sufficient to provide the required support. The industry learned that higher installation tension and stronger grades of steel allowed roof bolting to perform better. By advent of anchorage enhancing resins, roof bolt selection and design lent itself more and more to a science. In the more recent past, Jennmar engineers began evaluating the actual performance efficiency of roof bolts as follows:

This paper presented at the IMI meeting by Robert Pride.

- Roof Strata Investigation
- Load Cell Tests
- INSTáL Roof Bolts
- Jennmar Roof Control Cadd Design

Roof Strata Investigations. Roof strata investigations require the use of the stratascope which has the ability to observe the roof up to 20 feet above the roof line through a normal drilled test hole. The roof can be observed immediately after mining as well as over time. The stratascope locates fractures, separations, roof cutters, and horizontal movement. Review of rock core data and roof falls within the areas are correlated with the stratascope studies.

Load Cell Tests. Load cells are installed with the roof bolt to measure both the installed load immediately imposed upon the roof and the amount of load as a function of time. Bolt tension is not just a function of installation torque. Tension losses due to friction at the roof plate area and within the anchorage system can lessen the installed load on the bolt. The load cell is used to measure the net tension in the bolt and then compared to the torque applied. The efficiency of the bolt system is the ratio between tension in the bolt and applied torque. This is referred to as the tension/torque ratio. These types of engineering measurements revealed the need for bolt performance efficiency. INSTáL type roof bolts were then designed to optimize performance.

INSTáL Roof Bolts. The INSTáL roof bolt system was designed to minimize friction at the point of contact at the roof bolt plate. This is accomplished by using an anti-friction washer (AFW). Due to less friction and more effective torque, the AFW allows more revolutions of threads within the bolts expansion unit for any given torque. This results in increased anchorage and bolt tension. Also, by introducing a resin compression ring, the amount of resin required for any rock strata can be minimized (Stankus, 1990a). The overall result is a much more efficient roof bolt in terms of installed load and increased rock stabilization.

Jennmar Roof Control Cadd. A computer software package has been available for several years from Jennmar Corporation that utilizes mine site data as input (Stankus, 1990b). The Roof Control Cadd will calculate and draw the roof control plan for either intersection or entry with horizontal and plan views. The recommended bolting pattern will be rendered. Pull tests are automatically plotted and cost alternatives are generated.

PRESENT

In discussing the present, the following will be covered:

- Instrumentation
- Finite Element Analysis
- Optimum Beam Effect

- Cribless Tailgates
- Longwall Recovery
- Design of Latest Cable Support Systems

Instrumentation. Current roof control engineering is especially involved in monitoring ground movement and stresses already inherent in the rock as well as the combined effect once influenced by mining.

Instrumentation commonly used is as follows:

1. Stressmeter: a device implanted within the coal pillar or roof to register the amount of overburden and abutment load.
2. Sonic Probe Extensometer: a device installed in the roof extending above the theoretical failure arc. Very accurate measurements can be taken to reveal the exact amount of vertical roof movement at multiple locations.
3. Convergence: convergence control points are installed in the roof to monitor roof rock movement and shift both longitudinal and transverse with the entry.
4. Strain Gaged Bolts: specially prepared bolts that measure differential loading of a roof bolt system.

Finite Element Analysis (FEA). Basically, the finite element method is a numerical technique in which the problem domain is discretized into a finite number of elements, given material properties and boundary conditions, and then the various stress components and displacements are calculated. In the Jennmar Finite Element Analysis system (JFEA), a family of 2- and 3-dimensional generic finite element models for different mine layouts have been designed. By inputting actual mine site-specific data, a variety of ground control problems including roof bolting design, longwall support, pillar design, and surface subsidence can be solved (Stankus and Guo, 1996).

Due to today's high capacity portable computers, it is possible to perform at the mine site in approximately one hour what used to take days to do on high end and very large computers.

Optimum Beam Effect. In recent studies (Stankus, 1995; Stankus and Peng, 1996), it has been shown that for any given roof bolt with fixed installed tensioning, an optimum length of roof bolt exists. This in turn produces the optimum beam effect (OBE) on the rock strata. Case studies conclude:

- A shorter bolt with higher installed load can produce a stronger beam than a larger bolt.
- For the same length of bolt, the larger the installed load or pretension, the smaller the deflection of the beam concerned, hence a stronger beam.

- The bolt with the higher installed load induced a smaller beam deflection within the bolting range. The smaller deflection within the bolting range results in a smaller deflection in the roof above the bolting range.
- The longer the bolt, the larger a load will be induced in the bolt as a result of *in-situ* or mining related stress.

These results clearly indicate that many mines have the opportunity to both lower costs and improve roof control at the same time.

Cribless Tailgates. Utilization of new high-capacity roof truss systems results in elimination of crib blocks for tailgate entry support (McCaffrey, et al., 1994). As required by law, a systematic supplemental support system must be maintained in longwall tailgate entries. Until recently, this supplemental support was primarily in the form of wooden cribs. By installing trusses, labor costs and material handling is greatly reduced. Through proper mining condition evaluation, overall bolting systems can be designed to allow the implementation of trusses in lieu of cribbing.

It has been learned through various case studies that mines which experience a large degree of horizontal stress and lateral movement may experience some breakage of traditional rigid rod trusses. Utilization of new, high-capacity cable trusses are not susceptible to this type of failure and have controlled this condition very effectively (Oldsen, et al., 1997).

Longwall Recovery. Longwall recovery chutes are being designed with the aid of finite element analysis and are very successful while implementing the high strength cable bolts and trusses.

Cable Systems. Cable support systems are available in .5 inch (20 ton rated), .6 inch (30 ton rated), and recently, .7 inch (40 ton rated).

Cable ground control systems include supplemental support from vertical passive type cables and active high tensioned trusses. These systems have been particularly successful in longwall gateroad support (Oldsen et al., 1997).

The cable systems are also applicable to brow wrapping and pillar wrapping. Pillar wraps may be implemented on entire pillars, or on partial areas of pillars. The cable wrap systems are flexible in application and very cost effective.

FUTURE

Into the year 2000, we will see the following areas receiving increasing attention:

- Increased Knowledge of Shorter Bolt Applications.
- Longwall Recovery.
- Tensionable Cable Bolts.

Increased Knowledge of Shorter Bolt Applications. Through more case studies (Stankus and Guo, 1997) and mine specific instrumentation programs, we will learn more about the implementation and the limitations of the shorter bolt length concept. The result will be superior, safer, and yet less expensive roof bolting.

Longwall Recovery. Recovery Chutes: More mines are having success with recovery chutes due to proper chute and support system design. The recovery chute concept will be refined and become a common practice.

Full face recovery: Interest in pre-developed recovery rooms will increase as continued studies allow for custom design per individual cases. Through continued efforts of those anxious to improve mining efficiency, knowledge will be gained to allow effective pre-driven recovery room design.

Tensionable Cable Bolts. Also, new tensionable cable bolts will permit installation of these systems on cycle as part of the primary roof support plan. From a ground control and safety standpoint, the installation of these systems at the face, as soon as possible after mining, will better control conditions. From a cost standpoint, being able to install these systems on cycle will greatly reduce the high costs associated with outby installation of supplemental support.

CONCLUSION

Due to more difficult mining conditions and associated costs, mining will continue to strive for safer, better, and more cost effective ground control. Only through continuation of the type of engineering efforts as highlighted in this proceeding, will those goals be achieved.

REFERENCES

McCaffrey, J.J., and J.C. Stankus, S.S. Peng, 1994, "Bailey Mine Eliminates Cribbing in the Tailgates," Coal, (May), MacLean Hunter, Chicago IL.

Oldsen, J.G., and J.C. Stankus, S. Guo, A.W. Khair, 1997, "Continuing Development of Innovative Cable Support Systems," Proc. 16th International Conference on Ground Control in Mining, edited by S.S. Peng, West Virginia University, pp.117-129.

Stankus, J.C., 1990a, "Jennmar Compression Roof Control System," Proc. 9th International Conference on Ground Control in Mining, edited by S.S. Peng, West Virginia University, pp. 22-29.

Stankus, J.C., 1990b, "Designing Roof Control Systems," *Coal* (May), MacLean Hunter, Chicago IL.

Stankus, J.C., 1995, Design Criteria for Tensioned Point Anchored Resin Assisted Roof Bolt Systems, Ph.D. dissertation, West Virginia University, December, 126 p.

Stankus, J.C. and S. Guo, S.S. Peng, 1995, "Truss Systems for Longwall Tailgate Support - Update," Proc. 14th International Conference on Ground Control in Mining, edited by S.S. Peng, West Virginia University, pp. 1-8.

Stankus, J.C. and S. Guo, 1996, "Computer Automated Finite Element Analysis - A Powerful Tool for Fast Mine Design and Ground Control Problem Diagnosis and Solving," Proc. 5th Conference on the Use of Computers in the Coal Industry, edited by S.D. Thompson, R.L. Grayson, and Y.J. Wang, West Virginia University, pp. 108-115.

Stankus, J.C. and S.S. Peng, 1996, "A New Concept for Roof Support," Coal Age (Sept.), MacLean Hunter, Chicago IL.

Stankus, J.C. and S. Guo, 1997, "New Design Criteria for Roof Bolt Systems," Proc. 16th International Conference on Ground Control in Mining, edited by S.S. Peng, West Virginia University, pp. 158-166.

Jeff Hayden: Thank you, Bob. Any questions for Bob?

Robert Pride: Like I said, if you have any, come up and get with me.

Jeff Hayden. Thank you, Bob. Our next speaker comes to us all the way from Louisville, Kentucky, this morning, and he didn't fly. His name is Jim Lancaster; he will be discussing preventive maintenance with a technique that uses infrared technology. The coal mine where I work, White County Coal Corporation, has used this technique for the past two years, and it is tried, tested and true and is paying out for us. I think you will find it very interesting. Questions for the speakers can be made afterwards. Don't be bashful; they do want to talk about their subjects. If you are not comfortable asking questions in this environment, you can wrestle them down after this is over with, and they would be glad to talk to you about their subjects. Jim Lancaster.

Jim Lancaster: Thank you. I am with Infrared Technologies, and I also work as a representative for Infrared Systems. So, basically I have been working in infrared now for almost ten years. One of the things that is becoming much more common is electrical testing.

PREVENTIVE/PREDICTIVE MAINTENANCE WITH INFRARED IMAGING

JIM LANCASTER
Infrared Technologies
Louisville, Kentucky

INTRODUCTION

Infrared imaging was originally developed for use by the military. In the 1970s technology became physically smaller and less costly, resulting in the recognition of many new industrial/commercial applications. Even today we continue striving to make the imager smaller and more capable of managing constantly emerging industrial/commercial applications.

Fortunately for the Preventive/Predictive Maintenance, the application benefit has been documented since the 1970s, and is by far one of the most universally recognized infrared applications. The technology has continued to improve in attempts to satisfy this rapidly growing market, making the technology significantly easier to use.

WHAT IS INFRARED IMAGING?

Infrared imaging is a method of detecting radiance or heat of the surface of an object without touching that object. A modern imager will measure more than 78,000 targets simultaneously at a speed of 16.667 milliseconds or 60 times per second. The varying energy levels (heat) are then represented by one of 256 colors. The lighter colors usually represent warm and darker colors normally represent cool. When the colors from each of the 78,000 detectors are combined they appear as a thermal picture.

What can detecting radiance or heat do for me?

Electrical systems will develop heat when such things as poor connections, component degradation and overloading impede electrical current flow. When we identify this heating, we can often very accurately detect the problem source and perform repairs prior to complete failure or at least avoid many nuisance power interruptions due to prematurely failing fusing or unnecessary tripping of breakers, etc.

Although failures in your high voltage systems are more catastrophic, many consumers realize the greatest benefit in inspecting their low voltage systems. Because of the normally higher current loading, increased thermal stress from cyclical usage, and more environmental contact due to its placement near production equipment that often involves dirt, vibration, and more frequent operator contact. The compounded costs of many small

problems over time can be significant. Mechanical systems benefit from detection of overheating motors, failing refractory or insulation, roof moisture detection, and bearing wear, improper lubrication and misalignment.

Why should I use infrared imaging?

Many industrial and commercial consumers benefit from applying infrared imaging in their preventive/predictive maintenance programs by reducing the amount equipment shut downs that effectively reduces equipment and occupant production losses. Reduces repair costs by allowing a planned repair often using existing components rather than complete and emergency equipment replacement. This not only will reduce repair costs but also will reduce the required labor time.

What should I expect from an infrared inspection?

An Infrared Inspection is unfortunately a subjective interpretation of what an inspector will identify. The interpretation is dependent on the targeted equipment's operating situation, the inspection equipment capabilities, the inspector's work ethic, knowledge and experience. The documentation should contain an infrared image of sufficient quality to clearly identify problems and properly measure the temperature of the given target.

It has long been a misconception that imagers take temperatures at a cross point; rather, they measure an average of a square (shape of the detector) that is larger the further you remove yourself from the target. Improper use of optics will significantly affect your measurement and optical performance. The provided documentation should be set up in a work order format to efficiently guide you through the repair. Unfortunately, no inspector can always be 100 percent accurate; we still rely on human interpretation and stable operating conditions, of which neither can be guaranteed. But you should be able to expect very high accuracy from an experienced inspector with appropriate equipment, enabling you to receive a significant benefit from the effort.

Jeff Hayden: Any questions for Jim? I can thoroughly endorse Jim and his products; we have used them for quite some time and they have paid off handsomely. We will take a stretch break for a minute or two and get the blood flowing again for our next two speakers coming up.

Jim Folkerts: Jeff Hayden was called away for a funeral. My name is Jim Folkerts. I work for Joy Mining Machinery in Mt. Vernon. It is my pleasure to introduce the next two presenters. First of all, we have Charles Vaught. Charles is a doctor of sociology, working for NIOSH at Pittsburgh Research Institute. He is going to talk to us today about teaching emergency communication skills.

Charles Vaught: I wonder how a presentation on emergency communication would be received at a conference with an operational theme, but realistically there are some situations in which, if you don't communicate, you may cease to operate. So, I decided that I fit very well with the theme of this conference. Some of the things that we have found in our research have translated into some very practical training interventions that I think you will find interesting.

Jim Folkerts assumes chairmanship of Friday Technical Session.

TRAINING FOR EMERGENCY COMMUNICATION: THE COMMUNICATION TRIANGLE[1]

CHARLES VAUGHT

National Institute for Occupational Safety and Health
Pittsburgh, Pennsylvania

ABSTRACT

Research has shown that when a mine emergency occurs, the information required for effective response does not always get to the people who need it. While this is due sometimes to equipment failure, often it has been because the content of the warning message was inadequate. It is important that everyone at a mine knows what information to include when they are reporting an emergency and what questions to ask when they are receiving a warning. This presentation focuses on the content of emergency warning messages, and outlines a procedure that can be used by senders and receivers of emergency communications. The content and procedures are incorporated into training materials intended for use in short sessions such as start-of-shift safety or "toolbox" talks. The information can be presented in approximately 15 minutes and is appropriate for all workers at all experience levels. While examples and illustrations have been taken from the underground coal mining industry, this training can be tailored to any work setting by substituting appropriate examples.

The training packet contains an instructor's manual, a set of figures depicting parts of a "communication triangle," and decals showing the complete procedure. The instructor will need to prepare the figures in a form that can be seen by all class members. Some suggested methods are: 1) overhead transparencies, 2) laminated pages that can be held up for small groups, or 3) handouts with copies of the figures for each trainee. The training can be supplemented with decals featuring the communication triangle. These can be placed on hard hats, telephones or other devices to remind workers of the key information required to effective emergency warning.

The Communication Triangle–Basics

Most miners have studied the fire triangle at some time in safety training. (The sides of that triangle are fuel, oxygen and heat) A similar triangle can also be used for emergency warning communications. Here is what each part represents:

[1] Based on the research of Launa Mallett, Michael J. Brnich and Charles Vaught and presented at the Illinois Mining Institute Annual Meeting, September 26, 1997, by Charles Vaught under the title "Teaching Emergency Communication Skills."

WHO When reporting an emergency or receiving a warning, the first thing to do is identify yourself. This is important because people react differently based on who gives them information.

WHERE This may seem like common sense, but location isn't always given (or requested). As a result, miners may have to make decisions about such things as escape routes without knowing the source of the problem.

WHAT Next, tell exactly what is occurring. This does not always happen in an emergency. Valuable time can be lost as a result.

WHO, WHERE, AND WHAT It seems simple. But if we don't think about it, the job of communicating good information doesn't get done.

The Communication Triangle–Details

After providing the three most important pieces of information (Who, Where, and What), there are details that you should give to help speed up a response to an emergency.

MINERS Is anyone hurt? Has everyone been accounted for? When and where was a missing person last seen? If someone might be in trouble, make them the highest priority by reporting what you know.

EVENT Will this problem require a first aid kit or an ambulance? Should we call for mine rescue teams or just a couple of fire extinguishers? Report exactly what you are facing.

RESPONSE What's been done so far? (No need to duplicate efforts.) How many people are on the scene? What equipment is on scene? Be specific about that equipment is needed.

The Complete Picture

When reporting or receiving information about an emergency, be sure to cover these six points. This might take a little time, but it will save everyone time in the long run. People will react more quickly, their reactions will be more appropriate, and the response will be better coordinated. If you are reporting an emergency, go through each step and give whatever information you have about each point. If you are receiving a warning, go through each step to be sure you're given all the information that you need to protect yourself.

REFERENCES

Auf Der Heide, E. (1989). Disaster Response: Principles of Preparation and Coordination. St. Louis, Mo.: The C. V. Mosby Company.

Mallett, Launa, Charles Vaught and Michael J. Brnich, Jr. (1993). "Sociotechnical Communication in an Underground Mine Fire: A Study of Warning Messages During an Emergency Evacuation," *Safety Science*, 16, pp. 709-728.

Nigg, J. M. (1987). "Communication and Behavior: Organizational and Individual Response to Warnings," *in* Sociology of Disasters: Contributions of Sociology to Disaster Research, R. R. Dynes, B. De Marchi, and C. Pelanda (eds.), Milan, Italy: Franco Angeli, pp. 103-116.

Jim Folkerts: Anyone have any questions for Charles? We appreciate it, Charles. Communication skills on a daily routine basis, let alone emergency situations, are critical to all of our operations.

Our next speaker is John Hanou. He is a Principal at Hill and Associates, Inc., out of Annapolis, Maryland. His presentation is going to be on utility fuel choices under new environmental rules.

John Hanou: Good morning. First of all I want to find out if I can get from Charles a sticker if I don't have a hard hat, and whether or not I can get them for all of my kids? I'm sure he'll be happy to let some of those go. I want to thank the Illinois Mining Institute for inviting me here today to tell you a little bit about the changes that are occurring in the air emissions regulations and how they are going to impact the coal markets.

POWDER RIVER / ILLINOIS BASIN COAL DEMAND UNDER NEW ENVIRONMENTAL LAWS

JOHN T. HANOU
Hill and Associates
Annapolis, Maryland

INTRODUCTION

Since 1981, Hill & Associates has prepared the *"Outlook for U.S. Steam Coal Demand, Supply and Prices"* which is a 20-year projection of demand, supply and prices for major U.S. steam coals in all regions of the country. Our forecast ties together overall energy growth with specific plant plans and considers the impact of acid rain legislation and utility de-regulation. The information provided in this summary draws from this forecast.

This report discusses the substantial impacts that existing and proposed air emission laws and regulations will have on Wyoming Powder River Basin (PRB) and Illinois Basin coal demand. First, we present a legislative and regulatory background section which discusses the transition from the stable environmental regulations of the past few years to the new rules, both proposed and enacted, some of which are only a few weeks old as of this writing. Then we discuss Wyoming PRB and Illinois Basin demand results of our modeling three scenarios, or cases, of environmental rules with the Hill & Associates integrated UFEM/NPM model.

The reader will find the following guidelines useful for keeping the material in logical order:

1. The LEGISLATIVE AND REGULATORY BACKGROUND provides a brief history of the clean air rules
2. The BASE CASE summarizes our base case analysis of the impact of the Clean Air Act Amendments of 1990 on PRB and Illinois Basin coal demand and pricing.
3. The CAPI CASE discussion is an analysis of the new rules that President Clinton signed in July 1997 and, barring a successful challenge from Congress, will become the new law of the land, superseding the limitations in the Clean Air Act Amendments of 1990.
4. The RIO CASE discussion is a less in-depth analysis (one out-year, 2021, was modeled with the CO_2 limits) to provide an order-of-magnitude estimate of the impact that CO_2 limits would have on the coal industry.

Included in this section is table 1, which summarizes our results for two Wyoming PRB coal types: 8,300 Btu/lb and 8,700 Btu/lb coal and for three

Illinois Basin coal types: less than 2.5 lbs SO_2/MMBtu, 2.5 to 4.0 lbs SO_2/MMBtu and greater than 4.0 lbs SO_2/MMBtu.

LEGISLATIVE AND REGULATORY BACKGROUND

The purpose of this section is not to provide a definitive legal analysis of the clean air rules. Rather, it is to provide the reader with a very brief history as well as a "layman's guide" to the fundamental driving forces in this fast-changing arena.

It all started with the original Clean Air Act (CAA) in the mid-1970s. The focus was almost exclusively on SO_2 emissions and on the *rate* of those emissions measured in pounds of pollutant per million Btus of heat input to the polluting unit (lb/MMBtu). This resulted in some relatively permanent "jargon" being added to the lexicon of coal usage terms. The CAA separated existing or old sources of emissions from future or new sources and then came up with terms such as New Source Performance Standard (NSPS) which was 1.2 lb/MMBtu for SO_2. A coal which calculated to be less than this level was then said to be in compliance with the NSPS, and the new term of "compliance coal" evolved.

The original CAA also defined the concept of "National Ambient Air Quality Standards" (NAAQS) which were *in addition* to the unit-level performance standards. Under this logic, the amount of a pollutant (or its concentration) measured periodically in the ambient air in a region would be forced to be lower than the NAAQS limit set by governmental regulations. The exact methodology for achieving this limiting of the pollutant's concentration was to fall to the individual states, which were each required to submit a "State Implementation Plan" (SIP) addressing the actions required of individual plants within the state to achieve the overall NAAQS. As a practical matter, the SIPs of most states addressed primarily the older plants which did not fall under the NSPS limit of 1.2 lb/MMBtu since the need to force any plant below this level was not necessary to meet the NAAQS (except in a very few isolated localized regions with very high existing concentrations of SO_2 in the ambient air). Thus plants were categorized as being "NSPS plants" or "SIP plants" depending on which set of rules actually provided their limitation.

Then, after several years under this system, a new wave of environmentalism swept through Congress resulting in the Clean Air Act Amendments of 1990 (CAAA). This new law not only adds serious consideration of other pollutants beyond SO_2 (most notably, NO_x), but fundamentally changes the approach to regulating the emission of air pollutants. Now, instead of addressing the *rate* of emission (per million Btu), the *total* tons of annual release into the air are to be restricted. This means that as the demand for electricity generation grows year by year and the overall cap on total annual tons emitted stays the same (or is even stepped down in some target year such as 2010), then the rate of emission must keep dropping lower and lower to stay within the cap.

Certainly, passing reference is generally made in the CAAA to overall target rates (Phase I of 1995-1999 was theoretically designed to reduce the most serious SO_2 polluting utility plants to an average of 2.5 lb/MMBtu of SO_2, and Phase II beginning in year 2000 and going on thereafter was to cause all plants to come down to the 1.2 lb/MMBtu level). However, such references to rates are very general, and the real logic in the law is to set specific limits on total tons to guarantee a reduction of annual SO_2 emissions to a level 10 million tons below 1980 emission levels. The corresponding target for NO_x is a reduction to a level 2 million tons below 1980 levels.

It is important to understand how the CAAA is organized. The SO_2 provisions are very quantitatively spelled out, even to the inclusion of a plant-by-plant table of Phase I SO_2 allowances (an "allowance" is the governmentally approved right to emit one ton of pollutant into the air) to be granted annually to the 110 highest emitting utility plants in the U.S. For NO_x, however, the CAAA was much less quantitatively specific and simply required the Environmental Protection Agency (EPA) to come up with their own specifics by certain time deadlines (early-1997 being a key time period for deadlines) for controlling NO_x emissions.

Only two specific types of boilers have any mention in the CAAA of a quantitative NO_x limit. The law almost casually mentions that Phase I tangentially-fired and wall-fired coal boilers (collectively known as Group 1 boilers) should have NO_x emission limits of 0.45 lb/MMBtu and 0.50 lb/MMBtu, respectively. In 1994, EPA attempted to set the rules for NO_x emissions by other units during Phase I, but that was challenged in court by utilities and overturned. Thus, the primary focus at EPA shifted to controlling NO_x in Phase II beginning in 2000, and only the Group 1 boilers have a current NO_x limit.

All of this individual-unit targeting and discussion of allowances relates to "Title IV" of the CAAA. To fully understand the CAAA, one must realize that a different portion of the law (Title I) retains the old parallel scheme of EPA issuing NAAQS, based on "protection of public health and welfare" and requiring the states to come up with SIPs to implement the achievement of the ambient air concentrations dictated. This portion of the law is by far the more onerous since it requires EPA to be continually reviewing the "need" for revising air standards and issuing SIP calls to implement those revisions. Thus, the law entrusts the determination of whether tighter and tighter limits are needed to the very agency whose budget, implementation activities and, indeed, whose very existence largely depends upon having those tighter and tighter limits to analyze and implement. In the event that a state does not come up with an adequate SIP, then EPA devises its own "Federal Implementation Plan" (FIP) for the region under consideration.

Title I of the CAAA also established the Ozone Transport Commission (OTC) comprised of the eleven Northeastern states with the highest ozone concentrations plus Washington, D.C. Largely due to larger-scale transport

(beyond this eleven state area) of both ozone and NO_x, which is a precursor to ozone, many eastern states with ozone non-attainment areas were not able to develop and submit SIP revisions by November 1994 (the deadline set by the CAAA) that demonstrate attainment of the ozone standard. As a result, 37 eastern states have now come together, in cooperation with EPA, into the Ozone Transport Assessment Group (OTAG) with the goal of developing coordinated strategies that will reduce the transport both of ozone and of NO_x which helps to form the ozone by reacting in the presence of sunlight with Volatile Organic Compounds (VOCs). In late June 1997, OTAG submitted its report to EPA containing a number of proposals for limiting ground level ozone in the Northeast U.S. The likely result is that EPA will issue a proposed "SIP call" in September 1997 to various states for reducing NO_x emissions, primarily at power plants.

Under the "protection of public health and welfare" mantle of issuing NAAQS, EPA has most recently cited some "new health studies" [highly criticized outside the environmental community as being scientifically flawed and reaching unproven conclusions] for proposing a new program entitled the "Clean Air Power Initiative" (CAPI). This tentative program was first put out as a sort of "trial balloon" and was promoted as circumventing the piecemeal approach to addressing all the individual pollutants on a separate basis and coming up with a fully unified comprehensive program addressing SO_2, NO_x, ozone, fine particulate matter, and potentially mercury all in one set of rules. The bottom line is that based on these "new health studies," the program proposed again lowering SO_2 limits to only 50 to 60 percent of the final levels in the CAAA and limiting NO_x to 0.15 lb/MMBtu, a level well below the levels envisioned at the time of the CAAA (as evidenced by the Group 1 boiler limits of 0.45-0.50 lb/MMBtu). The ozone NAAQS was proposed by CAPI to be lowered from its current 0.121 ppm for one hour on three occasions over a three year period (if this happens, an area is in non-attainment status) to 0.08 ppm eight hour average. It is this drop in the ozone limit that is largely responsible for the lower limits on SO_2 and NO_x mentioned above.

Perhaps the most controversial issue in CAPI is the dramatic change in approach to the emission of fine particles. Current regulations on particulate matter look at particles that are 10 microns in size or larger (PM10) and are responsible for the electrostatic precipitators at many utility plants. However, based on the "new health studies" that vaguely refer to "premature mortality" and slightly reduced lung function in urban children versus non-urban, CAPI proposed dropping down to 2.5 micron particles as the basis for regulation (PM2.5). At such a small size, the gap is bridged between true solid particles and gaseous or liquid aerosol components such as gaseous SO_2 and NO_x going up the stack since these gaseous constituents undergo chemical reaction in the atmosphere to make particles (sulfates, etc.) which are measurable in the 2.5 micron range. It is really this ultra-fine particle issue, along with ozone attainment in a fairly narrow area in the

Northeast, that provide the rationale for dropping both SO_2 and NO_x limits substantially below those envisioned in the CAAA.

Faced with an impending July 19, 1997 court deadline on the fine particles issue (from a case filed by the American Lung Association to force EPA to tighten the air-quality rules), President Clinton accepted the CAPI proposed limits "lock, stock and barrel" in mid July and signed new National Ambient Air Quality Standards for ground level ozone and for fine particulate matter (PM2.5) which included those limits. The only changes made from the original CAPI proposal were in implementation dates, which were generally set back five years so that the new limits should become effective in roughly the 2007 to 2009 time frame. President Clinton's signature on the new NAAQS came in the face of opposition from EPA's own scientific advisory board, the Department of Energy, the Department of Defense, industrial trade groups and numerous members of Congress. At this writing, it is uncertain whether Congress will attempt legislation to overturn the new NAAQS.

Our approach to modeling these late-breaking developments was to generate first a "Base Case" which contained only the restrictions of Title IV of CAAA (basically the Phase I/Phase II limits that have become so familiar over the past few years) as modified by the OTC list of suggested NO_x limitations for plants *inside* the eleven-state OTC region. Then we developed an alternate "CAPI Case" which cut SO_2 emission limits by 50 percent from Phase II levels and imposed a fixed NO_x tonnage emission limit (equivalent to 0.15 lb/MMBtu at current generation) on those utility plants outside the eleven-state OTC region but inside the 37-state OTAG region. All of these CAPI Case limits were assumed to become effective in the 2007 to 2009 time frame. In both cases we added a NO_x Allowance trading program (allocating to each utility allowances proportionate to its 1990 emissions) to the existing SO_2 Allowance trading program. Finally, we generated a case which kept the CAPI SO_2 and NO_x limits but added "global warming" CO_2 emission limits. We entitled this last scenario the "Rio Case" since it was the Rio Treaty which set up the on-going global climate change negotiations.

BASE CASE RESULTS

Because numerous utilities do not yet have firm plans and because it is difficult to quantify the effects of the changes planned by those who do have firm plans, we have traditionally used a set of models of each utility system to estimate the economic compliance choices and the market impact of those choices.

This year for the first time we have modeled the NO_x compliance along with the SO_2 compliance. Our method for doing this was to allow each plant to select not only whether it would install a scrubber for SO_2 control but also whether it would install (1) no de-NO_x equipment or procedures, (2) "Combustion Zone" de-NO_x equipment/procedures (e.g. low-NO_x burn-

ers, over-firing of air, etc), or (3) "Post Combustion Zone" de-NO_x equipment/procedures (e.g., Selective Catalytic Reduction, Selective Non-Catalytic Reduction, re-firing of the hot exhaust gases, etc.). These choices were added into the Lotus spreadsheets for all affected utility systems which, as a group, comprise our Utility Fuel Economic Model (UFEM).

Also new this year was the fully dynamic integration of the UFEM model with our National Power Model (NPM). Each model uses Linear Programming (LP) techniques to optimize for a least-cost solution, and the two models loop back and forth feeding information to each other until convergence is reached.

Table 1 shows the tonnage changes expected for two different Wyoming PRB and three different Illinois Basin coal types in the Base Case. These numbers are the result of convergence runs of the integrated UFEM/NPM model in which each utility selects the most economic fuels for each of its plants (including possible new scrubbing and/or new de-NO_x alternatives) while simultaneously being variably dispatched under total deregulation and competitive wheeling.

Powder River Basin Demand. Three driving forces combine to make this region by far the largest recipient of shifted tonnage: (1) extremely low mining costs with large latent capacity which keeps pricing very competitive, (2) low sulfur content that puts most of this region's coal into the "super-compliance" category, and (3) low fuel-bound nitrogen content plus lower temperature burning characteristics which combine to cause NO_x emissions to be low. Compared to our forecasts in previous years, we have even more shifting into PRB coal this year, primarily due to the addition of NO_x limits in our models. This increased amount of shifting is extraordinary since we are measuring the shift against a 1996 base which itself has already experienced a substantial amount of the previously forecasted shifting.

Again, this strong shifting of tonnage into this region is not a case of "buying" the market with lower and lower profit margins. In fact, we show strong gain in margins for the first time in our recent forecasts. Basically, the added push in this year's forecast due to the inclusion of NO_x limits has finally caused the demand for PRB coals to start getting close enough to the latent supply capacity (at current mine cost levels) that some growth in margin can occur as Wyoming PRB tons, for example, start crossing over into the 400-450 million annual ton range. In fact, the models basically use our marginal cost curves along with the supply/demand balance to determine the tonnage at which profit levels can begin to move upward. Of course, if our estimate of the amount of PRB expansion tonnage available at modest capital is low (as almost everybody's estimate has historically been), then the 400-450 million annual ton threshold is low and even more tonnage could switch to the PRB without causing margin increases.

Illinois Basin Demand. Because of our assumption that no new scrubbers will be built before 2001 (due to a combination of lead-time for ordering and

construction plus the delay in capital decision-making due to uncertainties about deregulation and continually changing environmental rules), our analysis indicates that from 1997 to 2001, about 16 million tons of annual Illinois Basin demand will shift away to lower sulfur coals produced from other regions. Then, as new scrubbing comes on, there is a return to the inexpensive high sulfur coals, including a net gain of 19 million tons by 2006, and a gain of an additional 40 million tons by 2021.

CAPI CASE RESULTS

Since the CAPI limits (50 percent of CAAA Title IV SO_2 levels and tighter NO_x limits on plants outside the OTC eleven-state region) are not projected to become effective until the 2007 to 2009 time frame, our Base Case results through year 2006 served as the first portion of the CAPI Case. Then, beginning with our runs for year 2011 and beyond, the model emission limits change, and we generate differing results from the Base Case. This section discusses those differing CAPI Case results.

Table 1 shows the tonnage changes expected for the two Wyoming PRB and three Illinois Basin coal types analyzed in the CAPI Case. For the purpose of looking at trends, we include in this table the results from years 2001 and 2006 even though they duplicate the numbers for those years in the Base Case. Again, these figures are the result of convergence runs of the integrated UFEM/NPM model, and the tonnage shifts are calculated from the sourcing ratios as they existed in 1996.

On an overall basis, the CAPI emission limits hurt all coal areas and virtually all sulfur grades of coal with the possible exception of moderately low sulfur non-compliance coal. The sulfur limits are so strict that even PRB "ultra-compliance" coal is not low enough in sulfur for most of the plants that newly switched into PRB coal in the Base Case. Therefore, we see nearly 80 million fewer tons switching into Wyoming PRB as more plants scrub or switch to natural gas.

The discussion below analyzes CAPI results for the Wyoming PRB supply region and compares them to the Base Case results presented earlier.

Powder River Basin Demand. Perhaps the most dramatic economic impact under CAPI is the lowered attractiveness of PRB coal. Since so much of the PRB attractiveness under the Base Case is due to the specific emission limits set by the Clean Air Act Amendments of 1990, the CAPI results are almost a case of "The government giveth, and the government taketh away," to paraphrase something once written in King James English. Under this case, the higher 8,700 Btu/lb PRB coals fare marginally better than the 8,300 Btu/lb coals, primarily because they represent a "per million Btu" bargain for NO_x control. However, overall this region is still hurt severely by the CAPI limits which are just beyond the reach of PRB coal.

Illinois Basin Demand. Equally as dramatic as the lower attractiveness of the Powder River Basin coal is the lower demand for all Illinois Basin coal types under CAPI. While the overall demand for Illinois Basin coal is the

same under our Base Case as it is under CAPI for the period 1997 through 2006, after 2006 we see Illinois Basin demand dropping from 122 million tons in 2006 to about 90 million tons in 2011. Figure 1 graphically shows the impact of CAPI on Illinois Basin production for the period up to 2011. After 2011, overall demand remains stagnant at about a level of 90 million tons per year.

Table 1. Powder River Basin / Illinois Basin Coal Demand 1997 - 2021 (in millions of tons).

Year	1997	2001	2006	2011	2016	2021
BASE CASE (Phase II of the Clean Air Act of 1990)						
Wyoming PRB						
8,300 Btu/lb	92	159	185	183	184	185
8,700 Btu/lb	174	194	241	245	257	269
Totals	**266**	**353**	**426**	**428**	**441**	**454**
Illinois Basin						
Less than 2.5 lbs SO_2/MMBtu	21	18	12	11	10	9
Between 2.5-4.0 lbs SO_2/MMBtu	24	34	34	41	43	45
Greater Than 4.0 lbs SO_2/MMBtu	72	49	73	80	90	106
Totals*	**116**	**100**	**119**	**131**	**143**	**159**
CAPI CASE (Clean Air Power Initiative)						
Wyoming PRB						
8,300 Btu/lb	92	159	185	99	99	99
8,700 Btu/lb	174	194	241	209	211	213
Totals	**266**	**353**	**426**	**308**	**310**	**312**
Illinois Basin						
Less than 2.5 lbs SO_2/MMBtu	21	18	16	6	6	5
Between 2.5-4.0 lbs SO_2/MMBtu	24	34	34	19	19	19
Greater Than 4.0 lbs SO_2/MMBtu	72	49	72	66	67	69
Totals*	**116**	**100**	**122**	**90**	**92**	**92**
RIO CASE (Global Warming - CO_2 reductions to 1990 levels)						
Wyoming PRB						
8,300 Btu/lb	92	159	185	99	76	62
8,700 Btu/lb	174	194	241	209	159	129
Totals	**266**	**353**	**426**	**308**	**235**	**191**
Illinois Basin						
Less than 2.5 lbs SO_2/MMBtu	21	18	16	6	8	11
Between 2.5-4.0 lbs SO_2/MMBtu	24	34	34	19	17	15
Greater Than 4.0 lbs SO_2/MMBtu	72	49	72	66	69	71
Totals*	**116**	**100**	**122**	**92**	**94**	**97**

***Totals may not add up due to independent rounding.**

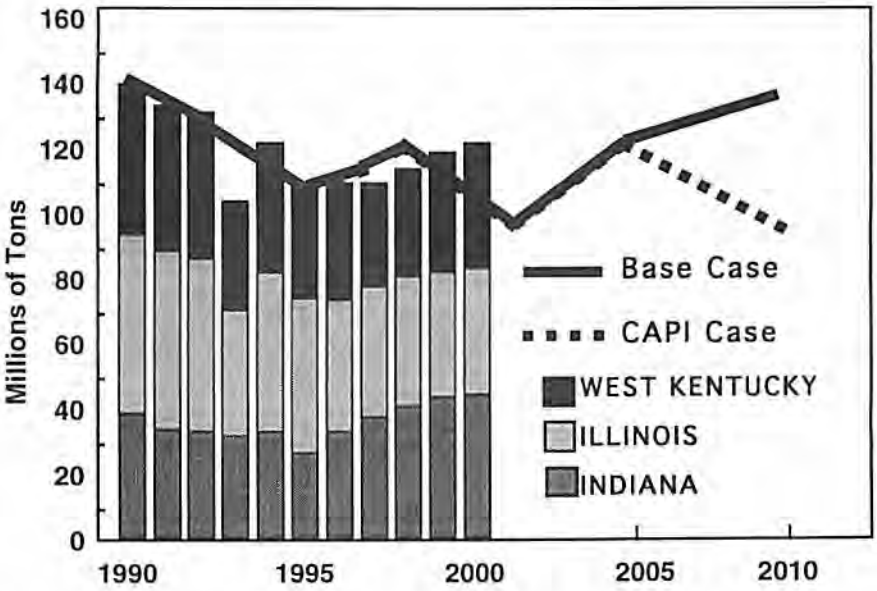


Figure 1. Illinois Basin production trends, 1990 to 2010.

International Negotiations on Global Climate Change. Following the release in 1990 of a report entitled "Scientific Assessment of Climate Change" prepared by the Intergovernmental Panel on Climate Change (IPCC), there was an 18-month negotiation period which resulted in a treaty signed in Rio De Janeiro in June, 1992. This treaty was named the "Framework Convention on Climate Change" (FCCC or the Rio Treaty), and the U.S. was a signatory.

The FCCC established a group called the "Annex I Parties" (basically the developed countries of the world) and committed that these Annex I Parties would implement programs and actions with the goal of returning emissions of greenhouse gases (CO_2, some hydrocarbon gases and a few other, more exotic gases) back to 1990 levels by the end of the century. Here in 1997 it is apparent that very few countries will be able to achieve this goal of matching 1990 levels by the year 2000.

In October 1993, the Clinton administration put forth The Climate Change Action Plan, a group of mostly voluntary initiatives for reduction of greenhouse gases in response to the FCCC. Shortly thereafter, DOE and the electric utility industry developed the Climate Challenge Program, designed as a voluntary effort to reduce greenhouse gas emissions as an alternative to mandatory programs.

At the first meeting of the Conference of Parties (COP) to the FCCC held in Berlin in 1995, the Parties declared that the existing commitments for the Annex I countries were inadequate to stabilize atmospheric concentrations of greenhouse gases at a level that prevents "dangerous interference" with

the climate system, and the Parties called for the negotiation of a protocol or other legal instrument to enhance the commitments of the Annex I Parties for the period beyond 2000 (the "Berlin Mandate"). The Ad Hoc Group on the Berlin Mandate (AGBM) is charged with the task of setting quantified emissions limitations and reduction objectives within specified time-frames and the task of elaborating policies and measures to achieve these objectives. AGBM is specifically charged with doing this through actions by Annex I Parties only with no new commitments on non-Annex I Parties (the developing countries of the world).

The July 1996, negotiating session of the AGBM saw a public policy shift by the U.S. when U.S. negotiators stated that voluntary programs had "failed" and that realistic but legally binding targets to limit emissions of greenhouse gases within Annex I countries are required. This new official position of the U.S. government essentially disembowels such efforts as the utilities' voluntary Climate Challenge Program. The new U.S. position calls for medium-term goals (defined as something past 2005) followed by longer-term goals (for the next 50 to 100 years) to achieve the ultimate objective of stabilizing atmospheric concentrations of greenhouse gases at desirable levels. The U.S. position also calls for emissions trading among nations but does not address how compliance would be verified or enforced on an international scale.

Negotiations by the AGBM were to be completed as early in 1997 as possible in order to adopt the final protocol at the third meeting of the COP in December of 1997 in Kyoto, Japan. Early indications are that the Clinton Administration may send U.S. negotiators to the bargaining table with instructions to agree to roll back U.S. CO_2 emissions by the year 2013 to the level that existed in 1990. At this writing, the U.S. Senate has passed a resolution by a unanimous vote of 95-0 calling on the administration to insist on full participation of the developing countries such as China, South Korea, India and Mexico in any agreement. The resolution also calls for a detailed explanation of economic effects on the U.S. of any treaty submitted to the Senate for ratification following the Kyoto, Japan meeting. The key point to recognize here is that even this repudiation of the Administration's prior position has embedded in it the presumption that under some circumstances the U.S. would agree to a roll-back of CO_2 emissions to a 1990 level (the stated goal of the Rio Treaty).

Model Results. Believing that 2013 is absolutely infeasible as a target date for any roll-back of CO_2 emissions, we set up our "Rio Case" with only CAPI SO_2 and NO_x limits until the year 2021 when we imposed a CO_2 national utility emission limit equal to 1990's amount of CO_2 emitted from utility plants. The remainder of this section discusses the model results in the year when CO_2 limits become effective.

Rio Case numbers shown in table 1 duplicates the CAPI Case numbers until year 2021 when CO_2 limits are imposed. Again, the earlier duplicated years are included to facilitate a look at any trends. The Rio Case CO_2 limits

are so draconian (remember electricity demand has been growing every year since 1990, and now we are arbitrarily rolling back CO_2 emissions to 1990 levels while still trying to generate at the much higher level to which electricity demand has grown), that coal plants can only be dispatched at a level about 55 percent of the Base Case for 2021 (or about 75 percent of the CAPI Case for 2021). The bottom line is that with utility coal plants only requiring around 650-700 million tons at these low environmentally-affected dispatch rates, much of the need for regional switching disappears since the SO_2 and NO_x fixed tonnage emission caps can be met with poorer quality coals when much less coal is being used.

Powder River Basin / Illinois Basin Demand. The Rio Case CO_2 limits, by driving coal plants down to a mere shadow of their former generation levels, have essentially "undone" much of the need for special modifications and operating procedures at those coal plants. This could create a whipsaw effect leaving much bigger "stranded investment" than the level currently under discussion because of impending deregulation. Demand for nearly all coals, including Wyoming PRB coals drop substantially. Wyoming PRB 8,300 Btu/lb coal demand drops from 185 million tons under the Base Case (or 99 million tons under the CAPI Case) to 62 million tons under the Rio Case. Demand for Wyoming PRB 8,700 Btu/lb coal drops from 269 million tons (Base Case) to 129 million tons under the Rio Case. Illinois Basin coal, on the other hand, is not affected by Rio. This is because the level of coal demand (nationwide) has dropped so dramatically, that higher sulfur coals will be favored due to their relatively low cost.

Question: What affect will electrical deregulation have?

John Hanou: I failed to mention that we have taken into full account deregulation, so all of our forecasts do analyze the impact of deregulation and transmission access, dispatching and so on.

Question: Do you have figures to support that projection?

John Hanou: Yes. I can't tell you what the numbers are, but Yes.

Question: The lack of growth for the demand for lower sulfur Illinois Basin coals(< 1.5% S), is that due to just the fact they will be depleted?

John Hanou: The lack of growth is mainly due to lack of CAPI base. We've done a pretty indepth analysis of what is available for low sulfur coal in Illinois. By the way, my company is publishing a Illinois Basin coal supply study where we are addressing the low sulfur reserves in the state, as well as the high-sulfur reserves. A lot of the demand for low sulfur coal is mainly due to the fact that the projections here are limited on the ability of the mines to produce more low sulfur coal. There isn't that much <1.5 percent sulfur coal here. There is some, but it is gong to be very expensive to mine. You can get down to a thousand feet to find some viable reserves, but I don't think you are going to be able to compete with Powder River Basin coals, or even the higher-sulfur coals that are scrubbed.

Statement: The answer to the Rio case is to defeat Al Gore in the year 2000.

John Hanou: I don't think so. The Rio De Janeiro meeting was in 1992, and the U.S. was one of the signatories. No, whatever happens to Mr. Gore, I don't think will help. I don't know; you know, he might push it.

Question: Given the price differentials between natural gas and coal, what would prevent coal-burning power plants from basically accepting the cost of further reduction, to 2.5 micron particle size (PM 2.5). In other words, there is room to invest in reducing the dust to 2.5 microns and yet compete with natural gas, because natural gas prices are so much higher. What would prevent the electrical industry from doing that?

John Hanou: That is a good question. I don't know if I have an answer off the top of my head. One of the problems that I see, is the ability for power plants to say take a 3 percent sulfur coal and scrub it to even lower levels, as well as particulate matter; 2.5 microns is almost a gas. Overall, it is going to impact the ability to take out that particle size. I don't think I have an answer for you. I would be happy to talk to you later. It is an area that I personally did not work on, but see me after the talk here. Thank you very much.

Jim Folkerts: This concludes the technical presentations of the IMI. I appreciate Robert, Jim, Charles and John for their presentations and all of you for attending.

LUNCHEON MEETING

Friday, September 26, 1997
LaSalle Room–12:00 Noon

John Lanzerotte: May I have everybody's attention. Good afternoon. My name is John Lanzerotte, and I am the President of this year's Illinois Mining Institute. On behalf of the Institute and the Executive Board, I would like to welcome all of you that stayed for the luncheon. I hope you found the meeting to be enjoyable. Before we get started with our program, I would like to introduce members here at the head table. Over to my left: Steve Rowland, who is the general manager of Galatia Mine for Kerr McGee and he is our first vice president elect; next to Steve is Fred Bowman and his wife Cindy. Fred is the recipient of this year's IMI honorary membership. Next to Cindy is Darrel Auch, Vice President of Illinois and West Kentucky Operations for Consolidation Coal Co.; he is our keynote speaker, and he is going to be giving us, hopefully, an optimistic story about Illinois coal in the next century.

Over on my right is John Hanou of Hill and Associates who spoke on coal markets this morning; I think anyone who attended his session, was a bit on the other side; John knocked us down and hopefully Darrel will pick us up after lunch. On my immediate right is Gregg Bierei; Gregg is the General Manager of Arch of Illinois, and he is our IMI president-elect. Next to Gregg is Sam Vancil, Deputy Director of Illinois Office of Mines and Minerals; Sam is going to be presenting the awards this year for coal reclamation and safety. Next to Sam is Dr. Paul Chugh, who is Chairman of the Department of Mining Engineering at Southern Illinois University at Carbondale; Dr. Chugh is going to be presenting the awards for this year's honorary memberships in the IMI. Next to Dr. Chugh is Jim Folkerts, Regional Sales Manager of Joy; Jim co-chaired the technical sessions.

At this time, I would like to recognize a few folks. Is Charlie Woolbright here? Charlie had to go back home, and that is too bad; we wanted to recognize Charlie Woolbright. A lot of you know Charlie Woolbright; he was the Vice President of the Midwest Region of Joy for many years, and he just announced his retirement after 40 years of service, exclusively dealing with mining and mining equipment here in the Illinois Basin; we wanted to wish Charlie our best and also say thanks for many years of IMI participation and sponsorship.

Also at this time, I would like to recognize Phyllis Godwin. Phyllis could you stand, and the other helpers from the State Geological Survey? It is really those folks and Phyllis and Heinz that make this annual meeting possible. I was a bit apprehensive about taking this job, being president, about having enough time and knowing enough people. But, basically, what I found out is that you don't really have to do anything; just do what Heinz tells you to do and it will go fine. Greg, I'll leave you that, and as long as you listen to Heinz, you will be in good shape for next year.

Next, the chairman of our Scholarship Committee, John Devon of Marston & Marston could not make it today. I do want to say a little bit

about the IMI Scholarship Program. As you probably know, at least for the last few years, the Illinois Mining Institute has donated $10,000 to four area schools: $4,500 to SIU-Carbondale, $3,500 to University of Missouri-Rolla, $1,500 to Illinois Eastern Community Colleges and $500 to Rend Lake College. Those dollars have always been well-received and much appreciated by these academic institutions, especially by the students. As we all know, due to the decrease in size of the Illinois coal business, the number of companies and generally the amount of dollars there are for these types of discretionary programs has diminished; the IMI is now the main contributor towards these scholarships.

I would first like to ask Dr. Chugh to call the recipients of this year's scholarships and present them with their certificates.

SCHOLARSHIP PRESENTATIONS

Paul Chugh: Thank you, John. The way we offer scholarships is that we always award the year behind. In other words, the money that just came to us, we are going to give to the people now, but a lot of these students have actually graduated. We gave five scholarships. The people that we gave scholarships to are Patrick Clay; he is working for the nuclear power industry. He got a six-figure salary; so he did not want to work for the aggregate or coal industry. Matthew Feist, Brian Mayer, Randy Rockrohr, [Randy actually is working right now for the Army, and once he finishes his assignment with the Army, he plans to return to the mining industry.] and Chris Russell. These are the five people who were given scholarships, and I have Chris Russell here. Would you please stand up. He is currently the president of our Society of Geologists and Mining Engineers, and he will be graduating next year.

There are a couple of other people that I would like to recognize: Matt Zacarea, please stand up; Don Buchanan, and we even have one alumnus, Jeff Walker. Jeff, please stand up. Thank you. [APPLAUSE]

SIU scholarship winner, Chris Russell, with Dr. Paul Chugh.

John Lanzerotte: Thank you, Dr. Chugh.

It is obviously good that those folks are employed, and that's the reason they couldn't make it today. Next, University of Missouri at Rolla.

Larry Grayson: Between yesterday and today, we brought nine students and three faculty members here. Would you all please stand for just a moment? Thank you. I should mention before I go any further that three of those, please stand again, are from Western Australia and are School of Mines exchange students. They are trying to see what America is really like.

There were four recipients this year, and three are here with us. One is a starting linebacker for the UMR football team, so he has taken off to be with the football team. But, with us we have Mark Schmidt from Arlington Heights; he is a senior in mining engineering. Next, we have Shannon Orr, a sophomore. She is from New Berlin, Illinois. And Rachel Kuro, is from Lincoln, Illinois; she is a freshman. Thank you all very much. [APPLAUSE]

University of MO scholarship winners, left to right: Rachel Kuro, Mark Schmidt, and Shannon Orr with Dr. Larry Grayson, who is holding Jeff Shaffer's certificate.

John Lanzerotte: George Woods from Illinois Eastern Community Colleges.

George Woods: We have another colleague to make the presentations.

Shirley Buche: I am Shirley Buche, and I am over the program at Southeastern Illinois College; however, I work for Illinois Eastern Community Colleges. We are located on several junior college campuses. We offer a two-year associate degree, as well as other training programs that people can come for. Today, we have three of our students with us to receive the scholarship certificates: Brett Patterson, Harvey Niehaus and Anthony Sexton. Harvey and Brett are working as temporary employees in the mining industry. Harvey works for MAPCO in Carmi and Brett Patterson works at Kerr McGee as a temporary employee; we are hoping that will soon turn into permanent. Anthony is a freshman this year; we haven't got him out working yet, but we are going to soon. Thank you. [APPLAUSE]

Faculty and scholarship winners from IL Eastern Community Colleges, left to right: George Woods, Harvey Niehaus, Brett Patterson, Anthony Sexton, Shirley Buche and John Howard.

John Lanzerotte: Is there anyone here from Rend Lake College? As I said a few minutes ago, Rend Lake was also a recipient of a $500 IMI scholarship award.

At this time, I would like to call Sam Vancil to the podium. Sam is the Deputy Director for the Office of Mines and Minerals. He is going to make the awards this year for reclamation and mine safety. Sam.

RECLAMATION AND MINE SAFETY AWARDS

Sam Vancil: Thank you, John. In the past, we have given reclamation awards at this event. This will be the first time we have ever given any safety awards, and this will be a six-month safety award. Hopefully, in the future we will be able to do this on a yearly basis. At this time, I would like to do the reclamation awards first.

The first one I would like to mention is the Department of Natural Resources recognizing two mining operations for outstanding reclamation practices, and the third for its educational outreach programs.

To quote Director Manning: "This year's winners have demonstrated the creativity that can occur in post-mining land uses." Consol's Burning Star #5 mine in Jackson County receives an award for establishing a wildlife conservation area along the Little Muddy River. The project combines 148 acres of wetlands and 233 acres of reparian areas, 242

Ronnie Marcum accepts reclamation award for Consol's Burning Star #5 mine.

Steve Aaron and Carolyn Bert accept reclamation award for Arch of Illinois.

acres of upland forests and 870 acres of high-capability row crop land. At this time, I would like to ask Ron Marcum to accept these awards. I also have an Interstate Mining Compact Commission (IMCC) award, Ron, if you want to get it at the same time for honorable mention from the IMCC. [APPLAUSE]

Our next award goes to Arch of Illinois to recognize the company for its excellent Earth Day practices. I would like to ask Carolyn Bert to accept this award. [APPLAUSE] For the Earth Day practices, I don't know to how many places Carolyn went to speak, but I think there were several. I heard her speak recently at one of our Holmes safety meetings. It was an excellent talk.

Now I would like to get to the safety award winners. The Division I award for underground mines goes to Consolidation Coal Company's Rend Lake Mine with 497,197 employee hours at a 2.8 frequency rate; could Joe Wetzel come up to accept the award. [APPLAUSE]

Joe Wetzel: I want to accept this on behalf of all the employees at the mine. I just found out we won this about two minutes before the meeting, so I don't have much prepared to say. But this is a tribute to a lot of hard work by a lot of people. Thank you very much. [APPLAUSE]

Joe Wetzel accepts safety award for Consolidation Coal Co.'s Rend Lake Mine.

Paul Barber accepts safety award for Arch's Captain Mine.

Sam Vancil: The Division I award for surface mines goes to Arch of Illinois' Captain Mine with 204,274 hours with a 5.9 frequency rate. I would like to ask Paul Barber to accept the award. [APPLAUSE]

Paul Barber: I would just like to accept this on behalf of all the employees at the Captain Mine, Arch of Illinois. [APPLAUSE]

Sam Vancil: Now we have a Division II award for underground mines; it goes to Arch of Illinois' Conant Mine for 197,666 employee

Wesley Hofmann accepts safety Award for Arch's Conant Mine.

hours with a 4.1 frequency rate. Would Wesley Hofmann come up to accept the award.[APPLAUSE]

Wesley Hofmann: Like Paul, I would like to accept this award for all the employees at the mine site. Thank you. [APPLAUSE]

Sam Vancil: Now we have a Division II award for surface mines which goes to Triad Mining Cedar Creek Mine with 49,635 employee hours with a zero frequency rate. I am not sure anybody is here to accept it. They are to be congratulated for a frequency rate like that, and I'll see that they get the award.

Finally, we have an award for support groups; it goes to Old Ben Coal Company's central cleaning plant, with 49,972 employee hours with a 0 frequency rate. Do we have any Old Ben folks here? So, I'll see that it gets to the proper place.

I would like to congratulate all these folks for the contributions they have made to the safety in the coal mines of Illinois; let's give a good round of applause to all of them. [APPLAUSE]

MEMORIAM

John Lanzerotte: Thanks, Sam. At this time in the program, we generally like to have a moment of silence for any members that have passed away since last year's meeting. We had asked you to let us know if there was anyone we could honor during this remembrance. One of these was Dr. Jim Scott. Jim Scott was a professor at UMR, and an exhibitor at the IMI for many years. Those of you who knew Jim remember that he was a really remarkable person. So, we would like to have a moment of silence for Jim and any other members that passed away since our last meeting.

With that, I will now turn the podium over to Dr. Chugh for the presentation of the honorary memberships.

HONORARY MEMBERSHIP AWARDS

Paul Chugh: Thank you, John, again. It is indeed an honor for me to present honorary member awards of the Illinois Mining Institute this year. The honorary member award is given to an individual who has provided outstanding service to the Illinois coal industry and the Illinois Mining Institute. Typically, one such award is given every year, but more than one may be given. This year, the honorary member selection committee consisted of Mr. Mike Caldwell from Freeman United, Mr. Steve Rowland, and myself. And we wrestled for two weeks to select the person. We selected an outstanding individual who is known to all of us, and he has given about a quarter of a century of dedicated and noteworthy service to our industry and the IMI. Mr. Fred Bowman is that individual. He recently

retired as Director of the Office of Mines and Minerals of the Illinois Department of Natural Resources. He has been training for some time to be a CEO, and he is certainly a CEO of the business that he has launched for himself. Mr. Bowman's involvement with the coal industry began in 1977 with Freeman United Coal Company. After working for the company for about eleven years, he joined the Illinois Department of Mines and Minerals as a state mining inspector. He steadily rose from that position to Director of the Department of Mines and Minerals. In 1995, this department was merged with the Illinois Department of Natural Resources, from where he has retired. Ladies and gentlemen, let me present to you our honorary member awardee for this year, Mr. Fred Bowman. [APPLAUSE]

Fred Bowman: Thank you very much. First of all, I would like to thank the nominating committee and the Executive Committee. I really never put myself in the same plane as those who have received this recently, the Shockleys, the Reillys, the Mullins. Believe me, it is an honor. I don't know quite what to say. When Dr. Chugh called me I thought he was asking for somebody else, wanted some information on where somebody was. Again, I want to thank you. This is, in my opinion, a very prestigious award and I thank you again. [APPLAUSE]

Fred Bowman accepts the 1997 IMI honorary membershp award.

Paul Chugh: We are not done yet. This year, the Honorary Membership Committee decided to gi ve an additional honorary member award to an individual who does not know that he is getting the award. But we made sure that he would be here. This person was se lected for his outstanding service to the Illinois Mining Institute and all of us know him. When you come to the IMI, he is omnipresent, and you know who I am talking about and that is Dr. Heinz Damberger. [APPLAUSE]

Heinz Damberger receives honorary membership from Dr. Paul Chugh.

Heinz Damberger: Well, I had no idea, obviously. When my wife showed up, I should have known. But she knows that I never catch on. I guess what this means is that I should be thinking about retiring, and as a matter of fact, I do; but I'm not going to announce it here. I have enjoyed working for the Illinois Mining Institute in this position for the last nearly 20 years. It came with the job at the Illinois State Geological Survey as head of the Coal Section. Harold Gluskoter, my

predecessor, called me after I had already taken the job as head of the coal section at the Survey, and said, "You know, one job that comes with this one is the Secretary of the Illinois Mining Institute. Are you willing to do that?" And I said, "Sure." I didn't know what I was going to get into. But it has been a good 20 years; I have made a lot of friends here. Thank you very much. [APPLAUSE]

Paul Chugh. I'd like to thank Phyllis Godwin. Can you please stand up. I have been plotting with her for the past several weeks, and we really succeeded. Thank you.

Phyllis Godwin: It's been fun!

John Lanzerotte: Thank you, Dr. Chugh. I think you pulled it off. Heinz was truly surprised. An excellent job. Again, congratulations to both Heinz and Fred on receiving this award.

I would like to now introduce our luncheon speaker who is Darrel Auch, Vice President of West Kentucky and Illinois Operations at Consolidation Coal Company. Darrel's topic is "Illinois Coal in the Next Century, Phase II and Its Impact." And I mentioned at the start, we all hope it is going to be an optimistic outlook. Because certainly people work hard in mining and processing and shipping Illinois coal deserve a reason to be optimistic.

Darrel is a South Dakota native; he got his degree in mining engineering in 1971 from the South Dakota School of Mines and Technology. I asked him, "Are you sure they have a school of mining and technology?" And he said, "Yes, and they still exist."

Darrel joined Consol in the same year; he advanced through various management positions: section foreman, assistant superintendent, superintendent, technical assistant, vice president of Morgantown operations, senior vice president for the northern West Virginia region and then to his present job as Vice President of West Kentucky and Illinois operations. Again, Darrel has had a long career with Consol, which is in itself unusual in these times, to stay with one company that long. He has also been involved in coal operations in the Illinois Basin, as well as throughout the east. I would like to introduce to you Darrel Auch.

Darrel Auch: Thank you, Mr. President, industry representatives, Illinois officials, equipment manufacturers, educators and students. It is a pleasure to be here to speak to the Illinois Mining Institute. There are a lot of students here, and thinking back on my career, when I graduated, it was about the same amount of graduates in the country as there are right now. This is a very cyclical industry, and as you heard earlier, all of the students seem to be getting jobs. There is a lot of movement within the industry, but I don't think it is quite as bad as we hear. As far as my title, "Illinois Coal in the Next Century, Phase II and Its Impacts," we could get into a very lengthy discussion. I plan to give a short history of where we have been, how we got there, and see what is in the future. After listening to John [Hanou] this morning talking about CAPI, RIO, some terms I hadn't heard before, and if the natural gas scenario he talks about is true, hopefully it is going to be produced from coal, not from natural gas by itself.

I would like to congratulate all of the students, all the award winners, Fred Bowman, and Heinz.

ILLINOIS COAL IN THE NEXT CENTURY: PHASE II AND ITS IMPACTS

DARREL D. AUCH

CONSOL Coal Group
Sesser, Illinois

INTRODUCTION

Inevitably, as the next century approaches, experts will pop up with various opinions as to what we can expect. We've seen a little of that already. There are the Doomsayers who preach that not much will be left of us when the clock strikes midnight on January 1, 2000. Others will say that the 20th Century will pass without even a whimper; that things will pretty much stay the same.

In a sense, we can apply these same views to the coal industry in Illinois: some believe it won't survive; others say it will look about the same, perhaps even improve a little. You can see, I'm not wearing sackcloth or sandals. And I don't have a sign that reads, "The End is Near." So I guess I count myself among the group which believes the industry will remain essentially the same: the same as today, but not as good as yesterday. I am even cautiously optimistic that we might see a small amount of growth over current production levels; perhaps, some new development. The reason? Ironically, part of it may be due to the federal Clean Air Act.

BACKGROUND

It really all began in the '60s. There were initial rumblings back then towards mandating clean air. It took Congress until 1970 to formalize the legislation, further amending it in 1977 and, again, in 1990. Back in the early 70s, the main air quality issue was particulates from fossil-fuel burning. As the air quality improved, the attention switched to limiting emissions of sulfur and nitrogen oxides, which some blamed for causing acid rain in the Northeast. Each time the act was revisited, it became more stringent and an even greater challenge to fuel users and producers, especially for us in the coal business.

Let me give you an example of how things have changed. In 1972, only $5.6 billion was spent nationally on air pollution abatement. Twenty years later, this figure has climbed to more than $30 billion annually in current dollars. With the 1990 amendments to the Clean Air Act, even greater limits were placed on sulfur dioxide emissions.

This time, however, under Title IV–the so-called "acid rain provisions" of the amendments–reductions in SO_2 emissions were to be accomplished in two phases. Phase I began on January 1, 1995. It required fossil-fuel users

to limit SO_2 emissions to 2.5 lbs per million Btu's through the year 2000. This sent utilities scrambling to meet the new requirement for certain generating stations within their systems.

PHASE I

Utilities really had two options to meet the Phase I standard: either fuel-switch or retrofit emission control devices on their stacks. The choices meant making significant commitments in terms of capital or in the way utilities conducted business. Ultimately, their decision would have some impact on high-sulfur coal producing regions.

To give utilities some incentive to meet the standard with scrubbing, a provision in Phase I offered them a "bonus," in the form of SO_2 allowances, if they installed scrubbers on plants by 1995. These SO_2 emission allowances would be allocated through the federal EPA. A formula was set up to allow an additional amount of SO_2 emissions annually through the year 2000. Utilities could purchase the allowances from the total offered–even trade them among each other–and use them to continue running plants that were unable to achieve compliance. Credits would accumulate for utilities when other more efficient and cleaner plants within their system met the Phase I SO_2 standards. It was a market-based approach to limiting SO_2 emissions. Current prices for each allowance range between $110 to $120. [One allowance permits emission of 1 ton of SO_2].

Still, even though users were provided with some flexibility to achieve the standard and continue to burn higher-sulfur coals, Phase I had a devastating effect on the coal industry in Illinois. Roughly two-thirds of the coal mined in Illinois was bought by utilities in Missouri, Indiana, Georgia, Florida and other states. Unfortunately, nearly all of these traditional markets for Illinois and Illinois Basin high-sulfur coals opted to switch to low-sulfur coals from western states, mostly from the Powder River Basin.

There are exceptions. Some Illinois producers still move coal to these markets. One example would be Consol's Rend Lake Mine near Sesser. Rend Lake coal, which has a sulfur content among the lowest in Illinois, continues to supply these markets. Even so, withun a decade, annual Illinois coal production fell more than 10 million tons, from around 60 million tons in 1985 to less than 50 million tons last year. Even with the allowances, what market remained for Illinois coal–with a sulfur content sometimes in the range of 3.0 to 4.0 percent–were scrubbed units, mostly in the state.

Another problem was the inherent overcapacity within the Illinois coal mining industry. High-cost mines were forced to close, since only the lowest-cost producers could remain competitive in the tightened market. By the year 2000, we can expect even more Illinois mines to close, some due to reserve depletion, others because they failed to remain competitive. Essentially, what has been achieved here has been some balance in supply and demand.

Short term, our analysts predict that annual production in Illinois will remain at current levels of less than 50 million tons annually through the

year 2000. For the Illinois Basin–which includes parts of western Kentucky–annual production should exceed 95 million tons during that same period. However, they do see a decrease of about 10 million tons in the year 2000 for Illinois Basin coals due to further fuel switching. Shortly after, production will rebound slightly to again about 50 million tons for Illinois coal and about 98 million tons for the Illinois Basin.

What will cause the bump? Analysts believe Phase II of the 1990 amendments may actually provide the catalyst. Under Phase II, the playing field will be leveled. All coal-fired units either will have to fuel switch or retrofit clean coal technologies.

PHASE II

Beginning January 1, 2000, Phase II requirements will further reduce SO_2 emissions by more than half, from Phase I's 2.5 lbs per million Btu to 1.20 lbs per million Btu. What Phase II ultimately will mean to the Illinois coal mining industry and to other high-sulfur coal producing regions is anyone's guess. We will likely see continued market pressures from Powder River Basin lower-sulfur coals and, perhaps, Central Appalachia higher-sulfur coals.

I would like to say that we'll see significant improvement in high-sulfur coal production with Phase II, in Illinois and elsewhere. But that's unlikely. Actual improvement probably will be modest for Illinois coal for the first 10 years of the century. In the Illinois Basin, we may see an annual increase of about one percent for that same period.

One thing is certain, even under Phase II, coal production in Illinois and the Illinois Basin never will achieve early 1990 levels, when annual production reached 60 million tons and 120 million tons, respectively.

ENERGY POLICY ACT

An additional element in the long-term outlook for Illinois coal is what the electric power industry will look like. Congress followed up the 1990 Clean Air Act amendments with the Energy Policy Act of 1992. Its aim will be to open up the electric utility industry to direct competition. Gone will be the power monopolies answerable only to state regulatory agencies. Consumer and commercial users will get to choose their own power supplier, much the same way as deregulation of the telecommunications industry allowed us to make choices for long-distance telephone providers.

Faced with having to streamline overall operations to stay competitive, utilities are looking hard at what fuel source will be the most cost-effective under deregulation. In addition, because of price pressures on coal suppliers, utilities are also foregoing traditional long-term supply contracts in favor of taking a chance and buying coal at lower prices for the short term or on the spot market.

There is a general reluctance among utilities to plan beyond a two-year horizon, because none of them want to be caught with high-priced, long-

term supply commitments when competitors may be in a position to purchase fuel cheaper and supply electricity to consumers at lower rates. Will this open up traditional and new markets for Illinois' high-sulfur coal, which is cheap and plentiful? Again, that's hard to pinpoint with any real accuracy.

The utilities themselves are uncertain about what deregulation will mean. Much like the coal industry, utilities are beginning to consolidate. Smaller power producers will be merged into the larger ones. A local example would be the recent merger between Union Electric and CIPS. In any event, it's likely the utilities under Phase II and deregulation will move to build more flexibility into their generating units, so more efficient units can be brought on line quickly and more economically.

Perhaps of more significance to the coal industry, generating units also could be modified to use multiple fuels in order to take advantage of short-term price differentials.

Will all of this still result in opportunity for Illinois coal and the industry in general? I think so. If we can overcome likely price volatility brought on by skittish buying decisions and work to make coal operations more efficient. Coal will continue to be the most reliable fuel available to utilities. They know it, and so do we. The trick will be to remain the low-cost producer to take advantage of any opportunity.

OPPORTUNITY FOR ILLINOIS

Looking ahead, I do see opportunity in coal, both on the mining side and on the utilization side. Getting the coal out of the ground more cheaply and efficiently will be important. What underground production remains in Illinois likely will be conducted using longwall mining systems. Reserves here are uniform enough to incorporate longwalls. This means future underground mines can be designed as longwall mines. This technology should be integrated in the planning stages for any possible new mines and adapted for current operations.

In order to open new markets for Illinois coal, low-sulfur reserves here must be developed. Illinois leads the nation in total demonstrated bituminous coal reserves: 90 billion tons. Some of it is low sulfur. Hopefully, markets will open up enough to prompt larger producers to develop these lower-sulfur reserves.

Illinois has other advantages as well, namely the availability of excellent river and rail transportation. Illinois coal also has a much higher heat value than competing Powder River Basin sub-bituminous coals, though it's about 1,000 Btu's lower than coal from Northern Appalachia.

On the utilization side, Illinois already leads the nation in the amount of financial commitments to develop clean coal technologies. Hundreds of millions of dollars have been invested already. We have seen a commitment by the public and private sector to develop new and more efficient clean coal technologies.

My own company has been active in this pursuit. CONSOL recently received a grant from the Illinois Clean Coal Institute to study making a salable aggregate from wet-limestone-based, flue-gas sludge from power plants.

Marketing the aggregate at a profit will illustrate to utilities that capital costs for building and running clean coal technologies can be made economical. Future coal managers also will have to know their mines and mining systems intimately. We are going to have to understand the details of our business better than ever before. Managers will have to be imaginative and be willing to take some risks. Adjustments will have to be made in a time frame that will allow their company to take advantage of market opportunities that can vanish as quickly as they appear.

CONCLUSION

What will Illinois coal look like after the first decade of the 21st century? I predict the industry will continue to consolidate here until there remains a very small number of producers operating in Illinois. They will be operating very efficient longwall mines. Though demand for coal-fired electricity will increase by 25 percent in the year 2010, there likely will be only a small number of scrubbed units in Illinois. Coal producers and users will be pretty self-contained in Illinois, with a portion of annual production making its way out of state to domestic or export markets.

Finally, with all of this discussion about the next century, I am reminded of Stanley Kubrick's classic 1960s film "2001: A Space Odyssey." Though they are highly automated, we don't have any longwall units named "HAL" which can think and talk. Not yet, anyway. I will leave that to those imaginative, risk-taking coal managers to deal with in the future. Thank you.

RAFFLE DRAWING

John Lanzerotte: Thank you Darrel.

Before we all go home, we have one more task to perform and that is to draw for the raffle winners. I would like to call on a member of the IMI Advertising Committee to do the honors. Jim Zwahlen, can you come up. The first ticket will be for two airline tickets to anywhere in the continental U.S.

Jim Zwahlen, Chairman of IMI Advertising Committee, draws 1997 raffle tickets.

Jim Zwahlen: Dennis Robbins, Kerr McGee. [APPLAUSE]

John Lanzerotte: The next one is for the set of golf clubs donated by Jim Justice of DuQuoin Iron and Supply.

Jim Zwahlen: Jill Coleman from Campbell Hill. [APPLAUSE]
John Lanzerotte: That is Arch of Illinois.

THE PRESIDENTS

John Lanzerotte:: At this time, I would like to introduce Gregg Bierei, the General Manager for Arch of Illinois; Gregg is going to be our president for 1998.

Gregg Bierei: Thank you, John. This is my first official duty here. I would like to present to John this souvenir gavel. John has worked hard during the last four years for the IMI. He was vice president last year; he has worked on the Scholarship Committee for four years prior to that, and we appreciate John's contribution to the IMI. [APPLAUSE]

Gregg Bierei presents souvenir gavel to outgoing President, John Lanzerotte.

John Lanzerotte: Well, that marks the end of the meeting for 1997. Thanks for your participation. It is sure great to see everybody, and we will look forward to seeing you in 1998. Mark these dates on your calendar now; the meeting is scheduled for September 24 and 25. Please join Gregg at the 106th meeting of the Illinois Mining Institute. Thank you very much.

ILLINOIS MINING INSTITUTE
1997-98 ACTIVE MEMBERS

AARON, STEVE, Supv. of Environ. Services, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/497-2141

ADAMS, DICK, Sales, Excel Mining Systems, 809 Skyline Dr., Marion, IL 62959 618/993-2611

ADAMS, JIM, Sales Rep, Minesafe Electronics, P.O. Box 281, Sturgis, KY 42459 502/333-5581

ALBERS, MARK, Sales, Weinacht & Assoc., 400 N. Bluff Rd., Collinsville, IL 62234 0

ALEXANDER, TRACY, Sales Rep., Kerco, Inc., P.O. Drawer 665, Madisonville, KY 42431 502/831-2889

ALLEY, KEITH, Vice Pres of Marketing & Sales, Stamler Corp., P.O. Box 307, Millersburg, KY 40348 800/736-4669

ANDERSON, DAVID G., Reg. Mgr., Mine Safety Appliances Co., 2300 Barrington Rd. Ste. 340, Hoffman Estates, IL 60195-2035 708/439-7474

ANDERSON, LYNN, General Mgr., Mining Div., Schroeder Industries, P.O. Box 72, Nichol Ave., McKees Rocks, PA 15136 412/771-4810

ANDOS, NICK, Pres. & CEO, Centrifugal & Mechanical Industries, 201 President St., St. Louis, MO 63118 314/776-2848

ANGLETON, JOSEPH, Pres., UMWA-District 12, 3695 S. 6th St., Springfield, IL 62703 217/529-8301

ARBESMAN, GARY J., Dist. Mgr., ITT-FLYGT, 16010 Meadow Oak, St. Louis, MO 63017 314/532-2257

ARNESON, N. ARNE, Pres., Arneson Timber Co., P.O. Box 6743, St. Louis, MO 63124 314/692-9999

ARNETT, GREG, Mgr., Engr., Freeman United Coal Mining Co., P.O. Box 261, Industry, IL 61440 309/254-3778

ATTERBERRY, JIM, Gen. Mgr., Woodruff Supply Co., Inc., P.O. Box 626, Benton, IL 62812 618/439-9451

AUCH, DARREL D., Vice Pres., IL/West KY Ops, Consolidation Coal Co., P.O. Box 566, Sesser, IL 62884 618/625-2041

AUGUSTINE, MICHAEL A., Dir. Project Develop, CDG Engineers, One Campbell Plaza, St. Louis, MO 63139 314/781-7700

AUSTIN, THOMAS J., Safety Dir., Freeman United Coal Mining Co., 1999 Wabash Ave., Ste 200B, Springfield, IL 62704-5364 217/793-7435 , Fax (217)698-3379

BACH, KENNETH J., Sales, Mine Safety Appliances Co., 3224 Gentry Rd., Makanda, IL 62958 618/457-2596

BACKS, GLENN, Maint. Supt., Monterey Coal Co., P.O. Box 94, Albers , IL 62215 618/248-5121,x253

BACQUET, GEORGIA, Jennmar Corporation, P.O. Box 501, Winchester, KY 40392-0501 606/744-9600

BACQUET, RON, Dist. Sales Mgr., Jennmar Corporation, P.O. Box 501, Winchester, KY 40393-0501 606/744-9600

* Honorary Member for Life

\+ Life Member

BAHR, E. WAYNE, Mgr. Coal Research & Dev., IL Dept. of Commerce & Comm. Affairs, 325 W. Adams St., Springfield, IL 62704 217/785-2017

BAILOR, JAMES J., Maint. Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

BALCH, RONALD, Pres., Midwest Reclamation Resources, P. O. Box 1642 , Murphysboro, IL 62966 618/684-5540

BANACH, NEDA, Admin. Asst., ILDNR, Office of Mines & Minerals, 503 E. Main St., Benton, IL 62812 618/ 438-9111

BANOVIC, EDWARD, Coal Mine Inspector, MSHA, P.O. Box 220, Hillsboro, IL 62049 0

BARBER, JOE, Purchasing Agent, Monterey Coal Co., RR4, Box 235, Carlinville, IL 62626 217/854-3291

BARBER, PAUL B., Mgr. of Preparation, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/497-2141

BARBOUR, DEWAYNE, Branch Mgr., National Mine Service Co., P.O. Box 1766, Mt. Vernon, IL 62864 618/244-6066

BARKER, KENNETH E., Service Tech., Lake Shore Mining Equipment, Inc., 105 Flower Dr., Albion, IL 62959-5015 618/445-3401

BARTEAU, JOHN M., Vice Pres., Rudd Equipment Co., 4679 Baumgartner Rd., St. Louis, MO 63129 314/487-8925

BAUER, FRED, Mgr., Materials, Old Ben Coal Co., P.O. Box 369, Coulterville, IL 62237-0369 618/ 758-4506

BAUER, MARY, Executive Secretary, ILDNR, Office of Mines & Minerals, 503 E. Main, Benton, IL 62812 618/ 438-9111

BAUER, ROBERT A. (BOB), Head, Earth Hazards/Engr. Geol. Section, IL State Geological Survey, 615 E. Peabody Dr., Champaign, IL 61820 217/ 244-2394

BEAL, LARRY, Sales Supv., Century Lubricants, P. O. Box 161, Marion, IL 62959 618/997-2302

BEARD, GREG, Prep Plant Leadman, White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651

BEAVEN, BRUCE, Supt. Ohio No. 11 Mine, Consolidation Coal Co., 1741 Hilltop Road, Morganfied, KY 42437 502/389-1071

BECK, ROBERT E., Prof. of Law, Southern IL University, Law School, Carbondale, IL 62901 618/453-8753

BECKER, TYRUS, Pres., UMWA #2412, Peabody Coal Co., 805 Eastside Dr., Evansville, IL 62242 618/853-4045

BEERBOWER, DAVID A., Vice Pres., Safety, Peabody Holding Co., 701 Market St., Suite 700, St. Louis, MO 63101 314/342-7731

BEERKIRCHER, MARK, Project Engr., Monterey Coal Co., RR4, Box 235, Carlinville, IL 62626 217/854-3291

BELL, JERRY, Sales Rep., Flanders Electric of Illinois, P.O. Box 1106, 1000 N. Court St., Marion, IL 62959 618/993-2681

* BELL, LANNY, (Retired), Roberts & Schaefer Co., 5712 Brookbank, Downers Grove, IL 60516 312/968-6433

BELLOMY, DWIGHT, Field Support Engr., SMC Electrical Products, Inc., 110 Westview Lane, Beckley, WV 25801 304/252-7637

BENEDICT, RICKY W., Gen. Maint. Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

* BENNETT, JOHN C., (Retired), Peabody Coal Co., 301 Greenhaven Dr., Belleville, IL 62221 0
BENNETT, PHILIP E., Vice Pres. of Coal Equip. Sales, Lake Shore Mining Equipment, Inc., P.O. Box 429, Millersburg, KY 40348 0
BERRI, JR., ROBERT, Mgr., Berri Exploration Services, P.O. Box 19871, St. Louis, MO 63144-0271 314/962-0324
BERRY, DARLENE, Warehouse Mgr., Gauley Sales Co., RR1, Box 155, Providence , KY 42450 502/667-2001
BERT, CAROLYN K., Exec. Sec., Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/497-2141
BETZ, FRED, Vice Pres., Baker-Bohnert/Service Group, P.O. Box 169003, Louisville, KY 40256-9003 502/634-3661
BHAGWAT, SUBHASH B., Head, Mineral Econ. Sect., IL State Geological Survey, 615 E. Peabody Dr., Champaign, IL 61820 217/244-7409
BIEREI, GREGG, Gen. Mgr., Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/497-2141, Fax 618/497-8001
BIGGER, JOSEPH, Regional Mgr., Brugg Cable Products, 125 Shaw Str., Suite 118, New London, CT 06320 860-442-9945
BIGGS, JIM, Sales Rep, Construction Machinery Corp., P.O. Box 22400, Owensboro, KY 42304 502/683-2000
BISE, DOUG, Product Dev. Mgr., American Mine Tool Co., P.O. Box AG, Chilhowie, VA 24319 703/646-8990
BISHOFF, STEVEN M., Mgr. Environ. Engr., Freeman United Coal Mining Co., 1999 Wabash Ave., Ste 200B, Springfield, IL 62704X 217/698-3300
BISHOP, DANIEL J., Relief Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316
BISHOP, MARY, State Mine Inspector, ILDNR, Office of Mines & Minerals, 503 E. Main St., Benton, IL 62812 618/ 439-9111
BLAIS, RUSSELL A., Vice Pres., Marketing, Naylor Pipe Co., 1230 E. 92nd St., Chicago, IL 60619 773/721-9400
BLAYLOCK, BOB, Supv. of Safety, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316
BLICKLE, KAREN, Reg. Sales Engr., Ameridrives Int'l., 650 East Elm, LaGrange, IL 60525 708/352-3330
BLOSS, DONALD (DON), Territory Mgr., G. W. Van Keppel Co., The, 11475 Page Service Dr., St. Louis, MO 63146 314/872-8440
BORDER, WILL, Sales Engr., Joy Technologies, Inc., #4 Industrial Park, Mt. Vernon, IL 62864 618/246-5041
BORGRA, THOMAS, Relief Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316
BOSWELL, ALAN, Mgr. of Operations, Webster County Coal Co., 2668 State Route 120East, Providence, KY 42450 502/667-2205
* BOTTOMLEY, J. A.,
BOUVET, TERRY, Mine Manager, Peabody Coal Co., 1214 Marissa Rd., Marissa, IL 62257 618/295-2374
BOWLES, JERRY, Salesman, Special Mine Services, Inc., P.O. Box 188, West Frankfort, IL 62896 618-932-2151
+BOWMAN, F. T., Pres., Bowdil Co., Box 20470, Canton, OH 44701-0470 0
* BOWMAN, FRED K., 2836 White Plains Court, Springfield, IL 62704 217/546-1351

BOYCE, KEITH D., Surveyor, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

BRANDLEIN, THOMAS F., Sales, Roberts & Schaefer Co., 120 S. Riverside Plaza, Chicago, IL 60606 312/236-7292

BRANDON, DOUG, Tricon Metals & Services, Inc., 1338 County Rd. 800E, Carmi, IL 62821 606/265-3510, Fax -3000

BRANDT, JOHN A., Pres., Lafayette Coal Co., 200 Frontage Rd, #200, Burr Ridge, IL 60521 708/986-1456

BRANSON, RICHARD R., Sales Manager, Reaco Battery Service Corp., Rt. 1, Box 48, Johnston City, IL 62951 618/983-5441

BRAXMEIER JR., THOMAS, Project Engr., Gunther-Nash Mining Construction Co., 2150 Kienlen Ave., St. Louis, MO 63121 314/261-4111

BRAXMEIER SR., THOMAS , Secy./Treas., Gunther-Nash Mining Construction Co., 2150 Keinlen Ave., St. Louis, MO 63121 314/261-4111

BRENDEL, JAMES B., Vice Pres., Gunther-Nash Mining Construction Co., 2150 Kienlen Ave., St. Louis, MO 63121 314/261-4111

BROCKHAUS, DOUGLAS A., Environ. Engr., Monterey Coal Co., 6 Greenridge Dr., Carlinville, IL 62626 217/854-9038

BROWN, DUKE, Foreman, Freeman United Coal Mining Co., P.O. Box 259, Farmersville, IL 62533-0259 217/627-2161

BROWN, JIM, Mine Engr., White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651

BROWN, RANDY D., Customer Service Ctr., Mgr., Fairmont Supply Co., P.O. Box 1388, Mt. Vernon, IL 62864X 618/244-5344

BRUCE, BRENDA, Eagle Seal Mine Sealant, P.O. Box 283, McLeansboro, IL 62859 618/643-2588

BRUCE, GARY, Pres., Eagle Seal Mine Sealant, P.O. Box 283, McLeansboro, IL 62859 618/643-2588

BRUCE, JOHN, Sales Rep, CSE Corporation, 600 Seco Road, Monroeville, PA 15146 412/856-9200

BUCHE, SHIRLEY, Training Adv., IL Eastern Community College, Harrisburg, IL 62946 618/252-6376, x331

BUCK, WAYNE M., Sr. Operations Engr., Monterey Coal Co., R4, Box 235, Carlinville, IL 62626 217/854-3291, x202

BULLARD, TROY, Supv., Coal Mine Inspect., MSHA, P.O. Box E, Sparta, IL 62886 0

BURGER, CHRIS J., Patrick Engineering, 300 W. Edwards Str., Springfield, IL 62701 217/525-7050

BURKE, JAMES E., Pres., Wescott Steel, Inc., 425 Andrews Rd., Trevose, PA 19053 215/364-3636

BURKETT, KEN, Outside Sales, The Mine Supply Co., 1703 Shawnee, P.O. Box 2220, Mt. Vernon, IL 62864 618/242-2087

BURTON, TONY, Sales Engr., Joy Mining Machinery, #4 Industrial Park Dr., Mt. Vernon, IL 62864 618/246-5019

BUSSELL, JACK, Rep., ZMI Corp., 7451 Switzer Rd., Ste. 115, Merriam, KS 66203 913/236-6447

BUSSLER, JAY M., Sr. Buyer, Freeman United Coal Mining Co., 3604 Whittington Ct., Springfield, IL 62704-6708 217/698-3300

BUTTRUM, ROBERT, Sales & Service Rep., The Mine Supply Co., 1703 Shawnee, P.O. Box 2220, Mt. Vernon, IL 62864 618/242-2087

CADY, PHIL, Sales, Ford Steel Co., P.O. Box 54, Maryland Heights, MO 63043 314/567-4680

CALDWELL, MIKE, Vice Pres. Engr. & Bus. Planning, Freeman United Coal Mining Co., Ste 200-B, Springfield, IL 62704-5364 217/698-3300, x274, Fax 698-3379

CAMPBELL, JOHN A. L., Consultant, 11816 Bevenshire Rd, Oklahoma City, OK 73162 405/270-3733

CAMPBELL, PAT, State Mine Inspector, ILDNR, Office of Mines & Minerals, 503 E. Main Str., Benton, IL 62812 618/439-9111

CAMPBELL, WESLEY, Training Spec., Monterey Coal Co., RR4, Box 235, Carlinville, IL 62626 217/854-3291, X253

CARE, DAVID L., Supv. of EE Dept., Freeman United Coal Mining Co., 10883 Avery Rd., West Frankfort, IL 62896 618/279-7241

CARR, BILL, Acct. Consultant, Kirby Risk Electrical Supply, 11381 Rend City Road, Benton, IL 62812 618/724-2415

CARR, IAN, Dir., Highwall Mining, Mining Technologies, 1500 N. Big Run Rd., Ashland, KY 41102 606-928-6644

CARR, PAT, Transportation, Kirby Risk Electrical Supply, 11381 Rend City Road, Benton, IL 62812 618/724-2415

CARRIL, LARRY, Gen. Sales Mgr., Cummins Gateway, Inc., 7210 Hall St., St. Louis, MO 63147 314/389-5400

CARTER, CHARLES, Supt., Kellogg Dock, Consolidation Coal Co., 3500 S. Levee Road, Modoc, IL 62261 618/284-6679

CARTER, LARRY, Materials Mgr., Joy Mining Machinery, #4 Industrial Park Dr., Mt. Vernon, IL 62864 618/246-5070

CARTER, LEE, Prof. Engr., Professional Engr., P.O. Box 44242, Rio Rancho, NM 87174-4242 314/821-4091

CARTER, STEVE, Partner, Knight Hawk Coal, LLC, 12824 Ladue Rd., Creve Coeur, MO 63141 314/576-6474

CARTWRIGHT, ROSE A., Mine Clerk, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

CASTELLANO, GENE, Sales Mgr., Arch Environmental Equip., Inc., P.O. Box 2422, Paducah, KY 42002-2422 502/898-6821

CAVINDER, MARK, Vice Pres/General Mgr., Old Ben Coal Co., P.O. Box 369, Coulterville, IL 62237-0369 618/738-1339

CHADY, JAMES D., (Retired), Old Ben Coal Co., 201 W. Park St., Benton, IL 62812-1932 618/435-5971

CHASE, DAVID H., Vice Pres., Chase Pump Equipment Co., Inc., P.O. Box 812, 603 S. Main St., Henderson, KY 42420 502/826-8713

CHEATHAM, ALAN, Sales Rep, Brake Supply Co., Inc., P.O. Box 447, Evansville, IN 47703 812/479-6881

CHOU, CHEN-LIN, Geologist, IL State Geological Survey, 615 E. Peabody Dr., Champaign, IL 61820 217/244-2492

CHUGH, YOGINDER P., Prof. & Chairman, Southern IL University, Dept. of Mining Engr., Carbondale, IL 62901 618/536-6637

CIMA, GREG, Pres., Cima Electrical & Mine Services, P.O. Box 69, Benton, IL 62812-0069 618/439/7211

CINCILLA, BILL, SR. Project Manager, Golder Paste Technology, Ltd., 200 Union Blvd., Suite 500, Lakewood, CO 80228 303/980-0540

CLARK, CARSON, Sales Rep., McJunkin Corp., P.O. Box 85, Calvert City, KY 42029 502/395-7171

CLARK, DANNY R., Section Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

CLARK, RODNEY, Sales, McJunkin Corp., 4139 Sisler St., Kingwood, WV 26537 304/329-3468

CLARKE, ROBERT P., Operations Mgr., Rust Environment & Infrastructure, 509 Olive Str., Ste 1101, St. Louis, MO 63101 314/447-4984

CLIFFORD, JAMES, Vice Pres., Sales, Roberts & Schaefer Co., 120 South Riverside Plaza, Chicago, IL 60606 312/236-7292

CLINE, LYLE, Dept. of Mining Engr., Southern IL University, 1605 Estate Lane, Marion, IL 62959-1578 618/536-6637

CLINTON, JEFF , Sales Mgr., Wallace Diesel Equipment, P.O. Box 68, Raleigh, IL 62977 618/244-4446

COLLINS, DON, (Retired), 9020 Stonebridge Dr., St. Louis, MO 63117 314/994-7044

* CONERTY, BETTY, Admin. Asst. (Retired), Illinois Mining Institute, 1761 County Rd. 1550 N., Urbana, IL 61801 217/328-1702

CONNER, DENNIS D., Engr., Joy Technologies, Inc., #4 Fountain Industrial Park, Mt. Vernon, IL 62864 618/246-5072

COOPER, HOLLY, Lab Sales Rep, Peoria Disposal Co. Laboratories, 4700 N. Sterling Ave., Peoria, IL 61615 309/688-7595

COSTELLO, ALLEN J., Geologist, IL Mine Subsidence Insurance Fund, 4 Executive Dr., Fairview Heights, IL 62208 618/624-3350

COTTER, JOHN L., Shift Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

COUSINS, MATTHEW, Sales Engr., Long-Airdox Co., 3206 W. DeYoung, Marion, IL 62959x 618/997-4335

COYNE, RON, Sales Rep., Advanced Drainage Systems, Inc., P. O. Box 809, London, OH 43140 800/733-9449

* CRAGGS, JOE, (Retired), Peabody Coal Co., R.R. 3, Box 47A, Taylorville, IL 62568 0

CRAIG, BETH, Chase Pump & Equipment, P.O. Box 812, 603 S. Main St., Henderson, KY 42420 504/826-8713

CRELLING, JOHN C., Prof., Southern IL University, Dept. of Geology, Carbondale, IL 62901 0

CUNETTO, JOE, Sales Rep., BCI Construction & Engr., 45 Empire Dr., Suite B, Belleville, IL 62220 618/277-2858

CURRY, JAMES E., Sales Mgr., American Mine Tool Co., P.O. Box AG, Chilhowie, V A 24319 540/646-8490

CUSHMAN, TOM, Vice Pres., Phillips Machine Service, Inc., P.O. Box 1245, Beckley, WV 25802-1245 304/255-0537

* DAMBERGER, HEINZ H., Head, Coal Section, IL State Geological Survey, 615 E. Peabody Dr., Champaign, IL 61820 217/333-5115 Fax 333/2830

DAME, DON, Dir, Human Rel. & Govt. Rel., Freeman United Coal Mining Co., 1999 Wabash Ave., Ste 200B, Springfield, IL 62704X 217/698-3300

DAME, JR., CHARLES D., Chief Safety Inspector Orient 6, Freeman United Coal Mining Co., 1999 Wabash Ave., Ste 200B, Springfield, IL 62704X 217/698-3300

DANKO, JOHN, (Retired), Peabody Coal Co., P.O. Box 272, Sparta, IL 62286

DANKO, J. ROBERT, Supt., Peabody Coal Co., P.O. Box 120, Morganfield, KY 42437 502/389-1007

DANNER, STEPHEN K., Geologist, IL Mine Subsidence Insurance Fund, 4 Executive Dr., Suite 4, Fairview Hghts., IL 62208 618/624-3350

DARGUZAS, JOSEPH N., Proj. Mgr., Sargent & Lundy, 55 E. Monroe, Chicago, IL 60603 312/269-6902

DAUSMAN, BRUCE R., Mgr. of Engr., Black Beauty Coal Co., P.O. Box 312, Evansville, IN 47702

DAUTEL, ROBERT, Supt.Mine Rescue Station, ILDNR, Office of Mines & Minerals, 609 Princeton Ave., Springfield, IL 62703 217/782-4831

DAVIS, BILL, Reg. Mgr., Marland/Ameridrives Intl., 650 E. Elm, LaGrange, IL 60525 708/352-3330

DEMARIS, PHILIP, Asst. Geologist, IL State Geological Survey, 2 Mayfair Court, Champaign, IL 61821 217/244-0082

DEMIR, ILHAM, Geologist, IL State Geological Survey, 615 E. Peabody Dr., Champaign, IL 61820 217/244-0836

DENNISON, ROGER, Pres., Turris Coal Co., P.O. Box 22, Elkhart, IL 62634 217/947-2673

DENTON, THOMAS G., Staff Mine Engr., Kerr-McGee Coal Corp., 312 West Church Str., Benton, IL 62812 618/268-6563

DEVON, JOHN, Vice Pres., Marston & Marston, Inc., 13515 Barrett Parkwy Dr., St. Louis, MO 63021 314/984-8800

DEVOUS, BILL, Supt., Jader Fuel Co., RR 1, Ridgway, IL 62979 618/272-7238

DEXTER, JOEL, Photographer, IL State Geological Survey, 615 E. Peabody Dr., Champaign, IL 61820 0

DILL, WILLIAM, Chairman, Mining & Indust. Tech., Rend Lake College, R.R. 1, Ina, IL 62846 0

DIMITROFF, JIM, Sales, Du Quoin Iron & Supply Co., P.O. Box 181, Du Quoin, IL 62832 800/535-5157

DIPASQUALE, CARL D., Tech. Mgr., Goodyear Tire & Rubber Co., 8544 Page Blvd., Lake St. Louis, MO 63367 314/429-8751

DOBBINS, DOUGLAS, Resident Engr., Mine 26, Old Ben Coal Co., P.O. Box 369, Coulterville, IL 62237-0369 618/758-4407

DODD, LEE W., Maintenance Planner, Monterey Coal Co., RR 4, Box 235, Arlinville, IL 62626 217/854-3291

DODRILL, BRENT, Tech. Asst. to VP, Consolidation Coal Co., P.O. Box 566, Sesser, IL 62884 618/625-2041

DOLL, ROGER, Mgr. of Bus Dev. & Tech. Serv., Zeigler Coal Holding Co., 50 Jerome St., Fairview Hts, IL 62208 618/394-2509

DONALDSON, DENNIS J., Energy Serv. Engr., Ameren CIPS, 1800 W. Main , Marion, IL 62959 618/997-3311

DONEY, EDWARD D., Mgr. Underground Planning & Econ., Kerr-McGee Coal Corp., P.O. Box 25861, Oklahoma City, OK 73125 405/270-2969

DOTSON, JOHN D., Electrical Engr., Freeman United Coal Mining Co., 16 Knollcrest, Chatham, IL 62629 0

DOWNING, DOUG, Mgr. Idle Prop., West, Arch Reclamation Services, Inc., City Place One, St. Louis, IL 63141-7056 314/994-2700

DRAPEAU, RONALD B., Engr. Tech., Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

DREYER, RICK, Central South Major Accts. Mgr., T. J. Gundlach & Co., Inc., P.O. Box 385, Belleville, IL 62222 618/233-7208

DUDZIK, ALBERT J., Foreman, Conant Mine, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/397-0275

DULA, STEPHEN H., General Mgr.,Fidelity Mine, Freeman United Coal Mining Co., P.O. Box 180, Du Quoin, IL 62832 618/542-2117

DUNCAN, S. W., Pres., Duncan Foundry & Machine Works, Inc., Box 433, Alton, IL 62002 618/465-7724

DURHAM, BILL, Sales Rep., Advanced Drainage Systems, Inc., P. O. Box 809, London, OH 43140 800/733-9449

EASTWOOD, ROGER, General Mgr., K&E Technical, Inc., P.O. Box 165, West Frankfort, IL 62896 618/932-2245

EDWARDS, BRENT, Vice Pres., Ashby Electric Co., Inc., P.O. Box 55, Madison St., Sebree, KY 42455 502/835-7534

EDWARDS, CHUCK, Dist. Sales Mgr., CSE Corporation, 600 Seco Road, Monroevile, PA 15146 412/856-9200

EHRLINGER III, HENRY P., (Retired), IL State Geological Survey, 1916 Forest Str., Eldorado, IL 62930 0

EILERTS, JR., MATHEW G., Maint. Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

ELGIN, BILL, Tech. Mgr., Goodyear Tire & Rubber Co., 605 State St., Newburgh, IN 47630 812/853-5844

ELLIS, BILL, Sales Mgr., J. H. Fletcher & Co., P.O. Box 2187, Huntington, WV 25722 304/525-7811

ELLIS, GORDON B., Branch Mgr., Bearing Headquarters Co., 329 S. 9th St., Mt. Vernon, IL 62864 618/242-7494

ELLIS, JOHN C., Mgr. of Material Handling Div., Henry A. Petter Supply Co., P.O. Box 2350, Paducah, KY 42001 502/443-2441

ENGLISH, VICTOR, Sales Mgr., BICC Cables Co., 2016 Bamboo Dr., Lexington, KY 40513 606/223-4673

ESTEL, STEVE, Engr. Tech., Pearl Designs, 200B, West Frankfort, IL 62896 618/937-2984

EVANS, DONNIE, Dist. Equip. Sales Mgr., Lake Shore Mining Equipment, Inc., 1601 E. DeYoung St.Rd., Marion, IL 62959-5015 618/993-1170

EVOY, TERRY, Supt. , Turris Coal Co., P.O. Box 21, Elkhart, IL 62634 217/947-2951

FARLAINO, G. REGGIE, Sales Rep., Phillips Machine Service, Inc., 1365 Sate Rt. 1163, Greenville, KY 42345 502/338-4341

FASTUCA, TONY, Sales Manager, Alloy Sling Chain Ind. Inc., P. O. Box 228, Hazelcrest, IL 60429 0

FIENE, KENT, Plant Supt., Captain Mine, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/497-2141

FILLION, JOHN P., Principal, CDG Engineers, One Campbell Plaza, 59th & Arsenal Strs., St. Louis, MO 63139 314/781-7770

FINDLEY, KEITH, Field Rep., Schroeder Industries, 1137 S. Englewood Ct., Evansville, IN 47714 0

FINDLEY, ROGER, Repair Mgr., Mt. Vernon Electric, Inc., P.O. Box 1548, Mt. Vernon, IL 62864 618/244-1066

FINK, JACK C., Mgr. Mining Products, Plymouth Rubber Co., Inc., 120 Bertley Ridge Dr., Coraopolis, PA 15108 412/262-3099

FINNERTY, DAVID J., Mgr., Engr & Envron Affairs, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/497-2141, x227

FISCHBECK, GROVER, Field Service Rep., J. H. Fletcher & Co., 1316 State Route 130 N., Morganfield, KY 42437-5404 502/333-4166

FISCOR, STEVE, Exec. Editor, COAL Age Magazine, 29 N. Wacker Dr., Chicago, IL 60606-3298 312/726-2802

FISKE, KELLY, Buyer, Kerr-McGee Coal Corp., P.O. Box 727, Harrisburg, IL 62946 618/268-6584

FLANAGAN, BILL, Area Sales Manager, Sunoco, 47 Muirfield Point Lane, St. Charles, MO 63304 314/922-0508

FLANAGAN, WM., Mine Mgr., Turris Coal Co., P.O. Box, Elkhart, IL 62634 217/947-2674

FLEENER, JOHN K., Vice Pres. & Gen. Mgr., Mid-Continental Fuels, Inc., P. O. Box 100, Johnston City, IL 62951 618/983-5406

FLEETWOOD, KELLY, Engr., student, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

FLEMING, ROBERT, Survey Party Chief, Freeman United Coal Mining Co., P.O. Box 259, Farmersville, IL 62533 217/627-2161

+FLETCHER, ROBERT, J. H. Fletcher & Co., Box 2187, Huntington, WV 25722-2187 0

+FLETCHER, WILLIAM, Dir., J. H. Fletcher & Co., 1630 Sheridan Rd., Apt. 10N, Wilmette, IL 60091 0

FLOWERS, DENNIS, Field Service Rep., Joy Mining Machinery, #4 Industrial Park Dr., Mt. Vernon, IL 62864 618/246-5066

FOARD, DAVE, Sales Engr., Industrial Process Equipment, 2800 Locust St., St. Louis, MO 63013 314/534-3100

FOLKERTS, JIM, Reg. Sales Mgr., Joy Technologies, Inc., #4 Industrial Park, Mt. Vernon, IL 62864 618/242-3650

FORD, JOHN, Pres., Ford Steel Co., P.O. Box 54, Maryland Heights, MO 63043 314/567-4680

FORD, MARTY, Prep Plant Leadman, White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651

FOX, JAMES M., Engineer, Emeritus, Tabor Machine Co., 908 Taylor Ave., Mt. Vernon, IL 62864 618/242-1048

FRAHER, LAWRENCE S., Opers. Mgr., Fansteel VR/Wesson Co., P.O. Box 11399, Lexington, KY 40575 606/252-1431

FRANCESCON, MICHAEL A., Section Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

FRANCOIS, MIKE, LAN/Workstation Analyst, Kerr-McGee Coal Corp., P.O. Box 727, Harrisburg, IL 62946 618/268-6586

FRANKLIN, DANNY, Mine Foreman, White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651

FRANKLIN, SR., WILBUR M., State Mine Inspector, ILDNR, Office of Mines & Minerals, 503 E. Main Str., Benton, IL 62812 618/439-9111

FRESE, TONY, Branch Mgr., Lake Shore Mining Equipment, Inc., 1601 E. DeYoung St., Marion, IL 62959-5015 618/993-1170

FREY, TRACY, Associate Editor, Coal Age Magazine, 29 N. Wacker Dr., Chicago, IL 60606 312/609-4332

FROEHLE, MAUREEN, Vice Pres., Bus. Planning, Freeman Energy Corporation, 1999 Wabash Ave., Suite 200A, Springfield, IL 62704-5368 217/698-3300

GALLI, BRYAN, Director of Sales, Freeman Energy Corporation, 1999 Wabash Ave., Ste 200, Springfield, IL 62704 618/793-7444

GAMSTER, SCOTT, Pres., Reaco Battery Service Corp., Route One, Box 48, Johnston City, IL 62951 618/983-5441

GANEY, DAN, Manager Engr., Kerr-McGee Coal Corp., P.O. Box 727, Harrisburg, IL 62946 618/268-6311, x6594, Fax-6579

GANN, JIMMIE E., 753 Rozier #18, Ste. Genevieve, MO 63670 0

GARRETT, DAN, Prep Plant Manager, White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651

GARRETT, MICKEY, Salesman, Pewag Chains, Inc., 281 Shore Dr., Unit C, Burr Ridge, IL 60521 800/526-3924

GARRISON, MERLE RAY, Sales, Gooding Rubber Co., P.O. BOX 487, Benton, IL 62812 618/435-8104

GENTRY, T. J., Sales Mgr., DuQuoin Iron & Supply Co., P.O. Box 181, Du Quoin, IL 62832 618/542-5477

GEORGE, TIM, Asst. Service Mgr., J. H. Fletcher & Co., P.O. Box 2187, Huntington, WV 25722 304/525-7811

GERDEMANN, DEAN, Sales Rep., Rud Chain, Inc., P.O. Box 8145, Cedar Rapids, IA 52408 319/390-4040

GILES, WILLIAM E., Chief Mech. Engr., Freeman United Coal Mining Co., P.O. Box 259, Farmersville, IL 62533 217/627-2161

GILL, JAMES B., V. P., Operations, MAPCO Coal, Inc., P.O. Box 911, Henderson, KY 42420 502/827-4996

GILLES, STEVE, Prod. Mgr. Bixby-Zimmer, Inc. P.O. Box 510, Galesburg, IL 61401 812/983-4654

GILLESPIE, BOBBIE, Sales, SETCO Solid Tire & Rim, 2862 Sharp Lane, West Frankfort, IL 62896 618/627-2760

GILMARTIN, D. LEO, (Retired), Peabody Coal Co., 13457 Tesson Ferry Rd., Apt. 226, S. Louis, MO 63128-4057 618/295-2254

GINNARD, KENNETH J., Geologist, Weir Int'l. Mining Consultants, 2340 River Rd., Suite 203, Des Plaines, IL 60018 847/297-3500, Fax -0217

GLASSCOCK, DON, Pres., Ironhorse, Inc., P.O. Box 152, Baldwin, IL 62217 618/785-2221

GLOGOWSKI, GERALD E., Head, Administrative & Gen. Services, IL State Geological Survey, 615 E. Peabody Dr., Champaign, IL 61820 217/244-2403

GODDARD, DONALD G., Pres., Mid-Continental Fuels, Inc., P. O. Box 100, Johnston City, IL 62951 618/983-5406

GOODWIN, JONATHAN H., Sr. Geologist, IL State Geological Survey, 615 E. Peabody Dr., Champaign, IL 61820 217/333-5855

GORMAN, ROBERT, Maint. Chief, Freeman United Coal Mining Co., RR, Waggoner, IL 62572 2178/627-2161

GRADY, JR., DAVE, Field Rep., J&R Manufacturing Co., Rt. 2, Box 173F, Bluefield, VA 24605 540/322-5431

GRAY, RALPH J., Consultant, Coal, Coked Carbons, Ralph Gray Services, 303 Drexel Dr., Monroeville, PA 15146 0

GRAYSON, R. LARRY, Professor, University of Missouri-Rolla, 226 McNutt Hall, Rolla, MO 65401 573/341-4753

GREGORY, WALT, Pres. & CEO, Freeman United Coal Mining Co., 1999 Wabash Ave., Ste 200B, Springfield, IL 62704 217/698-3300

GRIESEDIECK, CHRIS, Pres., American Pulverizer Co., 5540 W. Park, St Louis, MO 63110 314/781-6100

GRIFFITH, JOHN, Sales Mgr., Deister Concentrator Co., 901 Glasgow Ave., Fort Wayne, IN 46803 219/424-5128

GRIFFITH, MARK, Sales Custom Fabrication, Deister Concentrator Co., 901 Glasgow Ave., Fort Wayne, IN 46803 219/424-5128

GRIMES, JIM, Purchasing, Arclar Coal Co., P.O. Box 444, Harrisburg, IL 62946 618/252-2708

GRIMMETT, MARK A., Vice Pres., NARCO, Inc., P.O. Box 549, Smithers, WV 25186 304/442-5656

GRIMMETT, TIMOTHY J., Pres., NARCO, Inc., P.O. Box 549, Smithers, WV 25186 304/442-5656

GRISSINGER, LEE A., Pres., Profile Screens, Inc., 901 S. Water, Havana, IL 62644 309/543-2082

GROGAN, LESTER T., 308 W. Adelaide, Christopher, IL 62822 618/724-4429

GULLIC, ROBERT C. (BOB), General Mgr., Sahara Coal Co., Inc., 1660 Carrier Mills Rd., Harrisburg, IL 62946 618/994-2311

GUTHMAN, RONALD L., Warehouse Tech., Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

HAAGA, MATT, Bus. Unit Mgr., Peabody Coal Co., 1214 Marissa Rd., Marissa, IL 62257 618/295-2374

HAKE, WILLIAM D. (BILL), Vice Pres. - Coal Operations, Kerr-McGee Coal Corp., P.O. Box 25861, Oklahoma City, OK 73125 405/270-3732

* HALBERSLEBEN, PAUL

HAMILTON, GLENN, Environ. Engr., Freeman United Coal Mining Co., P.O. Box 349, Du Quoin, IL 62832 618/542-5875

HANCOCK, BUDDY, Branch Mgr., Commercial Testing & Engr. Co., P.O. Box 752, Henderson, KY 42420 502/827-1187

HANCOCK, JACK, Field Dept. Mgr., Commercial Testing & Engr. Co., P.O. Box 752, Henderson, KY 42420 502/827-1187

HANKINS, RONALD W., Warehouse Tech., Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

HANLEY, TERRY, Sales Rep., Hanley & Associates, 226 Dobson Str., Carterville, IL 62918 618/985-3223

HARLAN, KEITH, Service Tech., Lake Shore Mining Equipment, Inc., 1601 E. DeYoung, Marion, IL 62959 618/993-1170

*HARRELL, M. V. (DOC), Vice Pres. (Retired), Freeman United Coal Mining Co., Route 2, Mt. Vernon, IL 62864 618/242-7374

HARRIS, JAMES D., Salesman, Special Mine Services, Inc., P.O. Box 188, West Frankfort, IL 62896 618/932-2151

HART, MARK, Sr. Vice Pres., Cyprus AMAX Coal Co., 5420 East Long Place, Littleton, CO 80122 303/643-5426

HARTSTIRN, BOB, Supt. Burning Star #4, Consolidation Coal Co., RR #1, Box 39, Cutler, IL 62238 618/497-2176

HARVEY, DONNA, Shop Office Mgr., Mt. Vernon Electric, Inc., P.O. Box 1548, Mt. Vernon, IL 62864 618/244-1066

HASENSTAB, THOMAS J., Engr. II, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

HAWKEY, ROBERT, Pres., Hawkey & Kline Drilling, nc., P.O. Box 38AA, St. Peter, IL 62880 618/349-6113

HAYDEN, JEFF, Operations Mgr., White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651, fax: 618/382-8629

HAYWOOD, GREG, Prep. Plant Supt., White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651

HEIGERT, FRANK A., Surfaace Maint. Planner, Monterey Coal Co., RR#4, Box 235, Carlinville, IL 62626 217/854-3291

HEIN, DARRELL L., Field Spec., IL Mine Subsidence Insurance Fund, #4 Executive Dr., Suite 4, Fairview Heights, IL 62208 618/624-3350

HEINS, PHIL, Gen. Mgr., A. L. Lee Corporation, P.O. Box 2370, Mt. Vernon, IL 62864X 618/242-6065

HELFRICH, GEORGE, National Acct. Mgr., Mohler Technologies, Inc. P.O. Box 669, Boonville, IN 47601 800/282-2812

HELLER, CHRIS F., Surface Coord., Monterey Coal Co., RR#4, Box 235, Carlinville, IL 62626 217/854-3291

HENKEN, CARY, Sales Rep., Power Techniques, Inc., P. O. Box 166, 707 Railroad Str./ Rt. 37, Alma, IL 62807 618/547-9099

HENNESSEY, TERRY, Gen. Mgr., G. W. Van Keppel Co., 11475 Page Service Dr., St. Louis, MO 63146 314/872-8440

HENRY, TOM, Gen. Maint. Mgr., Old Ben Coal Co., P.O. Box I, Sparta, IL 62286 618/327-3895

HERNDON, MITCH, Sales Rep, Rudd Equipment Co., 4679 Baumgartner, St. Louis, MO 63129 314/487-8925

HERZOG, BEVERLY, Sr. Hydrogeologist/Group Head , IL State Geological Survey, 615 E. Peabody Dr., Champaign, IL 61820 217/244-2788

HESS, JAMES, Mine Supt., Orinte No. 6, Freeman United Coal Mining Co., 5885 N. Cherryville Lane, Waltonville, IL 62894 618/279-7241

HIGGINS, GEORGE, Retired, Ashby Electric Co., Inc., 306 Bailey Lane, Benton, IL 62812 618/439-3920

HIGGINS, JOHN, Salesman, Gauley Sales Co., RR1, Box 155, Providence, KY 42450 502/667-2001

HINSHAW, GREG, Mgr. of Engr., J. H. Fletcher & Co., P.O. Box 2187, Huntington, WV 25722 0

HINZ, BILL, Maint. chief, Freeman United Coal Mining Co., P.O. Box 347, Virden, IL 62690 618/965-5461

HIRD, TERRY, Supt., Marissa mine, Peabody Coal Co., P.O. Box 77, Marissa, IL 62257 618/587-1915

HIRSCHI, JOE, Mine Engineer, Kerr-McGee Coal Corp., P.O. Box 727, Harrisburg, IL 62946 618/268-6588

HITCHINGS, DAVID, Maint. Freeman, Freeman United Coal Mining Co., P.O. Box 347, Virden, IL 62990 217/965-5461

HOEMAN, JACK, Mgr.-Purchasing, Peabody Coal Co., 301 N. Memorial, St. Louis, MO 63102 314/342-7667

HOFFARD, DONNIE R., Section Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

HOFFMAN, MARKEL, Prep Plant Foreman, White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651

HOFMANN, WES, Coord., Archveyor, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

HOLDERFIELD, JOE, Branch Mgr., Fabick Machinery Co., P.O. Box 760, Marion, IL 62959 618/997-1881

HOLLOWAY, CLIFFORD, Public Service Admin., ILDNR, Office of Mines & Minerals, 503 East Main Str., Benton, IL 62812 618/439-9111

HOOD, CANDY, Admin. Asst., Long-Airdox Co., 3206 West DeYoung, Marion, IL 62959 618/997-4335

HOOKS, CHARLES, Agronomist, University of Illinois, 13040 Blackstump Rd., Percy, IL 62272 618/965-9651

*HOPKINS, M. E., Director of Geology (Retired), Peabody Holding Co., 35 Club Grounds N., Florissant, MO 63033-4110 314/342-3400

HORTON, RICHARD, Reg. Mgr., Polydeck Screen Corp., 905 Apricot Ave., Mt. Vernon, IL 62864 618/244-4291

HOSKINS, JOHN, Pres., Coal Carbon, Inc. DuQuoin, IL 62832 618/542-3355

HOWARD, JOHN L., Assoc. Dean, Mining Tech., Illinois Eastern Comm. Colleges, 2201 Toronto Rd., Springfield, IL 62707 217/627-3843

HOWELL, JIM, Tech. Manager, Minesafe Electronics, P.O. Box 281, Sturgis, KY 42459 502/333-5581

HUDSON, LARRY, Supt., Industry Mine, Freeman United Coal Mining Co., P.O. Box 261, Industry, IL 61440 309/254-3778

HUELSMANN, ARNOLD, CEO, The Arnold Co., 123 E. Broadway, Trenton, IL 62293-1601 0

HUFFMAN, DYRK, Engr. I, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

HUGHES, WILLIAM W., Service Engr., Continental Conveyer & Equip. Co., P.O. Box 2507, Mt. Vernon, IL 62864 0

HUNTSMAN, LES, Pres., Special Mine Services, Inc., P.O. Box 188, West Frankfort, IL 62896 618/932-2151

HURST, ROBERT J., Pres., Geo-Con, Inc., R.R. 4, 305 Fifth Ave., Princeton, IN 47670 0

HUTCHCRAFT, JIM, Owner, H & H Consulting, 707 S. Monroe, P.O. Box 481, West Frankfort, IL 62896 618/937-2622

IRMEN, BILL, Mfg. Mgr., Joy Mining Machinery, #4 Industrial Park , Mt. Vernon, IL 62864 618/246-5014

ISROW, JUDY, Sales, Ashby Electric Co., Inc., P.O. Box 55, Sebree, KY 42455 502/835-7534

IWASYSZYN, TED, Vice Pres, Sales, Group Manufacturing Ltd., P.O. Box 23298, Belleville, IL 62223 618/257-2440

JACKSON, AARON D., Gen. Mgr., Camp Bus. Unit, Peabody Coal Co., P.O. Box 328 , Morganfield, KY 42437 502/389-6507

JACKSON, ROYCE, Sales, TRYUS Company, Box 177, Du Quoin, IL 62832 618/542-8629

JAHNIG, RON, Process Engr., Decanter Machine, Inc., 3622 Bristol Hwy., Johnson City, TN 37601 615/282-8671

JAMES, JESSE, Sales, Minesafe Electronics, Inc., P.O. Box 281, Sturgis, KY 42459 304/568-5201

JANKOUSKY, BILL, Chief Safety Insp., Freeman United Coal Mining Co., P.O. Box 259, Farmersville, IL 62533 217/627-2161

JANKOUSKY, CHARLES, (Retired), Freeman United Coal Mining Co., 702 Sheridan Dr., Benton, IL 62812 618/438-4391

JENKINS, DAVE, Branch Mgr., Motion Industries, 13724 Shoreline Dr. E., Earth City, MO 63038 314/770-2600

JENKINS, RON, Scale Services Tech., Commercial Testing & Engr. Co., P.O. Box 752, Henderson, KY 42420 502/827-1187

JOHNSON, D. J., Prof., Mining Industrial Tech., Rend Lake College, R.R. 1, Ina, IL 62846 618/437-5321

JOHNSON, DEBBI, Ashby Electric, Inc., P.O. Box 55, Sebree, KY 42455 0

JOHNSON, SAM, Manager/Sales, Dooley Bros., Inc., 609 N. McLeansboro St., Benton, IL 62812 618/438-7831

JONES, JACKIE W., Salesman, Kerco, Inc., P.O. Drawer 665, Madisonville, KY 42455 502/676-3039

JONES, ROD, Mkt. Mgr., SMC Electrical Products, P.O. Box 880, Barboursville, WV 25701 304/736-8933

JONES, WAYNE L., Branch Mgr., IBT, Inc., 601 S. 10th Str., Mt. Vernon, IL 62864 0

JUBINSKY, STEVE, National Sales Mgr., Ingersoll-Rand , P.O. Box 1776, Liberty Corner, NJ 07938 0

JURICH, JOE, Technical Services, Mt. Vernon Electric, Inc., P.O. Box 1546, Mt. Vernon, IL 62864 618/244-1066

JUSTICE, J. H. (JIM), Vice Pres., Du Quoin Iron & Supply Co., P.O. Box 181, Du Quoin, IL 62832 800/535-5157

KAELIN, LARRY F., Pres., Marine Coal Sales Co., 645 W. Carmel Dr., #190, Carmel, IN 46032 0

KAHN, LATIF, Minerals Engr., IL State Geological Survey, 615 E. Peabody, Champaign, IL 61820 217/244-2383

+ KALIA, HEMENDRA N., 6425 W. Coley Ave., Las Vegas, NV 89102 0

+ KARNES, RALPH E., Maint. Foreman, Consolidation Coal Co., 1311 Ash Str., Hillsboro, IL 62049-1659 0

KASKY, JOHN, Sales Rep, Heartland Pump Rental & Sales, Inc., 102 Brown St., Carterville, IL 62918 618/985-5110

KATTERHENRY, BILL, Pres., Katterhenry & Assoc., 432 DuPahze St., Naperville, IL 60565 708/357-4466

KEE, GEORGE B., Vice Pres., Special Mine Services, Inc., P.O. Box 188, Country Club Rd., West Frankfort, IL 62896 618/932-2151

KEE, VERNON, Sales Rep., Special Mine Services, Inc., P.O. Box 188, West Frankfort, IL 62896 618/932-2151

KEEFE, DON, Policy Analyst, IL Dept. of Commerce & Comm. Affairs, 325 W. Adams Str., Springfield, IL 62704 217/785-2017

KELL, THOMAS M., Supt., Crown II, Freeman United Coal Mining Co., P.O. Box 347, Virden, IL 62690 217/965-5461

KELLER, DON, Kennametal, Inc., P.O. Box 231, Latrobe, PA 15650 0

KELLEY, JAY HILARY, Pres., Kelastic Mine Beam Company, 307 S. Pennsylvania Ave., Greensburg, PA 15601 0

KELLEY, RAY, Sales, Dyno Nobel Midwest, P.O. Box 349, Pittsfield, IL 62363 0

KELLY, JACK, , SPRAYON, 1059 Jennings Sta. Rd., , St. Louis, MO 63137 0

KEMP, LYNN, Sales, M & S Fire & Safety, P.O. Box 4348, Evansville, IN 47724 812/424-3863

KENNEDY, JACK, V. Pres., Jack Kennedy Metal Prods. & Bldgs., Inc., P.O. Box 138, Taylorville, IL 62568 217/287-7231

KENNEDY, WILLIAM, Pres., Jack Kennedy Metal Prods. & Bldgs., Inc., P.O. Box 138, Taylorville, IL 62568 217/287-7231

KERN, ALAN, Mine Engr. , White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651

KIELHORN, MIKE, Service Tech., Lake Shore Mining Equipment, Inc., 1601 E. DeYoung, Marion, IL 62959 618/993-1170

KILLMAN, ED, , ILDNR, Office of Mines & Minerals, 503 E. Main St., Benton, IL 62812 618/439-9111

KINNELL, HERB, Gear Engr. Specialist, Joy Technologies, Inc., 6160 Cochran Rd., Solon , OH 44139 216/248-7970

KITCHEN, MARK, General Mine Foreman, White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651

KITTINGER, JAY, Mine Foreman, White County Coal Corp., P.O. Box 457, Carmi, IL 62821 0

KLINE, DANNY (COWBOY), Sales Rep., Ashby Electric Co., Inc., P.O. Box 55, Sebree, KY 42455 502/835-7534

KOCUREK, PAUL J., (Retired), Freeman United Coal Mining Co., 505 Western, Taylorville, IL 62568 217/824-4670

KOHORST, JANE, Personnel Tech., ILDNR, Office of Mines & Minerals, 524 S. Second Str., Springfield, IL 62701-1787 217/782-0120

KOPEC, JOHN , Pres., K&E Technical, Inc., P.O. Box 165, West Frankfort, IL 62896 618/932-2245

KORTE, JAMES, Western Sales Mgr., T. J. Gundlach & Co., Inc., P. O. Box 385, Belleville, IL 62222 618/233-7210

KOVACK, MIKE, Area Mgr., Triune, Inc., 5967 Airline Road, Henderson, KY 42420 618/235-7928

KOVARIK, MIKE, Sales, Gooding Rubber Co., P.O. Box 487, Benton, IL 62812 618/435-8104

KRITZBERGER, GENE, Product Mgr., Voith Transmissions, Inc., 25 Winship Road, York, PA 17402 717/767-3200

KROESE, OWEN, Mgr., Elect & Sys. Engr., Kerr-McGee Coal Corp., PO Box 727, Harrisburg, IL 62946 618/268-6584

KUTZ, BILL, Vice Pres. Sales & Serv. Engr., Group Manufacturing Ltd., 2628 W. Main, Belleville, IL 62223 618/257-2440

LAFFEY, MIKE, Sales Rep., Laffey Equipment Co., P.O. Box 16285, St. Louis, MO 63105 314/427-7414

LAMBERT, KEITH, Dist. Sales Mgr., Carroll Engineering Co., P.O. Box 149, Morganfield, KY 42437 502/389-3800

LANCASTER, JIM, , Infrared Technologies, 4769 Shenondoah Dr., Louisville, KY 40241 800.862-5448

LANE, C. K., Pres., Bluegrass Coal Development Co., 771 Corporate Dr., Ste 300, Lexington, KY 40503 606/296-3838

LANZEROTTE, JOHN, Production Supt., Monterey Coal Co., R.R. #4, Box 235, Carlinville, IL 62626 217/854-3291, X221 Fax 6807

LARSON, JOHN C., Sales Rep., Michigan Industrial Lumber, P.O. Box 612, Whiting, IN 46394 219/659-4255

LATTINA, ALAN, Reg. Sales & Service Mgr., Centrifugal & Mechanical Industries, 201 President Str., St. Louis, MO 63118 314/776-2848

LAUER, BRIAN, Territory Mgr., Roland Machinery Co., 5920 N. Lindbergh Blvd., Hazelwood, MO 63042 314/731-1330

LAUZON, MARC, Land Rec. Spec., ILDNR, Office of Mines & Minerals, 503 E. Main St., Benton, IL 62812-2522 618/439-911

LAYMAN, JEFFREY S., Shift Mine Manager, Monterey Coal Co., RR#4, Box 235, Carlinville, IL 62626 217/854-3291

+ LEDVINA, C. T. (CHRIS), 69 Park Lane, P.O. Box 217, Golf, IL 60029-0217 847/726-0022, 773/561-1122

LEMMONS, SHARON K., Claims Mgr., Lynch Coal Operators Reciprocal Assn., P.O. Box 715, Terre Haute, IN 47805 812/232-5011

LETSKY, CONNIE, Geologist, IL EPA, 2009 Mall St., Collinsville, IL 62234 618/346-5140

LILLY, CHUCK, Vice Pres., Sales Machinery Parts, National Mine Service Co., P.O. Box 328, Oak Hill, WV 25901 304/253-7324

+ LINDSAY, GEORGE C., (Retired), 7024 Melody Lane, Fort Wayne, IN 46804-2836 0

LITTEKEN, GUY, Erosion Spec., A.S.P. Enterprises, Inc., 275 Northwest Blvd., Fenton, MO 63026 314/343-4357

LOGAN, STEVE, Sales, United Central Industrial Supply Co., 1800 Supply Road, Carterville, IL 62918 618/985-8316

LOGAN, TINA, Purchasing Agent, Arch of Illinois, Inc., P.O. Box 380, Percy, IL 62272 618/497-2141

LONG, T. R., Vice Pres., Midwest Reg., Long-Airdox Co., 3206 West DeYoung, Marion, IL 62959 618/997-4335

LONGO, DAVID, Resource Planner, ILDNR, Office of Mines & Minerals, 524 S. Second Str., Springfield, IL 62701-1787 217/782-4970

LOUNSBURY, RICHARD E., Environ. Advisor (Retired), Monterey Coal Co., P.O. Box 675, Carlinville, IL 62626 217/854-3717

LOVELESS, DONALD E., Shift Mine Manager, Monterey Coal Co., RR#4, Box 235, Carlinville, IL 62626 217/854-3291

LOVITZ, JERRY, Continuous Haulage Product Mgr., Stamler Corp., P.O. Box 307, Millersburg, KY 40348 618/997-4335

LOWDERMILK, J. SCOTT, Vice Pres., Forced Potato, 640 Bizzell Dr., Lexington, KY 40510 606/252-4531

LUBBERT, RANDALL, Dragline Training Coord., SIU-Coal Extraction & Utilization Research Center, MC6894, Carbondale, IL 62901 618/453-7329

* LUCAS, WALTER S., V. Pres. (Retired), Sahara Coal Co., Inc., P.O. Box 816, Harrisburg, IL 62946 618/252-1327

LUMM, DON, Mineral Assessor, Sr., Kentucky Revenue Cabinet, 938 Fairhaven Dr., Lexington, KY 40515 502/564-8334

LUNDBERG, MAGNUS, General Manager, Grindex Pumps, 118524 81st. Ave., Tinley Park, IL 60477-6256 708/957-9988

LUTZ, MIKE, Sales, S & S Urethane, P.O. Box 266, Farina, IL 62838 618/245-6476

LYMAN, ROBERT M., Geologist, Reserve Services, 911 Reynolds Str., Laramie, WY 82072 0

LYONS, THOMAS J., Manager, Adminis., Kerr-McGee Coal Corp., P. O. Box 727, Harrisburg, IL 62946 618/268-6584

MACK, THOMAS E., Sales Mgr., Mine Technik America, Inc., 12415 Bahama Dr., Marion, IL 62959 618/964-1986

MALONEY, PAULA, Public Inform. Spec. , SIU-Coal Extraction & Utilization Research Center, MC4623, Carbondale, IL 62901 618/536-5521

+MANCI, SAMUEL L., Sales Rep., Long-Airdox Co., 618/438-3821

MANIS, JIM, Dir. Corp & Foundation Rels., Southern IL University, Carbondale, IL 62901 618/453-4900

MANIS, WILLIAM, Survey Helper, Freeman United Coal Mining Co., P.O. Box 259, Farmersville, IL 62533 217/627-2161

MANLOVE, SONNY, Sales Rep., K&M Machine Works, 5001 S. 38th STr., St. Louis, MO 63116 314/481-1099

MANN, MIKE, Sales Mgr., Brake Supply Co., Inc., P.O. Box 447, Evansville, IN 47703-0447 812/429-9466

MANN, MITCH, Sales Mgr., Coal Age, Inc., P.O. Box 698, West Frankfort, IL 62896 618/937-4645

MARCUM, RONNIE, Vice Pres., Western/Non-Mining Operations, Consolidation Coal Co., P.O. Box 566, Sesser, IL 62884-0566 618/625-2041

MAROSCHER, GUS, Exec. Vice Pres., Brautigam , 820 Henderson Ave., Washington, PA 15301 412/228-7444

+MARTIN, CHARLES K. EDWARD, Mgr., Human Resources, EDS, 0

MARTIN, DALE, Vice Pres, CSI, 5595 Highway 34 N., Raleigh, IL 62977 618/268-4850

MARTIN, DARIN, Land Reclam. Specialist, ILDNR, Office of Mines & Minerals, 503 E. Main St., Benton, IL 62812-2522 618/439-9111

MARTIN, DEREK, Sr. Mech. Engr., Kerr-McGee Coal Corp., P. O. Box 727, Harrisburg, IL 62946 618/268-6423

MARTIN, HARRY, Vice Pres.Sales & Service, Mine Technik America, Inc., 2045 W. Pike Str., Houston, PA 15342-1010 412/743-1200

MARTIN, J. NEIL, Secretary-Treas., Heartland Pump Rental & Sales, Inc., 102 Brown St., Carterville, IL 62918 618/985-5110

MARTIN, JAMES, Gen. Mine Foreman, Webster County Coal Co., 2668 State Rt. 120 East, Providence, KY 42450 502/667-2205

MARTIN, JAMES W., Sr. Mining Engr., Freeman United Coal Mining Co., 1999 Wabash Ave., Ste 200B, Springfield, IL 62704 618/698-3300

MARTIN, KIM, Heartland Pump Rental & Sales, Inc., 102 Brown St., Carterville, IL 62918 618/985-5110

MATUSKA, DAN, Sr. Lubrication Engr., Century Lubricants, P.O. Box 161, Marion, IL 62959 618/997-2302

MATYI, STEPHEN R., Section Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

MAY, BILLY, Sales Rep., Mohler Technology, Inc., P.O. Box 669, Boonville, IN 47601 812/897-2900

MC BRIDE, DON, Supv., Training & Cert., ILDNR, Office of Mines & Minerals, 503 E. Main Str., Benton, IL 62812 618/439-9111

MC COY, LARRY, Sr. Dist. Mgr., Esco Corp., 122 EASTGATE DR., Danville, IL 61832 217/446-2210

MC FARLAND, JOHN, (Retired), Old Ben Coal Co., 13772 Spring Pond Rd., Benton, IL 62812 618/738-1339

MC GAHA, RAY, Sr. Vice Pres., Continental Conveyer & Equip. Co., Inc., P.O. Box 400, Winfield, AL 35594 205/487-6492

MC KEE, MIKE, C.S. Driver, Joy Mining Machinery, #4 Industrial Park Dr., Mt. Vernon, IL 62864 618/242-3650

MC KEEVER, JIM, General Mgr., Roland Machinery Co., 816 N. Dirksen Parkway, Springfield, IL 62702 217/789-7711

MC NULTY, JAMES E., Sr. Assoc., Coal Industry Consultants, Inc., P.O. Box 4345, Wheaton, Il 60189-4345 708/858-8673

* MC REAKEN, C. DAYTON (WORM), (Retired), Zeigler Coal Co., 701 E. 4th St., West Frankfort, IL 62896 618/932-3378

MEDVICK, CHARLES, Public Service Adminstr., ILDNR, Office of Mines & Minerals, 503 East Main Str., Benton, IL 62812 618/439-9111

MEIGHEN, MIKE, Operations Manager, White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651

MELCHOR, M. JOSEPH, Pres., Gunther-Nash Mining Construction Co., 2150 Keinlen Ave., St. Louis, MO 63121 314/261-4111

MELVIN, CALVIN, Maint. Supt., Kerr-McGee Coal Corp., P.O. Box 727, Harrisburg, IL 62946 618/268-6584

MERRIFIELD, NEAL H., Vice Pres., Operations, Freeman United Coal Mining Co., 1999 Wabash Ave., Ste 200B, Springfield, IL 62704-5364 217/698-3300

MESSMER, JERRY, Vice Pres., Profile Screens, Inc., 901 S. Water, Havanna, IL 62644 309/543-2082

MESSMER, JOE, Acct. Executive, Azcon Corp., P.O. Box 616, Alton, IL 62002 618/413-3770

MEULER, STEVE, Plant Supt., Fansteel VR/Wesson Co., P. O. Box 11399, Lexington, KY 40575 606/252-1431

MIHALEK, PAUL J., Longwall Coord., Monterey Coal Co., RR4, Box 235, Carlinville, IL 62626 217/854-3291

MILLARD, TIM, Sales, Central Illinois Steel Co., P. O. Box 78, Carlinville, IL 62626 217/854-3251

MILLBURG, LARRY, Gen. Mine Mgr., Freeman United Coal Mining Co., P.O. Box 347, Virden, IL 62690 217/965-5461

MILLER, JIM S., Director, Embarass Valley Coal Assoc., Rt, 2, Box 238, Mt. Vernon, IL 62864X 0

MILLER, JOHN J. (IKE), Mgr.-Sales/Service, Roberts & Schaefer Co., 120 S. Riverside Plaza, Suite 400, Chicago, IL 60606 312/236-7292

MILLER, MEGAN, Product Mgr., Fosroc, Inc. , 150 Carley Ct., Georgetown, KY 40324 502/863-6800

MILLER, MICHAEL E., Relief Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

MINER JR., JAMES A., Pres., Kerco, Inc., P.O. Drawer 665, Madisonville, KY 42431 502/821-2889

MISSAVAGE, ROGER J., Dir., CAIRL, Southern IL University, 207 S. 7th St., Herrin, IL 62948 618/453-7744

MITCHELL, WILLIAM, Gen. Mgr., St. Louis Div., Roland Machinery Co., 5920 N. Lindbergh Blvd., Hazelwood, MO 63042 314/731-1330

MONARCH, DENNIS D., Division Mgr., Gooding Rubber Co., P.O. Box 487, Benton, IL 62812 618/435-8104

MOON, DENNY, Lake Shore Mining Equipment, Inc., P.O. Box 307, Millersburg, KY 40348 800/736-4669

MOORE, JOHN S., Chief, IL Dept. of Commerce & Comm. Affairs, 325 W. Adams, Room 300, Springfield, IL 62704-1892 217/782-6370

MOORE, MARVIN R., Staff Production Engr., Old Ben Coal Co., P.O. Box 396, Coulterville, IL 62237 618/758-4417

MOORE, THOMAS W., Mgr. Systems Engr., SEER Services, Standard Labs, Newburgh, IN 47629

+MORGAN, GEORGE H., Morgan & Associates, 401 Tyler Ave., Evansville, IN 47715-3243 812/476-4065

MORGAN, MARK S., Dist. Sales Mgr., J. H. Fletcher & Co., 411 E. Geiger St., Morganfield, KY 42437 502/389-1626

MORK, JOHN W., Pres. & CEO, Gooding Rubber Co., P. O. Box 729, LaGrange, IL 60525 0

MORMINO, MARK E., Resident Engr., Mine 24, Old Ben Coal Co., P.O. Box 396, Coulterville, IL 62237 618/758-4409

* MORONI, E. T. (GENE), (Retired), Old Ben Coal Co., P.O. Box 477, Herrin, IL 62948 618/942-5048

MORRIS, BRIAN A., Asst. Vice Pres-Coal, IL Central Railroad, 455 N. Cityfront Plaza Dr., Chicago, IL 60611-5504 312/755-7888, fax 312/755-7920

MORRISON, SCOTT D., Pres. & CEO, Commercial Testing & Engineering Co., 1919 S. Highland Ave., 210B, Lombard, IL 60148 630/953-9350

MORSE, RONALD E., Regional Coord., IL EPA, 2309 W. Main, Marion, IL 62959 618/993-7200

MORTON, R. C., Fuels & Mining Contract Mgr., Cinergy Services, Inc., 1000 E. Main, Plainfield, IN 46168 0

MORVICH, JOHN, Mgr. Material Service, Zeigler Coal Holding Co., 50 Jerome Lane, Fairview Heights, IL 62208-2015 618/394-2400

MOTTERSHAW, RICHARD, Director, ILDNR, Office of Mines & Minerals, P.O. Box 10137, Springfield, IL 62791 217/782-3831

* MULLINS, W. H., Consultant, Freeman United Coal Mining Co., 1019 Election Dr., Benton, IL 62812 618/439-3864

MURPHEY, LLOYD, Sales Mgr., Lummez Sales Company, 1059 Jennings Station Road, St. Louis, MO 63137 314/867-8725

MURPHEY, MARY-ELLEN, Owner, Lummez Sales Company, 1059 Jennings Station Road, St. Louis, MO 63137 314/867-8725

MURPHY, AARON, Eagle Enterprises, Inc., P.O. Box 283, McLeansboro, IL 62859 618/743-2588

MURPHY, E. LOUIS, (Retired), 192 Oriole Avenue, Princeton, WV 24740 304/425-7867

MURPHY, JOHN, Mine & Process Service 0

MURRAY, ROBERT E., Ohio Valley Coal Co., 32 Cotswold Ln., Moreland Hills, Chagrin Falls, OH 44022 0

MUSKO, JR., MICHAEL J., Sales, Fosroc, Inc., 2701 Old Creal Springs Rd., Marion, IL 62959 618/997-3970

MYRACLE, ROY, Sales, Baker-Bohnert Service Group, P.O. Box 169003, Louisville, KY 40256-9003 502/634-3661

NALLEY, GARY, 3rd. Maint. Foreman, White County Coal Corp., P.O. Box 457, Carmi, IL 62821 0

NANCE, ROGER B., Geologist, 104 Halia Crest, Mt. Vernon, IL 62864 618/244-4016

NAWROT, J.R., Assoc. Scientist, Southern IL University, Coop. Wildlife Res. Lab, Carbondale, IL 62901-6504 618/536-7766

NELSON, JACK, Sales & Service Rep., Kennametal, Inc., 100 Dame Rd., Hanson, KY 24213-9771

NEMECEK, MONA L., Petroleum Geologist, IN DNR-Div. Oil & Gas, 4849 Hillside Ave., Indianapolis, IN 46205 251-1244

NEUHAUS, LYNN, Shift Mine Manager, Monterey Coal Co., RR #4, Box 235, Carlinville, IL 62626 217/854-3291

NEWMAN, FREDERICK G., Consulting Geologist, R.R. 1, Box 151A, Gillespie, IL 62033 217/839-3297

NEWTON, WADE, Service Technician, Long-Airdox Co., 3206 W. DeYoung, Marion, IL 62959 618/997-4335

NIEBRUEGGE, PAUL E., Sales Engr., Hopcroft Electric, Inc., 606 Glen Crossing Rd., Glen Carbon, IL 62034 618/288-7302

NOAH, LARRY G., Owner, Raben Tire Co., 709 S. Commercial, Harrisburg, IL 62946 618/252-8638

NOEL, JR., BILL, Rep, Long-Airdox Co., 3206 W. DeYoung, Marion, IL 62959 618/997-4335

NOLEN, JR., JACK, Service Technician, Long-Airdox Co., 3206 W. DeYoung, Marion, IL 62959 618/997-4335

NORRIS, DALE, Prep. Plant Mgr., Galatia Mine, Kerr-McGee Coal Corp., P.O. Box 727, Harrisburg, IL 62946 618/268-6491

O'DOWD, MICHAEL A., Midwest Coal Spec., FLEXCO, 7313 Kohler Dr., Barnhart, MO 63012 314/464-1026

O'KEEFE, A. (MIKE), Mine Mgr., Arch of Illinois, Inc., P.O. Box 308, Percy, Il 62272 618/497-2141

O'MALLEY, MIKE, Gen. Mgr., American Mine Tool Co., P.O. Box AG, Chilhowie, VA 24319 540/646-8990

O'TOOLE, HAROLD, Sales Engr., Camber Corp., P.O. Box 11041, Pittsburgh, PA 15237 412/367-8626

OAKES, JAMES K., Dist. Manager, MSHA, P.O. Box 418, Vincennes, IN 47591 812/882-7617

OAKLEY, KEN. Sales, Fairmont Supply Co., P.O. Box 1388, Mt. Vernon, IL 62864 618/244-5344

ODLE, JERRY, State Mine Inspector, ILDNR, Office of Mines & Minerals, 503 E. Main Str., Benton, IL 62812 618/439-9111

ODLE, JOE, Sales Rep., Rudd Equipment Co., 4679 New Baumgartner Rd., St. Louis, MO 63129 314/487-8925

OPOLKA, BRUCE, Warehouse Mgr., Peabody Coal Co., 1214 Marissa Road, Marissa, IL 62257 618/587-1925

ORLANDI, WILLIAM J., Pres., Carbon Coal Co., 1525-35th Ave., Vero Beach, FL 32960 407/569-9756

OTT, BILL, Maint. Mgr., Turris Coal Co., P.O. Box 21, Elkhart, IL 62634 217/947-2620

OTT, PHILIP, Supt., Crown III, Freeman United Coal Mining Co., P.O. Box 259, Farmersville, IL 62533 217/627-2161

OTTEN, MIKE, Parts Service Manager-Carterville, Roland Machinery Co., RR2, Box 220A, Carterville, IL 62918 618/985-3399

OWENS, DAVID, Surveyor, IL Mine Subsidence Insurance Fund, 4 Executive Dr., Ste 43, Fairview Heights, IL 62208 618/624-3350

* PACE, E. MINOR, (Retired), Inland Steel Coal Co. , 700 Lake Park Dr., Mt. Vernon, IL 62864 618/242-3144

PANNELL, DON, District Sales Mgr, CSE Corporation, 330-C Harper Industrial Park, Beckley, WV 25801 304/255-0541

PAPPAS, STEVE, Acct. Mgr., Reliance Electric, Inc., 3787 S. Rider Trail, Earth City, MO 63045-1114 314/344-8805

PARELLO, MARY, Book Sales Mgr., Coal Age Magazine, 29 N. Wacker Dr., Chicago, IL 60606 312/609-4203

PARKE, E. WAYNE, Black Beauty Coal Co., 5415 Winthrop Ct., Evansville, IN 47715-4281 0

PARKS, RAY, Pres., J. H. Fletcher & Co., P.O. Box 2187, Huntington, WV 25722 304-525-7811

PARO, JAY, Sales, CSI, 5595 Highway 34 N., Raleigh, IL 62930 618/268-4850

PATEL, RAVJI M., Sr. Vice Pres & Gen. Mgr., Roberts & Schaefer Co., 120 S. Riverside Plaza, Chicago, IL 60606 312/236-7292

PATON-ASH, RORY, Pres., Strata Products (USA), Inc., 3939 Roswell Rd., Suite 295, Marietta, GA 30062 770/321-2500

PATTERSON, BILL, Constr. Manager, Old Ben Coal Co., P.O. Box 397, Coulterville, IL 62237 618/758-4400

PATTERSON, R. KEITH, Mgr. of Engr., Jeffrey Div./Global Processing Systems, Inc., 104 Riverbank Court, Moore, SC 29369-9761 864/576-3114

PATTERSON, TOM, Inspector Supv., ILDNR, Office of Mines & Minerals, 503 E. Main Str., Benton, IL 62812 618/439-9111

PAYLOR, RANDY, Geologist, Stagg Engineering Services, Inc., P.O. Box 7028, Cross Lanes, WV 25356 304/776-6660

PAYNE, JOHN W., Owner, Heartland Pump Rental & Sales, Inc., 102 Brown Str., Carterville, IL 62918 618/985-5110 FAX 618/985-5108

PAYNE, MAE, Pres., Heartland Pump Rental & Sales, Inc., 102 Brown St., Carterville, IL 62918 618/985-5110

PEARSON, JOE, Vice Pres., Sales, Arclar Coal Co., P.O. Box 444, Harrisburg, IL 62946 618/252-0490

PEARSON, RICHARD ALAN, Sales, Roberts & Schaefer Co., 120 S. Riverside Plaza, Chicago, IL 60606 312/236-7292

PENSONEAU, TAYLOR, Vice Pres., IL Coal Association, 212 S. Second St., Springfield, IL 62701 217/528-2092

PESAVENTO, DON, Service Technician, A. L. Lee Corporation, P.O. Box 2370, Mt. Vernon, IL 62864 618/997-4335

PETREA, JOHN, Sales Rep, Fabick Machinery Co., P.O. Box 760, Marion, IL 62959 618/997-1881

PETREY, CARL G., Shift Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

PETTER, ROBERT P.(BOB), Pres., Henry A. Petter Supply Co., Box 2350, Paducah, KY 42012-2350 502/443-2441

PHIFER, STEVEN C., Environ. Engr., Freeman United Coal Mining Co., P.O. Box 259, Farmersville, IL 62533 217/627-2161

PHILLIPS, JIMMY D., Exec. Vice Pres., Phillips Machine Service, Inc., P.O. Box 1245, Beckley, WV 25801 304/255-0537

PIKE, ROCKY, Mgr., Maintenance, Kerr-McGee Coal Corp., P.O. Box 727, Harrisburg, IL 62946 618/268-6500

PILEGGI, JOSEPH J., Director of Purchasing, Freeman United Coal Mining Co., 1999 Wabash Ave. Suite 203, Springfield, IL 62704-5364 217/698-3300, x 233

PINKLEY, JIM, Mining Engr., Tensar, 5304 Durwood Lake, Springfield, IL 62703 217/529-9020

PITCHFORD, ROBERT, Gen. Mine Mgr., Freeman United Coal Mining Co., P.O. Box 259, Farmersville, IL 62533 217/627-2161

PLATT, MARC, Terr. Mgr., Dalloz Safety, P.O. Box 622, Reading, PA 19603 708/228-0300

+ POLING, GILBERT

POLLACK, TOM, Owner & President, Associated Supply Co., P.O. Box 86, West Frankfort, IL 62896 618/932-3114

POLLY, RAY, Sr. Vice Pres., Van-American Insurance Co., 167 E. Main Str., Suite 210, Lexington, KY 40507 606/225-1010

POPOVICH, JAY, Vice Pres., MICON Products Intl., Inc., #25 Allegheny Sq., Glassport, PA 15045 412/664-7788

PORTER, DICK, Division Pres., Austin Powder Co., P.O. Box 609, Maryville, IL 62062-0609 618/344-3111

POTTHOFF, JEFFREY D., Construction Coord, Monterey Coal Co., RR#4, Box 235, Carlinville, IL 62626 217/854-3291

POTTS, DANNY, Accounting Mgr., Brushy Creek Coal Co., Inc., 4270 N. America Rd., Galatia, IL 62935 618/252-8633

POTTS, RODNEY, Proj. Engr., John H. Crawford & Assoc., P.O. Box 21, Carterville, IL 62918 618/985-6370

POWELL, ERIC, Pres., Eric Powell & Associates, P.O. Box 337, Energy, IL 62933 618/453-7927

POWLES, B. L., Traffic Trans. Consultant, Azcon Corp., P. O. Box 616, Alton, IL 62002 618/413-3770

PRESLER, DONALD, Mfgs. Rep., Don Presler & Assoc., 4501 Urbana Road, Millstadt, IL 62260 618/476-1319

PRICE, KEITH, No Chip Tools, P.O. Box 283, Nashville, IL 62263 618/327-4200

PRIDE, ROBERT, Mining Engr., Sales, Jennmar Corporation, 660 West Center Str., Madisonville, KY 42431 0

PROVINE, JIM, Sales Mgr., Martin Marietta Aggregates, 125 Augusta Place, Ste C, Paducah, KY 42001 502/545-3351

PRYOR, CHARLIE, Mgr., Minesafe Electronics, P.O. Box 281, Sturgis, KY 42459 502/333-5581

PTASNIK, LEE, Pres., Mine & Process Service, Inc., P.O. Box 484, Kewanee, IL 61443 309/852-6529

PUCKETT, RANDY, Vice Pres. Sales, National Mine Service Co., P.O. Box 1766, Mt. Vernon, IL 62864 618/439-6345

QUERTERMOUS, DALE, Gen. Mgr., Arclar Coal Co., P. O. Box 444, Harrisburg, IL 62946 618/252-2708

RABEN, TOM, Owner/Pres., Raben Tire Co., 2100 N. New York Ave., Evansville, IN 47711 812/424-9600

RAINES, GARY, Mgr. Reclamation, Consolidation Coal Co., P.O. Box 566, Sesser, IL 62884 618/625-2041

RALEY, JAMIE, Purchasing, White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651

RALSTON, DAVID S., Agronomist, Soil Tech, Inc., 5144 W. Timberwood Dr., Newburgh, IN 47630-3010 0

RAMER, RALPH W., Pres., Screenco, Inc., 3003 Brainard Rd., Pepperpike, OH 44124 800/323-0606

RAMIREZ , MIKE, Mgr. of Preparaton, Old Ben Coal Co., P.O. Box 1, Sparta, IL 62286-0001 618/625-2861

REA, RICHARD, Mgr., Fuel Acquisition & Supply, Tennessee Valley Authority, 1101 Market Str., Chattanooga, TN 37402-2801 615/751-2651

READY, DALE, Owner, Ready Drilling Co., R.R. 1, Box 201B, Mason, IL 62443 618/238-4306

REED, CHARLES E. , Vice Pres., Kerco, Inc., P.O. Drawer 665, Madisonville, KY 42431 502/821-2889

REEVES, JEFF, KY Sales & Service, American Mine Tool Co., 2350 Anton Road, Madisonville, KY 42431 0

REIDELBERGER, BYFORD , Mgr. of Mines-Randolph County, Old Ben Coal Co., P.O. Box 396, Coulterville, IL 62237 618/758-4400

* REILLY, MICHAEL K., Chairman (Retired), Zeigler Coal Holding Co., 104 Burr Ridge Club Dr., Burr Ridge, IL 60521 618/394-2401

REIMER, BOB, Sales Rep., Fabick Machinery Co., Box 760, Marion, IL 62959 618/997-1881

REINERTSEN, DAVID L., Senior Staff Geologist, Emeritus, IL State Geological Survey, 615 E. Peabody Dr., Champaign, IL 61820 217/333-7372

RENNER, CHUCK, Tech. Proj. Coord., Commercial Testing & Engr. Co., P.O. Box 752, Henderson, KY 42420 502/827-1187

RENTZ, ROLLA, Mgr. Contract Admin., Zeigler Coal Holding Co., 50 Jerome Lane, Fairview Heights, IL 62208-2015 618/394-2560

RESNIK, WILLIAM L., Sales Rep.-Marion Div., Excel Mining Systems, 809 Skyline Dr., Marion, IL 62959 618/993-2611

* RICE, FRED, (Retired), Peabody Coal Co., 202 Miller St., Beaver Dam, KY 42320 0

RICHARDS, BRAD, Hydrogeologist, Andrews Environmental Engr., Inc., 3535 Mayflower Blvd., Springfield, IL 62707 217/787-2334

RICHARDS, GEORGE, Mine Mgr., Freeman United Coal Mining Co., P.O. Box 323, Virden, IL 62690-0320 217/965-4892

RIDDLE, HARRY, Section Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

RIDEN, DALE, Sales, Motion Industries, 13724 Shoreline Dr. E., Earth City, MO 63038 314/770-2600

RILEY, ROY, Pres., J&R Manufacturing Co., Rt. 2, Box 173F, Bluefield, VA 24605 703/322-5431

RIMSTIDT, DAN, Fuels Procure. Mgr., PSI Energy, Inc., 1000 E. Main St., Plainfield, IN 46168 317/838-1864

RIPP, BRYAN, Sr. Geological Engr., Golder Paste Technology, Ltd., 1280 W. New Britton Dr., Hoffman Estates, IL 60195 847/991-8010

ROBBINS, DENNIS, Surface Maintenance Supt., Kerr-McGee Coal Corp., P.O. Box 727, Harrisburg, IL 62946 618/268-6492

* ROBERTS, E. H. (Buster), Manger of Mines (Retired), Inland Steel Coal Co., 6 Lincoln Drive, Mt. Vernon, IL 62864 618/242-2054

ROBERTSON, JOE A., Surveyor, IL Mine Subsidence Insurance Fund, 4 Executive Dr., Suite 4, Fairview Hts., IL 62208 618/624-3350

ROBINETTE, KEN, Pres., Decanter Machine, Inc., 3622 Bristol Hwy., Johnson City, TN 37601 615/282-8671

ROBINSON, ROGER D., Product Support Mgr., Construction Machinery Corp., P.O. Box 22400, Owensboro, KY 42404-2400 502/683-2000

ROBISON, PHILLIP D., Operations Mgr., U. S. Filters, Bixby-Zimmer, P.O. Box 510, Galesburg, IL 61401 800-373-5154

ROBISON, RONALD, Supv., Experimental Mine, University of Missouri-Rolla, 226 McNutt Hall, Rolla, MO 65401 573/341-4753
RODGERS, RICK, Reg. Marketing Mgr., Senstar Capital Corp., One Oxford Centre, Ste. 3650, Pittsburgh, PA 15219 412/594-3003
ROETHE, ERIC, Turris Coal Co., P.O.Box 22, Elkhart, IL 62634 0
ROGERS, JOE C., Purchasing Agent, Brushy Creek Coal Co., Inc., 4270 N. America Rd., Galatia, IL 62935-9694 618/252-8633
ROHDE, C. M. (CHUCK), Dist. Mgr., Continental Conveyer & Equip. Co., Inc., P.O. Box 2507, Mt. Vernon, IL 62864 0
ROHRBAUGH, TERRY, Sales, MEMSCO, P.O. Box 189, Dawson Springs, KY 42408 502/797-3481
RONALD, GARY, Surface Mgr., Freeman United Coal Mining Co., P.O. Box 337, Virden, IL 62690 618/839-2521
ROPER, ROGER D., Mine Supt., Old Ben Coal Co., P.O. Box 369, Coulterville, IL 62237 618/758-1339
ROTH, ALLEN E. (AL), Mgr. of Underground Engr., Cyprus AMAX Coal Co., 8110 Newbury Rd., Evansville, IN 47711 812/925-7139
ROTTMAN, BERNARD, Regulatory Affairs Mgr., Black Beauty Coal Co., P.O. Box 312, Evansville, IN 47702 812/665-7881
ROUSE, RICHARD, Sales Mgr., Polo Citrus Corp., 8046 Minier Rd., Benton, IL 62812 618/438-4851
ROWE, DAVID, Vice Pres, NPN Environmental Engrs., 927 Horan Drive, St. Louis, MO 63026 314/343-1300
ROWLAND, STEVE S., Gen., Mgr., Galatia Mine, Kerr-McGee Coal Corp., P.O. Box 727, Harrisburg, IL 62946 618/268-6584, x6513
ROWLEY, LARRY W., Mgr., Manufactured Prods., Mining Controls, Inc., P.O. Box 1141, Beckley, WV 25801 304/252-6243
RULIS, MICHAEL, National Acct. Mgr., IL Central Railroad, 1551 N. Illinois St, Carbondale, IL 62901 618/485-5796
RUSHER, JAMES D., Coal Inspector, MSHA, P.O. Box 418, Vincennes, IN 47591 812/882-7617
RUTLAND, RANDY, Vice Pres., Construction Machinery Corp., P.O. Box 22400, Owensboro, KY 42304 800/626-8406
RYDER, ANDY, UMWA LOCAL 2412, Peabody Coal Co., P.O. Box 391, Tilden, IL 62292 618/587-2005
SAILLIEZ, GASTON, Sales Supervisor, Fansteel VR/Wesson Co., 100 W. St. Louis St., West Frankfort, IL 62896 0
SAMPLES, MIKE, Material Control Supt., Kerr-McGee Coal Corp., P.O. Box 727, Harrisburg, IL 62946 618/268-6455
SANDERS, BILL, State Mine Inspector, ILDNR, Office of Mines & Minerals, RR 3 Box 373, Pinckneyville, IL 62274-9526 618/439-9111
SANTOPIETRO, MARK, Chemist, Jack Kennedy Metal & Bldge Products, Inc., P.O. Box 138, Taylorville, IL 62568 217/287-7231
SARGENT, BRYAN P., Health Supervisor, MSHA, P.O Box 370, Benton, IL 62812 0
SARGENT, DARRIN, Sales Rep., National Mine Service Co., P.O. Box 1766, Mt. Vernon, IL 62864 618/244-6066
SAUNDERS, ALAN, Mine Engr., White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651

SAUNDERS, BENNY R., Maint. Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

SAVANT, JR., JAMES L., Maintenance Coord., Monterey Coal Co., RR#4, Box 235, Carlinville, IL 62626 217/854-3291

* SCHONTHAL, JOSEPH, Pres. (Retired), J. Schonthal & Assoc., Inc., 1220 Rudolph, Apt. 2N, Northbrook, IL 60062 618/480-7359

SCHOONOVER, CRAIG, Mining & Environ Engr., Freeman United Coal Mining Co., P.O. Box 261, Industry, IL 61440 309/254-3778

SCHROEDER, JOE, Sales Engr., Industrial Process Equip., 2800 Locust St., St. Louis, MO 63103 314/534-3100

SCHUH, JEFFREY S., Vice Pres. Engr. Oper., Patrick Engineering, Inc., 4985 Varsity Dr., Lisle, IL 60532 708/858-7050

SCHULTZ, WALLY, Warehouse Mgr.,Prep.Engr., Turris Coal Co., P.O. Box 21, Elkhart, IL 62634 217/947-2697

SCHULZ, ALLAN F., Warehouse Tech., Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

SCHULZ, HOWARD C., Gen. Manager, Monterey Coal Co., RR#4, Box 235, Carlinville, IL 62626 217/854-3291

SCOTT, ALAN, Mine Foreman, White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651

SCOTT, FRED, Parts Mgr., Jeffrey Mining Products, L.P., 635 IL Highway 1, Norris City, IL 62869-9802 0

SCOTT, JR., RALPH, Sales Engr., MICON Products Intl., Inc., #25 Allegheny Sq., Glassport, PA 15045 412/664-7788

SEBASTIAO, A. BUDDY, Vice Pres. of Marketing, Centrifugal & Mechanical Industries, 201 President Street, St. Louis, MO 63118 314/776-2848

SEBECK, EUGENE, Service Engr., Joy Mining Machinery, P.O. Box 49, Fenwood Dr., Belleville, IL 62220 618/234-7920

SHANKS, ROBERT W., Vice Pres., Operations, Arch Coal, Inc., City Place One, Suite 300, St. Louis, MO 63141 314/994-2909

SHAULIS, JERRY, Sales Mgr., Gauley Sales Co., P.O. Drawer Box C, Hico, WV 25854-0070 304/568-5201

+ SHIMKUS, ERVIN L., Safety Mgr., Peabody Coal Co., 609 Christopher Lane, New Baden, IL 62265-2002 0

* SHOCKLEY, RICHARD R., Director, IL Clean Coal Institute, P. O. Box 8, Carterville, IL 62918-0008 618/985-3500, Fax-6166

SHORT, STEVE, Coal Miners, Inc., P.O. BOX 130, Equality, IL 62934 0

SHULTZABARGER, TIM, Acct. Rep., DuPont Chemicals, 7221 Rucker Rd., #1, Henderson, KY 42420 502/836-8208

SHUMATE SR., MACK H., Sr. V. P./Engr. & Plan. (Retired), Zeigler Coal Co., 6425 Longmeadow, Lincolnwood, IL 60646 708/677-6198

SIEMSGLUSZ, MARY E., Project Mgr., Marston & Marston, Inc., 13515 Barrett Pkwy. Dr., St. Louis, MO 63021 314/984-8800

SILVERMAN, MARC S., Mgr.-Geologic Services, Peabody Development Co., 301 N. Memorial Dr., St. Louis, MO 63102 314/342-7652

SIMMONS, STEVE, Acct. Mgr., Special Mine Services, Inc., P.O. Box 188, West Frankfort, IL 62896 618/932-2151

* SIMON, JACK A., Retired Chief Emeritus, IL State Geological Survey, 101 W. Windsor Rd. , Apt. #4204, Urbana, IL 61801-6663 217/367-3462

SIMPSON, BRIAN, Indus. Sales Rep, Busler Enterprises, 401 Diamond Ave., Evansville, IN 47711 812/429-0668

SLATE, STEVE D., Sales Manager, J&R Manufacturing Co., Rt. 2, Box 173F, Bluefield, VA 24605 703/322-5431

SLEDGE, CAROL, Office Mgr., Joy Technologies, Inc., #4 Industrial Park, Mt. Vernon, IL 62864 618/246-5031

SLOAN, WALTER E., (Retired), , 1885 Linneman Rd., Cincinnati, OH 45238 0

SMITH, CECIL, Mgr., Preparation, Kindill Mining, Inc., P.O. Box 346, Benton, IL 62812 618/439-6792

SMITH, GREG, Territory Mgr., PLEXCO, 1050 Busse Rd., Suite 200, Bensenville, IL 60106-1000 708/350-3727

SMITH, GREGORY C., Vice Pres., Geology, Stagg Engineering Services, Inc., P.O. Box 7028, Cross Lanes, WV 25356 304/776-6660

SMITH, JOHN, Mine Rescue Supt., ILDNR, Office of Mines & Minerals, 503 E. Main Str., Benton, IL 62812 618/439-9111

SMITH, PAUL D., Maint. Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

SMITH, SHANNON K., Vice Pres., S & S Urethane, P.O. Box 266, Farina, IL 62838 800/237-6336

SMITH, SONNY, Pres., S & S Urethane, P.O. Box 266, Farina, IL 62838 618/245-6476

SMOCK, PAUL, General Supt., Brushy Creek Coal Co., Inc., 4270 N. America Rd., Galatia, IL 62935-9694 618/252-8633

SNEED, DWIGHT L., Mgr. Material Recovery, Zeigler Coal Holding Co., 50 Jerome Lane, Fairview Heights, IL 62208-2015 618/394-2482

SNYDER, DUKE, Dist. Mgr., Midwestern Machine & Hydraulics, Inc., P.O. Box 191, Nashville, IL 62263 618/327-3095

SOLLAMI, JIM, Vice Pres., Sollami Co., P.O. Box 627, Herrin, IL 62948 618/988-1521

SOLLAMI, PHILLIP, Pres., Sollami Co., P.O. Box 627, Herrin, IL 62948 618/988-1521

SOWELL, JERRY, Sales, Dayco Corp., 403 Blue Bird St., Troy, IL 62294 618/667-2971

SPENCER, RAYMOND D., Section Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

SPIHLMANN, MAURICE F., Supv., Monterey Coal Co., 7415 Woodlane Road, Germantown, IL 62245 618/523-8138

SPIVEY, JOSEPH S., Pres., IL Coal Association, 212 S. 2nd St., Springfield, IL 62701 217/528-2092

SPOTTE, WALTER V., Pres., Lincoln Hydraulics, Inc., 20 Museum Rd., Washington, PA 15301-6134 412/222-2700

SPRESSER, ROGER, State Mine Inspector, ILDNR, Office of Mines & Minerals, 47 Illini Drive, Taylorville, IL 62568 0

SROGI, WIN, Pres., WINCO, Inc., P. O. Box 251, Chesterfield, IN 46017 317/378-5035

STANKUS, JOHN, Jennmar Corporation, 258 Kappa Dr., Pittsburgh, PA 15238 412/963-9071

STANLEY, STEPHEN D., Surface Mgr., Freeman United Coal Mining Co., P.O. Box 259, Farmersville, IL 62533 217/627-2161

STATLER, DAN, Reg. Sales Mgr., Kennametal, Inc., P.O. Box 231, Latrobe, PA 15650 412/539-5342

STEELE, DEREK JOHN, Principal, Dames & Moore, 7717 Stonehenge Dr., Cincinnati, OH 45242 513/651-3440
STEELE, TOMMY JOE, Safety Director, White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651
STERNER, ROBERT M., Staff Mine Engr., Kerr-McGee Coal Corp., P.O. Box 727, Harrisburg, IL 62946 618/268-6582
STEWARD, LARRY, Dir. of Purchasing, Eastern Associated Coal Co., 800 Laidley Tower, Charleston, WV 25324 304/340-1886
STEWART, DON, Sales Engr., Mine & Process Service, Inc., P.O. Box 484, Kewanee, IL 61443 309/852-6529
STEWART, J. R. (BOB), Sales, Better Belt Wiper Service, Inc., P.O. Box 485, Royalton, IL 62983 618/984-2074
STEWART, LESLIE, Public Relations, The National Coal Museum, P. O. Box 369, West Frankfort, IL 62896 618/937-2625
STEWART, MICHAEL, Sales Mgr., K&E Technical, Inc., Box 165, West Frankfort, IL 62896 618/932-2245
STEWART, TONY, Purchasing, White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651
STICKLER, GERALD H., Reg. Sales Mgr., Ocenco, Inc., 128 Martha St., Kenosha, WI 53142 414/947-9000
STOKER, STEVE, Vice Pres., Zeicorp, 227 Chesterfield Ind. Blvd., Chesterfield, MO 63005 314/530-5999
STOUT, KEITH, Regional Rep, Forke Brothers,The Auctioneers, 321 Dog Days Farm, Marion, KY 42064 502/965-9596
STRAIN, WILLARD, Pres., Roe Machine Company, Inc., P.O. Box 531, West Frankfort, IL 62896 618/937-2509
STROTHMANN, KRIS, Sales Rep., Kennametal, Inc., P.O. Box 231, Latrobe, PA 15650 412/539-5342
STUCKWISCH, ROLAND, Roving Foreman, Freeman United Coal Mining Co., P.O. Box 261, Industry, IL 61440 309/254-3778
STURM, ROBERT, Chief Engr., Group Mfg. Ltd., 2628 W. Main Str., Belleville, IL 62226 618/257-2940
SUMMARY, GREGORY, Warehouse Tech., Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316
SUMMERS, MARY J., Secretary, ILDNR, Office of Mines & Minerals, 503 E. Main St., Benton, IL 62812 618/439-9111
SWINDELL, DAVID, Pres., Energy Technologies, Inc., 127 Perimeter Park Drive, Knoxville, TN 37922 615/690-1838
TABOR, GREG, Branch Mgr., United Central Industrial Supply Co., 1800 Supply Road, Carterville, IL 62918 618/985-8316
TABOR, HOLLIS, Pres., Norris Screen, 403 S. Wickham Ave., Princeton, WV 24740 304/431-7240
TALLUTO, RICKEY J., Section Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316
TASKOSKI, RONALD E., Section Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy , IL 62272 618/357-3316
TASSA, JOHN, Marketing Mgr., DuPont Chemicals, Rt. 2, Box 217, Martinsburg, WV 25401 304/274-5377
TATE, TERRY, Sales, S&S Urethane, P.O. Box 266, Farina, IL 62838 618/245-6476

TATE, WILLIAM, Surface Mgr., Old Ben Coal Co., P.O. Box 369, Coulterville, IL 62237 618/758-2334

* TAUCHER, R. A., (Retired), Consolidation Coal Co., 20 Patton Dr., Pinckneyville, IL 62274 618/357-5173

TAYLOR, GAIL, Asst. Support Scientist , IL State Geological Survey, 615 E. Peabody Drive, Champaign, IL 61820 217/333-4747

TAYLOR, JIM B., Special Account Adminis., Continental Conveyer & Equip. Co., Inc., Box 400, Winfield, AL 35594 205/487-6492

TAYLOR, MARK S., Dist. Mgr., Carroll Engineering Co., P.O. Box 149, 424 E. Waverly St., Morganfield, KY 42437 502/389-3800

TEISA, EMIL J., 6738 North Road, Coffeen, IL 62017 217/534-2275

THIGPEN, JIM, Pres., Thigpen Equipment Sales, P.O. Box 13921, Mexico Beach, FL 32410-3921 334/887-8392

THOMAS, CHRIS, Branch Mgr., Henderson, Commercial Testing & Engr. Co., P.O. Box 752, Henderson, KY 42420 502/827-1187

THOMPSON, KRISTIE K., Material Expediter, Kerr-McGee Coal Corp., P.O. Box 727, Harrisburg, IL 62946 618/268-6591

THOMSON, MICHAEL , Gen. Sales Mgr./East. Div., Fosroc, Inc. , 150 Carley Court, Georgetown, KY 40324 502/863-6800

TILLSON JR., CHARLES B., Consultant, 1920 SE 32nd Terr., Cape Coral, FL 33904-4429 813/945-3071

TINDALL, JEFF, Field Support Supv., Zeigler Coal Holding Co., 50 Jerome Lane, Fairview Heights, IL 62208 618/394-2605

TODD, LARRY, Safety Chairman, Peabody Coal Co., 502 S. Jackson, Millstadt, IL 62260 618/476-1507

TOWERS, RICK, Pres., Towers Mine Tool, Inc., Box 133, Christopher, IL 62822 618/724-4967

TOWERS, TOM, Consultant, Towers Mine Tool, Inc., Box 133, Christopher, IL 62822 618/724-4967

TOWNSEND, RICHARD, Adminis. Mgr., MAPCO Coal, Inc., P.O. Box 911, Henderson, KY 42420 502/827-4996

TREWORGY, COLIN, Geologist, IL State Geological Survey, 615 E. Peabody Dr., Champaign, IL 61820 217/244-2422

TRISKA, ROLAND A., Sales Mgr., Simpson Materials Co., P.O. Box 68, Valley Park, MO 63088 314/225-4944

TRUE, RANDY, Sales Rep, United Central Industrial Supply Co., 1800 Supply Rd., Carterville, IL 62918 618/985-8316

TRUEBLOOD, TED, Pres., Trueblood Oil Company/Chevron, P.O. Box 18, Farmersburg, IN 47850 812/696-5151

TUCKER, RICHARD, Sr. Communications Coord., Monterey Coal Co., Box 235, R.R. 4, Carlinville, IL 62626 0

TUPPER, LESTER H., Illinois Sales Mgr., Strata Products (USA), Inc., RR6, Box 14, Mt. Vernon, IL 62864-9203 618/242-6366

TURNER, JAMES E., IL Sales, American Mine Tool Co., 305 S. Logan, West Frankfort, IL 62896 618/932-3379

TURNER, SCOTT, Field Service Tech., Lake Shore Mining Equipment, Inc., 1601 East DeYoung Str., Marion, IL 62959 618/993-1170

TURREL, JOHN D., Pres., Hydrocarbon Survey, Inc., R.R. 2, Box 238, Mt. Vernon, IL 62864 618/242-6549

TYRELL, GARY, Sales Rep, Excel Mining Systems, 809 Skyline Dr., Marion, IL 62959x 618/993-2611

UGO, JOHN A., Sales, J. A. U., Inc., Box 42, Terre Haute, IN 47808 765-832-2763

UNAL, DR. AHMET, Assist. Prof., University of Missouri-Rolla, 226 Mc Nutt Hall, Rolla, MO 65401 573/341-4753

URMSTON, WALTER W., Owner, OKI Padgett Systems, #2 Simons Lane, Fairfield, OH 45014 513/870-0220

VALETT, GENEL, Project Engr., MK-Ferguson, 7295 Highway 94 S., St. Charles, MO 63304 314/441-8086

VALLAR, JOHN, Chief Electrician, Peabody Coal Co., 1214 Marissa Rd., Marissa, IL 62257 618/295-2374

VAN CLEVE, MIKE, Chief Maint. Foreman, White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651

VAN DERVEER, DICK, Exec. Vice Pres., Ocenco, Inc., 10225 82nd Ave., Kenosha, WI 53142-7737 414/947-9000

VANCIL, J.B. (SAM), Deputy Director, ILDNR, Office of Mines & Minerals, 503 E. Main, Benton, IL 62812 618/439-9111

VANTUYL, KEVIN, Erosion Control Spec., A.S.P. Enterprises, Inc., 275 Northwest Blvd., Fenton, MO 63026 314/343-4357

VENNE', CRAIG, Application Engr., Voith Transmissions, 25 Winship Rd., York, PA 17402 717-767-3200

WAGNER, DUANE, Sales, Mt. Vernon Electric, Inc., P.O. Box 1548, Mt. Vernon, IL 62864 618/244-1066

WALDEN, FRED E., Land Reclamation Spec., ILDNR, Office of Mines & Minerals, 524 S. Second Str., Springfield, IL 62701-1787 217/782-4970

WALKER, JEFF, Sr. Mining Engr., Kerr-McGee Coal Corp., 1607 Lee Str., Orland Park, IL 60467 847/442-5248

WALKER, JOE, Lab Sales Rep., Peoria Disposal Co. Laboratories, 4700 N. Sterling Ave., Peoria, IL 61615 309/688-7595

WALKER, JOHN, Sales Mgr., General Steel Crane Rentals, P.O. Box 1078, Hopkinsville, KY 42241 502/886-8857

WALL, RONALD B., Chief Engr., Freeman United Coal Mining Co., 1999 Wabash Ave., Ste 200B, Springfield, IL 62704 618/932-2164

WALLACE, DAVID, Sales Mgr., Midwest Reg., Long-Airdox Co., 3206 W. DeYoung, Marion, IL 62959 618/997-4335

WALLACE, HARVEY, Sales, Cima Electrical & Mine Services, P.O. Box 69, Benton, IL 62812-0069 618/439-7211

WALLNER, RICH, Indus. Sales & Market Mgr., Schaefer Brush Mfg. Co., 1101 S. Prairie Ave., Waukesha, WI 53187 414/547-3500

WAMPLER, BILL, Pres., Clinch River Corp., Rt. 6, Box 60, Tazewell, VA 24651 0

WATKINS, JERRY, Purchasing Mgr., White County Coal Corp., P.O. Box 457, Carmi, IL 62821 618/382-4651

WATSON, BILL, Mgr. Employee Rels., Kerr-McGee Coal Corp., P.O. Box 727, Harrisburg, IL 62946 618/268-6516

WATSON, BOBBY, Maintenance Chief, Webster County Coal Co., 2668 State Route 120 East, Providence, KY 42450 502/667-2205

WATSON, ROB, Engineer, MAPCO, Pattiki Mine, 2668 State Rte 120 E., Providence, KY 42450 0

WAYLAND, MARJORIE, Engineering Spec., Peabody Development Co., 301 N. Memorial Dr., Suite 310, St. Louis, MO 63102-2401 314/342-7693

WEADOCK, G. W. (MICK), District Sales Mgr., Svedala, 840 Wellington Ave., #406, Elk Grove Village, IL 60007 847/437-8015

+ WEARLY, WILLIAM L., Chairman of Board, Ingersoll-Rand Co., , Woodcliff Lake, NJ 07675 0

WEAVER, GEORGE P., Section Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

WEBB, DAVID L., Dir. of Operational Planning, Freeman United Coal Mining Co., 1999 Wabash Ave., Ste. 200-B, Springfield, IL 62704-5364 217/793-7473

WEBB, DON, Supply Superv., Freeman United Coal Mining Co., Box 32, Waggoner, IL 62572 217/227-4478

WEBB, JAMES J., Assistant Mine Supt., Kerr-McGee Coal Corp., P.O. Box 727, Harrisburg, IL 62946 618/268-6564

WEBSTER, BRIAN, Sales, FLEXCO, 1340 Rt. 14W, Benton, IL 62812 800/253-8132

WEGMAN, BRUCE E., Longwall Foreman, Monterey Coal Co., 507 N. Pin Oak, Trenton, IL 62293 612/224-7223

WEHMEYER, FRANK H., Section Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

+ WEIR, JOHN P., Consultant, Paul Weir Co., 2730 W. Lake Ridge Shrs, Reno, NV 89509-5736 702/825-0755

WELLINGER, THOMAS, Mgr., TMW & Associates, Inc., 2129 Barrett Sta. Rd. #245, St. Louis, MO 63131-1606 314/230-5547

WELLS, CHARLES S. , Vice Pres., Marketing, Senstar Capital Corp., One Oxford Centre, Pittsburgh, PA 15219-1415 412/594-3003

WETZEL, JOE, Supt., Rend Lake Mine, Consolidation Coal Co., P.O. Box 566, Sesser, IL 62884 618/625-2071

WHEATCRAFT, LYNN, Global Product Mgr., Joy Mining Machinery, 120 Liberty Str., Franklin, PA 16323 814/432-1471

WHEELER, DAN, Environ Protection Spec., ILDNR, Office of Mines & Minerals, 524 S. Second Str., Springfield, IL 62701-1787 618/782-4970

WHEELER, JIM, Buyer, Turris Coal Co., P.O. Box 21, Elkhart, IL 62634 217/947-2694

WHEELER, ROBERT E. , Sales, Henry A. Petter Supply Co., P.O. Box 1388, Mt. Vernon, IL 62864 618/242-8987

WHITCOMB, DAVID L., Asst. District Manager, MSHA, P.O. Box 418, Vincennes, IN 47591 812/882-7617

WHITE, GARY, Publisher, Miner News, P.O. Box 5694, Boise, ID 83705 208/375-3680

WHITE, JOHN R., Pres., Hydro-Power, Inc., P.O. Box 2181, Terre Haute, IN 47802 812/232-0156

WHITLEY, GERALD H., Shift Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

WHYTE, JAMES (JIM), Sales & Serv. Engr., Centrifugal & Mechanical Industries, 3680 Raleigh Rd., Eldorado, IL 62930 618/273-5105

WIFORD, LARRY, Branch Mgr., The Mine Supply Co., 1703 Shawnee, P.O. Box 2220, Mt. Vernon, IL 62864 618/242-2087

WILBURN, RICHARD L., IL Div. Mgr., Standard Laboratories, Inc., 8413 Peabody Rd., Freeburg, IL 62243 618/539-5836

WILDEN, RICH, Sales Mgr., North American Mine Exchange, RD #8- 114 Rolling Meadows, Greensburg, PA 15601 724/837-3155

WILDERMUTH, PAM, Inside Sales, U. S. Filters, Bixby-Zimmer, P.O. Box 510, Galesburg, IL 61401 305/343-4381

WILKEY, CRAIG, No Chip Tools, P.O. Box 283, Nashville, IL 62263 618/327-4200

WILKINSON, KEITH, Sales Rep., Brake Supply Co., Inc., P.O. Box 447, Evansville, IN 47703-0447 812/429-9418

* WILL, W. E., (Retired), Peabody Coal Co., 309 Ridgemont, Collinsville, IL 62234 618/345-5099

WILLIAMS, BENJAMIN, Section Foreman, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

WILLIAMS, J. SCOTT, State Mining Board Member, ILDNR, Office of Mines & Minerals, P.O. Box 127, West Frankfort, IL 62896-0127 618/937-4663

WILLIAMS, MICHAEL G., Sales, Tricon Metals & Services, Inc., 1338 County Rd. 800E, Carmi, IL 62821 606/265-3510, Fax -3000

WILLIAMS, JR., ROBERT L., Regional Manager, Roberts & Schaefer Co., 120 S. Riverside Plaza, Chicago, IL 60606 312/236-7292

WILLIAMSON, TOM, Marketing Rep., Fosroc, Inc. , 612 Wimbledon Place, Madisonville, KY 42431 502/821-7900

WILSON, LARRY W., Gen. Mine Supt., Kerr-McGee Coal Corp., P.O. Box 727, Harrisburg, IL 62946 618/268-6507

WILSON, STEVE, Mine Sales, Raben Tire Co., 709 S. Commercial St., Harrisburg, IL 62946 618/252-8638

WINTER, DALE M., General Mine Foreman, Arch of Illinois, Inc., RR 1, Box 242, Pinckneyville, IL 62274 0

WOJCIK, THOMAS, Gen. Mgr., Triune, Inc., 2328 I70 Frontage Rd., Grand Junction, CO 81505 970/242-2200

WOOD, CRAIG, Financial Analyst, Stagg Engineering Services, Inc., P.O. Box 7028, Cross Lanes, WV 25356 304/776-6660

WOODS, DAVE, Pres., Twin Mills Timber & Tie Co., Inc., 3268 State Highway 37, P.O. Box 34, West Frankfort, IL 62896 618/932-3662

WOODS, GEORGE A., Dean, Mining, Illinois Eastern Comm. Colleges, 1001 E. Clark St., Marion, IL 62959 618/985-3741

WOODSIDE, RICHARD, Land Reclam. Spec., ILDNR, Office of Mines & Minerals, 503 E. Main Str., Benton, IL 62812 618/439-9111

WOOLBRIGHT, CHARLES, Vice Pres. & Gen. Mgr., Joy Technologies, Inc., #4 Industrial Park, Mt. Vernon, IL 62864 618/246-5013

WOOTON, DAN G., Gen. Mgr., MAPCO Coal, Inc., P.O. Box 911, Henderson, KY 42420 502/827-4996

WORSEY, PAUL N., Assoc. Prof., University of Missouri-Rolla, 226 McNutt Hall, Rolla, MO 65401 573/341-4753

WYCKOFF, PETER S., Mine Mgr.-Conant Mine, Arch of Illinois, Inc., P.O. Box 308, Percy, IL 62272 618/357-3316

YARKOSKY, ROBERT R., Sr. Project Mgr., Marston & Marston, Inc., 10 Spruce Dr., Freeburg, IL 62243 314/984-8800

YATES, LARRY, Vice Pres. Materials Mgt., Peabody Holding Co., 301 N. Memorial Drive, St. Louis, MO 63102 314/342-7883

YEKNIK, MATT, Industry Spec, SKF Bearing Services Co., 1500 E. Bethany Home Rd. Ste 130, Phoenix, AZ 85014-2448 602/997-9434

YOCUM, KEVIN L., Asst. General Counsel, Zeigler Coal Holding Co., 50 Jerome Lane, Fairview Heights, IL 62208-2015 618/394-2616

YOUNG, BOB, Vice Pres., Webb Oil Co., Inc., P.O. Box 112, McLeansboro, IL 62859 618/643-3424

YOUNG, DAVID, Pres., Old Ben Coal Co., P.O. Box 369, Coulterville, IL 62237 618/758-4501

ZEILMAN, MIKE, Sales Mgr., ILL-MO Products Co., P.O. Box 788, Jacksonville, IL 62651 217/245-2183

ZEISER, JOHN, Pres., Zeicorp, 227 Chesterfield Ind. Blvd., Chesterfield , MO 63005 314/530-5999

ZENI, ALAN J., Vice Pres., Zeni Drilling Co., RD#13, Box 100, Morgantown, WV 26505 304/328-5665

ZURCHER, RON, John Zurcher Assoc., 2535 Dover Lane-Camelot Pl., St. Joseph, MI 49085 616/429-5435

ZWAHLEN, JAMES A., Purch. Coord., Monterey Coal Co., RR4, 235, Carlinville, IL 62626 217/854-3291

ZYWICKI, ROBERT A., Exec. Vice Pres., A-Z Industries, Inc., 3651 Commercial Ave., Northbrook, IL 60062-1822 708/291-9009

The Sincere

THANKS

of the Officers and Members of the

Illinois Mining Institute

go to

THE 1997 ADVERTISING COMMITTEE

Joe Pileggi and Jim Zwahlen, *Co-Chairmen*

KENNETH BARKER
Lakeshore Mining Co., Inc.

FRED BAUER
Old Ben Coal Co.

LANNY BELL
Roberts & Schaefer Co. (Ret.)

CHARLES (CHUCK) BOND
Consolidated Coal Co.

G. REGGIE FARLAINO
Phillips Machine Service, Inc.

JIM GRIMES
Arclar Coal Co.

JAMES H. (JIM) JUSTICE
Du Quoin Iron & Supply Co.

TINA LOGAN
Arch of Illinois, Inc.

JOHN J. (IKE) MILLER
Roberts & Schaefer Co.

KEN OAKLEY
Fairmont Supply Co.

BRUCE OPOLKA
Peabody Coal Co.

JOHN W. PAYNE
Heartland Pump Rental & Sales, Inc.

JOSEPH PILEGGI
Freeman United Coal Mining Co.

JOE C. ROGERS
Brushy Creek Coal Co., Inc.

DWIGHT L. SNEED
Americoal Development Co.

KRISTIE THOMPSON
Kerr-McGee Coal Corp.

DUANE WAGNER
Mt. Vernon/Decatur Electric, Inc.

JERRY WATKINS
White County Coal Co.

DAVID WALLACE
Long-Airdox Co.

JIM WHEELER
Turris Coal Co.

JAMES ZWAHLEN
Monterey Coal Co.

Some exhibitors at the Annual Meeting

TRADE EXHIBITORS AT THE 1997 ANNUAL MEETING

A.S.P. Enterprises, Inc.
American Mine Tool, Inc.
Baker-Bohnert/Service Group
Brautigam
Brugg Cable Products
CDG Engineers Architects Planners, Inc.
Century Lubricants Co.
Commercial Testing & Engr. Co.
Continental Conveyor & Equipment Co.
CSE Corporation
Du Quoin Iron & Supply Co.
Energy Technologies, Inc.
Fairmont Supply Co.
Fansteel VR/Wesson
Fosroc, Inc.
Gooding Rubber Co.
Heartland Pump Rental & Sales, Inc.
IL Dept. of Commerce & Community Affairs
IL DNR, Office of Mines and Minerals
Intertec Publishing
J. H. Fletcher Co.
Jennmar Corporation
Joy Technologies, Inc.
Kennametal, Inc.
Kerco, Inc.
Kirby Risk Electrical Supply Co.
Lake Shore Mining Equip., Inc.
Long-Airdox Company

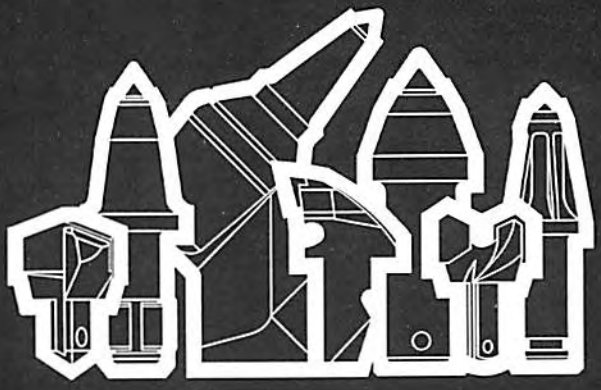
Lummez Sales co.
M & S Fire Safety
Mc Junkin Corp.
Mine & Process Service, Inc.
Mine Safety & Health Administration
Mine Supply Co., The
Minesafe Electronics
Mt. Vernon Electric, Inc.
National Mine Service Co.
No Chip Tools
Patrick Engineering
PDC Laboratories
Reaco Battery Service Corp.
Roberts & Schaefer Company
Roe Machine Co.
S & S Urethane
Schroeder Industries
SETCO Solid Tire & Rim
SIU-Coal Research Center
Special Mine Services
Stagg Engineering Services, Inc.
Standard Laboratories, Inc.
TriCon Metals & Services, Inc.
Triune, Inc.
United Central Industrial Supply Co.
Voith Transmissions
Webb Oil Co., Inc.
Zeicorp

top
tools

underground

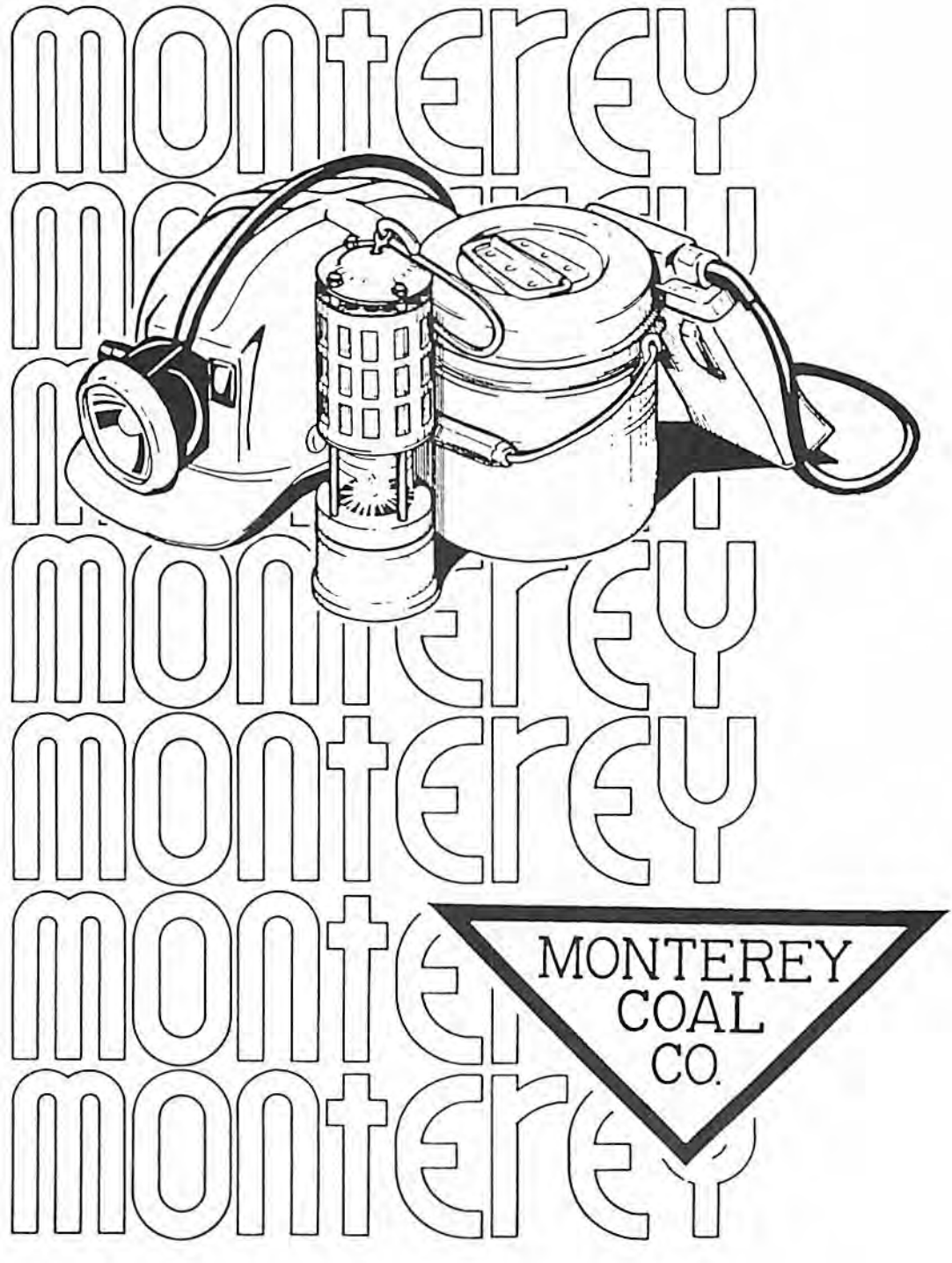
KENNAMETAL

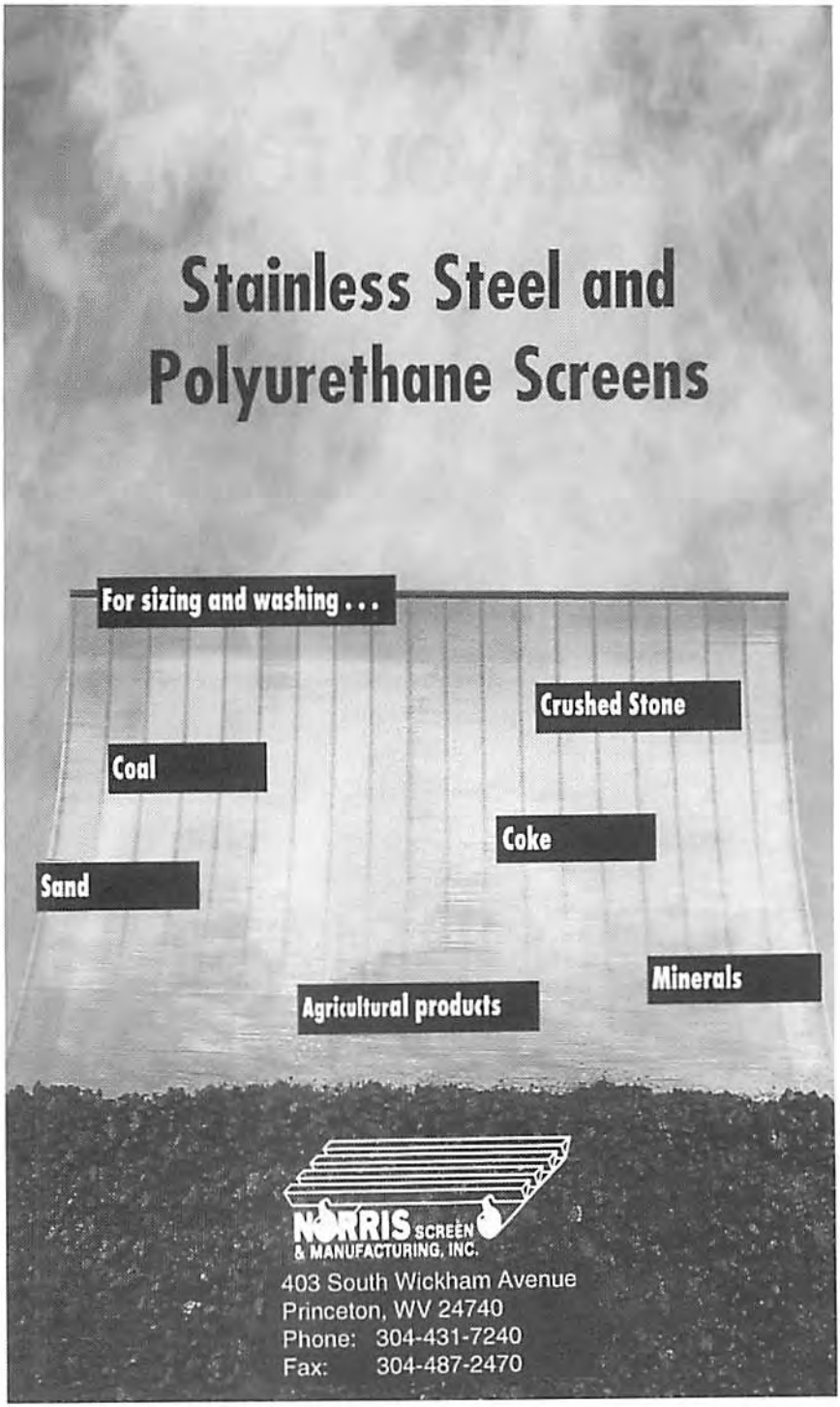
Kennametal Inc.
Mining and Construction Division
Latrobe, PA 15650

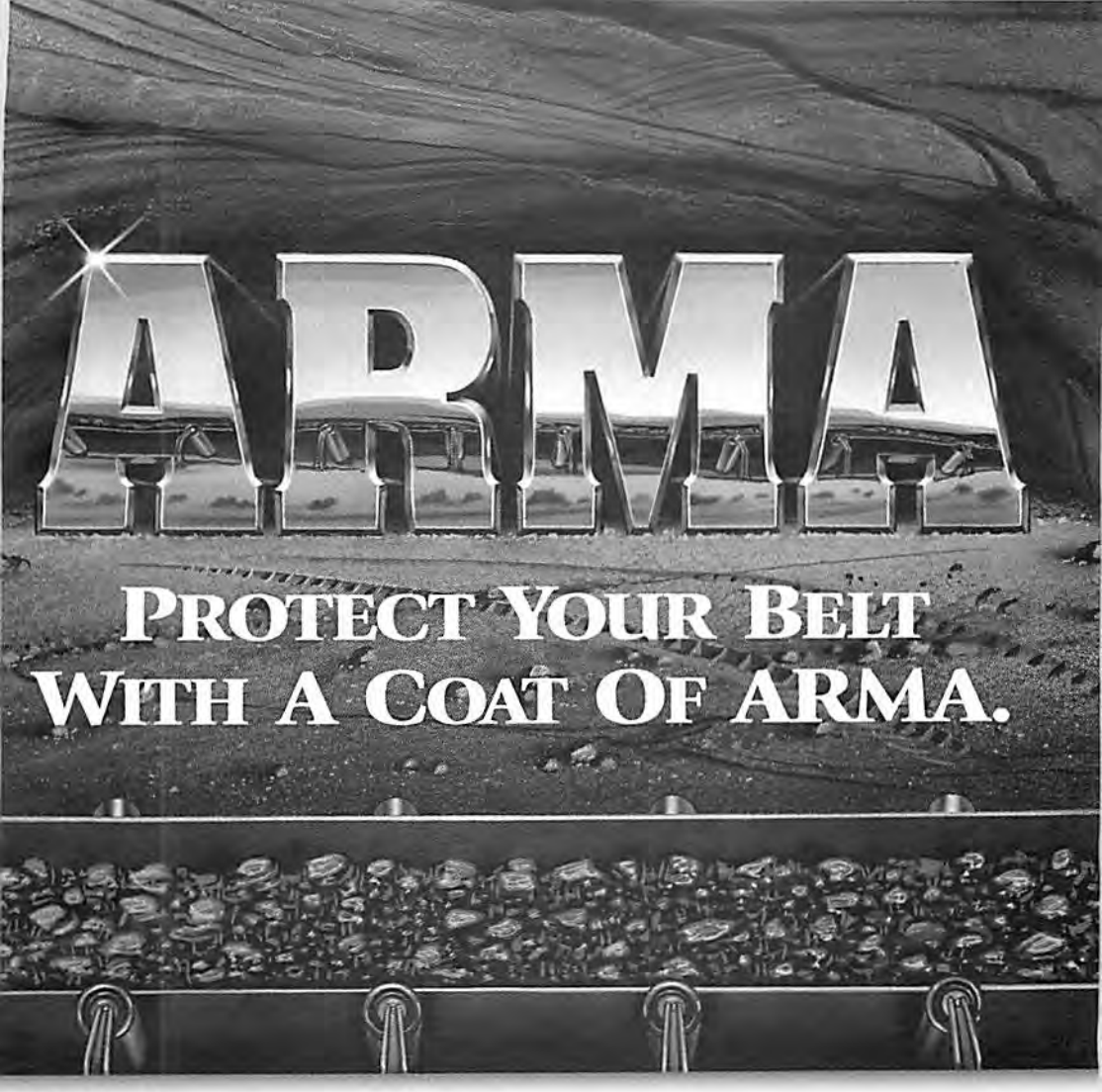


800/458-3608

B95-86


monterey
MONTEREY
COAL
CO.


Stainless Steel and
Polyurethane Screens
For sizing and washing . . .
Crushed Stone
Coal
Coke
Sand
Minerals
Agricultural products
NORRIS SCREEN
& MANUFACTURING, INC.
403 South Wickham Avenue
Princeton, WV 24740
Phone: 304-431-7240
Fax: 304-487-2470



To a conveyor belt, underground is a battleground. Defend your belt with ARMA™, Goodyear's new high abrasion-resistant cover compound for mining applications.

The result of extensive research and development, ARMA will help you win the underground battle. The leader in rubber compounding technology has brought you a cover compound with over 60% greater belt protection* and a vastly longer service life.

With over double the abrasion resistance of most competitive products, ARMA provides the lowest operating cost per ton in the industry. Call Goodyear's Worldwide Conveyor Belt Headquarters at (800) BELT-USA. Find out why ARMA cover compound is the most ironclad defense your belt will ever have.

GOODYEAR
Our Customers Are #1

*Based on increase in average laboratory PICO test vs. Goodyear's standard 2G compound

FREEMAN UNITED COAL MINING COMPANY

Filter Self-Rescuers Are Obsolete

ocenco M-20 SCSR puts lifesaving oxygen at arm's reach.

M-20 Self-Contained Self-Rescuer

- Self-contained, operates independent of mine air
- Compressed oxygen, automatic activation
- Quick and simple to don
- Low initial cost, low maintenance cost
- Inexpensively refurbished
- Fifteen year service life
- Thousands in use worldwide

Contact us for an on-site demonstration of the M-20 and our long duration EBA 6.5 SCSR.

ocenco
INCORPORATED
Safety through Innovation

LakeView Corporate Park
10225 82nd Avenue
Kenosha, WI 53142-7737
Phone (414) 947-9000
Fax (414) 947-9020

OVER 5,803,200 HOURS OF COAL PREP ENGINEERING EXPERTISE.

ROBERTS & SCHAEFER

For more than 90 years, Roberts & Schaefer has been the leader for quality engineering solutions in all phases of coal preparation, material handling, concept design, total systems and process engineering, detailed engineering, construction management, start-up and commissioning.

From small, specialized projects, to total turnkey operations, we have the expertise you need. With an international reputation for responsive, hands-on problem solving, you can be sure we'll work with you to engineer a solution that fits your project requirements.

To learn more about Roberts & Schaefer, call us today.

Roberts & Schaefer Company
Corporate Office
120 S. Riverside Plaza
Chicago, IL 60606
312-236-7292 phone
312-726-2872 fax
bobw@eni.com e-mail

HOW THE WORLD PROCESSES ITS RESOURCES

PERFECT MATCH

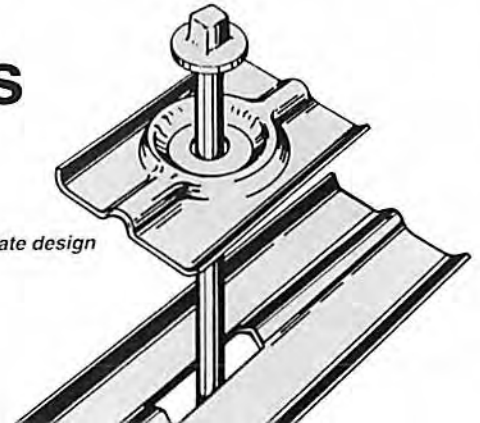
Innovative Leaders in Roof Control Systems

Jennmar

Advanced Channel Plates

Patented: 5,292,209 and 5,385,433

Provide increased strength with matched plate and channel

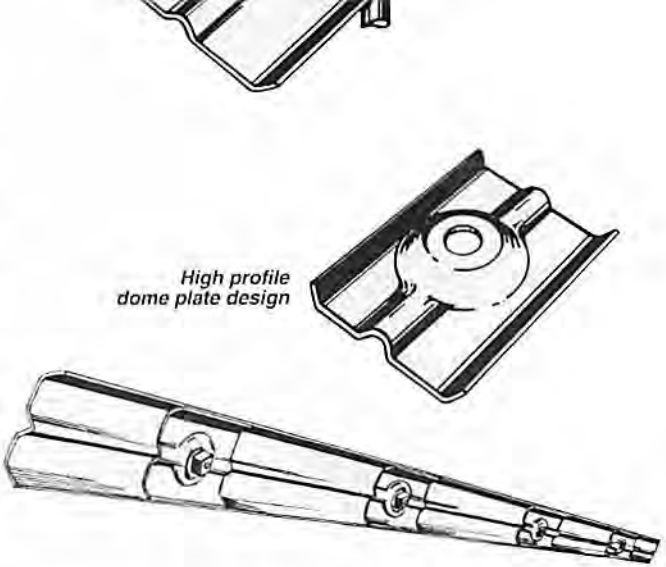


Low profile plate design

Advantages of unique channel plates

- Designed exclusively for use with T-2 through T-5 channel

- Embossed channel plates are designed to replace the 4" x 4" flat plates thus eliminating the plate and bolt head being pulled through the channel from excessive roof pressure
- Distribute bolt tension load uniformly over entire plate and channel. Bolt plate and channel work as a complete system to resist longitudinal and lateral movement
- Two plate designs. One is a ***low profile donut embossed plate*** for a small hole, two-piece point anchor system. The other is a large hole, ***high profile dome plate*** for a one-piece bolt system
- Lightweight. Easy to handle. Offers increased strength and safety over other systems
- For use with any bolt system. Specifically designed for INSTáL® Point Anchor System with non-slip anchor
- Installs in mining cycle, or later for additional support
- Plate-channel systems offer superior longwall mining performance
- Systems meet current F-432 roof plate specifications



High profile dome plate design

Join Jennmar's Exclusive Mining Safety Club!

Call or write for information, application assistance, pricing and delivery.

Jennmar Corp.

A Frank Calandra Industry
1330 Old Freeport Road
Pittsburgh, PA 15238
Phone: 412-963-9071
Fax: 412-963-9767
Telex: 559979 JEN PGH

Sales Offices and Plants: Pittsburgh, PA 412 963-9071; Cresson, PA 814 886-4121; Reedsville, WV 304 864-3601; Winchester, KY 606 744-9600; Tazewell, VA 703 964-2107; Knoxville, TN 615 546-4186; Clearfield, UT 801 775-0176

FLANDERS ELECTRIC OF ILLINOIS

1000 North Court St.
Marion, IL 62959
(618) 993-2681
FAX (618) 993-6081

MOTOR REPAIR

- 24 HOUR EMERGENCY SERVICE
- COMPLETE MACHINE SHOP
- VACUUM-PRESSURE-IMPREGNATION SYSTEM
- AUTHORIZED WELDER REPAIR CENTER
- SUBMERSIBLE PUMP REPAIR
- 500 HP DYNAMOMETER
- ELECTRICAL ENGINEERS ON STAFF
- 2 SHIFT OPERATIONS
- INHOUSE AC & DC DRIVE REPAIR
- CONTROLLED TEMPERATURE BURN-OUT AND BAKE OVENS
- 17,000 LB. DYNAMIC BALANCER
- IEEE 429 IMMERSION TESTED REWINDS
- UNITY PLUS REWINDS

EQUIPMENT SALES

MAGNETEK
CENTURY
LOUIS ALLIS
INDIANA GENERAL D.C.
UNIVERSAL

BENSHAW
SOLID STATE STARTERS

SAFTRONICS
SOLID STATE STARTERS

SQUARE D
MOTOR CONTROLS
AC DRIVE SYSTEMS
CIRCUIT BREAKERS
PROGRAMMABLE CONTROLLERS
TRANSFORMERS
DISTRIBUTION EQPT.

GOULD SHAWMUT
FUSES
FUSE BLOCKS
TAYLOR WIRE DUCT

TOSHIBA
MOTORS
MOTOR CONTROLS
VACUUM EQUIPMENT
AC DRIVE SYSTEMS
PROGRAMMABLE CONTROLLERS*
VACUUM RETROFITS

SIEMENS*
Motors
DC Controllers
PLC's

*Distributed by Flanders of Indiana

FIELD SERVICES

- FIELD ENGINEERING STAFF
- AC & DC DRIVE INSTALLATION
- PROGRAMMABLE CONTROL SYSTEMS
- SWITCHGEAR RETROFIT
- CUSTOM CONTROL SYSTEMS
- FIELD BALANCING
- VIBRATION ANALYSIS
- AC & DC DRIVE SERVICE

FLANDERS ELECTRIC OF ILLINOIS

(618) 993-2681

HENRY A. PETTER SUPPLY CO.

ALEMITE DIV.
AMERICAN AIR FILTER CO.
AMES
AMPCO METAL INC.
ARMEX
ARMSTRONG MACHINE
  WORKS
ARMSTRONG TOOL
ARO CORPORATION
AUTOMATIC SWITCH CO.
BETCO CHEMICALS
BINKS MFG. CO.
BLACK & DECKER MFG. CO.
BROWN & SHARPE MFG. CO.
BUSSMANN MFG.
CANON COPIERS
CARLISLE AND FINCH
CLEMCO
CLEVELAND TWIST DRILL CO.
COOPER GROUP
  CAMPBELL
  CRESCENT
  LUFKIN
  NICHOLSON
  H.K. PORTER
  WELLER
  WISS
CROUSE-HINDS CO.
DEVCON
DEVILBISS CO.
DIXON VALVE AND COUPLING
DRESSER IVI DIV
DRESSER MFG. CO.
DUFF-NORTON CO.
EATON
  CUTLER-HAMMER
  DURANT
EMERSON ELECTRIC CO.
  CHROMOLOX
  LOUISVILLE LADDER
  RIDGE TOOL
  VAN GORP
ENERPAC
ENPO PUMPS
EVEREADY BATTERY CORP.
EVERTITE COUPLING CO.
EXIDE
FACET PUROLATOR
FARBOIL PAINTS
FELPRO
FLEXIBLE METAL HOSE
FMC-LINK BELT DIV.
GARLOCK, INC.
GATORADE
GEORGIA PACIFIC
GLOVES
GO-JO INDUSTRIES
GOODYEAR TIRE & RUBBER
GREENFIELD TAP AND DIE
GREENLEE TOOL CO.
HARVEY HUBBELL CO.
HOLO-KROME
HOMELITE
HONDA PUMP
HYTROL CONVEYOR CO.
IMPERIAL-EASTMAN
ITT-BELL AND GOSSETT
  JABSCO
  MARLOW
JACUZZI BROS
KEYSTONE
KIDDE
KILLARK ELECTRIC MFG. CO.
KIMBERLY-CLARK
LINCOLN
LOCTITE
LUNKENHEIMER CO.
LYON METAL PRODUCTS
McDERMOTT
MEDICINES
MILWAUKEE ELECTRIC
MINNESOTA MINING & MFG.
  ELECTRICAL PRODUCTS DIV.
  OCCUPATIONAL HEALTH &
  SAFETY DIV.
  ADHESIVE COATING &
  SEALER
  MEDICAL DIV.
  INDUSTRIAL TAPE &
  SPECIALTY DIV.
NIBCO
NORTON ABRASIVES
NORTH SAFETY PRODUCTS
OFFICE FURNITURE
OFFICE PAPERS
OFFICE SUPPLIES
OSBORN MFG. CO.
PERMATEX
POWELL VALVE
RAPISTAN
RAY-O-VAC
ROCKWELL VALVES, CLAMPS
RUBBERMAID
  INDUSTRIAL/COMMERCIAL
RUST-OLEUM CORP
SCHRADER-BELLOWS
SPRAYON
SQUARE D COMPANY
SQWINCHER
STANLEY TOOL
STEARNS BRAKE
STEELCASE FURNITURE
SYLVANIA LAMPS
TEMPLETON, KENLY AND CO.
THOMAS AND BETTS
TORNADO FLOOR EQUIPMENT
VICTAULIC CORP.
HENRY VOGT MACHINE CO.
WALL ROPE
WARREN RUPP
WARREN TOOL
WERNER LADDER
WILLAMETTE PAPER
J.H. WILLIAMS
WISCONSIN TISSUE MILLS
DANIEL WOODHEAD
XOMOX CORP
YALE HOIST

HENRY A. PETTER SUPPLY CO.

P. O. Box 2350
Paducah, KY 42002-2350
Phone: 800-626-3940
Fax: (502) 443-3235

Mt. Vernon Branch
P O Box 707
Mt. Vernon, IL 62864
Phone: (618) 242-8987
Fax: (618) 242-9051

Continually On Top

Fansteel VR/Wesson Lexington has designed our carbide tipped bits with our continuous miner users in mind.

If you're looking for a bit that has been designed for fast penetration with less dust, a tapered cone that offers protection to the block and less drag, then Fansteel VR/Wesson Lexington has the variety of styles and grades you need.

We back up these carbide tipped bits with our blocks designed for quick-change.

Let us keep you "CONTINUALLY" on top, please return the enclosed reply card for more information.

Fansteel
VR/Wesson-Lexington
lilse road, lexington, kentucky 40575
606-252-1431

9 years in the mine without a break.

This Flexco® SRT Tool has worked in the mine for nine years, three shifts a day, installing thousands of belt splices and absorbing tons of punishment without ever breaking down. Not even once.

But that's not unusual for Flexco. Other SRT tools have been doing the job in the mine for years without ever adding a minute of downtime.

Why do Flexco tools last so long? Because we don't take any shortcuts when we make them. All are designed for simple, reliable operation. It's a tool a man can rely on for years. Without troubles, maintenance or worries.

So go with the system you can count on. And hammer on. And step on. Go with Flexco.

We don't promise it, we prove it.

Call for a free demonstration.

Flexible Steel Lacing Company
2525 Wisconsin AVenue
Downers Grove, IL 60615. U.S.A.

(630) 971-0150 FAX (630) 971-1180

FLEXCO

Your 14th Century Peasant Cottage Was Coal-Fired...

So was your 17th Century Castle...

And your 19th Century Railroad...

Your 1940s Automobile Plant...

Your 1970s Disco...

Your 1996 Personal Computer...

Your 1998 Electric Car...

And your 2022 Hovercraft...

Not a lot of people realize that our houses today are coal-fired, because coal fuels well over half of our nation's electricity. Or that air emissions have declined even as coal use has doubled in recent decades. Or that mining today is highly mechanized and very safe. Or that reclamation leaves the land in as good or better shape than before.

Coal has caught a lot of heat over the years. The King of England first attacked its environmental effects in the 1300s. Blake's satanic mills were coal-fired. And what did naughty children get for Christmas? Our product, of course.

But there's a reason that this year may be coal's best ever. Coal is safe, clean and dependable, thanks to people and technology. And coal remains the nation's least expensive, most abundant domestic energy source.

Zeigler Coal Holding Company, the nation's largest independent company devoted solely to coal, is proud to set the record straight about an industry that is used to taking its lumps. And we are also proud to be the largest coal producers in Illinois.

And oh, by the way...sorry about disco.

ILLINOIS MINES

Old Ben Coal
Zeigler No. 11,
Coulterville, Ill.

Turris Coal
Elkhart Mine,
Elkhart, Ill.

Zeigler

"To Be The Best... At Everything We Do"

WOODRUFF SUPPLY CO. INC.

Benton, Illinois
(618) 439-9451

Madisonville, Kentucky
(502) 821-3247

Aeroquip Hose & Fittings
Band-It Strapping Material
Bow Saws & Blades
J.B. Braswell U-Joints
Brown Plastic Brattice
Chain Hoist
Chalk #888
Clevis Grab Hooks & Slip Hooks, Etc.
Connecting Wire & Shot Fire Cable
Crosby Rope Clip s, Etc.
Discharge, Suction & Rock Dust Hose
Distilled Water
Dixon Valve & Couplings
Drinking Water
Dust Bags, Powder & Tools Bags
Electric Chain Saws
Electrical Cable Cutters
Electrical Connectors
General Electric Ballast
Gustin Bacon Mechanical Pipe Fittings
Hose Conduit & Trolley Wire Guard
Lighting – Mine Machine Headlight
Mechanic Wire
Metal Drain Pipe
Mine Rewire Cable
Mine Spray Hose
Mine Vent Tubing
Mining Machine Parts, Inc.
Naphtha
Panduit Electrical Connectors
Plastic Drain Tile
Plastic and Jute Brattice
Plastic Pipe & Fittings
Plymouth Tapes
PTC Link Belt Roller Chain, Shuttle Car
Feeder Breaker, Owens & Stamler
PVC Pipe Fittings
Red Oxide Paint
Rome Mining Cable
Rope Dogs – ⅜"-¾"
Safety Cans – 5 gal.
Security Light – Quartz & Mercury
Shawmut Fuses
Skirt Board Rubber
"SO" Cable
Stainless Worm Clamps
Steel Pipe – Grooved & Threaded
Steel Shelving & Bins
Templeton Kenly Mechanical & Hydr. Jacks
Track Bolts & Spikes
Trolley Splices & Wire Hangers, Etc.
Turnbuckles
Union Carbide Batteries & Brake Fluid
Union Shuttle Car & Feeder Chain
Water Dummy Filler Guns
Wayne Sump Pumps
SK Wellman Clutch Disc
West Virginia Armature Company
Westinghouse Light Bulbs
Whitney Blake Telephone Cable
Wire Rope
Wire Tie
Wood Fiber
ZEP Hand Cleaner

Jim Atterberry, Sales Representative of Illinois

MANUFACTURERS OF:
Shuttle Car, Feeder Breaker Flights
Rite Crete Products – Mine Sealent Products

© Heartland

Pump Rental & Sales, Inc.

102 Brown Street • Carterville, IL 62918
Phone: (618) 985-5110
FAX: (618) 985-5108

Owners

John W. Payne J. Neil Martin

Distributor of

Godwin Dri-Prime Pumps
SRS Crisafulli Sludge Removal Pumps
& Dredge Equipment
Barnes & Berkley Pumps
Grundfos Pumps
Wacker Construction Equipment
Honda Engines

Rental Equipment

Godwin Dri-Prime Pumps: 2" – 12"
(w/pipe, hose, & all necessary fittings)
ABS (MSHA-approved pumps)

Wacker Construction Equipment
(light towers, generators, compaction equipment)

Dredging
(contract dredging–mining, industrial, municipal, sludge ponds)

Dewatering
(contract dewatering and contract watering
no body of water too large or too small!!)

HDPE Pipe Fusion

HEAD OF ITS CLASS

If you're looking for a highly productive, efficient, reliable wheel loader that's comfortable enough to make long shifts seem shorter, look no further than the all-new Komatsu WA380-3 Avance wheel loader. From its Proportional Pressure Control (PPC), dual-speed hydraulics to its human-engineered operator's cab, the WA380-3 sets new standards. It does more work, faster and with less effort, than other loaders in its class — to help you win more bids and stay on top. To find out more, ask us about the Komatsu WA380-3 Avance wheel loader.

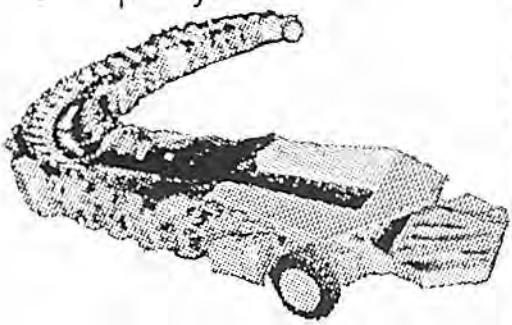
KOMATSU

ROLAND MACHINERY CO.

SPRINGFIELD, IL (800) 252-2926 • **BOLINGBROOK, IL** (800) 826-9608 • **LAKE-IN-THE-HILLS, IL** (800) 765-2635 • **CARTERVILLE, IL** (800) 274-7202 • **HAZELWOOD, MO** (800) 274-7230 • **CAPE GIRARDEAU, MO** (800) 274-7210 • **COLUMBIA, MO** (800) 274-7212 • **PALMYRA, MO** (800) 274-7214

OUR FUTURE

Today, Peabody Coal Company is a part of the Peabody group of companies, a global energy organization that has evolved since Peabody Holding Company, Inc. was formed in 1977. The Illinois coal business has changed dramatically and so has Peabody Coal Company. The men and women of



Peabody Coal Company's Marissa Business Unit remain committed to being the industry's safest and most productive coal miners, still a part of Peabody's proud tradition in Illinois. The Peabody Group's mission is to be a world-wide supplier of low-cost energy, which contributes to economic prosperity and a better quality of life.

excellence defined as industry leadership.

2000

ADVERTISERS PRODUCTS AND SERVICES INDEX

Building Materials and Construction

Allen Lumber Company, Inc., p. 190
Altorfer, Inc., formerly Capitol Machine, p. 187
American Mine Tool Division, p. 194
Arch Environmental Equipment Co., p. 130, 206
Arneson Timber Co., p. 121
Century Lubricants Co., p. 196
Fosroc, Inc., p. 185
Gunther-Nash Mining Construction Co., p. 146
Henry A. Petter Supply Co., p. 142
Jack Kennedy Metal & Building Products, Inc., p. 163
John Zurcher Assoc., p. 175
Lane Erectors, Inc., p. 134
Michigan Industrial Hardwood Co., p. 145
Ritecrete Concrete Products, p. 205
The G. W. Van Keppel Co. formerly Midco, p. 122
Tison & Hall Concrete Products, p. 194
Woodruff Supply, Inc., p. 172

Contractors and Professional Services (consultants, engineers, drilling, etc.)

Arch Environmental Equipment Co., p. 130, 206
Commercial Testing & Engineering Co., p. 145
Frontier-Kemper Constructors, Inc., p. 135
Gunther-Nash Mining Construction Co., p. 146
Hanson Engineers, Inc., p. 148
Kerco, Inc., p. 198
MICON, p. 190
Mine & Process Service, Inc., p. 128
Miners News, p. 164, 165
Patrick Engineering, p. 154
Power Techniques, Inc., p. 166
Reaco Battery Service Corp., p. 179
Southern Illinois University -Coal Research Center, p. 199
Stagg Engineering Services, Inc., p. 148
Stamler Corp., The (An Oldenburge Group Co.), p. 157
Standard Laboratories, Inc., p. 202
The G. W. Van Keppel Co. formerly Midco, p. 122
Weir International Mining Consultants, p. 127
Woodruff Supply, Inc., p. 172

Electrical Equipment (supplies, motors, cables, lamps and repairs)

Ashby Electric Co., Inc., p. 126
Berry Bearing Co., p. 132
Coal Age , Inc., p. 139
Crown Battery Mfg. Co., p. 173
Du Quoin Iron & Supply Co., p. 167
Fairmont Supply Co., p. 158
Flanders Electric of Illinois, Inc., p. 141
Henry A. Petter Supply Co., p. 142
Hopcroft Electric, p. 150
IBT, Inc., p. 154
Kerco, Inc., p. 198
Kirby Risk Electrical Supply Co., p. 177
Mine & Process Service, Inc., p. 128
Mohler Techology, Inc., p. 156
Mt. Vernon Electric, Inc., p. 181
National Mine Service Co., p. 129
Ocenco, Inc., p. 118
Reaco Battery Service Corp., p. 179
Triune, Inc., p. 135
Woodruff Supply, Inc., p. 172

Mining and Industrial Supplies

American Mine Tool Division, p. 194
Arneson Timber Co., p. 121
Associated Supply Co., p. 152
Berry Bearing Co., p. 132
Brake Supply Co., Inc., p. 112
Century Lubricants Co., p. 196
Coal Age , Inc., p. 139
Construction Machinery Corp., p. 127
Du Quoin Iron & Supply Co., p. 167
Excel Mining Systems, Div. of ANI Metal Products, Inc., p. 180
Fabick Machinery Co., p. 130
Fairmont Supply Co., p. 158
Fansteel, Inc. - VR/Wesson Co., p. 149
Flexible Steel Lacing Co., p. 155
Ford Steel Co., p. 159
Gauley Sales Co., p. 140
Heartland Pump Rental & Sales, Inc., p. 174

Mining and Industrial Supplies, cont'd.

Henry A. Petter Supply Co., p. 142
Kerco, Inc., p. 198
Martin Marietta Aggregates, p. 188
MICON, p. 190
Mine Supply Co., The, p. 193
Miners News, p. 164, 165
Mississippi Lime Co., p. 204
National Mine Service Co., p. 129
Naylor Pipe Co., p. 182
Raben Tire Co., p. 123
Reaco Battery Service Corp., p. 179
Richwood Industries, Inc., p. 119
Sollami Co., The, p. 160
The G. W. Van Keppel Co. formerly Midco, p. 122
Towers Mine Tool, Inc., p. 189
Wil-Mar Hydraulics & Mine Supply, p. 125
Woodruff Supply, Inc., p. 172

Mining Companies

Arch of Illinois, p. 191
Consolidation Coal Co., p. 138
Freeman United Coal Mining Co., p. 115
Kerr-McGee Coal Corp., p. 170
Monterey Coal Company, p. 110
Peabody Coal Co., p. 200, 201
White County Coal Co., Pattiki Mine, p. 131
Zeigler Coal Holding Co., p. 168, 169

Petroleum Products and Chemicals

Century Lubricants Co., p. 196
DuPont Chemicals, p. 188
Du Quoin Iron & Supply Co., p. 167
Fairmont Supply Co., p. 158
Henry A. Petter Supply Co., p. 142
Pennzoil Products Co., p. 203
Stamler Corp., The (An Oldenburge Group Co.), p. 157

Power Transmission Equipment (services and parts)

Berry Bearing Co., p. 132
Fairmont Supply Co., p. 158
Flexible Steel Lacing Co., p. 155
Henry A. Petter Supply Co., p. 142
IBT, Inc., p. 154
Mine & Process Service, Inc., p. 128
Mt. Vernon Electric, Inc., p. 181
National Mine Service Co., p. 129
Ohio Valley Vulcanizing, p. 162
Reaco Battery Service Corp., p. 179
SEMCOR, p. 198
The G. W. Van Keppel Co. formerly Midco, p. 122

Preparation Plants and Equipment (services and parts)

Associated Supply Co., p. 152
Centrifugal & Mechanical Ind., Inc., p. 147
Chase Pump & Equipment, p. 133
Coal Age , Inc., p. 139
Du Quoin Iron & Supply Co., p. 167
Fairmont Supply Co., p. 158
Ford Steel Co., p. 159
Gunther-Nash Mining Construction Co., p. 146
Henry A. Petter Supply Co., p. 142
John Zurcher Assoc., p. 175
Kerco, Inc., p. 198
National Mine Service Co., p. 129
Norris Screen & Mfg., Inc., p. 111
Ohio Valley Vulcanizing, p. 162
Reaco Battery Service Corp., p. 179
Roberts & Schaefer Co., p. 120
Stamler Corp., The (An Oldenburge Group Co.), p. 157
Tabor Machine Co., Inc., p. 196
The G. W. Van Keppel Co. formerly Midco, p. 122
Woodruff Supply, Inc., p. 172

Pumps
(all kinds, pipe valves, fittings, hydraulics)

Berry Bearing Co., p. 132
Chase Pump & Equipment, p. 133
Du Quoin Iron & Supply Co., p. 167
Fairmont Supply Co., p. 158
Farrar Pump & Machinery Co., p. 184
Heartland Pump Rental & Sales, Inc., p. 174
Henry A. Petter Supply Co., p. 142
Hydro-Power, Inc., p. 179
Industrial Process Equipment Co., p. 175
Kerco, Inc., p. 198
Midwestern Machine & Hydraulics, Inc., p. 159
Power Techniques, Inc., p. 166
The G. W. Van Keppel Co. formerly Midco, p. 122
Wil-Mar Hydraulics & Mine Supply, p. 125
Woodruff Supply, Inc., p. 172

Reclamation, Erosion Conrol, Ground Stabilization

Arch Environmental Equipment Co., p. 130, 206
Du Quoin Iron & Supply Co., p. 167
Kerco, Inc., p. 198
Lane Erectors, Inc., p. 134
Patrick Engineering, p. 154
Ready Drilling Co., p. 202
The G. W. Van Keppel Co. formerly Midco, p. 122

Rubber Products
(tires, belting and hose)

Berry Bearing Co., p. 132
Brad Ragan, Inc., p. 122
Du Quoin Iron & Supply Co., p. 167
Fairmont Supply Co., p. 158
Gooding Rubber Co., p. 143
Goodyear Tire & Rubber Co., p. 113
Henry A. Petter Supply Co., p. 142
IBT, Inc., p. 154
National Mine Service Co., p. 129
Ohio Valley Vulcanizing, p. 162
Raben Tire Co., p. 123

Rubber Products, cont'd.

Richwood Industries, Inc., p. 119
SEMCOR, p. 198
The G. W. Van Keppel Co. formerly Midco, p. 122
Woodruff Supply, Inc., p. 172

Steel and Steel Fabricators (screens, rail, etc.)

Arch Environmental Equipment Co., p. 130, 206
Associated Supply Co., p. 152
Berry Bearing Co., p. 132
Coal Age , Inc., p. 139
Du Quoin Iron & Supply Co., p. 167
Fairmont Supply Co., p. 158
Ford Steel Co., p. 159
Lane Erectors, Inc., p. 134
Levinson Steel Company, The, p. 150
National Mine Service Co., p. 129

Surface Mining Equipment

A. L. Lee Corporation (Allco), p. 195
Altorfer, Inc., formerly Capitol Machine, p. 187
Berry Bearing Co., p. 132
Fabick Machinery Co., p. 130
Flexible Steel Lacing Co., p. 155
J. H. Fletcher & Co., p. 171
Miners News, p. 164, 165
Mt. Vernon Coal Transfer, p. 151
Power Techniques, Inc., p. 166
Reaco Battery Service Corp., p. 179
Rimpull Corp., p. 184
Roland Machinery Co., p. 183
Rudd Equipment Co., p. 124
Sollami Co., The, p. 160
Stamler Corp., The (An Oldenburge Group Co.), p. 157
The G. W. Van Keppel Co. formerly Midco, p. 122
Wescott Steel, Inc., p. 161
Wil-Mar Hydraulics & Mine Supply, p. 125

Transportation (railroads, trucking, barge)

Associated Supply Co., p. 152
Cora Terminal, Enron Transportation Services, L.P., p. 117
Hanson Engineers, Inc., p. 148
J. H. Fletcher & Co., p. 171
Norfolk Southern Corp., p. 186
Patrick Engineering, p. 154
Reaco Battery Service Corp., p. 179
Roberts & Schaefer Co., p. 120
Sollami Co., The, p. 160
Stamler Corp., The (An Oldenburge Group Co.), p. 157

Underground Mining Equipment (equipment, replacement parts and rebuilds)

A. L. Lee Corporation (Allco), p. 195
Altorfer, Inc., formerly Capitol Machine, p. 187
Arneson Timber Co., p. 121
Associated Supply Co., p. 152
Berry Bearing Co., p. 132
Brake Supply Co., Inc., p. 112
Central Illinois Steel Co., p. 173
Coal Age , Inc., p. 139
Continental Conveyor & Equipment Co., p. 144
Flexible Steel Lacing Co., p. 155
Fosroc, Inc., p. 185
Gauley Sales Co., p. 140
Jeffrey Mining Products, L.P., p. 116
Joy Mining Machinery, p. 176
Kennametal, Inc., p. 109
Kerco, Inc., p. 198
Kirby Risk Electrical Supply Co., p. 177
Lake Shore Mining Equipment, p. 192
Long-Airdox Co., p. 153
Michigan Industrial Hardwood Co., p. 145
Midwestern Machine & Hydraulics, Inc., p. 159
Mine & Process Service, Inc., p. 128
Mine Technik America, Inc., p. 162
Minesafe Electronics, Inc., p. 197
National Mine Service Co., p. 129
Phillips Machine Service, Inc, p. 178

Underground Mining Equipment, cont'd.

Power Techniques, Inc., p. 166
Reaco Battery Service Corp., p. 179
Richwood Industries, Inc., p. 119
Roland Machinery Co., p. 183
Schroeder Industries, p. 152
Stamler Corp., The (An Oldenburge Group Co.), p. 157
Triune, Inc., p. 135
Wil-Mar Hydraulics & Mine Supply, p. 125
Woodruff Supply, Inc., p. 172

Underground Roof Support, Safety and Ventilation

American Mine Tool Division, p. 194
Associated Supply Co., p. 152
Dupont Chemicals, p. 188
Eagle Enterprises, Inc., p. 170
Excel Mining Systems, Div. of ANI Metal Products, Inc., p. 180
Fairmont Supply Co., p. 158
Fosroc, Inc., p. 185
Gauley Sales Co., p. 140
Jack Kennedy Metal & Building Products, Inc., p. 163
Jennmar Corporation, p. 136, 137
Joy Mining Machinery, p. 176
Lake Shore Mining Equipment, p. 192
Martin Marietta Aggregates, p. 188
Michigan Industrial Hardwood Co., p. 145
MICON, p. 190
Ocenco, Inc., p. 118
Pyro-Chem Corporation, p. 114
Towers Mine Tool, Inc., p. 189
Triune, Inc., p. 135
Woodruff Supply, Inc., p. 172

Users of Coal (utilities, industry, etc.)

Stamler Corp., The (An Oldenburge Group Co.), p. 157
The G. W. Van Keppel Co. formerly Midco, p. 122

Other

Altorfer, Inc., formerly Capitol Machine (construction mining equipment), p. 187
Flexible Steel Lacing Co. (material handling), p. 155
Fosroc, Inc. (ventilation seals, sealants/coatings), p. 185
IBT, Inc. (warehouse equipment and services), p. 154
John Zurcher Assoc. (alloy steel castings), p. 175
Miners News (publication and mining directories), p. 164, 165
Mossner Company, Alfred (reprographics/printing), p. 166
Naylor Pipe Co. (spiralweld steel pipe), p. 182
Roberts & Schaefer Co. (bulk material handling systems), p. 120
Triune, Inc. (monitors), p. 135

ALPHABETICAL INDEX

A

A. L. Lee Corporation (Allco), p. 195
Allen Lumber Company, Inc., p. 190
Altorfer, Inc., formerly Capitol Machine, p. 187
American Mine Tool Division, p. 194
Arch Environmental Equipment Co., pp. 130, 206
Arch of Illinois, p. 191
Arneson Timber Co., p. 121
Ashby Electric Co., Inc., p. 126
Associated Supply Co., p. 152

B

Berry Bearing Co., p. 132
Brad Ragan, Inc., p. 122
Brake Supply Co., Inc., p. 112

C

Central Illinois Steel Co., p. 173
Centrifugal & Mechanical Ind., Inc., p. 147
Century Lubricants Co., p. 196
Chase Pump & Equipment, p. 133
Coal Age , Inc., p. 139
Commercial Testing & Engineering Co., p. 145
Consolidation Coal Co., p. 138
Construction Machinery Corp., p. 127
Continental Conveyor & Equipment Co., p. 144
Cora Terminal, Enron Transportation Services, L.P., p. 117
Crown Battery Mfg. Co., p. 173

D-E

Du Quoin Iron & Supply Co., p. 167
Dupont Chemicals, p. 188

Eagle Enterprises, Inc., p. 170
Excel Mining Systems, Div. of ANI Metal Products, Inc., p. 180

F

Fabick Machinery Co., p. 130
Fairmont Supply Co., p. 158
Fansteel, Inc. - VR/Wesson Co., p. 149

Farrar Pump & Machinery Co., p. 184
Flanders Electric of Illinois, Inc., p. 141
Flexible Steel Lacing Co., p. 155
Ford Steel Co., p. 159
Fosroc, Inc., p. 185
Freeman United Coal Mining Co., p. 115
Frontier-Kemper Constructors, Inc., p. 135

G

Gauley Sales Co., p. 140
Gooding Rubber Co., p. 143
Goodyear Tire & Rubber Co., p. 113
Gunther-Nash Mining Construction Co., p. 146

H

Hanson Engineers, Inc., p. 148
Heartland Pump Rental & Sales, Inc., p. 174
Henry A. Petter Supply Co., p. 142
Hopcroft Electric, p. 150
Hydro-Power, Inc., p. 179

I-J

IBT, Inc., p. 154
Industrial Process Equipment Co., p. 175

J. H. Fletcher & Co., p. 171
Jack Kennedy Metal & Building Products, Inc., p. 163
Jeffrey Mining Products, L.P., p. 116
Jennmar Corporation, pp. 136, 137
John Zurcher Assoc., p. 175
Joy Mining Machinery, p. 176

K

Kennametal, Inc., p. 109
Kerco, Inc., p. 198
Kerr-McGee Coal Corp., p. 170
Kirby Risk Electrical Supply Co., p. 177

L

Lake Shore Mining Equipment, p. 192
Lane Erectors, Inc., p. 134

Levinson Steel Company, The, p. 150
Long-Airdox Co., p. 153

M

Martin Marietta Aggregates, p. 188
Michigan Industrial Hardwood Co., p. 145
MICON, p. 190
Midwestern Machine & Hydraulics, Inc., p. 159
Mine & Process Service, Inc., p. 128
Mine Supply Co., The, p. 193
Mine Technik America, Inc., p. 162
Miners News, pp. 164, 165
Minesafe Electronics, Inc., p. 197
Mississippi Lime Co., p. 204
Mohler Techology, Inc., p. 156
Monterey Coal Company, p. 110
Mossner Company, Alfred, p. 166
Mt. Vernon Coal Transfer, p. 151
Mt. Vernon Electric, Inc., p. 181

N-O

National Mine Service Co., p. 129
Naylor Pipe Co., p. 182
Norfolk Southern Corp., p. 186
Norris Screen & Mfg., Inc., p. 111

Ocenco, Inc., p. 118
Ohio Valley Vulcanizing, p. 162

P

Patrick Engineering, p. 154
Peabody Coal Co., pp. 200, 201
Pennzoil Products Co., p. 203
Phillips Machine Service, Inc, p. 178
Power Techniques, Inc., p. 166
Pyro-Chem Corporation, p. 114

R

Raben Tire Co., p. 123
Reaco Battery Service Corp., p. 179
Ready Drilling Co., p. 202
Richwood Industries, Inc., p. 119
Rimpull Corp., p. 184

Ritecrete Concrete Products, p. 205
Roberts & Schaefer Co., p. 120
Roland Machinery Co., p. 183
Rudd Equipment Co., p. 124

S

Schroeder Industries, p. 152
SEMCOR, p. 198
Sollami Co., The, p. 160
Southern Illinois University -Coal Research Center, p. 199
Stagg Engineering Services, Inc., p. 148
Stamler Corp., The (An Oldenburge Group Co.), p. 157
Standard Laboratories, Inc., p. 202

T-V

Tabor Machine Co., Inc., p. 196
Tison & Hall Concrete Products, p. 194
Towers Mine Tool, Inc., p. 189
Triune, Inc., p. 135

The G. W. Van Keppel Co. formerly Midco, p. 122

W-Z

Weir International Mining Consultants, p. 127
Wescott Steel, Inc., p. 161
White County Coal Co., Pattiki Mine, p. 131
Wil-Mar Hydraulics & Mine Supply, p. 125
Woodruff Supply, Inc., p. 172

Zeigler Coal Holding Co., pp. 168, 169