

# Coal Age<sup>®</sup>

The Magazine for Coal Mining and Processing Professionals

JAN/FEB 2020 | A Mining Media International Publication | [www.coalage.com](http://www.coalage.com)

A large orange JOY continuous miner is shown in a coal mine tunnel, cutting coal. The machine is positioned on a conveyor system, and the tunnel walls are visible. The JOY logo is clearly visible on the side of the machine.

## US Longwall Census Annual Forecast

— The mood darkens with  
an oversupplied market

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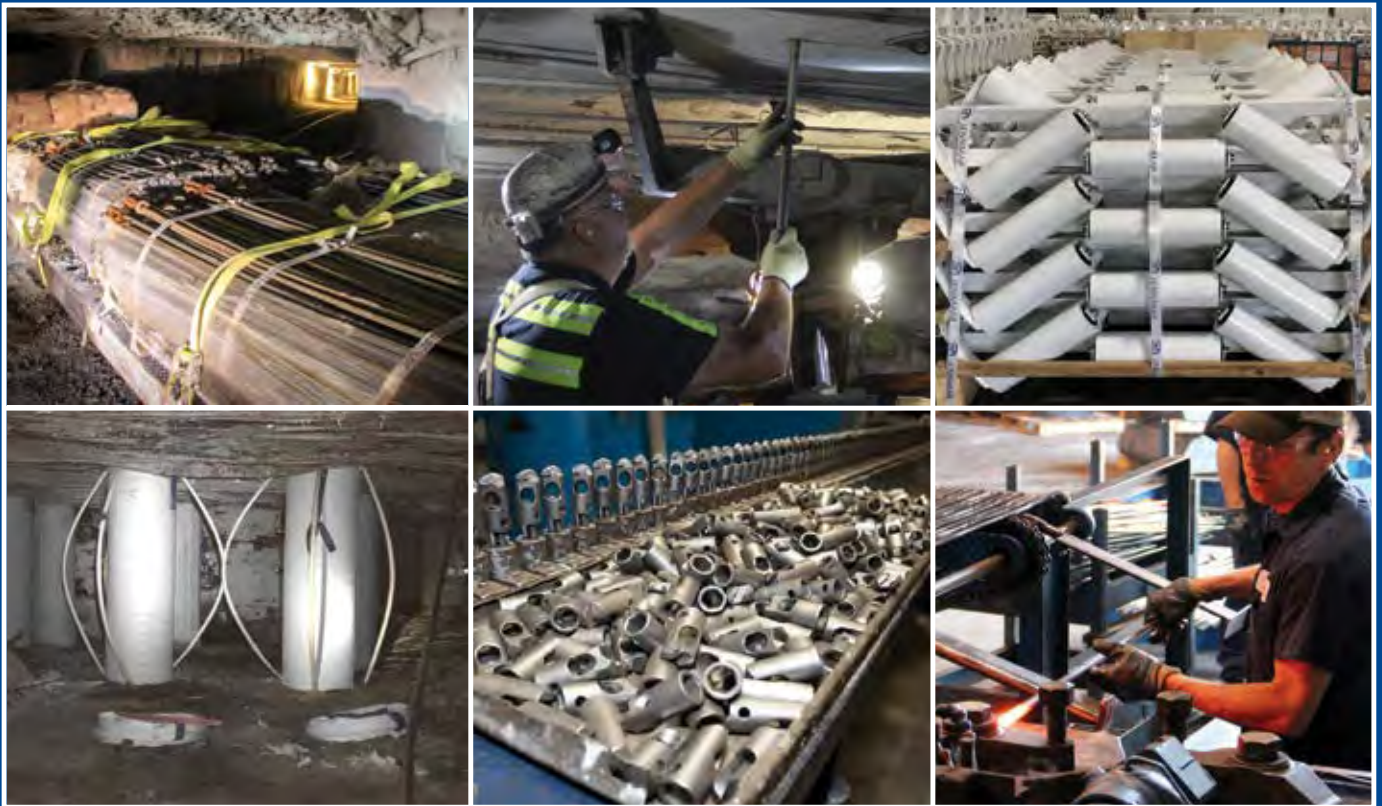
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# Coal Age

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This month, Coal Age documents some of America's most productive underground coal operations in the U.S. Longwall Census. The cover photo shows a Joy double-drum, ranging arm shearer loader in a modern longwall operation. (Photo: Komatsu).

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## 2020: AN INFLECTION POINT



**BY STEVE FISCOR**  
PUBLISHER &  
EDITOR-IN-CHIEF

Welcome to the combined January-February 2020 edition of *Coal Age*. This is a popular edition because it carries the Annual Forecast and the U.S. Longwall Census. It also provides the year-end production statistics in addition to other important articles. Looking at the top 10 coal-producing states and regions (See U.S. News, p. 7), readers can see that on December 28, total U.S. production stood at 700 million tons — the new floor. Annual production dropped by 50 million tons in 2019. The Annual Forecast discusses these numbers in depth.

The U.S. Longwall Census, which tallies the information for some of the nation's most productive underground coal mines, noted a slight downturn as well. Overall U.S. longwall production dropped roughly 6 million tons or 3.5% to 163 million tons in 2019. One longwall closed, bringing the total to 39 faces.

Last year, U.S. coal markets were dealt a series of blows. By the end of the first quarter, forward prices for thermal exports in Europe were declining with less demand. By midyear, it had become clear that coal had lost more of its domestic U.S. market share to natural gas. The trade rhetoric between the U.S. and China began to heat up, which created problems for coking coal markets. Even though production was down considerably, the U.S. was still swimming in thermal coal and the party was over for met producers.

What happens now? If everything remains the same, the U.S. coal market can expect further consolidation in 2020. The coal companies with strong balance sheets and contracts for delivery are in a good position. Those with unsustainable mining costs will be forced to idle production.

Can it get worse? Yes, if the political pendulum swings the other way in this year's presidential election. One Democratic candidate, former Vice President Joe Biden told coal miners recently they need to learn to code. Former New York City Mayor Michael Bloomberg, an anti-coal zealot, has also entered the race. There will be no sympathy from the left.

Could it get better? Yes. The Phase 1 deal struck between the U.S. and China could secure more exports for U.S. coal (See Annual Forecast, p 29). A turnaround in the global economy and steel markets would benefit all coal producers worldwide. Coal's market share for U.S. power generation could grow if declining petroleum prices disrupt natural gas markets. A drop in the hydroelectric aspect of the American renewable energy portfolio could also open market share to other fuels. In the meantime, the name of the game is to hold production costs as low as possible to weather the rough seas ahead.

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## MINING MEDIA INTERNATIONAL

*Coal Age*, Volume 125, Issue 1, (ISSN 1040-7820) is published monthly except January and July, by Mining Media International, Inc., 11655 Central Parkway, Suite 306, Jacksonville, Florida 32224 (mining-media.com). Periodicals postage paid at Jacksonville, FL, and additional mailing offices. Canada Post Publications Mail Agreement No. 41450540. Canada return address: PO Box 2600, Mississauga ON L4T 0A8, Email: subscriptions@coalage.com. Current and back issues and additional resources, including subscription request forms and an editorial calendar, are available online at www.coalage.com.

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**ARCHIVES AND MICROFORM:** This magazine is available for research and retrieval of selected archived articles from Proquest. For microform availability, contact ProQuest at 800-521-0600 or +1.734.761.4700, or search the Serials in Microform listings at www.proquest.com.

**POSTMASTER:** Send address changes to *Coal Age*, 11655 Central Parkway, Suite 306, Jacksonville, FL 32224-2659.

**REPRINTS:** Mining Media International, Inc., 11655 Central Parkway, Suite 306, Jacksonville, FL 32224 USA; phone: +1.904.721.2925, fax: +1.904.721.2930, www.mining-media.com

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## WESTMORELAND ROSEBUD MINING FINALIZES NEW COAL SUPPLY AGREEMENT FOR COLSTRIP UNITS 3, 4



The Colstrip Generating Station will burn Rosebud's coal until at least 2025. (Photo: Puget Sound Energy)

Westmoreland Rosebud Mining announced the finalization of a new, six-year agreement to supply coal to Colstrip Generating Station's Units 3 and 4 in December. The new agreement aligns with the needs of the regulated ownership group and will continue to enable Units 3 and 4 to operate reliably. It took effect on January 1 and will continue through to at least the end of 2025.

The Rosebud mine located in Rosebud County, Montana, is a low-cost surface mining operation, located in the Northern Powder River Basin, near the town of Colstrip and in close proximity to the Northern Cheyenne Indian Reservation.

Despite the closure of Colstrip's 1 and 2 Units at the end of 2019, the output from the mine will continue to provide sufficient energy to power the energy needs of approximately 1 million typical U.S. homes.

### Itochu Invests in \$450M NCR Coking Coal Mine

The group under developer North Central Resources LLC (NCR) wants to ramp up shipments to global markets in 2023, with Japan, South Korea

and India currently among the largest U.S. met coal export destinations.

The new 4-million-ton-per-year (tpy) Longview mine "will be contributing a stable supply of high-quality metallurgical coal to global customers, particularly in Japan and Asia," Itochu said.

Sources close to the mine project expect the finished product to be a high-vol A coking coal with high CSR, and final specifications such as ash and sulfur dependent on future coal processing and marketing.

Combined with an expansion at the 3-million-tpy Leer South mine starting to add shipments in Q3 2021 and potential for growth from other mines, the U.S. will boost supplies of higher CSR, low ash high-vol coals, aiding blending options for steelmakers and coke plants.

Longview "will produce high-quality coking coal with world-class cost competitiveness," Itochu said.

At the same time, the new mine potentially adds high-vol coking coal supplies into a competitive market.

The Longview mine is currently under development in Barbour County and planned to reach full-scale output at the end of 2022, to rank among the largest met coal mines in the U.S.

Itochu is providing development capital in line with its 25% equity stake in developer NCR, and the partners will develop a dedicated global marketing company, the Japanese company said.

AMCI holds a 42.38% stake in NCR, with Posco's interest at 22.05% and investor JAZ at 10.58%, Itochu said.

### Indonesia's PT Bukit Asam Plans to Increase Production in 2020

Indonesian state-owned coal miner PT Bukit Asam is targeting around 30 million metric tons (mt) of coal production for 2020, according to *Reuters*. That's a 1.5-million-mt increase over the company's 2019 production.

Bukit Asam Director of Commerce Adib Ubaidillah said 60% of the 2020 targeted production will be bought by the Indonesian power utility PLN and 30% will be shipped overseas, mostly to India.

He said, "We will let the rest, the 10% float on the spot market."

The company also said it had scrapped a plan to build a coal gasification project in Riau on Sumatra and focus on plants it is building near its mine in Tanjung Enim in South Sumatra, for efficiency reasons.

PT Bukit Asam Tbk received Indonesia's Most Trusted Companies Award in Good Corporate Governance Awards 2019 organized by *SWA Magazine*. "The GCG implementation was highly supported by the performance of our employees and a good company management system and hence made us win this award," said Arviyan Arifin, president, PT Bukit Asam Tbk.

### American Resources Sells Perry County Assets

American Resources Corp. has reached an agreement to sell certain non-core assets at its Perry County Resources subsidiary. The sale agreement consists of three idled permits associated with

one underground mine and one surface mine located in Perry County, Kentucky, near the town of Hazard. Total consideration for the assets being purchased by an undisclosed third party is approximately \$1 million of cash and equipment, according to the company.

American Resources purchased the assets of Perry County Resources in September as part of the court-supervised bankruptcy of Cambrian Holdings Co. Inc. The company has been restructuring the operating complex to lower its cost structure, streamline its operations and set it up for long-term success, the company said. Additionally, the divestiture of the three permits reduces the company's liabilities by shedding more than \$3 million of associated reclamation bonds.

"We are excited that the idled permits are going to a company that most likely has them in their near-term mining plan, while our near-term plan does not include them," Chairman and CEO of American Resources Mark Jensen said.

### States Ask Supreme Court to Hear Challenge of Washington's Coal Terminal Permit Denial

Montana and Wyoming have asked the U.S. Supreme Court to accept their challenge of what they considered Washington's "unconstitutional and discriminatory" denial of a permit for a proposed export terminal in Longview, according to Attorney General of Montana Tim Fox.

Montana and Wyoming are asking for original jurisdiction, which means the dispute would bypass lower courts.

The states argued that Washington's discriminatory denial of a Clean Water Act Section 401 Water Quality Certification for the proposed Millennium Bulk Terminal violates both the Dormant Commerce Clause and the Foreign Commerce Clause of the U.S. Constitution. The Commerce Clause, they said, grants the federal government — not states — authority to regulate interstate commerce.

"Montana's access to growing overseas markets shouldn't be dictated by the latest political fads on the West Coast," Fox said. "The framers of the U.S. Constitution wrote the Commerce Clause to prevent the very harms that Washington state is inflicting upon Montana and Wyoming today."

"I did not come to this decision lightly, but Wyoming's ability to export one of our greatest natural resources is being blocked unlawfully," Gov. Mark Gordon said. "It is critical that Section 401 of the Clean Water Act not be used to interfere with lawful interstate commerce. It is not a tool to erect a trade barrier based on political whims."

If built, the Millennium Bulk Terminal would ship 44 million metric

tons of coal annually from Montana and Wyoming to destinations overseas.

In 2017, the Washington State Department of Ecology denied the project a Section 401 Water Quality Certification, a necessary permit under the Clean Water Act. The denial effectively killed the proposed terminal.

"As our filings with the court show, the record is clear that Washington state officials killed the project for reasons outside the scope of the Section 401 permit and have demonstrated a clear bias against Montana and Wyoming coal," Fox added.

Washington state has 60 days to file a response to Montana and Wyoming's petition.

### TECK INCREASES EXPORT CAPACITY WITH NEW RIDLEY TERMINALS AGREEMENT

Teck Resources Ltd. has expanded its commercial agreement with Ridley Terminals for shipping coal from Teck's British Columbia operations. The agreement runs from January 2021 to December 2027, and increases contracted capacity from 3 million metric tons per year (mtpy) to 6 million mtpy with an option for Teck to extend up to 9 million mtpy. This will enable Teck to increase its shipment volumes through the Ridley terminal to provide greater flexibility and improved performance within its overall coking coal supply chain, according to the company.

"This agreement with Ridley Terminals, in combination with upgrades under way at our Neptune Terminal and our recent agreement with CN, will contribute to improved overall performance throughout

our steelmaking coal supply chain," said Don Lindsay, president and CEO of Teck. "We are looking forward to building on our strong working relationship with RTI and new principal owners Riverstone-AMCI to safely and efficiently transport our product to customers."

"Teck is a long time, valued customer of RTI," said Marc Dulude, president and COO of Ridley Terminals Inc. "This agreement further solidifies our strong relationship and demonstrates our commitment to our customers to provide fast, efficient, and reliable service. RTI is proud to be a part of Teck's long-term development plan and vision."

The terms of the agreement were not disclosed.



Teck's new agreement with Ridley Terminals increases capacity to 6 million mtpy. (Photo: Ridley Terminals)

# KENTUCKY MINERS BLOCKING COAL TRAIN RECEIVE PAY, END PROTEST



Coal miners demanding back pay block a train transporting coal from the Pike County mine, owned by Quest Energy.

After a three-day standoff, coal miners in Pike County, Kentucky, who were blocking the railroad track demanding back pay, ended their protest. The four miners were paid and agreed to leave the tracks.

The miners camped out starting on Monday, January 13, and were blocking a train transporting coal from the Pike County mine owned by Quest Energy. The group, which originally included about a dozen miners, claimed they were owed two-weeks' pay.

According to the company, the miners had been paid. On Quest Energy's Facebook page, it said, "We have always paid everything we ever owe our employees and will continue to do so. There has been times when pay has been delayed, but we have always paid."

American Resources, parent company of Quest Energy, said the blockade ended after almost 50 employees went to the protest to try and defuse the situation. Lisa Little, an employee of Quest Energy, said, "At Quest Energy, we are a family. Everyone in the company cares deeply for one another. The company has provided opportunities for all of us to support families even throughout challenging times."

American Resources Chairman and CEO Mark Jensen said, "Today's

actions and the massive outreach by our family on the ground is testament to the culture that we are building.

"American Resources is a company that has found success in buying distressed mining assets and utilize its talented team to restructure and restart such operations with a more affordable cost structure, for more sustainable employment."

## Western Kentucky Coal Mine Closing in Early 2020

The Western Kentucky Coal Co.'s Genesis mine in Centertown, Kentucky, issued WARN notices to employees in late December. The company said it planned for a mass layoff and plant closing on February 24. This will affect 250 employees.

The mine produced 2.4 million short tons of coal in 2018, according to the Mine Safety and Health Administration.

The decision comes after parent company Murray Energy filed for Chapter 11 bankruptcy in October.

## Tri-State Will Retire All Coal Generation in Colorado, New Mexico by 2030

Tri-State Generation and Transmission Association announced the retirement

of its remaining New Mexico coal-fired power plant by the end of 2020 and its remaining Colorado coal plants and coal mine by 2030. This includes the 253-megawatt Escalante Station in Prewitt, New Mexico, the 1,285-megawatt Craig Station in Moffat County, Colorado, and the Colowyo mine in Moffat and Rio Blanco counties.

Collectively, the closure of the power plants and mine will impact approximately 600 power plant and mine employees, which includes 107 employees at Escalante station, 253 at Craig Station, and 219 people at the mine, according to the company.

"Serving our members' clean energy and affordability needs, supporting state requirements and goals, and leading the fundamental changes in our industry require the retirement of our coal facilities in Colorado and New Mexico," said Rick Gordon, chairman of the board of Tri-State and a director of Mountain View Electric Association in eastern Colorado. "As we make this difficult decision, we do so with a deep appreciation for the contributions of our employees who have dedicated their talents and energy to help us deliver on our mission to our members."

Tri-State said it will work with state and local officials to support affected employees and their communities during the transition.

Tri-State attributed the decision to retire the Escalante Station to the economics of operating the power plant in a competitive power market, and the company's addition of low-cost renewable resources.

Escalante Station employees will receive a severance package, the opportunity to apply for vacancies at other Tri-State facilities, assistance with education and financial planning, and supplemental funding for health benefits, according to the company.



Tri-State previously announced that Craig Station's 427-megawatt Unit 1 will close by the end of 2025. The 410-megawatt Unit 2 and the 448-megawatt Unit 3 will close by 2030. Tri-State operates Craig Station and owns 24% of Units 1 and 2. Tri-State owns 100% of Unit 3. Tri-State is working with the other plant owners to determine the specific details for the retirement of Unit 2.

The Colowyo mine produces coal used at Craig Station and will cease production by 2030, when operations will turn to reclamation. Tri-State purchased Colowyo mine from Rio Tinto in 2011.

"With 10 years until the closure of Craig Station and Colowyo mine, we have additional time to work with the legislature, our employees and the communities in Moffat and Rio Blanco counties to plan for and support the transition," said Highley. "Our work starts now to ensure we can continue to safely produce power while working with stakeholders to thoughtfully plan for the future."

Tri-State previously retired its coal capacity at Nucla Station in western Colorado in 2019.

Tri-State's announcement is part of its Responsible Energy Plan, which it said will transform the cooperative power supplier, while maintaining its strong financial position.

"We are leading to be the cleanest, most flexible and most competitive cooperative power supplier for the benefit of our members, the communities they serve and the states we live in," CEO of Tri-State Duane Highley said.

## SWEPSCO Will Close Dolet Hills Power Plant in 2026

The Southwestern Electric Power Co. (SWEPSCO) plans to retire the Dolet Hills coal-fired power plant in Louisiana by the end of 2026. This was part of an agreement with environmental organization the Sierra Club approved by the Arkansas Public Service Commission on January 8.

The 650-megawatt plant is co-owned by Cleco and SWEPSCO, a subsidiary of American Electric Power. Cleco operates the plant.

SWEPSCO and Cleco filed their final integrated resource plans (IRP) for 2019 last week, which included a shift in focus from the lignite coal plant to other fossil fuels and renewable resources.

In early 2019, Cleco announced the plant would shift from year-round to seasonal dispatch. "Dolet Hills will transition both its mining operations and plant operations to a seasonal dispatch, focusing primarily on the summer months June through September," Cleco said in the IRP.

— U.S. News Continued on Page 10 —

## MONTHLY STATS FROM COAL COUNTRY

### TOP 10 COAL-PRODUCING STATES AND REGIONS

(Thousands of Short Tons)	Week Ending (12/28/19)		
	YTD '19	YTD '18	% Change
Wyoming	271,285	302,245	-10.2
West Virginia	92,295	94,929	-2.8
Pennsylvania	48,441	49,653	-2.4
Illinois	47,475	49,175	-3.5
Kentucky	36,664	39,496	-7.2
Montana	34,064	38,339	-11.2
Indiana	32,662	34,372	-5.0
North Dakota	26,076	29,462	-11.5
Texas	22,626	24,683	-8.3
New Mexico	15,380	10,693	43.8
Appalachian Total	191,687	199,636	-4.0
Interior Total	129,768	136,117	-4.7
Western Total	378,647	415,619	-8.9
<b>U.S. Total</b>	<b>700,101</b>	<b>751,372</b>	<b>-6.8</b>

### WEEKLY SPOT PRICES

(\$/ton)	Week Ending (1/17/20)	
Central Appalachia	(12,500 Btu, 1.2 SO <sub>2</sub> )	\$57.40
Northern Appalachia	(13,000 Btu, < 3.0 SO <sub>2</sub> )	\$54.00
Illinois Basin	(11,800 Btu, 5.0 SO <sub>2</sub> )	\$34.20
Powder River Basin	(8,800 Btu, 0.8 SO <sub>2</sub> )	\$11.75
Uinta Basin	(11,700 Btu, 0.8 SO <sub>2</sub> )	\$31.30

Source: Energy Information Administration

# RUSSIAN BALTIC COAL EXPORTS TO ASIA SURGE 32% IN 2019



Exports from Russia's export hub, Ust-Luga (above), total 5.42 million metric tons in 2019. (Photo: Rosterminalugol)

Russian long-haul coal exports to Asia from the Baltic Sea surged more than 30% year on year in 2019 due largely to insufficient European demand, more attractive Pacific-basin prices and low freight costs.

Exports of predominantly thermal coal from Russia's main European export hub of Ust-Luga, near St. Petersburg, to Asian destinations totaled 5.42 million metric tons (mt), according to vessel-tracking data provided by Arrow Shipbroking Group.

This compared with 4.1 million mt shipped in 2018.

Ust-Luga loaded 1.8 million mt for export to Israel, representing a 27% year on year rise, while 1.4 million mt went to India, up by 3%. The remainder was exported to Malaysia, China, Vietnam and South Korea.

The increase was partially due to bulging stocks at Amsterdam, Rotterdam and Antwerp (ARA) import terminals, which averaged 6.77 million mt in 2019, nearly 30% higher than in the previous year.

Just 460,00 tons were exported to Asian destinations in the last quarter, with only 70,000 tons recorded in November-December.

A coal analyst with a European utility said the decline could also have reflected cargoes being shipped to Asia via ARA terminals, so they were not initially recorded as having Pacific-basin destinations.

There was an overall decline in shipments from the port in the final months of the year, with total loadings to all destinations falling to around 52,000 tons per day (tpd) in December, from 63,000 tpd in November and 81,000 tpd in October.

Ust-Luga terminal exported 24 million mt of coal last year, up sharply from 2018's 19.9 million mt, due largely to port infrastructure upgrades, according to operator Rosterminalugol.

## India Has Grandiose Coal Block Auction Plans

BY AJAY K. DAS

Even as the Indian government draws up grandiose plans to auction 200 coal blocks over the next five years, 43 of the total 85 blocks allocated since 2015 have yet to be put into operation, with a total of 159 mandatory approvals still pending over the years.

Information sourced from the federal Ministry of Coal shows that

since auction was made mandatory for allocation of coal blocks and 85 assets handed over to various government and private operators, the latter has "not taken any necessary action."

In the case of eight blocks, operators have not even completed a mining plan, while in the case of 27 blocks, environmental clearances were still pending. Approval of mining leases were pending in the case of 28 blocks, including 17 blocks, according to the ministry, operators were yet to "take necessary action." Clearance of land acquisition were pending in the case of 39 blocks since their allocations in 2015.

The slow progress of operationalization of already allocated coal assets is in stark contrast to the Ministry of Coal's plans to auction another 200 coal blocks over the next five years, expecting to yield an incremental domestic coal production of 400 million tons, at peak capacity for each project.

The ministry reckons that with an additional 400 million tons of domestic production and state-miner, Coal India Ltd. (CIL) achieving its targeted production of 660 million tons over the next fiscal year, coal imports into the country would drop to nil over the next five years.

Having effectively scrapped the nationalization of the coal mining industry and opening up coal mining and production to private miners without any end-use restrictions and permitting 100% foreign direct investments (FDI), the ministry expects to complete auction of 40 of the 200 identified coal blocks before the end of the current fiscal year on March 31. This would yield an incremental 50 million tons per year to domestic coal production.

"Holding auctions and allocation of coal blocks is only half the job. The challenge is to get mining project op-



erational within shortest possible gestation period,” a ministry official said.

“Now that commercial coal mining will start and private miners will be allocated assets on revenue sharing contracts, the ministry is exploring options of incorporating fiscal incentives to bidders who commit

fastest project completion and commencement of production. Unless auctions are backed by quick production, goals of achieving nil coal imports will continue to be elusive.”

Government data shows that India’s coal import bill per year crossed the \$20 billion mark the last fiscal year.

According to industry estimates, Indian coal imports during April-November 2019, was recorded at 161 million tons, up 4% over the corresponding period of the previous year and forecast to close on March 31, 2020, with inward shipment of 235 million tons.

— *Worldwide News Continued on Page 14* —

## GENERAL RICHARD LAWSON OBITUARY

Former president and CEO of the National Mining Association (NMA), **Gen. Richard Lawson**, 90, passed away on January 20, 2020. Prior to serving as the president of the NMA, he was the president of the National Coal Association for eight years. He was the president of the NCA when it merged with the American Mining Congress to form the NMA. He also served as chairman of Energy, Environment and Security Group Ltd. and vice chairman of the Atlantic Council of the U.S., chairman of the Energy Policy Committee of the U.S. Energy Association; chairman of the United States delegation to the World Mining Congress; and chairman of the International Committee for Coal Research.

Before joining the NCA, he had a distinguished military career, retiring from the U.S. Air Force in 1986 as a four-star general and deputy commander-in-chief of the U.S. European Command in Stuttgart, Germany.

Lawson was born in Fairfield, Iowa, in 1929. He attended the University of Iowa and graduated from Parsons College in 1951 with a bachelor of science degree. He graduated from the Air Command and Staff College at Maxwell Air Force Base in 1964 and concurrently earned a master of public administration degree from The George Washington University. He completed the National War College at Fort Lesley J. McNair in 1969, and received an honorary doctorate of laws degree from Centenary College, Shreveport, Louisiana, in 1980.

While at Parsons College, he enlisted in the Iowa Army National Guard and was called to active duty as the 133rd Infantry Regiment’s sergeant major at Fort Riley, Kansas. He was commissioned a second lieutenant in November 1951 and assigned as adjutant for the 133rd Aircraft Control and Warning Squadron, Alexandria, Louisiana. In May 1952, he entered pilot training at Columbus Air Force Base, Mississippi, and completed training at Reese Air Force Base, Texas, in July 1953. He was then assigned to the 69th Bombardment Squadron at Loring Air Force Base, Maine, as a B-36 co-pilot and aide-de-camp to Brigadier General Bertram C. Harrison. He accompanied General Harrison to the 72nd Bombardment Wing, Ramey Air Force Base, Puerto Rico, in July 1955. He continued to serve as aide to General Harrison and also Brigadier General H.R. Sullivan. However, his primary duty was as chief, Operations Control Division, 72nd Bombardment Wing.

He returned to the United States in June 1958 and was assigned to staff officer positions in the 5th Bombardment Wing at Travis Air Force Base, California. The general transferred to Headquarters Strategic Air Command at Offutt Air Force Base in September 1961 and served as a member of the European Force Application Team, Joint

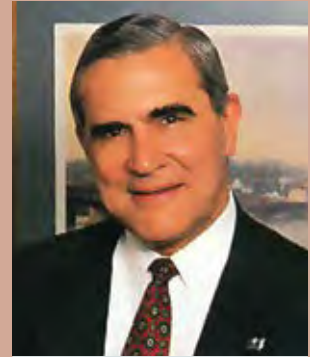
Strategic Target Planning staff. In September 1963, he entered the Air Command and Staff College. Upon graduation, he returned to SAC headquarters and was assigned as an operations planner in the Concepts Division, Operations Plans Directorate. He became chief of the Future Concepts Branch in February 1967 and entered the National War College in July 1968.

From June 1969 to February 1970, he served at McCoy Air Force Base as deputy commander for operations, 306th Bombardment Wing. He took command of the 28th Bombardment Wing, then deployed to the Western Pacific from Ellsworth Air Force Base. He returned to Ellsworth in March 1970.

He was assigned, in July 1971, to the U.S. Air Force, Washington, D.C., in the Directorate of Operations, Office of the Deputy Chief of Staff, Plans and Operations, with duty as chief, Strategic Division. In July 1972, he was named deputy director for strategic operational forces. In February 1973, he became deputy director of operations. Appointed military assistant to the president in August 1973, he served at the White House until March 1975 when he returned to Air Force headquarters as director of plans, and remained there until June 1977. He was then assigned as commander, 8th Air Force at Barksdale Air Force Base. In July 1978, he was named director for plans and policy, J-5, Organization of the Joint Chiefs of Staff. He was assigned as the U.S. representative to the Military Committee of the North Atlantic Treaty Organization, Brussels, Belgium, in July 1980 and moved to Mons, Belgium, in July 1981 as chief of staff, Supreme Headquarters Allied Powers Europe.

His military decorations and awards include the Defense Distinguished Service Medal, Air Force Distinguished Service Medal with oak leaf cluster, Legion of Merit with oak leaf cluster, Soldier’s Medal, Bronze Star Medal, Air Medal with oak leaf cluster, Joint Service Commendation Medal, Air Force Commendation Medal with three oak leaf clusters, Army Commendation Medal, Presidential Unit Citation Emblem with oak leaf cluster and Air Force Outstanding Unit Award Ribbon with two oak leaf clusters.

He passed away following his 70th wedding anniversary in August to his wife, Joan. Services, burial and reception will be held at Arlington Cemetery within the year.



Gen. Richard Lawson

## BlackRock Takes Tough Stance on Coal Investments

The world's largest fund manager, BlackRock said it will make sustainability as its "new standard for investing."

In his letter to chief executives, Chief Executive Officer Larry Fink said the investment risks presented by climate change are set to accelerate a significant reallocation of capital.

"Our investment conviction is that sustainability-integrated portfolios can provide better risk-adjusted returns to investors," Fink said. "And with the impact of sustainability on investment returns increasing, we believe that sustainable investment will be a critical foundation for client portfolios going forward."

The BlackRock Executive Committee said it did not believe "long-term economic or Investment rationale justifies continued investment" in the thermal coal sector.

The company is in the process of removing public securities of companies that generate more than 25% of their revenues from thermal coal production from their investment portfolios. They plan to accomplish this by the middle of 2020.

Also, BlackRock's alternatives business will not make any future direct investments in companies that generate more than 25% of their revenues from thermal coal production.

In the letter, Fink said the company does not see itself as a passive observer in the low-carbon transition. "We believe we have a significant responsibility — as a provider of index funds, as a fiduciary, and as a member of society — to play a constructive role in the transition," he said.

Moody Vice President-Senior Credit Officer and U.S. Coal Industry Analyst Benjamin Nelson commented on the potential credit implications for the coal industry of

increased investor focus on sustainability. "We see an emerging credit issue for the coal industry regarding access to capital," he said. "While an increasing number of banks and investment firms have signaled an intent to move away from coal over the past few years, a drop in coal prices is compressing cash flow generation and debt trading prices are meaningfully weaker today. We expect these developments will push coal companies to express more financial conservatism in 2020."

## Tolk Generating Station Will Close by 2032

Xcel Energy intends to shutter the 1,067-megawatt (MW) Tolk coal-fired generating station, which provides power to Texas and New Mexico, by December 31, 2032, according to an uncontested comprehensive stipulation endorsed by Southwestern Public Service (SPS), and filed with the

### PEOPLE IN THE NEWS



Hal Quinn

*Hal Quinn* was honored by the **Washington Coal Club** with a lifetime achievement award for his longstanding dedication to the industry and many successes working on behalf of the coal industry. Quinn served as president and chief executive officer of the National Mining Association (NMA) for 11 years and another 23 years

in various leadership roles within NMA and its predecessor organizations. In April 2019, Quinn announced his intention to retire at the end of 2019.



Rick Lanoha

**Kiewit Corp.** announced that *Rick Lanoha*, president and COO, will assume the role of president and CEO. He will succeed *Bruce Grewcock*, who will remain as chairman of the board of directors, a role he has held since 2013.

**Motion Industries Inc.** named *Chris Pacer* to vice president of the company's central group. Pacer has more than 24 years of experience within the industry. He has spent the last 22 years with Motion Industries. Pacer joined Motion Industries as a certified fluid power specialist, working his way up to branch manager and lastly as Detroit Division vice president and general manager in 2014.



Mark Spurbeck

**Peabody** named *Mark Spurbeck* as interim CFO replacing *Amy Schwetz*, who will be taking the CFO position at a leading NYSE-listed industrial company. Spurbeck has more than 20 years of accounting and financial experience, most recently serving as chief accounting officer, overseeing Peabody's finance, treasury, tax, internal audit, financial reporting and corporate accounting functions. Prior to joining Peabody in early 2018, he was vice president of finance and chief accounting officer at Coeur Mining Inc., a Chicago-based silver mining company.



Chris Pacer

**Alliance Resource Partners** announced that *Kirk Tholen* has joined the executive team as senior vice president and chief strategic officer. He will also serve as president of ARLP's oil and gas minerals segment. Most recently, Tholen served as a managing director within the oil and gas group and head of the acquisitions and divestitures practice for Houlihan Lokey in Houston.



Ann Fandozzi

**Ritchie Bros. Auctioneers** announced that *Ann Fandozzi* will become CEO and join the board of directors. Most recently, Fandozzi was CEO of ABRA Auto Body and Glass.



New Mexico Public Regulation Commission (NMPRC).

On July 1, in accordance with the Public Utility Act, SPS filed its application with the commission to authorize SPS to modify the service life of Tolk.

Tolk's depreciation rates are to be calculated based on a remaining useful life through December 31, 2037.

SPS will submit a robust analysis of Tolk abandonment and potential means of replacement by June 2021, which will include a review by an independent evaluator and be incorporated in SPS's 2021 integrated resource plan application. The Tolk analysis will include, without limitation, replacement resources priced based on an RFP or RFI process, and the value of reselling the water rights.

In the IRP public input process and prior to filing the IRP, SPS will hold two technical conferences located in Santa Fe or Albuquerque, New Mexico.

SPS will run at least one scenario where all coal-burning units are retired or replaced by 2030.

### **B&W Renew Maintenance Contract for San Juan Plant**

Babcock & Wilcox Enterprises Inc. announced that its subsidiary, Babcock & Wilcox Construction Co. LLC (B&W), has received a contract renewal valued at more than \$4 million to provide maintenance services for Public Service Company of New Mexico's (PNM) San Juan Generating Station in 2020.

BWCC will continue to provide a variety of services at the power plant next year, including general plant maintenance, coal pulverizer equipment maintenance and outage support, as it did in 2019.

### **Duke Reaches Agreement on Ash Basins in North Carolina**

In North Carolina, state regulators, community groups and Duke Energy have agreed to a plan to permanently close the company's remaining nine coal ash basins in the state, primar-

ily by excavation with ash moved to lined landfills.

The agreement announced by Duke Energy, North Carolina's Department of Environmental Quality (NCDEQ) and groups represented by the Southern Environmental Law Center (SELC) details a reasonable and prudent plan for basin closure. This plan is consistent with the approach Duke Energy is taking to close ash basins in South Carolina.

"This agreement significantly reduces the cost to close our coal ash basins in the Carolinas for our customers, while delivering the same environmental benefits as full excavation," said Stephen De May, North Carolina president, Duke Energy. "We are fully focused on these important activities and building a clean energy future for the Carolinas."

Under the agreement, seven of the basins will be excavated, with ash moved to lined landfills, including two at the Allen Steam Station (Belmont), one at Belews Creek Steam Station (Belews Creek), one at Mayo Plant (Roxboro), one basin at the Roxboro Plant (Semora) and two at the Cliffside/Rogers Energy Complex (Mooreboro).

At the Marshall Steam Station and the Roxboro Plant, uncapped basin ash will be excavated and moved to lined landfills. At both locations, sections of the basins were filled with ash in the past. To make use of that space, state permitted facilities, including existing lined landfills, were built on top of those portions of the ash basins. Because the ash underneath is already covered, that material will not be disturbed and will be monitored and safely closed under other state regulations.

Under the plan, almost 80 million tons of ash will be excavated from the remaining sites. The company is already removing ash from basins at other facilities, bringing the total amount of material to be excavated in North Carolina to approximately 124 million tons.

The agreement calls for expedited state permit approvals, which would

keep projects on a rapid timeline with excavation at the six sites completed in 10 to 15 years.

This plan will reduce the total estimated cost to close the nine basins by about \$1.5 billion, as compared to the April 1 NCDEQ order requiring full excavation. As a result, the estimated total undiscounted cost to permanently close all ash basins in the Carolinas is now approximately \$8 billion to \$9 billion, of which approximately \$2.4 billion has been spent through 2019. Most of the remaining expenditures are expected to occur over the next 15-20 years, according to the company.

At Roxboro and Marshall, Duke Energy said it will install specialized wells and other technology at specific locations to ensure that groundwater conditions improve and comply with standards by 2029, assuming plans are expeditiously approved by the state.

As previously announced, Duke Energy is closing all of its coal ash basins, including 31 in North Carolina.

Material from 12 basins at Buck Steam Station, HF Lee Plant and Cape Fear Plant will be reprocessed and recycled into useful construction material. Parties agree to explore opportunities to maximize recycling at those sites by extending closure deadlines to 2035.

The agreement completely resolves the pending disputes over ash basin closure plans being debated by the parties in various courts, including cases before the North Carolina Office of Administrative Hearings, North Carolina Superior Court and United States District Court for the Middle District of North Carolina. The parties will make the necessary court filings to dismiss each case.

### **IPL Issues All-source RFP to Meet Future Electric Needs**

Indianapolis Power & Light Co. (IPL) announced that Sargent & Lundy will act on IPL's behalf to facilitate an all-source request for proposals (RFP) to meet future electric needs. The RFP was issued on December 20, and



## DATELINE WASHINGTON

## FOR GLOBAL ENERGY LEADERSHIP, THINK COAL FIRST

BY CONOR BERNSTEIN



What does the coal plant of the future look like?

For too many people, the answer is that we don't need new coal technology nor a new generation of plants.

That line of thinking is a huge mistake.

Too many self-described energy and climate experts seem blissfully unaware of global energy trends and global energy use. Many policymakers, including what would appear to be the entire field of Democratic presidential candidates, think that U.S. energy and climate leadership will be established by phasing out coal, as if that's at all a replicable or useful approach in energy hungry, developing nations. If these candidates and their advisors don't know that global coal consumption continues to grow, and that coal remains the world's leading fuel for electricity generation, it's well past time they find out.

The world needs new, more efficient, more flexible and lower emission coal technology. And the U.S., with the world's largest coal reserves and an unmatched capacity for innovation, should take the reins in delivering it. Fortunately, the U.S. Department of Energy (DOE) is leading the charge.

DOE's Coal FIRST (Flexible, Innovative, Resilient, Small and Transformative) program is setting goals on how the coal fleet of the future needs to perform and what it should look like. Coal FIRST is aiming to develop and deploy a new type of coal plant that will better compliment the energy mix of the future. DOE is aiming for smaller, more flexible units that can complement the peaks and valleys that come with intermittent renewables. Today's existing coal fleet, while essential to providing affordable, reliable power, was designed to run continuously for optimal efficiency, not to accommodate swings in solar and wind generation.

The plants Coal FIRST envisions will be extremely efficient, small but capable of stacking to meet increased demand, have near-zero emissions, with minimized water consumption, and will be far more agile than anything currently available. If that kind of innovative plant seems too good to be true, think again.

Coal FIRST is just the kind of innovative, advanced energy technology both the U.S. and world need. While these super-efficient, flexible and clean plants are needed to ensure our own electricity mix remains balanced and to provide the fuel security and resilience that underpins our grid reliability, the market for this technology overseas is potentially enormous. It's a market the U.S. should capture.

Hundreds of new coal plants are planned or already under construction around the world. Asia already consumes nearly three-quarters of the world's annual coal production. Coal is the fuel driving industrialization and lifting tens-of-millions out of poverty. Affordable, abundant and secure, it's going to remain the fuel of choice in many nations well into the future.

Not so long ago, coal and advanced coal technology were a place of bipartisan agreement. Then presidential candidate Barack Obama told a campaign rally in 2008. He said, "This is America. We figured out how to put a man on the moon in 10 years. You can't tell me we can't figure out how to burn coal that we mine right here in the United States of America and make it work."

That's a message many so-called experts, policymakers and current presidential candidates desperately need to hear.

*Conor Bernstein is a spokesperson for the National Mining Association, the industry's trade group based in Washington, D.C.*

considers all potential options for replacement generation capacity.

The need for 200 megawatts of firm capacity resources follows IPL's recent announcement to retire two coal-fired units at Petersburg Generating Station in 2021 and 2023, respectively. At a public advisory meeting held December 9, IPL leaders presented the company's preferred portfolio and demonstrated how IPL plans to continue to diversify its generation mix, with the expected integration of additional renewable resources, while continuing to deliver electricity at reliable, cost-effective rates.

IPL submitted its 2019 integrated resource plan to the Indiana Utility Regulatory Commission (IURC) on December 16. The projected capacity shortfall, modeling assumptions and key drivers are outlined in IPL's IRP, which is a 20-year projection submitted to the IURC every three years.

The purpose of the all-source RFP is to competitively procure replacement capacity by June 1, 2023, which is the first time period IPL is expected to have a capacity shortfall.

### Hallador Energy Will Idle Carlisle Mine

Sunrise Coal LLC will temporarily idle production at its Carlisle Mine in Sullivan County, Indiana, which will result in a reduction of 90 full-time employees, according to its parent company, Hallador Energy Co.

"Unfortunately, weak market conditions have resulted in an over-supply of domestic coal, which necessitates that we reduce our production," Chief Financial Officer of Hallador Energy Larry D. Martin, said. "The employees who are affected by this action are a part of the Sunrise family, and we regret the impact this will have on their families and the community."

Hallador will be shifting production to its lower cost operations at Oaktown, Indiana, and reducing its sales guidance to 7 million tons for 2020, according to the company.



## DEVELOPMENTS TO WATCH

### CONSOL ENERGY INVESTS IN CFOAM

CONSOL Energy recently acquired a 25% stake in CFOAM Corp. for \$3.5 million. The company also provided a \$1.1 million term loan to CFOAM LLC for working capital and invested another \$400,000 to acquire a first lien note, bringing the total value of the transaction to \$5 million.

CFOAM is a newly formed U.S.-based holding company whose subsidiary, CFOAM LLC, has manufacturing facilities in Triadelphia, West Virginia. CFOAM Ltd., listed on the Australian Stock Exchange, owns the remaining 75% of CFOAM Corp.

CFOAM LLC manufactures inorganic carbon material from coal, pitch or lignin feedstock. They have a rigid foam structure, similar in appearance to pumice stone, but with entirely different properties, which are currently used across a wide variety of markets, including composite tooling for the aerospace sector, energy absorbing applications and defense applications, according to the company. Additional markets such as automotive applications for energy absorption and fire resistance are also expected to become significant to the CFOAM over time.

"This is our first major step in the coal-to-products area, which leverages certain attractive properties of coal, but with significantly lower emissions and greater value uplift potential than conventional combustion applications," President and CEO of CONSOL Energy Jimmy Brock said. "These products not only provide a high-margin revenue stream, but also provide an intriguing new opportunity to utilize the vast resource base that our country is endowed with."

He added that the total addressable market for CFOAM's products is more than \$15 billion annually.

"We are very excited to partner with CONSOL Energy," President and CEO of CFOAM Flemming Bjoernslev said. "This investment and collaboration will offer the technical support and business acumen CONSOL Energy has demonstrated for decades and will enable CFOAM to advance as a reliable partner in the material science industry."

CONSOL Energy said it is pursuing alternative uses of coal in three different areas. The company is partnering on a Department of Energy-funded project with Ohio University and other industry partners to develop coal plastic composites that are geared toward the engineered composite decking and other building products markets.

In addition, CONSOL has partnered with OMNIS Bailey LLC to develop a refinery that will convert waste coal slurry into two products: a high-quality carbon product that can be used as fuel or as a feedstock for other higher-value applications, and a mineral matter product that has potential to be used as a soil amendment in agricultural applications.

### West Virginia Governor, Ramaco Carbon Plan New Research Facility to Advance Coal-to-carbon Products

In his State of the State Address, Gov. Jim Justice announced an agreement with Wyoming-based carbon technology company Ramaco Carbon to open a new research facility in West Virginia to pursue research related to the use of coal as the precursor for advanced carbon products and materials.

"I am excited beyond belief to welcome Ramaco Carbon's next incredible research facility to our great state," Gov. Justice said. "It's a complete game-changer for us and, really, the entire country."

This will be the second such coal research facility that Ramaco Carbon currently has under development, which are called iCAM centers (Carbon Advanced Materials). It will be located in Charleston. The first research center, located in Sheridan, Wyoming, is under construction and is scheduled to open this summer.

In recent years, Ramaco Carbon has also built a national network of research support at universities, scientific institutes, the Department of Energy's National Labs and other government organizations. One of the company's mantras is, "Coal is too valuable to burn."

The U.S. Department of Energy (DOE) announced last September that Ramaco was the recipient or a sub-recipient of more than \$5 million in new federal grants to support these efforts.

"We are excited about the transformative potential of these projects," said Steven Winberg, DOE assistant secretary for fossil energy. "Advancing this coal R&D is paving the way for future technology innovation and integration."

"The research that we will conduct in West Virginia has potentially far-reaching national economic and strategic implications," Ramaco Carbon Chairman and CEO Randall Atkins said. "We are deeply appreciative of the governor's vote of confidence in our contributions to these research efforts and we look forward to further cementing the Ramaco 'family' of coal interests in West Virginia."

### DOE Will Award \$6.3M for University Training, Research for Fossil Energy Applications

The U.S. Department of Energy's Office of Fossil Energy (FE) announced approximately \$6.3 million in federal funding for research and development projects under the funding opportunity announcement (FOA), University Training and Research for Fossil Energy Applications.

This FOA will encompass two separate university programs, each with its own requirements and restricted eligibility. The two programs are the University Coal Research Program and the Historically Black Colleges and Universities and Minority Serving Institutions (HBCU/MSI) Program.

Projects under this FOA will support early-stage, fundamental research that advances the science of coal technologies, while also helping to train the next generation of energy researchers, scientists, and engineers at U.S. colleges and universities. The HBCU/MSI program aims to increase the participation of underrepresented students in such research.

This FOA will focus on four areas of interest (AOI) as follows: AOI 1, Quantum for Energy Systems and Technologies; AOI 2, Novel Sensors and Controls for Flexible Generation; AOI 3, Machine Learning for Computational Fluid Dynamics; and AOI 4, Fast, Efficient, and Reliable Fossil Power with Integrated Energy Storage.

The FE funds research and development projects to reduce the risk and cost of advanced fossil energy technologies and further the sustainable use of the nation's fossil resources.

## Worldwide News Continued from Page 9

**New Signplates of JSW's Mines**

On January 1, JSW's new mine acquired a different name. The mine Bzie-Dębina under development became "Jastrzębie-Bzie." This means that the combined mine "Borynia-Zofiówka-Jastrzębie" will be transformed into a two-section colliery with its name shortened to "Borynia-Zofiówka."

The management board of Jastrzębska Spółka Węglowa SA has made a decision to change the organizational structure of its two mines. The Jastrzębie Section has been spun off from KWK Borynia-Zofiówka-Jastrzębie and subordinated to KWK Bzie-Dębina under development, with the name of the new mine changed accordingly. The name changes of both mines are of a technical and organizational nature. All tasks pursued by the mines will be in compliance with the Technical and Economic Plan adopted for 2020 and with the JSW SA Strategy for 2020-2030.

The new mine consists of the John Paul shaft and buildings, including the winding engine and the temporary administrative building. Estimated reserves of type-35 coking coal in the area of the Jastrzębie-Bzie mine are 180 million tons.

The company said the launch of the new mine will significantly improve the production capacity of Jas-

trzębska Spółka Węglowa, enabling the company to set the target output at approximately 2 million tons of coking coal per year. The first longwall is scheduled to be put into operation by the end of 2022. Jastrzębska Spółka Węglowa will invest PLN 3 billion in the construction of the mine.

**Vinacomin Will Sell 49 Million MT of Coal in 2020**

The Vietnam National Coal-Mineral Industries Holding Corp. Ltd. (Vinacomin) has set to sell 49 million metric tons (mt) of coal in 2020, a year-on-year surge of 10%, according to Vinacomin Deputy Director General Nguyen Hoang Trung.

He said the corporation expects to gain 138 trillion VND (5.95 billion USD) in total revenue, compared to the 131.5 trillion VND recorded in 2019.

This year, the company will produce the same as last year, and import around 10.2 million mt. As a result, coal production last year totaled 40.5 million mt, while coal sales reached 44 million mt.

**CIL Will Raise Fuel Stock at Power Plants to 22 Days**

Coal India is hoping to increase fuel stocks at power plants to 22 days, which requires 36 million metric tons (mt) to be stored at generating sta-

tions, a company executive said.

The company has managed to raise average daily production from 1.27 million metric tons (mt) in October to 1.8 million mt now. This increased stocks at power plants by 64% since October to 28 million mt, enough for 17 days. It is almost double last year's stock position, which stood at 14 million mt, barely usable for nine days.

"We hope to touch Central Electricity Authority's (CEA) mandated 22 day's stocks at power plants by January as production at Coal India is on the rise. Stocks at power plants will have to be increased by five days to touch the CEA's number. It would require a build-up of additional 8 mt of stock at the plants," a Coal India executive said. "At present, stocks at mine-mouth in CIL is around 22 mt, more than enough for increasing stocks to the necessary level. Combined stock at CIL and power plants stands at around 50 mt this week."

According to the executive, a 28% month-on-month increase in Coal India's October production and a 27% rise in month-on-month November production has enabled the company to increase stocks at power plants.

In an effort to make sure the sector can lift adequate coal, the company has recently decided to offer limited credit facilities by doing away with the advance payment norm.

**CALENDAR OF EVENTS**

**February 17-19, 2020:** *Coaltrans India 2020*, Goa, India. Contact: Web: [coaltrans.com/Events](http://coaltrans.com/Events).

**February 23-26, 2020:** *The annual Society for Mining, Metallurgy and Exploration (SME) conference and exhibition*, Phoenix, Arizona. Contact: Web: [www.smenet.org](http://www.smenet.org).

**March 3-5, 2020:** *American Coal Council 2020 Spring Forum*, Fort Lauderdale, Florida. Contact: Web: [americancoalcouncil.org](http://americancoalcouncil.org).

**March 17-20, 2020:** *Coaltrans School of Coal Singapore 2020*, Singapore. Contact: Web: [coaltrans.com/Events](http://coaltrans.com/Events).

**March 24-25, 2020:** *Coaltrans MENA*, Cairo, Egypt. Contact: Web: [www.coaltrans.com/Events](http://www.coaltrans.com/Events).

**April 20-22, 2020:** *CoalProTec*, Lexington, Kentucky. Contact: Web: [www.coalprepsociety.org](http://www.coalprepsociety.org).

**April 20-22, 2020:** *Coaltrans China*, Shanghai, China. Contact: Web: [www.coaltrans.com/Events](http://www.coaltrans.com/Events).

**June 9-10, 2020:** *Coaltrans Poland*, Krakow, Poland. Contact: Web: [www.coaltrans.com/Events](http://www.coaltrans.com/Events).

**June 21-23, 2020:** *Coaltrans Asia*, Bali, Indonesia. Contact: Web: [www.coaltrans.com/Events](http://www.coaltrans.com/Events).

**September 7-11, 2020:** *Coaltrans School of Coal Oxford*, Oxford, U.K. Contact: Web: [www.coaltrans.com/Events](http://www.coaltrans.com/Events).

**September 28-30, 2020:** *MINExpo INTERNATIONAL*, Las Vegas, Nevada. Contact: Web: [www.minexpo.com](http://www.minexpo.com).

**March 14-21, 2021:** *Haulage & Loading 2021*, Hilton El Conquistador Resort, Tucson. Contact: Web: [www.haulageandloading.com](http://www.haulageandloading.com).

**May 4-6, 2021:** *Longwall USA*, David L. Lawrence Convention Center, Pittsburgh, Pennsylvania. Contact: Web: [www.longwallusa.com](http://www.longwallusa.com).





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# LONGWALLS LEAD THE WAY UNDERGROUND

*US coal operators turn to technology to improve productivity*

BY STEVE FISCOR, EDITOR-IN-CHIEF



Longwall operators take a break from mining Pittsburgh No. 8 seam coal in southwest Pennsylvania. (Photo: CONSOL Energy)

Overall U.S. longwall production shrunk in 2019. Collectively, this group of 34 underground coal operations produced more than 162.7 million tons, which was about 5.9 million (3.5%) less than last year. In a year where the U.S. saw total coal production drop by 50 million tons (6.6%), this was an expected outcome.

The total number of faces dropped from 40 to 39 and the total number of longwall mines dropped from 35 to 34. Those figures include two trona mines in Wyoming and five mines that operated two longwall faces. One longwall face in West Virginia was removed, Arch Coal's Mountain Laurel mine, which completed longwall mining operations last fall.

The top three longwall operations produced more than 10 million tons per year (tpy) from two longwall faces. Last year, 13 longwall installations produced at a capacity of 5 million tpy or more, compared to 14 in 2018 (See Table 2).

Two new names appear this year: Murray Metallurgical and Genesis Alkali LLC. Murray Energy Corp. purchased the Oak Grove mine in Alabama along with other assets that produce met coal and placed them under Murray Metallurgical. Genesis Energy L.P. acquired Tronox Ltd. and formed Genesis Alkali LLC for the Westvaco mine.

In its third quarter 2019 earnings report, Peabody Energy said it planned to operate two longwall kits at its Shoal Creek mine briefly, taking advantage of an opportunity as the mine transitions to a new district. Shoal Creek's fourth quarter production was expected to improve as a result. Peabody said it was also progressing with activities to upgrade the mine's conveyor system to improve long-term reliability.

Arch Coal reported that its Mountain Laurel was expected to complete longwall mining near the end of 2019 and to transition to a continuous miner operation thereafter. The company's Leer mine, according to the company's Q3 2019 earnings statement, was doing well. "During the quarter, the Leer mine continued its outstanding operating performance, achieving cash costs below \$45 per ton," said Paul Lang, presi-

**Table 1—Longwall Installations by Parent Company (2019-2020)**

Company	Ala.	Colo.	Ill.	Mont.	N.M.	Ohio	Pa.	Utah	Va.	W.Va.	Wyo.	Total
Alliance Resource Partners			1							2		3
American Energy (MEC)						1						1
Arch Coal		1								1		2
Blue Mountain Energy		1										1
CONSOL Energy							5					5
Cuntura Energy							1					1
Coronado Coal									1			1
Foresight Energy (MEC)			4									4
Murray Metallurgical	1											1
Murray American Energy (MEC)										6		6
Pacific Minerals											1	1
Panther Creek Mining										1		1
Peabody Energy	1	1										2
Signal Peak Energy				1								1
Solvay Chemicals											1	1
Genesis Alkali											1	1
UtahAmerican Energy (MEC)								1				1
Warrior Met Coal	3											3
Westmoreland Coal					1							1
Wolverine Fuels								2				2
<b>Total</b>	<b>5</b>	<b>3</b>	<b>5</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>6</b>	<b>3</b>	<b>1</b>	<b>10</b>	<b>3</b>	<b>39</b>



dent and COO, Arch Coal. “As expected, Leer completed mining activities in the western portion of its reserve base and — at the end of the third quarter — moved the longwall into a new district where the coal seam is thicker.”

## Industry Demographics

Longwall ownership in the U.S. remained relatively unchanged. Robert E. Murray and the companies he controls (American Energy, American Coal Co., Foresight Energy, Utah American Energy and MEC) operate 13 longwall faces spread across Alabama (1), Illinois (5), Ohio (1), Utah (1) and West Virginia (6). CONSOL Energy operates three mines with five longwall faces in Pennsylvania. Alliance Resource Partners and Warrior Met Coal own three longwall faces.

With 10 faces, West Virginia remains the longwall leader, followed by Illinois (6), Pennsylvania (6) and Alabama (5).

Looking at the numbers, the average U.S. longwall mine operating in coal produced 5.09 million tpy in 2019 compared to 5.11 million tpy in 2018. On average, it has a cutting height of 96.4 in., a panel width (or face length) of 1,216 ft, and a panel length of 12,308.2 ft. Last year, those numbers were 96.7 in., a panel width (or face length) of 1,209.3 ft, and a panel length of 12,204.8 ft, respectively. A total of eight longwall faces have face lengths of 1,500 ft or greater. A total of 15 longwalls operate in the Pittsburgh No. 8 seam. The maximum overburden on average reaches 1,071.9 ft. Except for a few mines in Utah, most are developed with three entry gates. Using an 1,871.1-hp double-drum, ranging-arm shearer, they take a 40.1-in. cut. The average yield setting on the shields are 1,060.4 tons. All of the faces except for four are high voltage (4,160 volts). Contura Energy’s Cumberland mine in Pennsylvania has the longest face: 1,580 ft. Coronado’s Buchanan mine is the deepest at 2,000 ft. At 22,500 ft, Signal Peak Energy’s Bull Mountains mine in Montana has the

longest panel. The West Elk mine in Colorado operates a 2,805-hp shearer.

The Twentymile mine has installed the first panline manufactured by Tianming with a knock-off Ultratrac 2000 haulage system. Three mines, Lila Canyon in Utah, Marshall County in West Virginia and Oak Grove in Alabama use ZMJ roof supports, which are made in China.

## Technology Keeps the Face Straight

The technology on modern longwall faces continues to advance. A prime example would be the further application of the Landmark inertial naviga-

tion system (INS) on Joy shearers. “We installed this initially at the Hamilton County mine in Illinois,” said Ed Niederriter, global product director, longwall shearers for Komatsu. “It proved itself and we have now installed similar systems at the Tunnel Ridge and Leer mines in West Virginia.”

The technology was developed by CSIRO in Australia. Most of the Australian longwalls are already using it, Niederriter explained. CSIRO owns the rights to the technology and Komatsu licenses it. “We also have the software that makes the roof supports compatible,” Niederriter said.

**Table 2—Active US Longwall Mines (February 2020)**

U.S. Longwall Mines		Prod. 2019	Prod. 2018	% Change
Foresight Energy	Sugar Camp*	12,793,896	14,460,951	-11.5
CONSOL Energy	Bailey*	12,218,072	12,735,390	-4.1
Murray American Energy	Marshall County*	11,718,744	11,433,840	2.5
CONSOL Energy	Enlow Fork*	10,043,384	9,876,324	1.7
Alliance Resource Partners	Tunnel Ridge	7,330,458	6,807,214	7.7
Signal Peak Energy	Bull Mountains	7,019,129	7,566,480	-7.2
Murray American Energy	Harrison County	6,808,868	7,215,143	-5.6
Murray American Energy	Ohio County	6,600,582	6,509,414	1.4
Contura Energy	Cumberland	6,595,204	6,422,579	2.7
Murray American Energy	Marion County	5,962,845	6,133,349	-2.8
Alliance Resource Partners	Hamilton County	5,889,105	6,298,997	-6.5
Foresight Energy	Mach Mining	5,174,361	6,887,728	-24.9
CONSOL Energy	Harvey	5,023,781	4,980,569	0.9
Coronado Coal	Buchanan	4,940,159	5,188,441	-4.8
Warrior Met Coal	Blue Creek No. 7	4,921,590	5,597,175	-12.1
American Energy Corp.	Century	4,735,046	4,785,568	-1.1
Murray American Energy	Monongalia County	4,469,056	4,404,054	1.5
Wolverine Fuels	Sufco No. 1	4,373,942	4,904,476	-10.8
Arch Coal	Leer	4,274,748	3,444,773	24.1
Arch Coal	West Elk	4,079,345	4,674,833	-12.7
Wolverine Fuels	Skyline	3,916,179	3,602,708	8.7
Westmoreland Coal Co.	San Juan South	3,775,959	1,848,018	104.3
Utah American Energy	Lila Canyon	3,713,971	2,630,631	41.2
Peabody Energy	Twentymile	2,543,911	3,049,511	-16.6
Pacific Minerals	Bridger	2,193,565	2,210,433	-0.8
Alliance Resource Partners	Mountain View	2,075,291	2,280,219	-9.0
Blue Mountain Energy	Deserado	2,034,835	2,073,860	-1.9
Peabody Energy	Shoal Creek	1,868,840	2,659,074	-29.7
Warrior Met Coal	Blue Creek No. 4	1,734,964	2,137,810	-18.8
Murray Metallurgical	Oak Grove	1,364,382	1,497,321	-8.9
Panther Creek Mining	American Eagle	1,271,954	1,516,885	-16.1
Arch Coal	Mountain Laurel**	1,256,784	1,763,202	-28.7
Bluestone Resources	Pinnacle No. 50**	NA	1,016,246	NA
<b>Total U.S. Longwall Production</b>		<b>162,722,950</b>	<b>168,613,216</b>	<b>-3.5</b>

\*Each of these mines operate two longwall faces. \*\*No longer operating a longwall.

Basically, the system consists of a defense-grade gyroscope that is placed inside the shearer. It detects movement on the shearer and reports the speed and direction. As the shearer trams, the Landmark system knows precisely what path it took. "If there is any curve or lack of straightness in the panline, it tells the roof supports," Niederriter said. "We developed an algorithm that automatically straightens the face incrementally over time."

The price tag is not for the faint of heart. "It can be expensive because the

shearer and the INS are costly, and it often requires a longer shearer controller," Niederriter said. "In addition, CSIRO charges a licensing fee as they are the initial developer and hold the patents on the concept. The longwall operators that have installed the systems are happy with the results they are getting from it."

Niederriter explained that there are other unexplored applications for the unit. This is one area where the Australian longwall operators are ahead of U.S. longwall operators, but they are catching up, he said.

## It's All About the Service

One of the most important aspects of a longwall move is to minimize downtime, which decreases costs. Longwall Associates works with many mines rebuilding or installing new equipment between longwall moves. "We have been very busy," said Dennis Heninger, engineering manager, Longwall Associates. "For the past year or two, we have been focusing heavily on what's really important to our customers, such as becoming more efficient with equipment installation. Anything we can do to make the move more efficient helps keep costs under control."

Longwall Associates now does a lot of work in house that a few years ago would have been done underground during setup. "The whole process is more involved as far as customer visits to the factory, more preassembly, more efficient methods of shipment and getting more involved with the logistics that might have been handled by the mine in the past," Heninger said. "We have also been working to make the equipment more ergonomically efficient underground."

Making equipment more modular would probably best describe Longwall Associates approach. "We basically deliver a prepackaged piece underground with the hoses connected and, for all intents and purposes, it is ready to run," Heninger said.

Longwall Associates rebuilds stageloaders. In addition to rebuild services, the company is also an original equipment manufacturer (OEM) for AFCs, stageloaders, longwall crushers and tailpieces.

"The resilience of the industry to remain successful during these tough times is remarkable," Heninger said. "During that last three years, we have seen customers pull up their bootstraps, increase their efficiency, grow their production, upgrade the equipment, and increase power to eliminate downtime and improve availability." Heninger said. "That all works together with delivering equipment on time with short turnarounds. Without that innovation, the coal industry would be in a lot worse shape today."



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Mine Company (parent)	Seam	Seam height (inches)	Cutting height (inches)	Panel width (ft)	Panel length (ft)	Over-burden (ft)	No. of gate entries	Depth of cut (inches)	Shearer Total hp	Haulage system	Roof support yield (tons)	Face conveyor type (strand, motors)	Face conveyor width (mm)/ speed (fpm)	Stageloader type width, speed	Crusher	Electrical controls	Voltage to face
<b>ALABAMA (5)</b>																	
Blue Creek No. 4 Warrior Met Coal	Blue Creek/ Many Lee	45	85	1,115	4,000-13,000	1,600	4	36	Joy 7LS-ID DDR 1,813	Ultratrac 2000	Joy 1,300	JWR with CSTs 42 TIB 3x1,200	1,000/305	JWR 1,300 mm, 420 fpm	JWR	Line Power	4,160
Blue Creek No. 7 North Warrior Met Coal	Blue Creek/ Many Lee	53	69	1,060	7,000-8,000	1,600	4	36	Joy 7LS-ID DDR 1,813	Ultratrac 2000	Cat 1,243	Joy 42 TIB 3x1,000	1,000/305	JWR 1,300 mm, 420 fpm	JWR	Line Power	4,160
Blue Creek No. 7 East Warrior Met Coal	Blue Creek/ Many Lee	53	80	1,040	4,000-13,000	1,600	4	36	Joy 7LS-ID DDR 1,813	Ultratrac 2000	Joy 1,300	Joy 42 TIB 3x1,200	1,000/305	JWR 1,300 mm, 420 fpm	JWR	Line Power	4,160
Oak Grove	Blue Creek	50-	74	1,088	12,300	785	4	36	Joy 7LS-ID DDR 1,813	Ultratrac 2000	ZMJ NA	Longwall Associates 42 TIB 3x1,000	1,000/384	Joy 1,300 mm, 420 fpm	Longwall Associates	Line Power	4,160
Murray Metallurgical	Blue Creek	55	84-	1,000	11,000	1,150	3	42	Joy 7LS5 DDR 2,091	Ultratrac 2000	Joy 955	Cat 48 TIB 3x1,000	1,342/320	Caterpillar 1,424 mm, 385 fpm	Cat	Service Machine	4,160
Shoal Creek	Mary Lee/ Blue Creek	132	132	1,000	11,000	1,150	3	42	Joy 7LS5 DDR 2,091	Ultratrac 2000	Joy 955	Cat 48 TIB 3x1,000	1,342/320	Caterpillar 1,424 mm, 385 fpm	Cat	Service Machine	4,160
Peabody Energy	Blue Creek	132	132	1,000	11,000	1,150	3	42	Joy 7LS5 DDR 2,091	Ultratrac 2000	Joy 955	Cat 48 TIB 3x1,000	1,342/320	Caterpillar 1,424 mm, 385 fpm	Cat	Service Machine	4,160
<b>COLORADO (3)</b>																	
Deserado	B	84-168	132	800	14,000	400-900	3	30	Joy 7LS2 DDR 1,371	Super GearRack	Joy 910	Longwall Associates 38 TIB 2x900	860/450	Joy 1,220 mm, 410 fpm	Joy	Service Machine	2,300
Blue Mountain Energy	B	168	132	800	14,000	400-900	3	30	Joy 7LS2 DDR 1,371	Super GearRack	Joy 910	Longwall Associates 38 TIB 2x900	860/450	Joy 1,220 mm, 410 fpm	Joy	Service Machine	2,300
Twentynile	Wadge	108	108	1,000	12,000-15,000	1,400-1,650	3	39.4	Joy 7LS5 DDR 2,360	Ultratrac 2000	Cat 1,327	Tianming 48 TIB 3x1,900	1,188/371	Caterpillar 1,588 mm, 520 fpm	Cat	Service Machine	4,160
Peabody Energy	Wadge	108	108	1,000	12,000-15,000	1,400-1,650	3	39.4	Joy 7LS5 DDR 2,360	Ultratrac 2000	Cat 1,327	Tianming 48 TIB 3x1,900	1,188/371	Caterpillar 1,588 mm, 520 fpm	Cat	Service Machine	4,160
West Elk Arch Coal	E	84-216	156	1,080	10,250-16,000	600-1,200	3	42	Cat EL3000 DDR 2,805	Jumbotrac	Cat 1,271	Cat 48 TIB 3x1,650	1,188/371	Caterpillar 1,388 mm, 464 fpm	Cat	Service Machine	4,160
<b>ILLINOIS (5)</b>																	
Deer Run (Idle)	Herrin No. 6	96	96	1,400	15,000	600	3	42	Joy 7LS5 DDR 2,360	Jumbotrac 2000	Cat 1,200	Cat 52 TIB 3x1,900	1,000/371	Caterpillar 1,388 mm, VFD	Cat	Intermountain Electrical	4,160
Foresight Energy	Herrin No. 6	68	84	1,400	18,000	400	3	42	Joy 7LS2A DDR 2,054	Ultratrac 2000	Cat 1,200	Cat 48 TIB 3x2,200	1,000/383	Caterpillar 1,376 mm, VFD	Cat	Intermountain Electrical/SMC	4,160
Mach No. 1	Herrin No. 6	72	86	1,400	19,000	900	3	42	Joy 7LS2A DDR 2,054	Ultratrac 2000	Cat 1,200	Cat 48 TIB 3x2,200	1,000/383	Cat/AEMI 1,376 mm, VFD	Cat	Intermountain Electrical/SMC	4,160
Sugar Camp M-Class Foresight Energy	Herrin No. 6	72	86	1,400	19,000	900	3	42	Joy 7LS2A DDR 2,054	Ultratrac 2000	Cat 1,200	Cat 48 TIB 3x2,200	1,000/383	Cat/AEMI 1,376 mm, VFD	Cat	Intermountain Electrical/SMC	4,160
Sugar Camp Viking Foresight Energy	Herrin No. 6	72	86	1,400	19,000	900	3	42	Joy 7LS2A DDR 2,054	Ultratrac 2000	Cat 1,200	Cat 48 TIB 3x2,200	1,000/383	Cat/AEMI 1,376 mm, VFD	Cat	Intermountain Electrical/SMC	4,160
Hamilton County Coal No. 1 Alliance Resource Partners	Herrin No. 6	76	84	1,400	14,500	1,000	3	42	Joy 7LS1D DDR 1,840	Ultratrac 2,000	Joy 1,320	Joy 50 TIB 3x1,650	1,000/370	Joy 1,350 mm, 480 fpm	Joy	Service Machine	4,160
<b>MONTANA (1)</b>																	
Bull Mountains Signal Peak Energy	Mammoth	102-204	156	1,250	22,500	200-850	3	42	Joy 7LS5 DDR 2,360	Super GearRack	Joy 1,130	Longwall Associates 48 TIB 3x1,650	1,088/376	Caterpillar 1,388 mm, 464 fpm	Cat	Intermountain Electrical	4,160





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Mine Company (parent)	Seam	Seam height (inches)	Cutting height (inches)	Panel width (ft)	Panel length (ft)	Over-burden (ft)	No. of gate entries	Depth of cut (inches)	Shearer Total hp	Haulage system	Roof support yield (tons)	Face conveyor type (strand, motors)	Face conveyor width (mm)/ speed (fpm)	Stageloader type width, speed	Crusher	Electrical controls	Voltage to face
<b>NEW MEXICO (1)</b>																	
San Juan Mine No. 1 Westmoreland Coal Co.	No. 8	136-200	120-156	1,000	12,500	400-1000	3	36	Joy 7LS5 DDR 2,092	Ultratrac 2000	Joy 1,160	Joy 50 TIB 3x1,150	1,100/350	Joy 1,350 mm, 500 fpm	Joy	Service Machine	4,160
<b>OHIO (1)</b>																	
Century Mine American Energy	Pittsburgh No. 8	59	70	1,500	10,942	400	3	30	Joy 7LS1D DDR 1,880	Ultratrac 2000	AEMI 692	AEMI 48 TIB 3x1,900	1,000/365	AEMI 1,200 mm, 525 fpm	AEMI	MCI	4,160
<b>PENNSYLVANIA (6)</b>																	
Bailey - Dry Ridge CONSOL Energy	Pittsburgh No. 8	62-72	89	1,547	11,950	400-1,000	3	42	Joy 7LS2A DDR 1,666	Ultratrac 2000	Cat 969	Cat/Longwall Associates 48 TIB 3x1,900	988/378	Caterpillar 1,188 mm, 528 fpm	Cat	Line Power	4,160
Bailey - Crabapple CONSOL Energy	Pittsburgh No. 8	62-72	90	1,576	12,300	500-1,400	3	42	Joy 7LS2A DDR 1,666	Ultratrac 2000	Joy 1,005	Cat/PF6 48 TIB 3x1,900	988/378	Caterpillar 1,188 mm, 528 fpm	Cat	Line Power	4,160
Harvey CONSOL Energy	Pittsburgh No. 8	62-72	86	1,547	14,810	800-1,400	3	42	Joy 7LS2A DDR 1,666	Jumbo Track 2000	Cat 969	Cat 48 TIB 3x1,900	988/378	Caterpillar 1,188 mm, 528 fpm	Cat	Line Power	4,160
Cumberland Countura Energy	Pittsburgh No. 8	72-84	96-102	1,580	11,000	600-1,200	3	42	Joy 7LS2A DDR 1,666	Jumbo Track 2000	Cat 1,096	Cat 48 TIB 3x1,900	988/371	Caterpillar 1,388 mm, 420 fpm	Cat	Line Power	4,160
Enlow Fork - F Side CONSOL Energy	Pittsburgh No. 8	64-74	88	1,545	10,696	500-800	3	42	Joy 7LS2A DDR 1,666	Super GearRack	Cat 893	Longwall Associates 48 TIB 3x1,900	988/371	Caterpillar 1,188 mm, 525 fpm	Cat	Line Power	4,160
Enlow Fork - G Side CONSOL Energy	Pittsburgh No. 8	59-69	81	1,493	14,024	600-1,200	3	42	Joy 7LS2A DDR 1,666	Super GearRack	Cat 983	Longwall Associates 48 TIB 3x1,900	988/371	Caterpillar 1,188 mm, 525 fpm	Cat	Line Power	4,160
<b>UTAH (3)</b>																	
SUFCO No. 1 Wolverine Fuels	Upper Hiawatha	84-216	96-156	1,110	2,400-4,000	800-1,800	3	42	Joy 7LS2A DDR 1,940	Ultratrac 2000	Joy 1,100	Joy 48 TIB 3x1,650	1,000/374	Caterpillar 1,388 mm, 464 fpm	Cat	Service Machine	4,160
Skyline Wolverine Fuels	Lower O'Connor A	84-200	96-144	850	6,000	500-1,600	2	36	Joy 7LS2 DDR 1,752	JumboTrac 2000	Cat 1,007	Cat 42 TIB 2x1,200	1,042/340	Caterpillar 1,388 mm, 450 fpm	Cat	Line Power	4,160
Lila Canyon Utah American Energy	Summerville	168	160	850	4,000	1,000	2	42	Cat EL-1,000 DDR 1,880	Ultratrac 2000	ZMJ 1,250	AEMI 48 TIB 3x1,000	1,000/365	AEMI 1,200 mm, 525 fpm	AEMI	Line Power	2,300
<b>VIRGINIA (1)</b>																	
Buchanan Coronado Coal	Pocahontas No. 3	60-76	70	700	11,500	1,400-2,000	4	42	Joy 7LS1D DDR 1,290	Super GearRack 2000	Joy 1,024	Joy/Longwall Associates 42 TIB 3x800	1,000/357	Longwall Associates 1,294 mm, 485 fpm	Joy	Line Power	4,160

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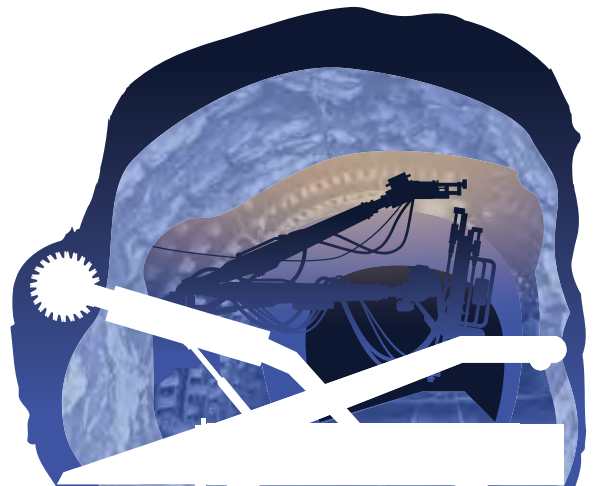
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Mine Company (parent)	Seam	Seam height (inches)	Cutting height (inches)	Panel width (ft)	Panel length (ft)	Over-burden (ft)	No. of gate entries	Depth of cut (inches)	Shearer Total hp	Haulage system	Roof support yield (tons)	Face conveyor type (strand, motors)	Face conveyor width (mm)/ speed (fpm)	Stageloader type width, speed	Crusher	Electrical controls	Voltage to face
<b>WEST VIRGINIA (10)</b>																	
American Eagle	Eagle	50	64	1,020	16,200	600-1,000	3	42	Joy 7LS1D DDR 1,625	Super GearRack 2000	Cat 1,271	Cat/LW Associates 48 TIB 3x1,200	988/320	Caterpillar 1,388 mm, 350 fpm	Cat	Service Machine	4,160
Harrison County Murray American Energy	Pittsburgh No. 8	94	90	1,465	4,315	950	3	42	Joy 7LS1D DDR 1,880	Jumbo GearRack Indirect Drive	Cat 862	LW Associates 48 TIB 3x1,900	1,000/365	Caterpillar 1,200 mm, 525 fpm	Cat	Line Power	4,160
Leer Arch Coal	Lower Kittanning	54-96	72-84	1,200	5,000-9,000	320-750	3	42	Joy 7LS1D DDR 1,840	Ultratrac 2000	Joy 1,040	Joy 42 TIB 3x1,000	1,000/337	Joy 1,294 mm, 443 fpm	Joy	Service Machine	4,160
Marion County Murray American Energy	Pittsburgh No. 8	84	90	1,415	7,175	1,000	3	42	Joy 7LS2A DDR 1,854	Ultratrac 2000	Cat 890	AEMI/Cat 48 TIB 3x1,900	1,000/365	Caterpillar 1,200 mm, 525 fpm	Cat	Line Power	4,160
Marshall County West Murray American Energy	Pittsburgh No. 8	72	93	1,500	12,000	1,000	3	42	Joy 7LS1A DDR 1,880	Ultratrac 2000	Cat 890	AEMI 48 TIB 3x1,900	1,000/365	Caterpillar 1,200 mm, 525 fpm	Cat	Line Power	4,160
Marshall County East Murray American Energy	Pittsburgh No. 8	72	93	1,500	12,000	1,000	3	42	Joy 7LS2A DDR 1,880	Ultratrac 2000	ZMJ 1,000	AEMI 48 TIB 3x1,900	1,000/365	AEMI 1,200 mm, 525 fpm	AEMI	MCI	4,160
Monongalia County Murray American Energy	Pittsburgh No. 8	78	96	1,100	11,800	1,000	3	42	Joy 7LS1D DDR 1,880	Ultratrac 2000	Cat 840	AEMI 48 TIB 3x1,000	1,000/365	Cat 1,200 mm, 525 fpm	Cat	Line Power	4,160
Mountain View Alliance Resource Partners	Upper Freeport	78-108	78-108	850	6,000-8,000	600-800	3	42	Joy 7LS1A DDR 1,330	Ultratrac 2000	Joy 815	Longwall Associates 38 TIB 2x700	950/229	Joy 1,200 mm, 312 fpm	Longwall Associates	Line Power	2,300
Ohio County Murray American Energy	Pittsburgh No. 8	66	87	1,406	14,068	650	3	42	Joy 7LS1A DDR 1,880	Ultratrac 2000	Cat 862	AEMI 48 TIB 3x1,900	1,000/365	AEMI 1,300 mm, 525 fpm	AEMI	Line Power	4,160
Tunnel Ridge Alliance Resource Partners	Pittsburgh No. 8	62-72	80-84	1,200	16,000	400-725	3	42	Joy 7LS1D DDR 1,840	Ultratrac 2000	PSS/CAT 1,020	Joy/LW Associates 48 TIB 3x1,200	1,000/360	Joy 1,294 mm, 443 fpm	Joy	Line Power	4,160
<b>WYOMING (3)</b>																	
Bridger Pacific Minerals	D41	96-144	120	600	10,000	700	3	36	Cat EL 2000 DDR	JumboRack	Cat 982	Cat 42 TIB 2x1,200	988/357	Cat 1,388 mm, 423 fpm	Cat	Service Machine	2,300
Green River Solvay Chemicals	Bed 17	132	120-132	625	8,750	1,600	3	34	Joy 7LS5 DDR 2,360	Super GearRack 2000	Famur/Cat 800	Longwall Associates 42 TIB 2x1,000	1,100/330	Caterpillar 1,388 mm, 477 fpm	Cat	Service Machine	4,160
Westvaco Genesis Alkali LLC	Bed 17	96-132	96-132	750	9,400	1,500	4	38	Joy 7LS5 DDR 2,360	Ultratrac 2000	Joy 870	Joy 42 TIB 2x1,072	1,100/268	Joy 1,294 mm, 385 fpm	Joy	Service Machine	4,160

Legend: DDR 2,000 means double-drum ranging arm shearer with 2,000 hp installed. Cutting machines reported are all shearer type unless otherwise indicated. VFD—variable frequency drive; SS—single strand; TIB—twin strand inboard; 42 TIB 2 x 1,000 means 42-mm chain, twin strand inboard, two 1,000-hp motors. \*Note: AEMI=American Equipment and Machine Inc.





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# DECLINING COAL PRICES ACCENTUATE A DISMAL YEAR FOR COAL

*If the current situation does not change, 2020 may be worse*

BY STEVE FISCOR, EDITOR-IN-CHIEF

During the first quarter of 2019, most coal operators knew their business was facing a difficult market. With declining domestic demand, U.S. coal operators were clinging to thermal and metallurgical coal exports. By May, however, it became clear that the prices for U.S. thermal coal exports into Europe were softening, which forced some operators to reconsider their options. At the same time, trade negotiations between U.S. and China broke down and the Chinese began to block coal imports, which impacted Australian coal exporters.

The situation was not good, but the metallurgical side of the coal business had not been affected. The other shoe would drop in August as prices for met exports began to soften. Steel production was slowing in Europe, India and Japan, and by year's end, met coal prices had fallen from more than \$200 per metric ton (mt) to \$136/mt. While traders have debated whether prices greater than \$200/mt were sustainable for some time now, coal operators had grown accustomed to those levels and no one expected the drop to be that steep, that quick.

Market fundamentals were clearly not working in favor of the coal business. Prompt prices for Central Appalachian (CAPP) thermal coal, which climbed to \$81.40/ton by the end of 2018, fell to \$60.30/ton at the end of 2019. While the final figures were not available, it appears as though U.S. coal production in 2019 dropped 50 million tons (6.8%) year-on-year to 706 million tons from 756 million. Most of that decline happened in the western U.S., where coal production in Wyoming alone declined 31 million tons.

At first blush, the situation in the U.S. looks grim, but 700 million tons

is still a considerable amount of coal. The market outside the U.S. ranges from brisk in India, Indonesia and Russia to somewhat sluggish in China and Australia to depressing in South Africa. While it seems that most of the U.S. headlines are related to coal bankruptcies, there are regions and companies actively involved in coal mining that are doing well. To get a handle on the situation, *Coal Age* surveyed 500 executives and asked them how they feel about the future. That information was combined

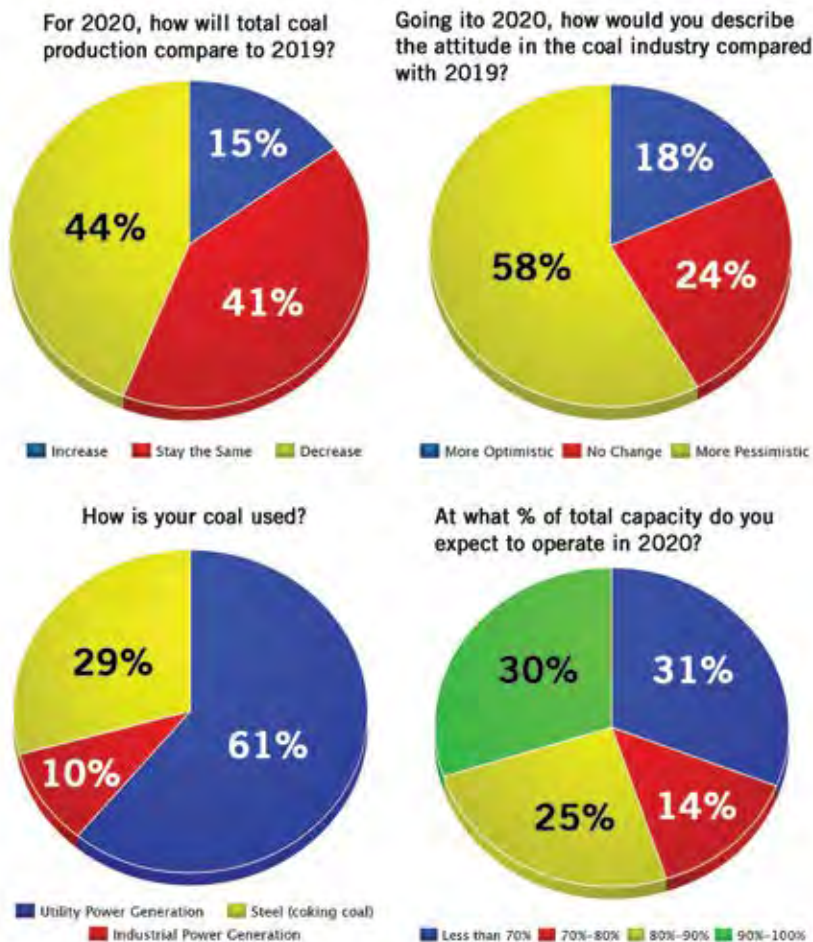
with publicly available reports to produce the 2020 Annual Forecast.

## Survey Says

*Coal Age* contacted 500 professionals who mine and process coal, and received 52 completed surveys. The results reaffirmed the previous market share discussion. Most of the respondents (64%) produced bituminous coal. Subbituminous, lignite and anthracite accounted for 15%, 12% and 7%, respectively. As far as production

**Figure 1 — Production, Consumption and Attitude**

This year, *Coal Age* received 52 responses from 500 executive surveys



capacity, most of the respondents represented large mine operators (more than 5 million tons, 57%), followed by medium-sized operators (mining 1-5 million tons, 22%), and the small (less than 1 million tons, 21%); 30% described themselves as surface coal operators exclusively, while 42% said they only operated underground mines. The remainder (28%) said they worked for a company that mined coal using both surface and underground techniques.

Due to *Coal Age's* growing international circulation, the survey received more international responses. Like year's past, most of the respondents said their coal was shipped to electric utilities (61%). A greater number said their coal was destined for steel mills (29%), while a small amount sell coal to industrial boilers (10%).

Going into 2020, the survey revealed that the coal operators' mood had darkened. A total of 58% (vs. 11% last year) described their attitude as pessimistic, and far less were optimistic (18% vs. 63% in 2019). This year, 24% said they expected things to remain the same, compared to 34% last year. The overall outlook, especially in the U.S., is grim.

Confirming that feeling, only 15% of the respondents thought their coal production would increase in 2019, compared to 47% last year. A large portion (41%) said production would remain the same, compared to 42% last year. A larger group (44%) foresees production decreasing, compared to 11% last year. The best spin: a little more than one-half of the respondents (56%) see production remaining the same or growing in 2020, which was well below last year's response (89%).

Coal mining is a capital-intensive business. For 2020, only one-third (33%) of the respondents said their capital budgets would increase, compared to 54% last year. The number of respondents saying their capital budgets would decrease was 38%, which was considerably higher than the 12% response in 2019. The rest of the respondents (29%) said their budgets

would remain the same, compared to 35% last year. While the industry faces distress, nearly two-thirds of it (62%) see their budgets either staying the same or increasing over 2019.

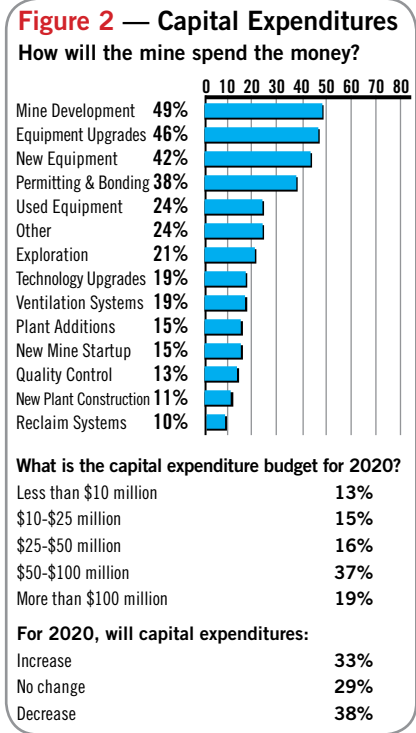
When asked how they would spend the money, they said mine development (49%), equipment upgrades (46%) and new equipment (42%). When asked about their capital budgets, nearly one-fifth (19%) said they would spend more than \$100 million; \$50-\$100 million, 37%; \$25-\$50 million, 16%; \$10-\$25 million, 15%; and \$10 million or less, 13%. This year, 56% of the *Coal Age* survey respondents said they would spend \$50 million or more.

When asked about what specific issues will affect the coal industry most in 2019, Politics & Policy registered the highest score (4.56/5) as the leading concern. This was followed closely by Prices and Power Plant Regulations. Coal prices remained ahead of the economy. Reading between the lines, the miners are saying that prices and the economy do not matter if their customers are not allowed to burn coal. Limited production capacity and a retiring workforce were the least of their concerns.

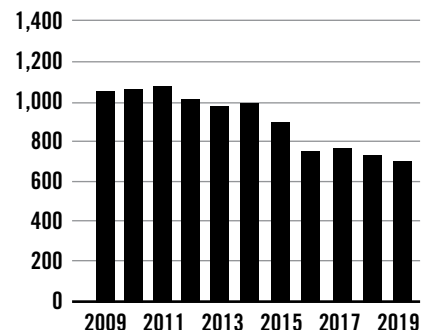
### A Market in Flux

As this edition was going to press, Alliance Resource Partners (ARLP) had just released its fourth quarter earnings report. One of the best U.S. coal operators, it has an enviable safety record and balance sheet and its situation provides a snapshot of what's happening to the U.S., east of the Mississippi River. It has exposure to Illinois Basin (ILB) and Appalachian markets. This time last year, the company was reporting record financials and its 2019 guidance on coal sales was 43.5 million to 45 million tons with 8 million tons destined for the export market. It didn't pan out. The company reported 2019 coal sales of 39.3 million tons with exports falling 4.2 million tons.

"Alliance entered 2019 with positive coal fundamentals intact and ex-



**Figure 3 — U.S. Coal Production, 2009-2019 (million short tons)**



Source: Energy Information Administration

pectations of building on the strong performance achieved in 2018, when we delivered record coal sales volumes at higher price realizations," President and CEO of ARLP Joe Craft said. "The strong start to the year supported those expectations. Unfortunately, positive coal market fundamentals soon began to turn negative, as the year progressed. The international coal markets deteriorated significantly as weak power demand in Europe, aggressive Russian coal production, and collapsing liquefied natural gas (LNG) prices all contributed to a significant drop in the



**Figure 4 — Current Spot Prices for Coal (\$/ton)**

	Btu/lb	lb SO <sub>2</sub>	Dec 15	Dec 16	Dec 17	Dec 18	Dec 19
Northern Appalachia	13,000	< 3.0	\$48.95	\$45.75	\$46.20	\$63.75	\$50.75
Central Appalachia	12,500	1.2	\$43.50	\$48.05	\$59.85	\$81.40	\$60.30
Illinois Basin	11,800	5.0	\$32.60	\$35.50	\$32.60	\$38.95	\$34.20
Powder River Basin	8,800	0.8	\$10.90	\$11.00	\$12.10	\$11.95	\$11.80
Western Bituminous	11,700	0.8	\$40.65	\$40.90	\$41.10	\$40.40	\$31.45

Source: EIA/Platts Coal Outlook Weekly Price Survey

API 2 thermal price index. As a result, the international markets became uneconomic for most U.S. coal operators, causing exports to decline sharply.”

That reduced export volume along with tepid domestic coal demand due to persistently low natural gas prices caused a significant oversupply in the U.S., Craft explained, creating additional pressure on coal prices and producers. “We continue to believe that current market conditions are unsustainable for most of ARLP’s competitors,” Craft said. “Accordingly, additional supply rationalization is necessary. ARLP anticipates that much of this market correction will occur this year, making 2020 an inflection point for domestic thermal coal producers. In this fluid environment, we have adjusted our coal operations to reflect the realities of the current market.” The 2020 guidance is 36.8 million to 38.8 million tons of coal sales with at least 900,000 tons in exports.

In 2019, ARLP picked up 2.8 million tons in domestic market share from mine closings in the ILB. “We believe

the pressure on other operators is increasing as the domestic thermal coal headwinds persist,” Craft said. “As competitors assess their options, we stand ready to pursue strategic transactions that may provide opportunities to capture additional market share this year.”

As a large multinational coal operator, Peabody Energy has exposure to many markets, including Australian exports and U.S. thermal, including Wyoming’s Powder River Basin and bituminous operations in the ILB. In its third quarter earnings statement (the most recent available), the company not-

ed that average seaborne hard-coking coal spot prices declined approximately 20% quarter to quarter. At that point in early October, they were expressing relief that seaborne coking coal prices into China had rebounded from three-year lows. They also singled out India, saying it continued to increase metallurgical coal imports, with September year-to-date imports rising 7%.

Citing similar influences on the export market, they also reported that Indonesian and Russian exports had increased, contributing to a weaker pricing environment. At the time, the

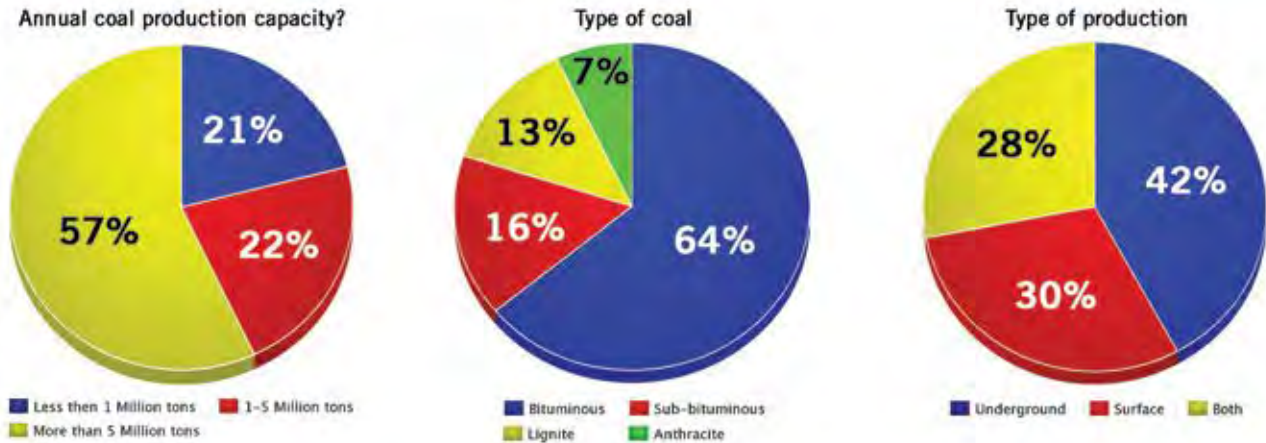
**Figure 5 — On a scale of 1 (not very important) to 5 (extremely important), how do the following concerns rate?**

1. Politics & Policy	(4.56)
2. Prices	(4.39)
3. Power Plant Regulation	(4.32)
4. Economy	(4.06)
5. Bonding & Permits	(3.91)
6. Other	(3.56)
7. Retiring Workforce	(3.20)
8. Limited Capacity	(2.79)

**Figure 6 — What will be the single most expensive item the mine purchases in 2019? ..... What will it cost, in round figures?**

Slope and Shaft Development .....	\$200 million
Longwall Equipment (4).....	\$80 million
New Mine Development (3).....	\$50 million
Mining Operation .....	\$40 million
Heavy Equipment.....	\$37 million
Electric Shovel.....	\$20 million
Mining Supplies.....	\$12 million
Equipment Upgrades .....	\$10 million
X-ray Sorting Machine .....	\$10 million
Heavy Equipment.....	\$8 million
Earthmoving & Proc. Equip. ....	\$7 million
LW Equipment Rebuilds.....	\$4.5 million
Continuous Miners.....	\$4 million
Equipment.....	\$4 million
Plant Upgrade .....	\$3 million
Dragline Bucket.....	\$2 million
New Shaft.....	\$2 million
Chemical Stripper.....	\$1.5 million
Continuous Miner.....	\$1.5 million
Bulk Sampling/Washability Analysis.....	\$1 million
Dozer (2).....	\$1 million

Figure 7 — Survey Demographics



average Q3 Newcastle-spec prompt price was \$68 per metric ton (mt), a 15% decline compared to the Q2 average. More recently, the company revised its seaborne thermal guidance for 2019 to 11.5 million to 12 million mt and seaborne met guidance to 8.5 million to 9 million mt. In 2018, the company’s seaborne thermal was 19.1 million mt and its seaborne met was 11 million mt.

For the U.S., Peabody explained that electricity generation had decreased and coal was losing more market share to natural gas. It revised its ILB guidance down to 16 million tons for 2019. It was 18.9 million tons in 2018. Production from its three PRB mines (Caballo, North Antelope Rochelle and Rawhide) in 2019 totaled 108 million tons, an 11.1-million-ton decrease over 2018, and a little more than a third of the previously announced 31-million-ton decline for Wyoming.

The other important U.S. market is the northern Appalachian market and the leader in this region is CONSOL Energy. During his third quarter presentation, President and CEO of CONSOL Energy Jimmy Brock acknowledged the same market concerns. He credited the company’s strong performance to its contracted position and the continued desirability of its product.

“This has been an increasingly tough year for our industry,” Brock said. “The good news is that we have positioned ourselves to weather this

storm. We moved early to contract our coal and are now 82% contracted for 2020 at attractive prices compared to the current market.” Brock also said he sees further supply rationalization in the marketplace.

These three American coal companies provide a glass-half-full perspective. They have a strong balance sheet and contracted positions. They also acknowledge that it’s bad out there. Peabody Energy and CONSOL Energy will release Q4 2019 reports soon and the results will likely follow the same lines. For the other side of story, the pages of *Coal Age* are littered with distressed coal companies that will not likely weather the storm.

### What to Expect in 2020

During mid-January, the U.S. and China signed Phase 1 of a trade deal. *S&P Global Platts* reported that Beijing pledged to buy more metallurgical coal in the next two years from the U.S. As part of the interim trade deal, China has agreed to purchase \$200 billion worth of U.S. goods and services over the next two years. China plans to boost its imports of U.S. energy sources, according to *S&P Global Platts*, including LNG, crude oil, refined products and coal by \$18.5 billion in 2020 and \$33.9 billion in 2021.

No one expects much to happen until tariffs are removed. Currently, U.S. metallurgical coal exported

to China are subject to a 25% tariff and a 3% import tax, which was imposed in 2018 as the trade dispute between the two intensified.

According to customs statistics, China imported 280 million mt of coal in 2018. Of that, 64.2 million mt was coking coal in 2018, of which only 2 million mt were from the U.S.

The domestic market for coal for power generation in the U.S. may not improve as long as low natural gas prices persist. Comparing year-to-date consumption figures through October 2019, coal consumption had decreased by 74 million tons. From 2017 to 2018, U.S. domestic thermal consumption dropped from 717 million tons to 688 million tons. The average month-to-month decline from 2018 to 2019 was 12.6%. If that remains the case for November and December, U.S. domestic thermal coal consumption for electricity could drop to 600 million tons — a level not seen since the late 1970s.

In addition to the oversupplied market domestic coal producers face, the U.S. Congress reinstated for 10 years a \$0.60/ton tax on underground coal production that expired at the beginning of 2019 when it passed the American Miners Act of 2019. If everything remains the same, it will be difficult for U.S. coal operators to maintain the current 700-million-ton production level.

## DRILLING IN THE DIGITAL AGE

*Coal Age reviews some of the newest products and solutions in the blasthole drill rig market*

BY CARLY LEONIDA, EUROPEAN EDITOR



Two Pit Viper 351's from Epiroc operating at Newmont Goldcorp's Peñasquito gold mine in Mexico.

Blasthole drill rigs are a staple of surface mines across the globe. Representing a major capital investment for any mine, these machines are not replaced regularly and so it is important that new rigs come ready for whatever the “mine of the future” may throw at them.

Autonomy and digital optimization tools are currently high on mining companies' lists of requests, and this trend is reflected both in original equipment manufacturers' (OEMs) R&D efforts, and the newest products and solutions that have come to the market over the past 12-18 months.

Let's look at key developments from four of the biggest vendors in this space.

### Epiroc Advances Automation Solutions

Epiroc held a press conference at the Society of Mining, Metallurgy and Exploration (SME) meeting in Denver about a year ago, highlighting the breadth of its automation solutions for blasthole drill rigs and the work of its Automation Center in Garland, Texas.

At the event, Matthew Inge, business line manager for drilling solutions at Epiroc, spoke of the Pit Viper-231, which was first introduced to the market in September 2016 at MINExpo. He said the rig had undergone 18 months of field testing at a gold mine in Nevada and would be available to the market very shortly. The PV-231 can drill 53 ft (16.2 me-

ters) in a single pass with hole diameters from 6.75 in. to 9.88 in. As with all Epiroc blasthole drill rigs going forward, it comes automation-ready from the factory and customers can choose varying levels of autonomy to suit their needs.

Tyler Berens, Epiroc product line manager, automation, said: “We first introduced a control system on our drills back in 2006. Since that time, we've continued to develop the platform and advance automation levels taking us to fully autonomous.

“That detailed path has brought about a very sound autonomous platform that is now being deployed globally. It's running in rough winter conditions above the Arctic Circle, in high



elevations and extreme heat. We continue to see the rollout to sites growing. We are continuing our journey to bring more intelligence to the drill fleet to make a smarter, more productive autonomous drill fleet. There will be more to come on intelligence solutions in the upcoming months.”

Berens said Epiroc’s Automation Center is one of the most tangible areas that empowers the company’s automation program, allowing it to be progressive and somewhat disruptive.

“It allows us to have a cutting-edge facility to grow our global automation team through very focused and hands-on training,” he said. “It also allows for a realistic environment where we can do both focused development testing as well as work with our customers hands-on with the automation they are about to employ. This center allows us to move much quicker and more accurately in development by bringing cross-functional teams together around the systems.”

### The New ‘Norm’

Berens described autonomy as “the new normal” when it comes to drill rigs.

“There are quite a few autonomous and teleremote installs going on now and into the near future,” he said. “They are global, not specifically centralized to one region. What has us excited about these is the trend. These installs are not trials and haven’t been for a few years now.

“I see a few interesting areas where digital technologies will continue bringing about safer and more efficient operations in drilling. Digitizing work commonly done manually is ensuring more frequent and accurate data goes into decision-driving systems. Additionally, this information is being used in robotics systems to automate processes, ensuring safety and efficiency.”

In October 2018, Epiroc’s drilling business acquired part of ASI Mining, a U.S.-based company that provides

technology solutions for the autonomous operation of mining vehicles.

Epiroc took a 34% stake in ASI Mining, which is based in Utah, gaining access to a product range that includes onboard hardware and software to convert vehicles to autonomous operation, as well as system level software platforms for command and control of autonomous fleets. ASI’s solutions are vendor agnostic and can integrate with various mobile machines, regardless of make or model.

In a press release accompanying the announcement, Jon Torpy, vice president of marketing drilling solutions at Epiroc, explained the relevance of the acquisition: “A decade ago, we started the Pit Viper automation program that has now led to a paradigm change in how drilling is done in surface mining,” he said. “We see that the ASI Mining solutions will also fundamentally change the industry toward higher productivity and improved safety. We are excited about the potential that exists when we work together to bring new solutions to the mining community.”

And in terms of new products coming soon to the market?

“We work really closely to the market,” said Heino Hammann, product line manager, blasthole, Epiroc. “We have explored opportunities and benefits our solutions can bring to our customers ... Historically, we have introduced a new rig model at MINExpo, so stay tuned.”

### Sandvik Rigs Get Smarter

Commenting specifically on the market for blasthole drills, David Shellhammer, president for the Rotary Drilling Division at Sandvik Mining and Rock Technology, described it as “stable but flat.”

“Most drills coming to the market are replacements as opposed to new drills for new projects,” he explained. “Current trends are toward autonomous operation and integration into existing mine digital infrastructure to drive data collection and improve operational efficiency.”

Shellhammer explained that automation and digitalization continue to make the drilling process more precise, consistent, information rich, cost-efficient and safe. “Providing ‘cross-process’ (extraction, hauling, milling) communication and third-



Epiroc’s Automation Center in Garland, Texas. This is used for both R&D and to train clients on new technologies.



Sandvik's DR416i rotary blasthole drill is released in June this year.

party integration (such as that offered by Sandvik) between OEM equipment will only amplify the power of digitalization," he said. "When combined with the lower cost of connectivity and data storage, it enables improved decision-making and lowers overall mining process costs."

In line with this, many of Sandvik's customers are currently concerned with achieving consistent, predictable results at the lowest possible cost per hole, with an increasing number looking to enable these results via automated functions and/or autonomous machines. Dependable post-sale service and support including readily available replacement parts also rank high on their list of priorities.

"We continue to evolve our R&D efforts to meet the ever-changing technology landscape, but more importantly to make sure we are delivering exceptional value to our customers. The products we have recently released along with the soon-to-be-released products reinforce our culture of aggressive innovation and our never-ending focus on customer satisfaction," said Shellhammer.

## New Autonomous Rig on the Way

Indeed, when it comes to product releases, Sandvik has been one of the busiest vendors in this space over the past 12 months.

In June, it released the DR416i rotary blasthole drill, which delivers a single-pass capacity of 69 ft or 21 m (the longest single-pass mast in its class). Constructed for large diameter 16-in. rotary drilling, the DR416i is automation-ready, scalable, and supplies the highest rotational torques and pull-down forces at the lowest possible operating cost. It's also equipped with Sandvik's patented Compressor Management System to reduce fuel consumption and improve productivity.

Shellhammer explained: "In developing the latest addition to our iSeries family, we looked at our customers' greatest challenges in the large-diameter drill space and developed a cost-effective, highly-efficient solution to solve those challenges."

In January, Sandvik introduced the D75KX, the first rig in the xSeries family.

"The xSeries family is built upon the proven design, and reliability of our diesel-powered rotary blasthole drills and features added intelligence and improved operator ergonomics, providing operators with the right balance of reliability and technology to safely drill the perfect hole," Shellhammer said. "The xSeries offers a migration path to the iSeries should the customer's business needs dictate."

xSeries rigs feature a touch-screen GUI interface with the Sandvik Automation Module (SAM), a health monitoring system that replaces old-style shutdown switches and enables continuous, real-time measurement, and the same hardware and software components as iSeries machines.

To date, Sandvik has two automation-ready products, the DR412i and the DR416i, which can be adapted to autonomous operations. "We will be launching a third automation-ready rig in the coming months," Shellhammer said.



Sandvik's DR412i in action.



## Interoperability Key for Komatsu

Komatsu has nearly doubled its expected units recently, with drill placements in Canadian iron-ore operations, and the Peruvian and Chilean copper regions. Matt Collins, Komatsu Mining product director for drills, described the current market for blast-hole drill rigs as “in a steady uptick.”

“The need for efficient drill and blast options carries across commodity markets,” he said. “Across Komatsu, we are seeing the benefits of synergies resulting from the Joy Global acquisition. We’ve implemented effective training programs and are focused on world-class support where our certified technicians work with customers to optimize operational and maintenance practices on their drill fleet.”

The company is currently seeing a wide range of feedback from customers centered around application-spe-

cific needs. For example, customers near the Arctic Circle are looking at efficient ways to handle ice buildup and component functionality in extreme temperatures. In other parts of the world, customers need options to handle dust safely and effectively.

“There is a common thread on how to handle tooling on board the drill to enhance safety — from bit handling to rod handling, while providing operator visibility,” Collins explained. “Also, across all applications, attention always drives back to the fundamentals of achieving optimal fragmentation. Looking at the powder factor, pattern layout, geological condition, and then mapping out the most effective way to use data input to achieve that desired fragmentation.

“Some of this evaluation has led to a trend in stepping the bit diameter slightly smaller to match the patterns adjustment effectively. The drill is a key

piece that can aid in providing the tools to continuously improve those functions. We guide our R&D efforts around value creation through innovation.”

Komatsu is actively working on new models and designs to expand its drill options. “We recently did some rack-and-pinion down-the-hole percussive drilling on a mining-duty production drill rig, which is an exciting innovation as the pulldown and pull-back is done on racking with constant pinion engagement,” Collins said. “This offers a more effective way to control the operational parameters to match geological conditions.”

Komatsu has also noticed a strong market pull for autonomous features. “Beyond the initial step of moving personnel, we also hear feedback around defining a common automation language. Not all assets are created equal or operate on a common platform, so there has been a push



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The MD6200 is the smallest model in Caterpillar's revamped line of rotary blasthole drills.

for interoperability, layered on top of fundamental autonomous solutions that enable the drill to operate independently. This is an area where we are focusing to meet future demand and emerging trends," said Collins.

### Cat Drills: Revamped and Ready for Action

Seeing an improvement in sales for blasthole drilling rigs, Jason Anderson, marketing manager—drills, Caterpillar Global Mining, said "the market continues to be strong across the major regions driven by strong commodity prices."

Over the past few years, Caterpillar has been working to revamp its drill line, and three of the five planned new models (all rotary; Caterpillar exited the top hammer drill business a few years ago) are now in production.

The MD6250 and MD6310 came to the market in 2017, and the MD6200, the smallest in the Cat line, began production in October 2018.

The MD6200 will see its main use in small mines and quarries. It is capable of rotary or down-the-hole (DTH) drilling of holes 5 in. to 7.87 in. (127-200 mm) in diameter. Offering both single- and multipass modes, it can drill at a negative angle up to 15° to match the slope of highwalls for pre-split drilling. Caterpillar said the result is cleaner highwalls with less waste material going to downstream operations.

The MD6250 and MD6310 are the core of the new family of Cat drills. The MD6250 is designed to drill 32.8-ft and 39.4-ft benches, including angle drilling for cast blasting, making it a good choice for mining, quarrying

and heavy construction applications. The MD6310 offers single-pass drilling down to 44.9 ft or 57.4 ft depending on the mast configuration. It can create holes angled up to 30° for cast blasting and is a good all-rounder in mining applications.

Caterpillar said the new family of drills leverage the same electronics, hardware and software used across other Cat product lines. They have the same look and feel as other Cat products, and the design also supports service needs with straightforward diagnostics and expanded use of common components.

The first Cat MD6250 rotary blasthole drill in Queensland, Australia, was recently delivered to contractor Mining and Civil Australia (MACA) for use at Bluff coal mine, an open-cut operation producing coking coal. MACA has a 10-year A\$700 million (US\$476 million) contract with Carabella Resources to manage both the drill-and-blast and load-and-haul operations at the Bluff mine.

Hastings Deering, the regional Cat dealer, handled all logistics, including assembly of the drill on site.

"It's an interesting site as there are restrictions around noise," said Adam Davis, product manager for drills and large motor graders at Hastings Deering, in the company's press release. "MACA had experience with the MD6250's predecessor model and believed they could get the same value and production out of the new model."

"The MD6250 has proportional hydraulics, which means the machine makes less noise during operation and the fan circuit only operates when it needs to. The machine only creates horsepower when needed, which cuts down on heat, noise and energy."

The two larger drills in Caterpillar's range, the MD6540C (diesel) and MD6640 (tethered electric), are next in line to be replaced with new models, but the company has not publicly announced a schedule yet.

These drills are most commonly used in coal mines where they drill large diameter blastholes.

### Koodaideri Opts for Autonomy

Anderson said the company is currently seeing a lot of interest from mining customers in technology and automation features, so it is a continued area of focus for his R&D team.

“Caterpillar is well along the autonomy journey and Cat drills are an important part of this,” he said. “The industry focus is on employing digital technology to help equipment perform more productively and efficiently. There is also a strong pull from mining companies for automation. Not all mining operations, however, want or need a fully autonomous solution.

“To meet these varying needs, the MD6250 and MD6310 offer a building block approach to technology — using Cat hardware and software that

delivers automated functions ranging from basic operator assist, such as auto-level, all the way to autonomous drilling of single rows. The building block approach enables upgrading the level of automation in the field as the customer’s needs change.”

There are several sites today running various levels of automation and autonomy on Cat drills. The most recently announced (May) was Rio Tinto’s smart mine, Koodaideri, in Western Australia.

The A\$2.6 billion mine was approved in November last year with construction commencing earlier this year. Phase 1 of the operation will help sustain Rio Tinto’s existing production capacity by replacing depletion elsewhere in the system. The mine is expected to produce 43 million metric tons per year (mtpy) commencing by year end 2021. A prefeasibility study into Koodaideri Phase 2,

which could increase annual capacity to 70 million mtpy, is ongoing.

In May, Caterpillar announced with support of its local dealer Wes-Trac, it will supply a fleet of 20 autonomous 793F trucks and four autonomous blasthole drills to the mine, as well as loaders, dozers, graders, water carts and diggers. The operation will be Rio Tinto’s first Pilbara mine to be primarily operated using Caterpillar machinery. The two companies have also agreed to study the potential for increased levels of automation.

Caterpillar’s machinery will be integrated with Rio Tinto’s Mine Automation System, which collects and enhances data from mining operations, to improve productivity across its entire iron-ore network.

*This article was originally published in the September 2019 edition of Engineering & Mining Journal.*



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# DOWNTURN FORCES SCOOP SUPPLIERS TO INNOVATE

*The latest releases have been a long time coming but speak to pressing, timely needs*

BY JESSE MORTON, TECHNICAL WRITER



Komatsu's Joy line of electric scoops hit the market in Q2 2019 and are expected to see demand in emerging markets. (Photo: Komatsu)

Shoestring budgets year over year going back a half-decade have taken their toll on underground haulage fleets, insiders said. A general manager at an equipment company told *Coal Age* many mines have, in the last couple of years, deprioritized needed rebuilds. "So many mine managers are currently facing aging fleets, which is resulting in rising downtime and mine cost," Jarrod Bailey, Highland Machinery Co., said. "This has led to machines being run far beyond when they would historically be sent in for refurbishments and rebuilds. Over time, fleets began to experience severe and catastrophic failures."

At the same time, the underground haulage equipment market has downsized. "The industry has changed exponentially over the past five years," Bailey said. "We have seen times where the market had suffered setbacks and has lost a considerable amount of manufacturers."

Both trends bode well for the suppliers still in the space. The ones that

spoke with *Coal Age* all mentioned new opportunities now arising. They each had a new or improved battery-powered solution waiting for the right moment. Hopefully, they said, the time is now.

## It's Back, Orange and Going Global

Komatsu reported the Joy line of Electric Scoop Vehicles (ESVs) is set to go global.

Near-future market for the product line will focus more intensely than previously on emerging markets, including India, Russia and South Africa, Dennis Conner, product manager, scoops, Komatsu, told *Coal Age*. "There are several global emerging markets in the underground coal industry," he said. "We are aggressively pursuing those."

For a couple of those countries, the scoop is novel technology, he said. "It is a new concept, a new technique being applied in India and Russia where they don't currently use the scoop."

The product line, formerly known as Fairchild scoops, was quietly purchased by Joy from General Electric in June 2018.

Since then, Joy has made some changes to the design, which is now backed by the Komatsu brand. "It is essentially the same design," Conner said. "We made some improvements, some modifications to fit in with our other product offerings," he said. "Essentially, though, it is still the proven, time-tested Fairchild scoop."

Some of the changes ensured the scoops shared common parts with other Joy products. "And there were some minor tweaks to resolve known issues," Conner said.

Those resulted from a year of design analysis, he said.

"It is not as simple as taking our designs and sending them out for manufacture. We had to analyze and redraw everything. The complete design had to be taken down and then built back up," Conner said. "In many cases, things were not changed, which is why it is essentially the same design, but along the way we did find areas for improvement and took that opportunity."

The updated scoops were available in Q2 2019 and featured electrical component upgrades and minor structural improvements. "For some of our purchased components, the manufacturers changed to Komatsu-preferred vendors, like going from one brand of hydraulic valves to one that is more commonly used by the company," Conner said. "And when they found any errors or higher-cost ways of manufacturing something due to the design, we looked at those and tried to reduce the cost and minimize the customer's price or the customer's costs."



The smallest unit in the line, the 01ESV36, (for 36-in.-plus seams) uses a 660-ampere-hour (amp-hr) battery, weighs 23 tons, has a 75-hp motor, offers a tram speed of up to 5 mph, and has a breakout load rating of 10.4 tons and a maximum payload rating of more than 20 tons. It has ground clearance of less than 13 in. and a bucket capacity of 120 ft<sup>3</sup>.

The biggest unit, the 01ESV60, uses a 1,240-amp-hr battery, weighs 35 tons, has two 75-hp motors, offers a tram speed of up to 6 mph, and has a breakout load rating of 15 tons and a maximum payload rating of 30.4 tons. It has ground clearance of less than roughly 17 in. and a bucket capacity of 165 ft<sup>3</sup>.

Company literature said the lead benefits include twice the battery life of standard 128-volt (V) units, increased stability, and capacity control on steep grades, a proven braking system, and reduced battery maintenance.

Other benefits include “consistent performance over the diesel competitors in torque, in its ability to work,” Conner said.

The battery technology is lead-acid based. “There is a lot of experience with lead-acid battery usage in underground coal mining,” Conner said. “The users are typically familiar with the care and maintenance, and the mitigation of risk.”

While utilization practices and mine conditions vary, the batteries can usually go between six and eight hours. “It could last a full shift,” Conner said. “Reality is they normally change it out sometime in the shift.”

For that, charging stations are strategically placed near working sections. “Normally, in a multisection mine, there wouldn’t be one centralized battery charging area,” Conner said. “They would place one charging area close to each working section.”

The entire battery pack is replaced. The old one is situated in the charging station. The new one is installed, and then the scoop is back in service.

Many of the mines in developing countries will have to make an up-front investment in infrastructure to adopt the scoops. “There is an additional investment required to set up the battery charging stations and to train your workforce for battery maintenance,” Conner said.

Adoption for mines already deploying battery-powered Joy equipment is more streamlined, he said. “If they do, for example, have Joy battery haulers, the adoption of the scoop is not very difficult because they are already familiar with the battery-powered equipment and the battery maintenance.”

Either way, adoption is a win for the miner because “in most cases we are displacing a piece of diesel-powered equipment,” Conner said.

That means less heat, noise and diesel particulate matter, which translates to ventilation cost savings. “Overall, we show a savings, both monetarily and in the personnel health and safety realm,” Conner said. “Over the life cycle of a machine, the total cost of ownership is a fraction of what it costs for a similar piece of diesel equipment.”

Additionally, the units are supported by Komatsu’s global mining service support network, “which has a huge presence in underground coal mining,” he said. Further, users can

leverage the expertise of the broader Komatsu engineering team.

“Komatsu’s footprint and support network are both large,” Conner said. “We are in a great position to support this product for future success.”

## Designed to Make a Splash

Highland Machinery Co. (HMC) showcased the re-released battery-powered 280 AC-VFD Scoop at the Bluefield Coal Show in September.

The upgraded model was the subject of a yearlong redesign project and featured improvements that made it “head and shoulders above everything else on the market,” Jarrod Bailey, general manager, parts, HMC, said. “We took what we had learned from our previous machines in the field and looked at what operators and maintenance professionals from the industry wanted and combined them to make the machine that we have today. This machine is based upon years of real-life work and experience, not just ideas on computer screens and unproven theories.”

Improvements included a “much larger oil tank to allow for greater hydraulic demand while allowing for cooler operation during long operating hours and moving the pump motor and pump to the side of the machine for easier access,” Bailey said.



Highlands Machinery Co. says the upgrades to the 280 battery-powered scoop are based on real world experience. The scoop already had the ‘highest quality frame on the market,’ the company reports. (Photo: HMC)

The scoops already had the “highest quality frame on the market,” he said. “Components can be replaced over time, but frames are the backbone of the machine. The frame is the basis of your investment.”

The unit at the show was purchased at the booth by a customer new to the company. “We consider that to be a great testament to the machine,” Bailey said.

The original 280 Scoop hit the market more than seven years ago. Company literature said the model has a 140-ft<sup>3</sup> bucket, an HMC wet disc brake system, John Deere planetary four-wheel-drive axels, and a variable frequency drive (VFD) controller and main breaker panel.

It can run off a 240-V or a 128-V battery system.

The 128-V design has an 850-amp-hr battery and a 1,000-amp-hr battery. The motor is rated at 75 hp. Ground clearance is approximately 15 in.

Options include a hydraulic winch, camera and proximity systems, and a forklift attachment.

Benefits include increased battery life, longer run times, and more power over DC machines, Bailey said. Others include high machine availability, longevity and dependability; “industry-leading warranties; and lower cost of ownership over the life of the machine when using HMC replacement parts.”

Customers can also expect an elevated level of support and service. “We built our team with the most talented minds in the industry,” Bailey said. “We have numerous employees in critical roles in production, development and quality control that have been with HMC for 30-plus years.”

Accordingly, the “beauty of the HMC product lines is the customization we offer,” he said.

For a customer in search of a low-cost option, “we can provide a basic DC electrical panel,” Bailey said. For a mine with steep grades and wet conditions, “we can provide a machine with optional AC VFD Traction systems,” he said. For a big mine needing a larger machine, HMC “offers larger scoops with dual tram motors that can produce twice the amount of torque generated by the 280 model.”

HMC will first sit down with a customer to qualify them for a specific base solution. “When talking with a mine manager we first ask them to outline all of the concerns and issues the operation is currently facing,” Bailey said. “Once we fully understand all of the aspects of the operation, we can then make recommendations for the best type of setup that will help to resolve the issues and improve the operations. We like to stress to managers that we want to improve their daily operations by providing greater availability of the equipment, reduc-

ing downtime and replacement parts, and improving profitability.”

Illustrating the durability of HMC machines, the first AC scoop produced by the company recently came due to be rebuilt and proved it didn’t need it. It had been deployed in two mines and has at times seen near-continuous use. “After our regional sales representative met with the customer to discuss the condition of the machine, we determined it was in their best financial interest that we did not recommend a full rebuild at this time,” Bailey said. “We provided them with a list of repairs that we felt needed to be performed. These repairs were minimal and only included items such as replacement of bushings, pins and a few weldments. The repairs were so minimal that the customer felt they could be made on mine site with Highland OEM replacement parts and consultations with our expert staff.”

Adoption requires no major infrastructure investments or upgrades. “When purchasing a machine, the customer would only need to purchase a charger for the batteries,” Bailey said, “which is always included with the quote for the machine.”

The customer can use HMC as “their warehouse to reduce overall cost and initial investment,” he said.

“There is no need for customers to make a large investment for replacement parts,” Bailey said. “We carry a very large inventory to support all of our lines, and we provide parts for most other OEM machines through our aftermarket parts sales division.”

Thus, adopting a new HMC scoop “should be a seamless transition,” he said.

Bailey said HMC expects the re-released 280 to make a major splash. “The market is currently open for getting these machines into the field,” he said. “I think that we will look back 10 years from now and when most operators are asked what brand of scoop, they are running they will tell you Highland. They will tell you that over



Simmon's new SE30XL Hauler features a vertical articulation system that makes the machine 3 ft shorter than the competition and allows for superior maneuverability, the company reports. (Photo: Simmon's Equipment Co.)

the past years they have partnered with a company that had the customers best interest in mind.”

### Game Changer Awaits Release

Simmons Equipment Co. announced the impending release of the battery-powered SE30XL Hauler, which the company described as “game changing” and offering the best cost-per-ton value of any haulage vehicle in its class.

In an exclusive report for *Coal Age*, the company reported the hauler offers a uniquely optimized drivetrain, a patented vertical articulation system, part interchangeability, as well as other cost-cutting, production-increasing features.

The hauler speaks to demand for a haulage solution other than shuttle cars or complex continuous haulage systems.

“The current state of the mining sector has pushed many mines to abandon battery haulers, which give increased production, for the cheaper alternative of shuttle cars,” the report stated. “This cost-saving move has come with many headaches including cables, which limit freedom of movement dictate mine planning to the operator due to cable length limitations.”

With the cable as a hindrance, the shuttle car also presents safety risks by decreasing operator visibility while loaded. “For years, operators have made the difficult decision to stick with tethered shuttle cars in order to reduce initial equipment and maintenance costs, in spite of known capacity and flexibility limitations,” the report stated.

In comparison, the SE30XL “increases production, safety and operational benefits of comparable haulers on the market while at the same time eliminating the cost-of-ownership advantage of shuttle cars,” the company reported.

At 35.5 ft long and 12 ft wide, with a wheelbase of roughly 18 ft, the hauler offers a trailer capacity of 10 tons, a maximum tram speed of 5 mph, and

battery options. It can be powered by either a 240-VAC or a 128-VDC battery.

The company reported the hauler has steering articulation of 120°. This capability, coupled with its compact design, “offers best-in-class” maneuverability, the company reported.

“The SE30XL is the lowest hauler on the market with a canopy setting as low as 35 in.,” the report stated. “There is the option of Hydraulic Canopy Assist, which allows for quick, easy adjusting of canopy height as seam height permits. Simmons’ unique two-post-canopy design also offers less obstruction and, with the optimized operator deck and battery layout, the SE30XL offers improved visibility down the rib versus previous battery hauler designs.”

The frame is designed for low seam optimization. Additionally, “the company has developed some unique and industry-first tire configurations for low-coal applications,” the report stated. The SE30XL is the first hauler specifically designed to accommodate dual tires on the tractor and trailer end, the company reported. “This combination of extremely efficient frame design and optimized tire arrangements dramatically decreases ground pressure.”

Improved weight efficiency and tire arrangement “addresses chronic overloading often found on previous battery haulers, which reduces maintenance costs,” the report stated. “It also reduces roadway damages and allows for battery hauler use in applications that previously were off limits due to bad or weak bottom conditions.”

The vertical articulation system makes the machine 3 ft shorter than the competition. It “has 2 ft less overhang from the trailer end to the trailer tire than the leading competition and much better visibility,” the report stated.

The design reduces the complexity of the unit, “which in turn leads to lower sales, maintenance and repair costs,” the report stated. “The vertical articulation also allows for superior maneuverability and increased productivity in low, undulating seams.”

Maneuverability is further increased by four-wheel-drive on-demand Hydraulic Trailer Assist, “which uses industry-leading and proven wheel motor technology,” the company reported. “This on-demand feature allows the SE30XL to navigate the most demanding conditions.”

Cab design gives operators simple, easy-to-use controls and improved visibility and safety, the company reported.

Trailer design offers improved heaping capability over previous battery hauler designs, the report stated.

The hauler also features “a simpler drivetrain system, which results in significant improvements in initial costs and reduces maintenance costs,” the company reported.

Battery system design is comparatively streamlined. “This may be one of the best improvements on the machine,” the report stated. “Because of Simmons’ ability to offer customized solutions, for the first time in history, the SE30XL offers potential battery interchangeability between haulers and scoops. This makes for tremendous savings in initial purchase, battery maintenance, and retraining costs.”

The model, first designed by company founder Jack Simmons, was in development for a decade. “Extensive testing and validation has been ongoing over the last few months,” the report stated. “Field trials are currently being planned.” Release date is planned for H1 2020.

The hauler is meant to allow miners to adapt to narrowing seams and adopt the most cost-effective practices and equipment, the company reported.

“In today’s competitive climate, incremental tonnage can mean the difference in sustaining a healthy mine operation or closing the doors,” the report stated. “The primary goal the company had in designing the SE30XL was to build the most efficient and highly productive haulage option for low- to mid-seam miners.”



# SELECTION TIPS FOR VIBRATING SCREENS

*When it comes to coal processing, it's not one size fits all for screens*

BY STEVE FISCOR, EDITOR-IN-CHIEF



Elgin Separation Solutions is making some modifications to its multislope screen (above).

To increase capacity and save money on construction costs, many of the newer prep plants have gone to fewer, but larger pieces of equipment, such as pumps, cyclones, centrifuges, etc. The same holds true with screening machines. Many plants have installed large multislope screening machines (or banana screens) because they can process a great deal more material than a conventional screen in the same footprint. That material, however, must be distributed on to the deck effectively on these big machines.

In coal preparation, screening machines serve two purposes: sizing and media recovery. Oftentimes, the initial screening is performed by a scalping screen located outside the plant. This prevents the screens inside the plant from becoming overloaded. The deslime screens make the next cut and most prep plants size to minus 1 mm. The media, or magnetite, is recovered by drain-and-rinse (DNR) screens, which are placed on both the clean coal and refuse streams. Magnetite is quite expensive right now and losing

it to either stream is a major concern for heavy-media plant operators.

Other concerns include downtime due to maintenance, availability of parts, and after-market sales and service. Suppliers today have developed some innovative ways of addressing these concerns.

## The Advent of the Multislope Screen

The mainstay for raw coal deslime and DNR applications continues to be the multislope screen, explained John Casey, vice president-sales for Elgin Separation Solutions, based in Princeton, West Virginia. "Multislope screens can process on average 30% to 40% more tons per hour compared to a conventional horizontal machine in the same footprint."

In 2015, Elgin combined the sales teams from several of its product lines (Tabor Machine, Norris Screen, CMI, etc.) under Elgin Separation Solutions. The group, for example, manufactures screening media or profile and sells it under the Norris brand name. "Given

the opportunity, we would always suggest a prep plant use an Elgin brand, but if they insist on another brand of screen media, we will install it in our machines," Casey said.

This year, Elgin Separation Solutions will introduce an independent cross-member design for its vibrating screen. "When it comes to the multislope, other manufacturers developed successful independent cross-member designs, while we offered a sectional style deck support frame," Casey said. "The engineering work has been completed and we will be discussing this and other processing technologies at the upcoming CoalProTec conference in Lexington during April."

Much like the Chevy and Ford debate when it comes to pickup trucks, Casey explained that there are customers that prefer the independent cross-member design because they can replace the individual cross members as opposed to 4-ft-long sectional decks. "We now have the ability to offer both types," Casey said. "We still have a significant following that prefers the sectional frames."

When it comes to maintenance, Casey explained that the feed end of the machine always has the highest amount of wear, which increases with the volume and velocity of the material fed into the machine. On a multislope screen, the majority of the screening takes place on the first 8 ft to 12 ft of the deck and the last 4 ft to 8 ft of the deck is used for finished screening.

Tabor multislope screens can be used for both deslime and DNR applications, Casey explained. "The difference between DNR and the deslime application is that the deslime is rotated an additional 5° to increase the travel rates and thin the bed for quicker stratification and sizing of the finest

minus 1-mm material,” he said. “For a DNR application, the last deck section sits horizontal and uses the same principles. With the velocity on the feed end, we are able to get the liquid media back to the sumps before the undersize fraction reports to the final DNR.”

Casey doesn't see the need for static sieves with multislope machines. “The multislope machine typically does the whole job,” Casey said. “With some situations, such as large volumes of water, we would use a sieve. As rule-of-thumb with DNR applications, the multislope is a stand-alone piece of equipment.”

Some of the biggest concerns in the coalfields are the availability of product and the after-market service, Casey explained. “After-sales service is really important,” Casey said. “Many mines are reducing their stock levels and relying more on the OEMs to serve as the warehouse. We have satisfied those concerns with additional stocking at our facilities or selling on consignment by stocking at their facility instead of direct billing. With these current market conditions, everyone needs to be a little more creative.”

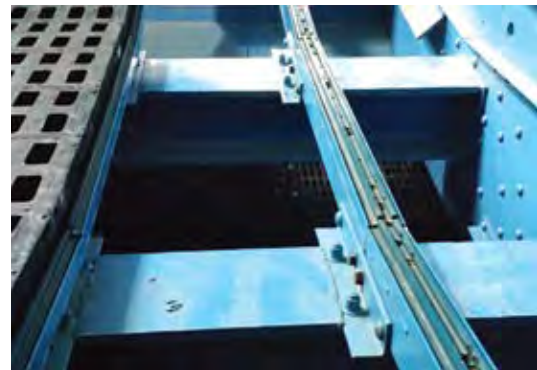
## Screen Machine Selection

Regardless of its use, plant managers need to know several fundamental variables to properly size a screen be-

yond the total feed rate or the tons per hour (tph). Marvin Woodie, vice president-field operations for Conn-Weld, who is also located in Princeton, said some of the requests the company gets make him chuckle. “It never fails. A plant operator will call and say he is processing 500 tph and ask, ‘What kind of machine should I get?’ There's a lot more to it than the feed rate,” Woodie said. “How much water are we handling? If it's a slurry, how much is water and solids. There are other factors that affect wet screening.”

Particle size distribution is another important detail. They need to know the desired separation to determine the size of the openings, Woodie explained. “We need to know specifically if we will have near size to the openings that we are trying to separate,” Woodie said. “There are a number of variables that are used to determine the size and type of the screening machine and the screen media.

“Plant engineers have different philosophies on how they can deslime or size the material properly based on what equipment is used to classify the minus material coming off the deslime screens,” Woodie said. “The oversize material typically reports to the heavy-media circuit (either a vessel or a cyclone) and the undersize fraction reports to some type of fine coal washing



Polydeck has been converting a lot of decks to its PolyRail system (above).

system (cyclone, spirals, flotation, etc.). The magnetite must be recovered from the cyclones. Normally we suggest the use of static screens or sieve units to recover the magnetite. They work in a system to recover the media.”

Woodie said he prefers wedge-wire screens. “That's what we were selling in 1975 when we started building vibrating screen machines,” Woodie said. “It works well for most minus 2-in. applications. There are some applications for polyurethane and we sell it, too. There are lots of screen media out there, but the first consideration should be the process, not wear. If you get the process correct, then you will get a payback on the maintenance faster.”

Profile and wedge wire may wear faster in this arrangement, however, if you're not losing magnetite, then the total cost to the operation is lower on a cost-per-ton basis, Woodie explained. “At \$300/ton for magnetite, you can replace a whole lot of screen panels,” Woodie said. “Heavy-media plants that retain their magnetite are way ahead of the game. Many companies see maintenance costs adding up, but the real payback comes from making sure the process is correct vs. a concern about changing screen panels too often.”

Whether it's used on the clean coal or refuse side, the static sieve on a DNR application should recover 85% of the magnetite, Woodie explained. If it's not sized or designed correctly, the vibrating screen will not be able to return the media to the heavy-media circuit fast



A Conn-Weld multislope screen is lowered into a new prep plant under construction.

enough. It will carry over to the dilute side. Sometimes they try to wash it off with sprays and they end up overwhelming the magnetic separators.”

The surface area of the screen is critical in determining performance. Conn-Weld calculates it using a formula based on tonnage per square foot and that area dictates what size machine should be used. “The capacity of the machine tells us whether to use circular-motion inclined, a banana screen (multislope) or horizontal screen machine,” Woodie said. “Then there is also a high-frequency dewatering screen, which is often used on the reject from the spirals. They operate at 1,000 to 1,100 RPMs.”

Conn-Weld relies on a couple of engineering tools to improve the performance of its machines. “We use Finite Element Analysis to determine stress points in a vibrating screen,” Woodie said. “We also use dynamic measuring equipment that can tell us in the field or in the factory whether a screen is operating correctly or will operate correctly. We use these tools to evaluate a machine’s performance and to tell us how to best design it.

“We have accelerometers that show us the motion of the machine at any point on the machine,” Woodie said. “When we commission a machine, we

instruct the owners how to best service the machine, which ranges from oil changes to suspensions to clamping arrangement of the media on screen surface, wear liners, attaching mechanisms properly. At that time, we also generate a baseline profile and, after the screen has been in service for a while, we can make comparisons to determine if it is still operating as designed.”

The best way to determine if an exciter or a component is failing is by measuring the temperature of the bearings, Woodie explained. “We also listen to hear if it’s operating in a normal range,” Woodie said.

Big banana screens are the new trend and they need to be properly supported. “Some of these machines can be 8- to 14-ft wide,” Woodie said. “It’s critical when designing a plant to properly support these machines with a structure that eliminate the natural frequencies not only in the screening machine but within the structure that supports the screening machine.”

### Matching Media for Performance

Screening process is not a one-size-fits-all process. It is application driven, said Aaron Boggess, industry manager-coal for Polydeck. “For the coal processing business, Polydeck has been converting existing system

to its Polyrail systems and we performed several conversions in 2019.”

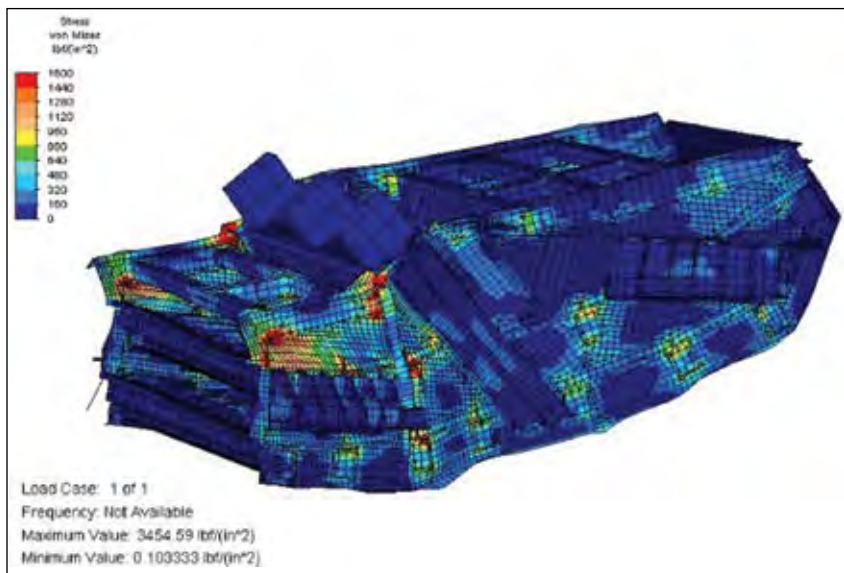
“The manpower at many plants has been reduced and the cost of downtime for maintenance is more critical,” Boggess said. “Many coal-processing plants today are still using 2- x 4-ft profile in a bolt-down configuration. Our modular system takes the place of that. We supply a modular 2- x 2-ft stainless media that is pressure applied to our Polyrail system. The panels can be replaced in 20% of the time it would take to replace a 2- x 4-ft, bolt-down panel. These panels can be used for both desliming application as well as heavy-media DNR applications.

Boggess has noticed a similar trend with customers no longer wanting to buy and store large volumes of media on site. “Getting the product to the customer in the shortest of time from a service standpoint has become more-and-more important,” Boggess said. “Polydeck has established customer distribution centers (DCs) across North America. They track customer usage and they try to maintain a two-day delivery.

The PolyRail adapter strips are manufactured from a rugged polyurethane compound, which provides a long service life. Injection molding technology assures consistent quality and accuracy in the critical area of the locking mechanism.

PolyRail’s one-piece construction allows its adapter strips to be quickly and easily bolted to existing stringer systems with 2-ft stringer spacing minimizing downtime and simplifying panel installation and removal. It can be installed without any cutting or welding. The adapter strips and screen panels install quickly — as little as three to four hours for an 8- x 16-ft deck. It easily installs on a variety of screen types, Boggess explained.

“With more than 1,500 dies, we have a lot of media products in our toolbox that we can use for specific applications that present problems for conventional media,” Boggess said.



Conn-Weld uses finite element analysis to reduce stress points during design.



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Monday features interactive workshops on pumps and an overview of coal prep. The keynote session the next day provides valuable insight as to what is coal's place today and what the future holds. Thirteen technical presentations on Tuesday and Wednesday will cover the latest developments in advanced coal preparation practices and technologies, the design and operation of slurry impoundments and advances in dry coal upgrading techniques.

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## schedule of events



monday april 20	tuesday april 21	wednesday april 22
exhibitor setup 8am - 5pm	keynote session 9am - 10am	slurry impoundments 9am - 11am
pump workshop 10am - 1pm	exhibit open 10am - 5pm	exhibit open 9am - 2pm
coal prep workshop 1pm - 5pm	advanced coal prep 2pm - 4pm	dry coal upgrading tech 2pm - 4pm
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**Workshop 1 - Pumps 101: Slurry Pump Operation and Maintenance**  
Presented by: Kenny Don, global product line manager, Krebs Products



Slurry pumps are a necessary piece of equipment in coal preparation plants and their operation is critical to for plant reliability. Pumps can also account for a significant portion of maintenance costs and downtime, if they are not maintained properly. This workshop sets out to teach attendees not only how slurry pumps work, but also what operating factors can significantly impact pump performance and wear life. Topics of the presentation will include the fundamentals, selection, what affects performance, wear modes, and the best maintenance practices of slurry pumps. The course designed for plant personnel of all knowledge levels, who are involved with the selection, operation, and maintenance of slurry pumps.

**Workshop 2 - Coal Prep 101**

Presented by: Barbara Arnold, president, PrepTech, Inc.

This workshop is intended for equipment manufacturers, utility personnel, coal purchasers, new plant hires or other support staff who would like to develop a better understanding of the principles of coal preparation. It covers a broad range of topics including a review of coal properties important to utilization, coal sizing, cleaning and dewatering operations.

Equipment sections will provide descriptions of common types of coal preparation processes and the factor that influence their performance. A fundamentals section will show participants how to interpret characterization data obtained from particle sizing and float-sink (washability) analyses. Ancillary topics include coal sampling and analysis, coal handling and wear materials.

**Member's Night Out is Tuesday, April 21. Buses will leave from High Street at 6 p.m.**

This networking event will be held at the Talon Winery. Join us for an evening of wine tasting, hors d'oeuvres and dinner, followed by a brief member's meeting, awards ceremony and entertainment. This year, comedian Byron Trimble will have you laughing. It is always a memorable and sold out event.







Two days of Technical Sessions  
Full Abstracts are published on our website at [www.coalprepsociety.org](http://www.coalprepsociety.org)  
under the events tab

### **Advanced Coal Preparation Practices and Technologies (Tuesday, April 21, 2-4 p.m.)**

Impact of Coal Mining on Coal Prep Performance  
Presenter: Dan Yanchak

Maximizing Coal Preparation Plant Performance and Mine Profitability Through the Development, Application and Auditing of Plant Best Practices  
Presenter: Peter Bethel, Steve Keim and Mike Kiser

Arq Energy Unbound  
Presenter: C. K. Lane

SCI Fine Coal Recovery System Provides Insurance Against Lost Tons Through Direct Recovery  
Presenter: Mike Barish, Tony Toney, Dave Osborne and Cliff Raleigh

HHS Process for Ultrafine Coal Recovery  
Presenter: R. H. Yoon

### **Design & Operating Practices for Slurry Impoundments (Wednesday, April 22, 9-11 a.m.)**

Merits of the Continued Use of Upstream Construction for Slurry Impoundments  
Presenters: Seth Frank, PE and Andrew Kolbert, PE

Automation Delivers Safety Benefits for Tailings Facilities  
Presenters: Landon Lounsbury

Vertical Wick Drains to Accelerate Consolidation of Problem Soils Coal Refuse Disposal Impoundment in Western Kentucky  
Presenters: Mitchell S. Halsey

Reclaiming Impoundments using Reinforcing Geosynthetics  
Presenters: Santino Piccoli

### **Advances in Dry Coal Upgrading Technologies (Wednesday, April 22, 2-4 p.m.)**

Reducing Ash Content in Power Plant Feed at Prairie State Energy using Sensor-Based Sorting  
Presenters: Daniel McLean, Harold Cline and Anthony Mattingly

Clean Coal: Differentiating Coal Qualities Using a Sensor Sorting  
Presenters: Lütke von Ketelhodt, Ian Hamilton, Jeremy Hundley and Tyler Huff

The Economic Impact of X-ray Sorting Applications in Coal Production  
Presenters: Charles Roos, Chad Sechrist, Serhat Keles, Wencai Zhang, Aaron Noble, and Rick Honaker

Dry Cleaning of Coal Using the FGX Machines- A Status Report  
Presenters: B.K. Parekh, Ron Bowling and Jing Li



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# FRUSTRATED WITH DIESEL PARTICULATE FILTERS?

BY STEVE FISCOR, EDITOR-IN-CHIEF

With all the advances in emission controls, diesel particulate filters (DPFs) can be found almost anywhere a new diesel engine is operating today. The systems work well for trapping soot, but they can also be a nuisance if they are not properly maintained. A fouled DPF will not operate as efficiently as it should and it could eventually put backpressure on the engine, increasing fuel consumption. Similar to most maintenance practices, waiting to take action will only cost more money.

Original equipment manufacturers (OEMs) have been supplying Tier IV compliant engines to the mining market since 2014. The engines have after-treatment systems that employ DPFs, which are expected to operate 4,000 hours between maintenance intervals. For a haul truck or hydraulic excavator operating three shifts per day, 4,000 hours could be six to eight months. For other non-production equipment, such as dozers, front-end loaders and motor graders, it could be one to two years or more.

Some mine operators, however, are finding they need to manually clean these DPFs much sooner

than the recommended 4,000 hours. Several practices or the lack thereof could be causing the reduced time between maintenance intervals. Most of these units include an active regeneration system that burns off the soot (carbon), but not the metallic residue. To initiate the active regeneration system, the operators must idle their equipment. If they are trying to meet a production target, they might be reluctant. The metallic residue comes from additives in the fuel and engine oil, so it's important to select the proper products for the engine that has the least impact on the DPF.

## Impact of Engine Oils

To comply with emissions policy, diesel engine OEMs began installing after-treatment systems, such as selective catalytic reduction with diesel exhaust fluid. With these systems, they placed an oxidation catalyst and DPF between the engine and the selective catalytic reduction system.

"The DPF is designed to capture the soot so it doesn't escape up the stack," said Dan Holdmeyer, industrial and coolants brand manager,

Chevron Delo. "The inside of the exhaust stack should be much cleaner these days and that's a good thing."

Those after-treatment systems required lubricant suppliers to remove other components in the engine oil to avoid damaging the oxidation catalyst and plugging the DPF, Holdmeyer said. "Today, we are looking closely at SAPHS, the sulfated ash, phosphorus and sulfur found in engine oils," Holdmeyer said. "The sulfur often comes from the base oil and the antioxidants found in additives, which could poison an oxidation catalyst. The phosphorous is used for anti-wear and it can harm a catalyst, too."

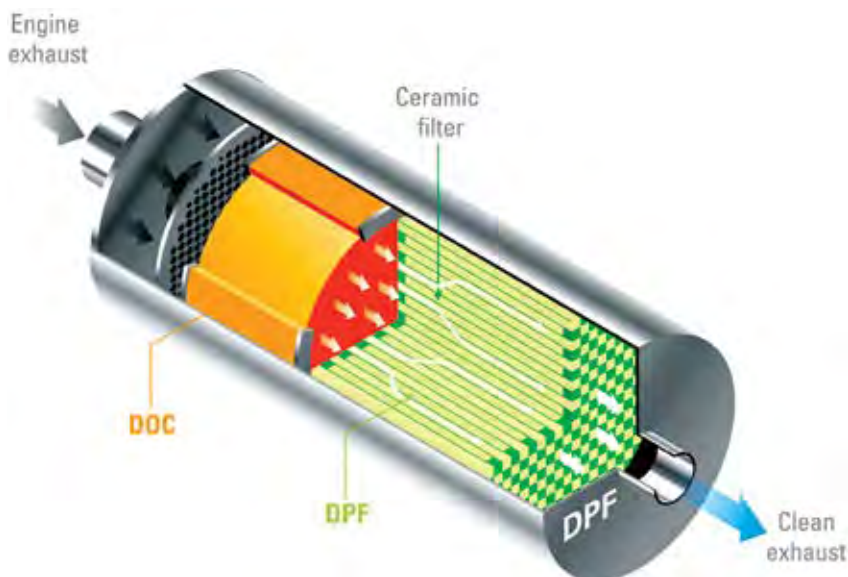
The sulphated ash component results from the metallic additives used in the oil to protect the engine. "To measure the weight of sulfated ash in engine oil, lab technicians burn a small amount of oil," Holdmeyer said. "The ash is washed with sulfuric acid and the remaining metals are weighed."

When lubricant suppliers transitioned from API CI to API CJ engine oils to help protect those after-treatment systems, the amount of sulfated ash declined from 1.5% to 1%, Holdmeyer explained. "Today's API CK4 also has 1% maximum sulfated ash content and some lubricant manufacturers have reduced the sulfated ash below 1%," Holdmeyer said.

## Understanding the DPF

Some equipment operators do not understand how to maintain the DPFs or why. Holdmeyer said some think of it as a Black Box on an airliner. They know it's there, but they don't understand what's inside or how it works.

The DPF is designed to capture soot. The exhaust flows from the catalyst through a ceramic filter, which collects the soot in the DPF and can clog the system. The soot needs to be purged through either passive or ac-



A fouled DPF creates back pressure on a diesel engine's exhaust system.



tive regeneration. Passive regeneration takes place while the equipment is running. Active regeneration, similar to a self-cleaning oven, raises the temperature by burning fuel in the chamber, which yields a light, powdery non-clogging ash.

Over time, DPF will not achieve the same hours between maintenance intervals due to residue build-up. Eventually the system will need to be removed and cleaned thoroughly. The maintenance crews at some mines have been trained to do this, while other operations outsource it.

OEMs said the DPFs should last 4,000 hours, but some operators and maintenance managers are reporting 1,500 to 2,000 hours instead. Why?

One possibility could be the equipment operators. When they get the active regeneration warning, they have to pull to the side and dump fuel into the exhaust, ignite it and raise the exhaust temperature up to 1,000°F, so it can regenerate, Holdmeyer explained. That uses a lot of fuel and the additives in the fuel increase the residue that clogs the DPF. Over time, a plugged DPF causes backpressure and more fuel consumption.

If an operator is under pressure to meet production goals, they might override that call for active regeneration. “If they neglect it for too long and the heat and pressure builds to the point where it cracks the DPF, they are now facing an \$8,000 replacement cost rather than a \$1,000 maintenance cost for properly cleaning the DPF,” Holdmeyer said. “Failing to understand the DPF can create a lot of headaches with spent fuel, replacement parts and lost productivity due to downtime — and that’s just the soot aspect.”

The metallic ash that fouls the DPF results from the additives in the unspent fuel coming off the engine and burnt oil going through the exhaust. “Those hydrocarbons and additives are now in the exhaust,” He said. The active regeneration burns off the oil and soot, but it can’t burn

off that metallic additive. That builds up in the DPF and diminishes its capacity over time.

The OEM-recommended 4,000 hours is based on standard operating conditions. “Miners that are pushing machines longer and harder than the OEMs expect are burning more fuel, which translates into more soot and metallic ash,” Holdmeyer said. “They are spending more money on DPFs and fuel.”

Chevron Delo has been studying this for a while and they are looking

at ways to reduce the contamination of the DPF, Holdmeyer explained. “We’re exploring ways to minimize it from both an operations and maintenance standpoint,” Holdmeyer said. “We’re trying to help people understand how much life they should be getting from a DPF. We want to educate the market and help mitigate these issues.”

The company is currently working on new oil technology, which will help with fuel consumption and DPF life and Holdmeyer said miners can expect more results soon.



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## JENNMAR LAUNCHES XCAL

JENNMAR announced that it plans to rebrand TungsteMet as XCAL Industries ([www.xcalindustries.com](http://www.xcalindustries.com)), which manufactures tungsten carbide blanks. The company also announced it would form XCAL Tools ([www.xcaltools.com](http://www.xcaltools.com)) to consolidate several lines, including JENNMAR McSweeney's, JENNMAR SANSHELL, Cuda Tools Inc. and JENNMAR Construction Tools.

"XCAL Industries and XCAL Tools will bring tremendous capabilities and increase our product offerings of tungsten carbide blanks and cutting tools with new hard facing capabilities for North America's mining and tunneling industries," said Tony Calandra, group president of Frank Calandra Inc. and Calandra Group LLC, which owns JENNMAR. "All products will retain their product name and we will be producing the same quality products made by quality people."

Calandra explained that the company is constantly seeking ways to enhance the experience for miners. "This rebranding will not affect or delay any current business and business will continue as usual," Calandra said. "Our focus and commitment to the mining business is guided by three words: Safety, Service and Innovation."

### Experience Centers Shape New Mining Leaders

Immersive Technologies has established Experience Centers at five of

its largest offices worldwide to demonstrate workforce optimization solutions, while sharing knowledge and best practices with mining industry professionals.

The Experience Centers are designed to offer real business value, market leading insights, and inspiration for all mining executives seeking to improve the performance of their operator workforce.

The first Experience Center was inaugurated during late October in Perth, Western Australia. Immersive Technologies hosted more than 35 young professionals and university students as part of the recent Australasian Institute of Mining and Metallurgy (AusIMM) New Leaders Conference.

The AusIMM New Leaders conference series is aimed at strengthening professional foundations for future growth, along with showcasing the industry's latest innovations, products and services. By providing conference delegates access to the Perth Experience Center, Immersive Technologies helped inspire the next generation of industry leaders, exposing them to the latest simulation technology, and provided an understanding of key mining workforce challenges.

AusIMM CEO Stephen Durkin said that AusIMM has a deep commitment to supporting the future resources workforce. "Conferences such as New Leaders provide valuable

opportunities for the next generation to connect with industry and gain first-hand experience of the technology that is shaping the future of our sector," Durkin said.

### Carlson Offers Software Upgrades

Carlson Mining 2020 features upgrades to existing options, new tools and functionality enhancements. The package includes three modules, Geology, Surface Mining and Underground Mining. It runs on AutoCAD 2015-2020 and comes with IntelliCAD 9.2.

"Carlson Mining 2020 provides dozens of new updates to the various modules, enhancing block modeling, variograms, mining solids with improved 3D viewing and rendering, design and scheduling," said Grant Wenker, vice president, Carlson Mining. "These additions further expand the capabilities of the Carlson Mining Suite, linking the office software closer to the Carlson Laser Measurement and Machine Control solutions."

Carlson Mining 2020's Variogram features multiple updates like the ability to process multiple strata and attributes at once, data point compositing, cross variable geostatistical analysis with cross variograms, a method to auto-fit model variograms, and output lag results.

The Block Model Viewer in Carlson Mining now shows a legend of grade names and assigned colors. Users can now switch the grade parameters for viewing the blocks colored by a different attribute, without exiting the command. Users can also define new grade parameters by attribute value range while in the viewer.

The Surface Equipment Timing has several upgrades with the 3D pick tool such as the ability to define attribute equations to display in the charts, tooltip settings that allow values to show, automatic tracking of non-key tonnage, and an undo button. Speed



New Leader's conference attendees experience market leading simulators, e-learning and VR tools from Immersive Technologies. (Photo: Immersive Technologies)

has been improved — allowing pit assignment within a few seconds even with up to 35,000 pit blocks.

There are new commands to create solid models including by grade from a block model and by 3D triangulation from a cloud of points. Additionally, there is a new option to create a solid using a Carlson surface object — providing better performance, as opposed to drawing hatched 3D faces, especially on larger models. The new solid-by-section model uses a series of slices through a model to make edits.

Another new tool within Carlson 2020 is the Settings Migration Wizard. The Settings Migration Wizard is a new way to transfer Carlson and CAD settings between previous versions of Carlson. When using Carlson 2020 for the first time, the Migration Wizard gives users the chance to transfer the settings. The Migration Wizard can be accessed anytime from the settings menu.

### Thriveni, Zyfra to Implement First Intelligent Mine Project in India

Thriveni Earthmovers Pvt. Ltd. (Thriveni), through a joint venture, operates National Thermal Power Corp.'s (NTPC) Pakri Barwadih coal project in Jharkhand, India. Thriveni has awarded Zyfra the contract to implement its Intelligent Mine solution at Pakri Barwadih.

Zyfra's mining division, formerly known as the VIST Group, is a leader in automation for large mining companies in Africa, Asia and the Middle East.

"Our investment to collaborate with Zyfra is to ensure the latest technology intelligence like IIOT and AI capabilities are available," said B. Prabhakaran, managing director of Thriveni.

Zyfra's Intelligent Mine solution includes ZM Karier, Mine Fleet Management System with automatic dispatch system of haul trucks; ZM Drill, Automated Drilling and Blasting Control System; and ZM Scarex, Machine Guidance Digging Systems, integrated with Payload and Fuel Level Monitor-

ing System, Tire Management System, Equipment Diagnostic Systems, and other resource planning and application software for data import and export related to planning, production, equipment performance, manpower attendance, real-time analytics. The customer has remote access from anywhere to the existing network, which will be available in English, Hindi and other vernacular languages as required.

Zyfra will supply, install, configure, integrate a complete package of




equipment, and then operate, maintain the system and impart training for a period of one year.

Automatic dispatching and optimization software allocates mining equipment, creates a schedule and assigns routes to mobile equipment according to the production objectives in real time. Payload and fuel level monitoring system allows optimizing average payload of haul trucks and eliminating underloading and overloading.

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# SDLG ROLLS OUT HEAVY-DUTY GRADER



Chinese equipment manufacturer SDLG recently added the G9290 to its range of motor graders. With a base operating weight of 22.9 metric tons (mt) and a 14-ft blade as standard, the impressive productivity of blade down force and blade pull makes the SDLG G9290 the best in its size class.

The size and strength of the SDLG's new 9290 motor grader make it ideal for haul road maintenance at mines, according to the company.

The robust design of the new G9290 motor grader builds on the proven reputation of the company's smaller graders — the G9138, G9190 (VHP) and G9220 (VHP) — when it comes to the moldboard, circle turn, drawbar, front axle and rear tandems.

However, the G9290 adds a new level of quality with its Volvo-supplied engine and Volvo-designed transmission. The SD130B Stage II common rail diesel engine offers high torque at low revs from a 211-kW output with variable horsepower (VHP) technology as standard. Meanwhile, the HT-E840S transmission, designed specifically for motor graders by Volvo, has eight speed forward gears and four speed reverse gears all with automatic shifting. The engine is cooled by a thermostatically controlled, hydraulically driven fan, which can be re-

versed simply by flipping a switch in the cab for easy radiator fin cleaning.

The moldboard is kept level at all times by the 16° oscillation on the heavy-duty front axle, 18° wheel leaning and +/-15° oscillation on the rear tandem, ensuring quality, fine grading.

The heavy-duty chain-driven tandem with a no-spin differential lock on the rear axle and heavy-duty bearings, meanwhile, delivers outstanding traction and reliability.

The circle turn, exclusive to SDLG, uses twin-gear hydraulic cylinders to provide instant, high-output torque, enabling moldboard rotation under heavy loads. This means there is no need to stop, reverse and change moldboard angle. Having circle turn gears on the outside of the ring gives the benefit of less mud and debris stuck to the gears and hence less wear, less maintenance and longer durability.

The SDLG circle drive system comes with five support shoes on the G9290 and non-greasing slide bushings for better grading, an extended service life and easier maintenance. SDLG graders also feature an asymmetric drawbar ball stud that can be rotated 180° to keep the drawbar in horizontal level position.

A box-type design on the rear frame offers superior strength and du-

rability, accommodating the drivetrain as well as rear attachments. For example, SDLG offers a parallel rear ripper for the G9290 fitted with three ripper shanks. The ripper frame can also accommodate scarifier teeth if required.

A ROPS/FOPS certified cab ensures the safety of the operator. It is fitted on the front frame of the G9290 in order to reduce vibrations and heat from engine and transmission. Entry and exit can safely be made with three-point contact all the way. The cab is fitted with LED work lights to ensure safe operation even in the absence of daylight.

With large openable doors at the side and at the rear, the G9290 provides excellent access to all the main maintenance points. For convenience, all filters are grouped together on the left side of the engine. The extensive SDLG dealer and service network ensures that customers always receive excellent support and reliable backup. [www.sdlg.com](http://www.sdlg.com)

## Self-priming Centrifugal Pump

The Series 2100 trash- and solids-handling, self-priming pumps from Vertiflo Pump offer easy access to the impeller and case to remove debris. It has an oversized, tapered bore and a self-flushing seal chamber. It also has the industry's first optional external flush, resulting in extended seal life. Back pullout design with external impeller adjustment, plus a replaceable case wear plate allows for continuous high efficiency performance.



The Series 2100 has capacities to 1,300 gpm, heads to 112 ft and is available in 3-, 4- and 6-in. sizes. It is capable of handling solids with up to 3-in. diameter spheres. Additionally, the suction lifts to 25 ft.

[www.vertiflopump.com](http://www.vertiflopump.com)

### Suspended Permanent Magnets

The CP-20 Series of Suspended Magnets from Eriez use a single-pole permanent magnet circuit to provide a uniform field across the feed belt to optimize separation efficiency of damaging tramp iron. These reliable, low-cost suspended magnets have a maximum suspension height of 10 in. and are available in both manual and self-cleaning configurations.

TP-25 Series Magnets use a twin-pole permanent magnet circuit to provide maximum ferrous removal at higher suspension heights. The twin-pole magnetic circuit used by the TP Series Magnets allows for horizontal lift of longer ferrous objects, such as rebar or wire. This results in improved ferrous removal and longer life for the self-cleaning belt. These suspended magnets have a maximum suspension height of 12 in. and are available in both manual and self-cleaning configurations.

The self-cleaning versions of both the CP-20 and TP-25 Series Magnets

are available with either a standard electric drive or a hydraulic drive.

<http://erieznews.com/nr499>

### Application-specific Seals for Conveyor Idlers

Superior Industries said it will introduce a group of application-specific idlers seals at CONEXPO-CON/AGG 2020. They're one of a dozen new products the company will introduce. "These next-generation SpinGuard Idler Seals will offer greater protection in applications known to expose bearings to fugitive material prematurely," said Paul Schmidgall, chief engineer of Superior's conveyor components division. "We tested dozens of seal iterations over more than five years and we think we have some pretty robust options."

Superior offers four application-specific conveyor idler seals: SpinGuard Wet Seal; SpinGuard Dry Seal (dusty applications); SpinGuard Low Drag Seal (for overland or long distance conveying); and SpinGuard Titanium Seal (for the most extreme conditions including wet and slurry applications). Each class of seal will be easily recognized by a unique color: Wet Seals are blue, Dry are



ivory, Low Drag are green and the Titanium Seal is silver.

[www.superior-ind.com](http://www.superior-ind.com)

### The Fat Truck

Premier Truck Rental will be among the first firms to bring to the United States the Fat Truck, designed and assembled in Canada. It can move up to eight people or 1 metric ton (mt) of payload across terrain that in the past might have required helicopter transport or been totally inaccessible — including on wet and flooded lands.

The Fat Truck is designed with safety foremost in mind and is certified to the highest ROPS standards, is compliant with Environmental Protection Agency guidelines, and offers 360° visibility to the driver, among other safety features.

It has an intuitive joystick drive and dash display, automatic transmission, and the ability to be driven on the left or right side of the vehicle depending on customer requirements.

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# 2020 HINDSIGHT

BY MARK SAVIT



Looking back at 2019, I can see that we achieved yet another record low of 24 fatalities for the year. We have no matching work hour data to determine actual rates, rather than raw numbers, but even so, any reduction in fatalities and injuries is good news. However, the one thing that we can all agree on is that 24 fatalities is 24 too many and we can always do a better job. What can we do better?

With few exceptions, the Mine Safety and Health Administration (MSHA) has historically taken the view that its principle mission is enforcement of its regulations without any real consideration of whether enforcement is the most effective way to increase the safety and health of miners. It's time for that consideration to take place. It's high time for all of us to take a hard, objective, dispassionate look at what the best way to reduce fatalities and injuries in our industry actually is. MSHA's own data shows that fatalities have remained roughly constant over the last five years and that there has been no definitive downward trend in the last 10. Assuming that data is correct, there ought to be no argument that something needs to be done.

The only way that progress can be made is if MSHA and industry engage in a genuinely cooperative effort to develop a new, more effective approach. In that regard, it's worth repeating that the Mine Safety and Health Act is essentially 50 years old and many of the regulations under it come from pre-existing rules that are even older than that. What unquestionably worked to reduce hazards 50 years ago will not have the same impact now. Times have changed and solutions need to change with them. We must cooperate in the effort to achieve that change.

A suggestion as to how to start this cooperative process would be to take a different approach to rulemaking. MSHA's latest regulatory agenda state that the new proposed regulation intended to reduce the potential for mobile equipment accidents. While the agency did solicit suggestions and comments from stakeholders on this topic, MSHA has not given the regulated community any indication as to even a general concept for such a regulation. If MSHA follows its traditional pattern of rulemaking, the first the regulated community will hear of the rule will be when it is formally proposed.

Rather than taking that approach, MSHA should consider engaging in negotiated rulemaking rather than using the traditional notice and comment process. In the negotiated rulemaking process, all parties gather to try to achieve consensus on the final text of the rule. This approach has been used successfully in the past by the Occupational Safety and Health Administration (OSHA) with regard to a number of rules, most notably the regulations on crane safety.

Negotiated rulemaking would be particularly appropriate here given the huge variety of conditions, equipment and circumstances that need to be addressed and the variety of equipment types, models and ages that it needs to cover. In a negotiated rulemaking, mine operators, miners' representatives, manufacturers of both equipment and safety accessories, contractors, safety consultants, and even insurers could meet and hash through the best approaches to the complex issues associated with this problem.

MSHA's last major rulemaking, workplace examinations for metal/nonmetal mines, was amended shortly after its promulgation. It was challenged in court two years after it became a final rule. The challenge struck down the

amendment, but the rule remains embroiled in litigation, which, if successful, would completely repeal the current rule and reinstate its predecessor. Had all of the interested parties been allowed to cooperate on the language of the rule in the first place, the current litigation might have been avoided.

The same approach could bring improvements to the inspection and enforcement process. The act mandates that MSHA not just inspect conditions, but also inspect "practices." MSHA might want to take that mandate a bit more seriously. The agency could shift some of the regulatory efforts toward talking to miners at companies with exemplary safety records about what they think is responsible for their success.

Recently, the Society of Mining Engineers was approached by representatives of the construction and manufacturing industries about exactly that. They said they had done their research and it showed that our industry had improved the most in terms of reductions in injuries and fatalities. They wanted to talk to us to find out what we are doing right.

During the 1980s, the mining industry suffered more than 200 fatalities per year. Since then, we have reduced that total by approximately 90%. While mining employment has dropped during that period, the decrease in injuries and fatalities has far outstripped that drop. We have every right to be proud of what we have done.

Everyone agrees that we must do better. We must look back at what has worked, take stock of what has not, and use that analysis as the catalyst for regaining the pace of improvement that has marked the last 30 years, but has been lost in the last five.

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