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2019 Prep Plant Census

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Coal Age

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THIS ISSUE

This month, in addition to the annual Prep Plant Census, Coal Age *reviews different aspects of overburden removal. On the cover, articulated haulers and an excavator tackle 100-ft-thick overburden at Point Lick Energy's Camel's Creek site in West Virginia. (Photo: Volvo)*

FEATURE ARTICLES

LEADING DEVELOPMENTS

U.S. NEWS

WORLDWIDE NEWS

DEPARTMENTS

Navajos Become Third Largest US Coal Producer

BY STEVE FISCOR
PUBLISHER &
EDITOR-IN-CHIEF

As this edition was going to press, the Navajo Transitional Energy Co. (NTEC) had finalized its acquisition of the Spring Creek mine in Montana and the Cordero Rojo and Antelope mines in Wyoming. NTEC purchased the mines from Cloud Peak Energy (CPE) during its Chapter 11 bankruptcy proceedings. The transaction makes NTEC the third-largest coal producer in the country.

"With the acquisition of these mines, NTEC is thrilled to become a neighbor and important employer in Montana and Wyoming," Clark Moseley, president and CEO of NTEC, said at the time the deal closed. "We look forward to working with the existing team of 1,200 employees and implementing our exceptional record of safety, reclamation and community partnership in the Powder River Basin."

The Antelope and Cordero Rojo mines are the third- and fifth-largest coal mines in the country, respectively. Spring Creek has made headlines as a coal exporter and NTEC said it planned to take full advantage of its export capacity at Westshore Terminals. Moseley said he was looking forward to working with all the new partners to return these mines to profitability, but they hit a snag with Spring Creek.

NTEC is a single-member limited-liability company organized under the laws of the Navajo Nation, which owns the Navajo mine, near Fruitland, New Mexico. NTEC operates the Navajo mine pursuant to a limited waiver of sovereign immunity and has won numerous awards for its safety and reclamation record, including awards from the Office of Surface Mining (OSM) and the National Mining Association (NMA). This year alone, NTEC and Bisti Fuels LLC received three different awards, including the Sentinels of Safety award from the NMA, the Good Neighbor Award from the OSM, and the 2019 Excellence in Reclamation award by the New Mexico Mining Association.

An impasse with the Montana Department of Environmental Quality (DEQ) over sovereign immunity has resulted in the shuttering of operations at Spring Creek — putting people out of work. Despite months of productive conversations with the agency, the DEQ demanded a full and complete waiver of sovereign immunity from NTEC. NTEC offered a partial waiver, allowing the company to be regulated by Montana under any and all state laws. Carlson Goes Ahead, vice chairman of the Crow Tribe of Indians, wrote a letter to Montana Gov. Steve Bullock requesting that "the state of Montana maintain consistency in its relations amongst tribes and extend NTEC the same comity and respect it has shown to tribal nations located within the state."

Montana DEQ and NTEC reached a short-term agreement that will allow coal production at Spring Creek to resume. The interim agreement will keep the mine operating for 75 days while the two parties continue negotiating a long-term agreement.

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BPA WORLDWIDE BUSINESS

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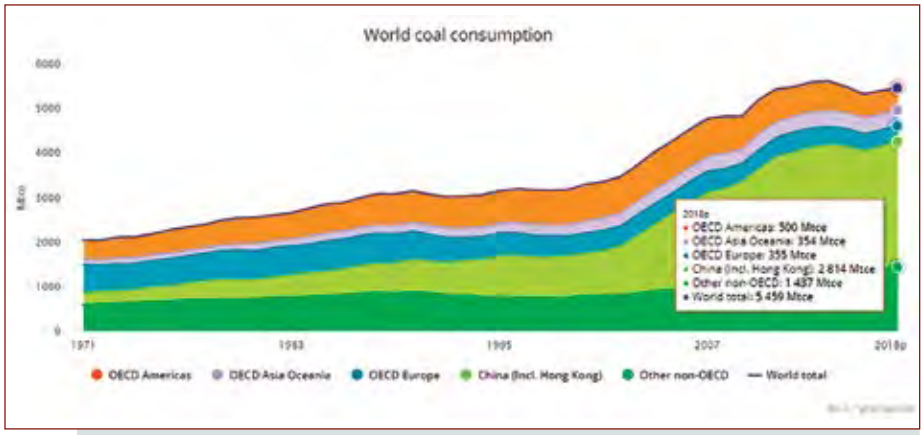
Coal Reigns Supreme in Southeast Asia Power Market



Worldwide coal-fired power generation has grown steadily and will continue to do so.

According to a new report by Wood Mackenzie, coal will continue to be the dominant fuel source in power generation, peaking at 2027 before slowing down and accounting for 36% of the region's generation mix in 2040.

By then, total power demand in Southeast Asia is expected to double from 1.05 petawatts per hour (PWh) in 2018 to 2.46 PWh.

To meet the rapidly increasing power demand, Southeast Asia will have to invest an average of US$17 billion annually in power capacity. Coal should account for most of this investment in the medium term, before being overtaken by spending on gas-fired generation. By 2034, investments in solar and wind power plants should surpass that of gas power plants.

"The narrative surrounding coal has been pessimistic across the world," said Jacqueline Tao, research associate, Wood Mackenzie. "This will result in the gradual slowdown of new coal-fired capacity in Southeast Asia. However, the reality of rising power demand and affordability issues in the region mean that we will only start to see coal's declining power post 2030."

Incremental coal will decline over time as the cost of renewables decreases and pressure on environmental grounds increases. By 2040, solar and wind power plants will lead in the region's power capacity mix at 35% or 205 gigawatts (GW).

"Collectively, investments in wind and solar power supply makes up 23% of total power investment, amounting for more than US$89 billion from 2019 to 2040," Tao added. "This is despite renewables being less cost competitive in the region compared to the rest of the world, and challenges such as land acquisition and intermittency issues," Tao added.

Often touted as a transition fuel, the percentage of gas in the region's power mix should remain flat at about 30% through to 2040. Southeast Asian total gas demand will grow from 14 billion cubic feet per day (bcfd) today to more than 23 bcfd by 2040, supported by the continued infrastructure expansions in Thailand, Vietnam and Indonesia.

Murray Energy Faces Potential Default

Murray Energy Corp. (MEC) announced on October 3 that it did not make amortization or interest payments that were due September 30 to its major lenders and has entered into forbearance agreements with them. The lenders agreed not to take legal action against MEC until October 14.

These lenders hold in excess of 50% of outstanding loans under its Superpriority Credit and Guaranty Agreement (SCGA) and with lenders holding in excess of 50% of outstanding loans under its ABL and FILO credit facilities.

Murray Energy said this will allow it to continue discussions with its lenders about various options to strengthen the company's business, improve its liquidity position, deleverage its balance sheet, and achieve a more sustainable capital structure to support the long-term business plan.

Moody's Investors Service downgraded all ratings for MEC, including the company's Corporate Family Rating (CFR) to Ca from Caa1, and placed the ratings on review for further downgrade.

"Murray Energy's capital structure is not sustainable amid a sharp reduction in pricing for export thermal coal in 2019 and intensifying competition for declining domestic demand," said Ben Nelson, Moody's vice president of senior credit officer and lead analyst for MEC. "While the company has pursued series of distressed debt exchanges dating back to early 2018, deemed tantamount to default by Moody's, the erosion in market conditions clearly will increase financial distress in the second half of 2019."

At the beginning of October, Foresight Energy reportedly failed to make its interest payment, invoking a 30-day grace period to

evaluate options, according to *Bloomberg*. In 2015, Murray bought a controlling stake in the St. Louis, Missouri-based company.

China's Coal Imports Rise This Year

China's coal imports have grown this year, but this may be about to change, assuming Beijing takes steps to ensure that growth for the whole of 2019 is more or less zero. Total coal imports rose 8.1% in the first eight months of the year to 220.8 million metric tons (mt), a gain of 17 million mt. Looking specifically at seaborne imports, which exclude overland shipments from countries such as Mongolia, the growth looks even more impressive. Seaborne imports were 191.3 million mt in the January-August period, up 11.4% from 171.8 million mt in the same period last year.

Opposition to ACE Shot Down in US Senate

The Senate voted to halt the Affordable Clean Energy (ACE) rule during October. This rule replaced the former President Barack Obama's Clean Power Plan (CPP). In a 41-53 vote, the Senate rejected the Congressional Review Act resolution to stop the ACE rule.

New U.S. National Mining Association (NMA) President and CEO Rich Nolan applauded the majority of senators that stood up in defense of the ACE rule and "rejected a clear case of political theater."

He continued, "The ACE rule shows that it is possible to advance the nation's environmental protections while preserving the rightful authority of the states to manage their own unique energy infrastructure and electric grids. Unlike the prior administration, this EPA has chosen to follow the law instead of picking winners and losers, and through that path has paved the way for a smart, all-of-the-above energy strategy that makes affordable, reliable electricity accessible for all Americans."

The ACE vote never reached the numbers needed for repeal and was regarded as symbolic for lawmakers clinging to anti-coal policies.

Peabody Will Close Wildcat Mine, Prep Plant

Peabody Energy will permanently close the Wildcat Hills coal mine in southern Illinois and a nearby coal-processing plant late this year, according to the *AP*. The closure of the mine Willow Lake preparation plant will affect 225 workers.

Peabody Energy said the mine and processing center at Arclar Complex in Saline County will cease production December 14 due to "uneconomic mining conditions," as reported by the *AP*.

The *Southern Illinoisan* reported that the closures and job losses are expected to be permanent. Peabody Energy said it will work with employees interested in seeking positions at the company's other operations in the Midwest.

BHP Shareholders Reject Anti-coal Resolution

BY JESSE MORTON, TECHNICAL WRITER

At its annual general meeting, BHP shareholders voted against the company pulling out of industrial organizations with pro-coal ties, according to wire reports.

The resolution foisted at the meeting in London was worded to align the multinational mining company with United Nation's climate change initiatives. Corporate leadership had pursued the action for almost two years.

Shareholders overwhelmingly voted it down. At the meeting, 42% of the shareholders voted on the resolution and overall a paltry 22% voted in favored the resolution.

Corporate leadership at BHP, the largest mining company by market capitalization and the largest coal producer in Australia, had previously pined to pull out of the World Coal Association, the Minerals Council of Australia, and even the U.S. Chamber of Commerce — all groups that support continued coal use through political advocacy.

If the resolution had passed it would have made BHP the latest large global institution moving to align better with the climate-change agenda.

Over the course of the last two years, Rio Tinto's corporate leadership advocated policy moves similar to those pushed by BHP leadership. Glencore, No. 3 in market cap behind Rio Tinto, in April reported it would not produce any more coal than it does now in an effort to align with UN initiatives. However, it didn't report it would sell or scale coal production back.

On October 16, insurer Axis Capital Holdings announced it will not provide new insurance or reinsurance to coal miners, some of their suppliers, and others involved in fossil fuels.

In August, Commonwealth Bank of Australia announced it was nixing financing coal projects.

In Q1 2019, China's behemoth State Development & Investment Corp. declared it would cease investing in coal power.

In Q3 2018, Munich Re, the world's biggest reinsurer, reported it will cease investing in companies with certain ties to coal.

In Q2 2018, Norway's $1 trillion wealth fund reported it was moving to cut coal investments. Synchronously, the Royal Bank of Scotland, one of the oldest, biggest and most storied banks in the world, declared it was restricting lending to coal projects. Around that time, Pensioenfonds Van De Metalektro, a $55.4 billion pension fund in the Netherlands, said it was pulling out of investing in coal-linked companies. And HSBC, the largest bank in Europe, announced it would stop financing coal projects.

In Q1 2018, the monolithic Lloyds Banking Group reported it will not fund coal mines or coal power projects.

American Resources Completes Purchase of Perry County Coal Assets

The first train loaded with American Resources coal leaves the Perry County Coal loadout.

American Resources Corp. has closed on the purchase of a majority of the assets of Perry County Coal LLC from Cambrian Holding Co. Inc., which entered into Chapter 11 bankruptcy protection on June 16. The assets were acquired free and clear of all liens and American Resources assumed no liabilities other than $9,614,000 in reclamation bonds and other non-material contractual liabilities, according to the company.

The company also negotiated to receive cash consideration at closing of $250,000 in addition to payments of the next two payroll cycles of the Perry County operations, which equates to approximately $1.5 million. The payroll obligation will be repaid to the lender, an affiliate of one of the other purchasers of the Cambrian assets, at the end of 12 months in addition to a 4% annual interest rate, according to the company.

"This acquisition is a significant step for the company as it expands our presence in the global infrastructure market," Chairman and CEO of American Resources Mark Jensen said. "The assets of Perry County Resources fit extremely well within our current platform, both geographically and strategically. We're confident that our efficient, low-cost operating structure will enable us to improve performance and enhance profitability, which will set these assets up for long-term success and provide the world with a high-quality resource for infrastructure development, while also providing long-standing stable employment for the hard-working men and women at these operations."

American Resources said it will work with current personnel to integrate it into American Resources' platform.

Prior to closing the acquisition, the complex consisted of three active mines — two underground mines and one surface mine — with access to more than 110 million tons of carbon deposits consisting primarily of PCI, high-quality semi-soft coking and industrial stoker carbon. The Perry County assets also included the Davidson Branch Preparation Plant, capable of processing 1,300 tons of carbon per hour, more than 300,000 tons of on-site carbon storage, and batch weight rail loadout with access to the CSX Railroad.

Perry County was in the process of extending a belt line from the preparation plant to the course refuse impoundment. The company said it is immediately implementing a plan to get this project completed and operational.

Contura Pays $90M for Blackjewel PRB Mines

On October 18, Contura Energy Inc. closed on the transaction with Eagle Specialty Materials LLC (ESM), an affiliate of FM Coal LLC, to acquire the Eagle Butte and Belle Ayr thermal coal mines located in the Powder River Basin (PRB) in Campbell County, Wyoming.

On October 2, as part of the bankruptcy proceedings for Blackjewel LLC, Blackjewel Holdings LLC and certain affiliated entities, the U.S. Bankruptcy Court for the Southern District of West Virginia approved the sale.

Contura paid cash consideration to ESM of $81.3 million at closing and has agreed to pay an additional $8.7 million into an escrow account to be used to make payments in respect to a federal royalty claim against Contura Coal West, and has also agreed to convey certain Wyoming real property to ESM. It has also paid $13.5 million to Campbell County, Wyoming, for ad valorem back taxes, has waived its rights to the remaining $3.05 million of a purchase deposit provided to the debtors, and has released or waived certain other claims against the debt-

ors or with respect to certain of their assets. ESM has agreed to indemnify Contura and its affiliates against all reclamation liabilities related and against federal, state and local claims for royalties, ad valorem taxes and other amounts relating to the Western assets for the period beginning on December 8, 2017.

The surety bonding previously posted by Contura's subsidiary, Contura Coal West LLC, with the state of Wyoming Department of Environmental Quality, Land Quality Division (DEQ) has been replaced with substitute surety bonds arranged by ESM in the amount of approximately $238 million, and neither Contura nor Contura Coal West will have any liability in respect of those substitute surety bonds. As part of an agreement with Contura Coal West, Eagle Specialty Materials, FM Coal and the United States Department of Interior's Office of Surface Mining, Reclamation and Enforcement (OSM), OSM has agreed that any bond forfeiture related to the mines will not be linked to or held against Contura Coal West and OSM will not link Contura Coal West to any Surface Mining Control and Reclamation Act of 1977 violation by Eagle Specialty Materials.

ESM will operate the mines during the transfer process of certain state permits held by Contura Coal West and certain state and federal leases held by an affiliate of Blackjewel. ESM has agreed to use commercially reasonable efforts to cause the permits to be transferred as promptly as possible.

"Closing this deal with ESM brings about a positive result for our company and the many stakeholders involved in this transaction," Chairman and CEO David Stetson said. "In our view, this transaction represents a best-case-scenario outcome to a lengthy and uncertain process, putting the mines in the hands of an operator with a long-term interest in the PRB, and getting hard-working coal miners back on the job."

Contura was a prior owner of the Western assets through its subsidiary, Contura Coal West, though the company has not operated the mines since selling the assets to Blackjewel in December 2017. Because the permit transfer process relating to that transaction was not completed prior to Blackjewel's filing for Chapter 11 bankruptcy protection, however, Contura Coal West remains the permitholder in good standing for both mines and has maintained bonding to cover related reclamation and other obligations.

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 (9/28/19)

	YTD '19	YTD '18	% Change
Wyoming	203,953	224,462	-9.1
West Virginia	71,207	71,673	-0.6
Pennsylvania	37,780	37,070	1.9
Illinois	36,706	36,909	-0.5
Kentucky	28,498	29,714	-4.1
Indiana	25,698	25,352	1.4
Montana	24,346	27,518	-11.5
North Dakota	20,013	22,184	-9.8
Texas	16,390	19,064	-14.0
Alabama	11,354	11,047	2.8
Appalachian Total	148,464	149,976	-1.0
Interior Total	99,704	102,397	-2.6
Western Total	285,913	307,155	-6.9
U.S. Total	**534,082**	**559,528**	**-4.5**

WEEKLY SPOT PRICES

($/ton) — Week Ending (10/11/19)

Central Appalachia	(12,500 Btu, 1.2 SO_2)	$65.40
Northern Appalachia	(13,000 Btu, < 3.0 SO_2)	$57.90
Illinois Basin	(11,800 Btu, 5.0 SO_2)	$38.95
Powder River Basin	(8,800 Btu, 0.8 SO_2)	$12.15
Uinta Basin	(11,700 Btu, 0.8 SO_2)	$34.10

Source: Energy Information Administration

Thiess Wins $1.3B Curragh Extension in Australia

Thiess will continue to provide overburden removal and haulage at the Curragh mine.

Thiess has been awarded a six-year A$1.3 billion contract extension by Coronado Global Resources Inc. to provide mining services at the Curragh mine in Queensland, Australia. Under the extension, Thiess will continue to provide overburden removal and haulage, mining and run of mine rehandling services, equipment maintenance, and pit dewatering.

Located in the metallurgical coal-rich Bowen Basin, Thiess has a long record of service at the Curragh mine, having operated at the project since 2004.

"Thiess has a consistent record of exceeding our client's expectations at the mine, through a focus on operational excellence and innovation, and an unrelenting commitment to safety culture and outcomes at Curragh," CIMIC Group CEO Michael Wright said. "This contract extension reflects Thiess' ongoing ability of creating lasting value for its clients."

In addition to this contract, Thiess will continue delivery of its existing scope of works, including the operation and maintenance of the client-owned 1,400 metric ton (mt) electric-rope shovel and ultra-class trucking fleet. CIMIC Group companies Sedgman and UGL provide various operations and maintenance contracts at the Curragh mine.

Poland to Open New Coal Mines

Poland's ruling Law and Justice party plans to introduce legislation that will allow the government to open new coal mines without the approval of local authorities, as reported to *Reuters*. PiS wants to build new mines as it expects half of the country's electricity to be generated from coal by 2050. That would be down from 80% coal-fired electricity currently, but goes against European Union calls for member states to achieve zero carbon emissions by 2050.

Energy Minister Krzysztof Tchorzewski said, "This special legislation, which is being prepared by lawmakers is related to the fact that local authorities are not interested in new mines being built in their areas while we will need new coal deposits to secure supplies for the energy industry."

He said the new legislation would help Poland develop the planned lignite open-pit mine Zloczew, which environmentalists say would be the country's deepest ever open-pit mine and would displace 3,000 people from their homes. The Zloczew lignite project is owned by state-run energy group PGE and would guarantee supplies for PGE's power plant in Belchatow.

Sumitomo Breaks Ground at Van Phong Plant

On October 6, Sumitomo Corp. organized the ground-breaking ceremony of Van Phong 1 coal-fired power project after 12 years of waiting. Entailing the construction of a new supercritical coal-fired power plant with a generation capacity of 1,320 megawatts (MW) in Van Phong Special Administrative-Economic Zone (SAEZ)in Vietnam's Khanh Hoa province, Van Phong 1 is a build-operate-transfer (BOT) power generation project that will sell electricity to EVN (Vietnam's state-owned power company) over a period of 25 years. Total project costs should reach about $2.58 billion and will generate 9 billion kWh per year.

The project was implemented in 2007, however, it was not until July 2017 that the Ministry of Planning and Investment granted the investment registration certificate for Sumitomo. In October 2018, the investor official signed the BOT contract and power selling contract with partners while simultaneously receiving government guarantee.

It has been 12 years since the investor expressed interest in the project and land clearance was finished in May 2019.

At the ground-breaking ceremony, Nguyen Tan Tuan, chairman of the Khanh Hoa People's Committee, said the Van Phong 1 coal-fired power project is the largest industrial project in the province so far.

Byerwen Coal Mine Opens in Queensland

Minister for Resources and Northern Australia Matt Canavan officially opened the Byerwen coal mine in Queensland's Bowen Basin. The operation — a joint venture between Japan's JFE Steel and the QCoal Group — will deliver around 10 million metric tons (mt) of hard coking coal to be used in steel production in overseas markets each year.

Minister Canavan said the opening of the QCoal Group-owned mine symbolized the resilience of Queensland's coal industry, which delivered more than $3 billion in direct wages, $3.8 billion in royalties and almost 37,000 jobs for the state in 2017-2018.

"This mine has already contributed significantly to the region's job numbers and will continue to do so over its potential 50-year lifespan," Minister Canavan said. "It also enhances our trade relationships with other nations, which rely on our high-quality coking coal to produce the steel they need to grow and prosper."

Federal Member for Capricornia Michelle Landry said about 1,000 people worked on construction of Byerwen mine, with 14% indigenous employment.

"The mine is expected to have a permanent workforce of more than 500 people when construction is finished, with around 5% of those to be indigenous," Landry said. "Every one of those workers embodies the prosperity created by our mining sector, the advantages it brings to Australia and the resilience of regional communities in Queensland."

globalCOAL Expands Met Coal Offering With New Premium Low-vol Product

globalCOAL will introduce spot and forward markets for premium low-volatile coking coal on its online coal trading platform, starting October 9.

The new product, HCCLV, will initially allow delivery of BHP Mitsubishi Alliance (BMA) Saraji Coking Coal and Peak Downs Coking Coal on a FOB Australia basis.

HCCLV bolsters globalCOAL's Australian origin metallurgical coal offering, which already includes successful markets in premium medium-volatile coking coal (HCCA). More than 9.1 million metric tons (mt) of physical HCCA coal have been transacted on the globalCOAL platform since the launch of the product in October 2015.

Also, a revised version of HCCA will be effective from January 6, 2020, to ensure that the Relevant Standard Specification of the product offering are aligned with market requirements, according to globalCOAL.

"Price visibility is a major issue in the coking coal market," Philip Shawcross, head of metallurgical coal at globalCOAL, said. "Bringing the trade of premium low-vol coals on to a transparent online environment will make a significant difference to the amount of reliable pricing information available to market participants — as well as facilitate the spot trade of these coals."

Martin Abbott, CEO of globalCOAL, added, "globalCOAL's product portfolio already spans the world's most liquid seaborne thermal coal hubs. Our metallurgical coal offering continues to grow, trading volumes are increasing, and we will continue to reflect the market realities with our product development."

Africa Coal Partners Buys Stake in Mbuyelo From Ichor

Africa Coal Partners, a separate entity set up and managed by Duet Group, announced its acquisition of a 45.18% stake in Mbuyelo Coal Pty. Ltd. from Ichor Coal N.V. The agreed purchase price was set at 95 million euros ($106 million) with the transaction expected to close in the first quarter of 2020, once regulatory requirements have been completed.

Mbuyelo is a South African coal producer supplying the national power utility Eskom. It operates three open-pit mines with a minimum production of 600,000 metric tons per month (mtpm), thus averaging 7.2 million to 8 million mtpy.

Mbuyelo operates three open-pit mines.

CEO and Co-founder of Duet Group Henry Gabay said, "We are very excited by the opportunities offered by the coal industry in South Africa. South Africa is not yet in a position to switch completely into green energy, hence coal will remain a key component of South Africa's energy portfolio for the foreseeable future. Reliable power production remains at the heart of Africa's industrialization and its ability to lift its citizens out of poverty."

Commenting on the transaction, Rirhandzu Siweya, CEO of Mbuyelo, said, "I welcome the arrival of an African-focused investor that will help us grow and seize new opportunities in a very interesting environment for local coal players."

Olive Downs Coking Coal Project Receives Environmental Approval

Pembroke Resources has received the Environmental Authority (EA) for its Olive Downs Coking Coal Project (Olive Downs) in Central Queensland, Australia. Granted by the Department of Environment and Science, the EA authorizes activities for Olive Downs'

— Worldwide News Continued on Page 14 —

U.S. News Continued from Page 7

ESM was incorporated on September 19 and is headed by a former Blackjewel executive, according to local media reports.

Jeofffey Pilon, formerly the vice president for Blackjewel, will be the chief operating officer of ESM.

In 2015, Contura acquired the mines when the company was spun off from bankrupt Alpha Natural Resources, at the time under CEO David Steston. Stetson joined the new company's board of directors.

Contura initially planned to expand Belle Ayr. Coal prices never bounced back fully and by the second quarter of 2017, the miner abandoned those plans.

Later that year, Contura paid the recently formed Revelation Energy more than $20 million to take the mines. The CEO of Revelation energy, Jeffrey Hoops, created Blackjewel to run the mines, but never put up the money to assume the reclamation obligations.

Previously, Hoops was a board member of Trinity Coal Partners, which, after bankruptcy restructuring became Trinity Coal Corp. and appointed Stetson an executive.

From the onset, Hoops and Blackjewel was mired in litigation. Hoops maintained his innocence to the press.

Meanwhile, extreme winter weather and flooding disrupted operations in the PRB, contributing to a decline in production for the first half of 2019. Blackjewel declared bankruptcy on July 1.

On July 26, Contura was announced to be the stalking horse bidder for the mines. Three days later, the company announced it had appointed Stetson as CEO.

Contura's bid to acquire the mines fell through when word got out the company possibly planned to shutter the mines within two years.

Since declaring bankruptcy, Blackjewel has been at the center of a legal firestorm over not providing 60-days' notice and pay to employees prior to shutting down. Employees protesting lack of backpay blocked coal car tracks in Kentucky for months and gained national media exposure.

Blackhawk Mining Closes 3 Mines, 2 Prep Plants in West Virginia

Blackhawk Mining LLC and its subsidiaries have idled three underground coal mines and two preparation plants in Logan and Mingo counties, West Virginia, due to weak global coal markets and drop in prices. The operations included the Washington underground mine, Muddy Bridge underground mine, Buffalo underground mine, Fanco preparation plant, and Mingo 1 preparation plant and Mingo 2 (Scaggs) loadout.

The mine issued Worker Adjustment and Retraining Notification Act (WARN) notices to 342 employees. The company said employees are encouraged to apply for open positions elsewhere within the company.

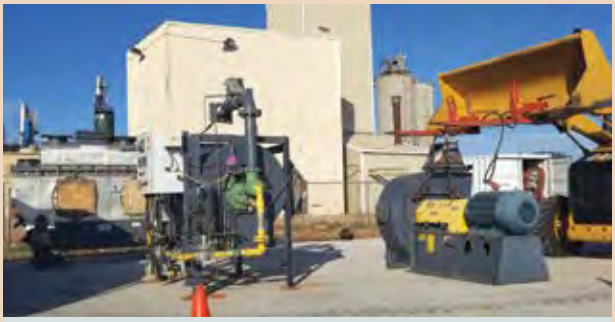
Permanent workforce reductions associated with the WARN notice are expected in early December, according to the company.

The company is also idling operations at the No. 8 underground mine, a contract mine in Mingo County, West Virginia.

DEVELOPMENTS TO WATCH

CCTI Builds 'Second-generation' Test Facility in Wyoming

Clean Coal Technologies Inc. (CCTI) is assembling a test facility near Fort Union, Wyoming, USA. CCTI uses technology to convert run of mine coal into a cleaner-burning and more efficient stabilized and dust-free fuel source. This second-generation facility will incorporate new features and designs following the successful testing of the company's process in Oklahoma.



Workers moving equipment and components into position for the assemble of CCTI's coal-enhancement and beneficiation technology at the company's Fort Union, Wyoming, site. (Photo: CCTI)

These new features and designs are a result of a collaboration between the company's engineers and the University of Wyoming's School of Energy Research, who partnered with CCTI in 2017 to help optimize this technology for coal beneficiation and for the extraction of coal byproducts, which CCTI said are critical issues facing the Powder River Basin coal-producing region.

"This is a milestone event in our progress and is the result of more than 12 months of process enhancement analysis and beneficiation optimization," CCTI COO Aiden Neary said. "The components and improvements in the coal beneficiation process and byproduct extraction engineered into our process represent first-of-a-kind, game-changing advancements that we believe will reverberate throughout the entire global coal industry."

The University of Wyoming's School of Energy Research is a leading research institutions in energy technology, particularly in the development of coal beneficiation and byproduct extraction. CCTI management will be prepared in the coming months to demonstrate their technology to potential customers and test international coal.

Blackhawk filed for Chapter 11 bankruptcy on July 19. At that time, the company said it had "sufficient liquidity to continue normal mining operations, pay employee wages, healthcare and other benefits, and pay vendors and suppliers for all goods and services."

Paringa Continues Ramp Up at Poplar Grove Mine

Paringa Resources Ltd. continued to ramp up shipping of coal to customers during the September quarter, with approximately 136,000 tons of product barged from the company's dock on the Green River, up from approximately 26,000 tons shipped during the June quarter.

September quarter coal sales equate to revenues of approximately $5.7 million for the quarter (US$23M on an annualized basis). The company said it expects a further increase in sales during the December quarter as the operations continue to ramp up.

Unit 1 mining activities continue to progress well, with continuous miner activities achieving about 85% of nameplate Mains productivity through the second half of September in the Mains areas of the mine.

The ramp up in Unit 1 productivity is largely attributable to operational efficiencies plus the cumulative benefits of alterations to coal cutting processes and mining unit support arrangements, according to Paringa. The company anticipates reaching full nameplate productivity through continuous improvements and an increase in available underground mining area over the coming months.

Unit 2 has successfully been relocated away from the previously encountered geological fault, and has recently recommenced regular operations, which will allow the unit to continue to ramp up production, the company said.

Paringa is now shipping coal to both of its major customers, and maintains a very strong pipeline of forward sales, with about 100% of 2019, about 75% of 2020 and about 50% of the next 5 years of production pre-sold.

In Paringa's primary region of the Illinois Basin in western Kentucky, approximately 5.8 million tons of supply capacity has recently been consolidated by Alliance Resource Partners, who acquired and then closed the Pennyrile Mine with a 1.3-million-ton-capacity in September and closed the high-cost Dotiki mine with about a 4.5-million-ton capacity in August.

Paringa said it is now the only significant independent supplier of coal outside of Alliance and Murray Energy Corp.

Wolverine Considers Reopening Utah Mine

The sealed Trail Mountain coal mine in central Utah could reopen under a new name, according to the *Salt Lake Tribune*. Executives with Wolverine Fuels discussed its plans to access the Fossil Rock reserves with a state legislative panel during September. The company holds leases on 58 million tons of recoverable coal on a tract near Orangeville.

Those reserves could be accessed through Trail Mountain's sealed portals. "We have plans to breach those seals and begin mining as early as next year," said Garrett Atwood, vice president-operation for Wolverine Fuels.

Wolverine plans to convert the mine from a room-and-pillar mine to a longwall operation. Supporting as many as 400 high-paying jobs, it would be a boon to Utah's rural economy, Atwood explained.

The prospects of a new mine thrilled leaders in Emery County, according to the *Salt Lake Tribune*. "It's going to be a great thing for the county. We've been waiting for a long time. We hope that it really happens," County Commission Chairman Lynn Sitterud said. "Had there been a means of exporting that coal, the mine would probably have opened before now."

Unlike most of Utah's coal production, the Fossil Rock reserves are leased from the state, rather than the federal government. This coal lies under the 8,200-acre Cottonwood tract controlled by the Utah School and Institutional Trust Lands Administration, which auctioned the rights to mine it in 2007.

Wolverine sees growing demand through export markets. "There is this notion that coal is dying, [but] we can't hire enough qualified people right now," Atwood told the interim committee. "We have been growing and hiring more people at each of our mines. There is an opportunity to keep growing."

Atwood also expects Fossil Rock to help supply PacifiCorp's Hunter and Huntington coal-fired power plants with high-quality 11,500 Btu/lb compliant coal (less than 0.6% sulfur).

BLM Approves King II Expansion in Colorado

On October 11, the Bureau of Land Management (BLM) Tres Rios Field Office released the final environmental assessment and decision record for a lease by application (LBA) for GCC Energy's King II coal mine, located near Durango, Colorado. This lease includes 2,462 acres of federal coal under a parcel referred to as the Dunn Ranch property, which holds 9.5 million tons of recoverable coal. The decision could extend the life of the mine, which employs 150, by more than 20 years at current production rates.

PRB Coal Users' Group Rebrands

The PRB Coal Users' Group changed its name to the American Coal Users' Group (ACUG). This is a major move for an organization that leveraged its affiliation with the Powder River Basin (PRB) mines and the utilities that burned that coal.

"The change in focus needed to happen given the market challenges of today," said Johnny Howze III, vice president supply chain management, gas, generation and shared services for Southern Co. "Coal in our energy mix is declining, but not gone yet."

Despite this tepid endorsement, the ACUG said it will continue to pro-

DATELINE WASHINGTON

Restore Competition to Electricity Markets

BY CONOR BERNSTEIN

Are renewable sources of power ready to stand on their own two feet? Ask wind and solar boosters and the answer would seemingly be yes. The story we're being told is that after decades of government support, wind and solar projects are now cost-competitive with traditional sources of power. Except when they're not. Curiously, these same boosters who claim wind and solar power have arrived, want nothing to do with pulling back the subsidies and mandates that give renewables a massive leg up in supposedly competitive electricity markets.

It would seem the renewable lobby would like things both ways. They want wind and solar to be recognized as cost-competitive resources that are ready to shoulder a far bigger load of the nation's energy demand, but they adamantly oppose any efforts to touch the mandates and subsidies that have been their engine of growth.

And what an engine it has been. While just a snapshot of that largesse, according to the Joint Committee on Taxation, wind and solar power will receive $36.5 billion in federal tax credits over the five-year period from 2016-2020. It's an extraordinary sum, yet it doesn't even begin to account for the support provided to wind and solar at the state level.

Despite the much-ballyhooed maturation of renewable technology, these subsidies and mandates aren't on their way out. Rather, they're poised to grow. Instead of phasing out this largesse, and perhaps using that government support to accelerate innovation of nascent energy technologies, we appear to be doubling down. The result is havoc in electricity markets and a growing threat to reliability. These out-of-market payments have turned competitive markets into anything but.

Consequently, essential coal plants are being forced into early retirement not because they can't provide cost-competitive electricity but rather because they are competing in a contest rigged so that they can't win.

While electricity markets are supposed to foster reasonable wholesale electricity rates that ensure affordable and reliable power, baseload power plants — the foundation for that affordable, reliable power — are being replaced with sources that undermine it. It's an alarming situation.

Excluding sources of power receiving distortive subsidies from capacity markets is a logical and reasonable step in addressing this burgeoning crisis. If states are bent on upending competitive markets, it's up to federal regulators to address market manipulation and level the playing field.

It's eroding reliability and shifting a growing burden onto consumers. Ratepayers are footing the bill to fund these subsidies and paying inflated prices driven by renewable mandates.

As a recent study from the University of Chicago discovered, in the 29 states hosting renewable portfolio standards, consumers paid $125.2 billion more for electricity in the seven years after the passage of these policies than they otherwise would have. The lead author of the study, a former Obama administration economic advisor, observed, "The headline result here and the most important result in the whole exercise: signing up for these policies increases electricity prices, full stop. Second point: what do you get in exchange for that?"

What we seem to be getting is erosion of the reliability of the grid and a springboard for far higher electricity prices.

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

vide value to its members by promoting resources that encourage safety, reliability, education, innovation, awareness, and a "sense of community" as it relates to the use of coal. The group said it will accomplish its new mission in several ways, beginning with a symposium that coincides with the Electric Power conference, which takes place April 14-17, 2020, in Denver, Colorado.

Bluefield Hosts Another Successful Coal Show

BY STEVE FISCOR, EDITOR-IN-CHIEF

This time around it was unseasonably warm at the Bluefield Coal Show. The biannual event organized by the Chamber of the Two Virginias was held at the Brushfork Armory in Bluefield, West Virginia, during mid-September. Roughly 200 suppliers were on hand, exhibiting underground coal mining equipment and technology. Total attendance appeared to be 2,500 to 3,000.

The show opened with a Media and Exhibitor Appreciation Breakfast, which was sponsored by American Electric Power. Robert "Bob" Ramsey, president of Peters Equipment and Ramsey Industrial, and the chairman of the Bluefield Coal Show, presided over the breakfast. "We are so excited," Ramsey said. "As you can tell, a lot of work has gone into organizing this event." He recognized and thanked volunteers who help support the show.

The torch was passed to Ramsey last year after Charlie Peters died. A moment of silence and reflection was held to honor Peters, who started the event in 1976.

To honor him, the Chamber of the Two Virginias created the Charles A. Peters Excellence in Business Award. The award, Ramsey said, will be presented every two years at the show to an exhibitor that showcases excellence in business, professionalism in the mining industry and demonstrates service to its local community.

The first recipient of the award was AMR PEMCO, which supplies monitoring systems, circuit breakers and power

centers from its facilities in the region. "AMR PEMCO embodies the spirit of this award and they have participated in all 23 Bluefield Coal Shows." Jay Johnson, executive vice president, sales and marketing for AMR PEMCO, accepted the award. Johnson introduced the keynote speaker, Jimmy Brock, president and CEO, CONSOL Energy.

Jimmy Brock Delivers Keynote

Brock recapped CONSOL Energy's recent transition for the audience. He explained how CONSOL Energy has a 150-plus-year history and has adapted over time. He also talked about how its former parent, CNX Resources (CNX) became involved in the natural gas exploration and production (E&P) business, which led to the foundation of CNX's current E&P business. In November 2017, CONSOL Energy was spun out of CNX. "I'm very proud of our team," Brock said. "What all this means is that we now have control of all the cash flow that is generated by the coal business and we are deploying it based on our own strategic priorities instead of funding E&P production growth. Right after the spin, we decided to reduce the debt that we took on to effectuate the spin transaction from our former parent. The top priority then was to create a very healthy balance sheet that can withstand the volatility of commodity and economic cycles. After that we started investing some of the capital back into the business to value enhancing projects. As we made significant progress to achieving some of these priorities, we pivoted to investing in growth projects such as Itmann low-vol metallurgical coal project and returning capital to our own shareholders."

CONSOL Energy currently operates the Pennsylvania mining complex, which consists of three underground mines with five longwalls feeding the largest preparation plant in the country. The Bailey Central prep plant can process 8,200 tons per hour (tph) of coal. The rail loadout at the plant can load coal at 9,000 tph, Brock explained.

The 2019 Bluefield Coal Show ribbon cutting ceremony: Jimmy Brock (blue suit), Charlie Peter's wife Dafney, Bob Ramsey (scissors in hand) and Jay Johnson.

"They can load a unit train at 0.9 mph," Brock said. "We also own the CONSOL Maritime Terminal in Baltimore. That's critically important to us. We do not have ground coal storage capacity in Pennsylvania. The terminal has 1.1 million tons of ground storage and has the capacity to ship 15 million tpy. Last year was a record year for the terminal, which generated more than $65 million in revenue."

Brock discussed some of the good news for coal and areas for concern, including coal's affordability as a fuel, its growth in importance around the world, the current rhetoric regarding climate change and the upcoming elections, and the dangers of moving the U.S. power grid away from coal.

"There is a lot of negativity in the mainstream media regarding coal," Brock said. "Media outlets are reporting that it's a dying industry and I'm here today, telling you that's not the case."

Brock pointed to 400 gigawatts (GW) of new coal-fired capacity under construction or planned and he also mentioned that few companies are investing on the supply side to meet these needs. "Existing coal production will be more valuable moving forward," Brock said. "Many countries do not have access to the low-cost energy coal provides and low-cost energy is the key to economic growth. People in developing countries want what we have here in the U.S — a better quality of life and unconstrained access to low-cost energy."

Domestically, coal faces considerable competitive pressure from low-cost natural gas and Brock explained how that could change. "We see coal-fired power playing an important role when it comes to grid resiliency," Brock said.

Six countries account for 56% of total global GDP, Brock explained. "Each of these derived at least 30% of their energy from coal-fired power in 2017," Brock said. "The fastest growing economies, China and India, rely heavily on coal and they are building more coal-fired generation."

Brock explained how U.S. coal competes with natural gas in the U.S. and Europe as well as coals delivered to the Asia Pacific region from Australia. "On a BTU basis, the value proposition of U.S. energy is unparalleled and that's especially the case with northern Appalachian coals," Brock said.

Worldwide, more than 7 billion tons of coal are mined annually. "The reports of coal's demise are totally

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Worldwide News Continued from Page 9

79-year mine life and provides the conditions, including environmental obligations, for the operation of the mine, according to Pembroke Resources.

"The company now looks forward to receiving federal government approval under the Environment Protection and Biodiversity Conservation Act and, to the grant of its mining leases so that construction and jobs can commence," Pembroke Chairman and Chief Executive Officer Barry Tudor said. "The grant of the EA represents the most important milestone for the project so far and provides a clear pathway toward commencement of construction and first coal."

The project is 100% owned by Pembroke, an Australian specialist steel-making coal company and backed by its major shareholder, leading global energy and resources private equity firm, Denham Capital.

"Pembroke has delivered an outstanding standard of assessment and will deliver exceptional rehabilitation outcomes in the development of Olive Downs," Tudor said. "In addition, we have acquired a significant area of land to dedicate to environmental outcomes. These areas will provide for the protection of native flora and fauna habitat in perpetuity, with the environmental area increasing over the life of the mine to become significantly more area than we started with."

Olive Downs has assembled all the elements required to commence construction immediately following the grant of the mining leases, including access to power, water, rail and port. Last year, Olive Downs awarded a $184 million EPC contract for a coal handling and processing plant. The mine is expected to create up to 500 jobs during construction and up to 1,000 new jobs when the project reaches name plate production capacity.

Strategically positioned in the Bowen Basin, the project will supply steel-making coal to markets globally and has already attracted strong interest within the industry across Asia, including Japan, Korea and China.

Largest Untouched Coal Reserves Will Be Mined in Botswana

Minergy Ltd. said it will record its first commercial sale at its Masama coal project soon. Following successful startup of mining operations, Minergy has exposed the first 340,000 metric tons (mt) of coal, which represents approximately three months of nameplate production. In doing so, the company has removed more than 2.5 cubic meters of overburden.

Minergy said it is completing the process to sign its first long-term contract, to deliver 120,000 mt per year (mtpy) of coal to one regional industrial customer, which represents approximately 10% of estimated annual saleable coal.

"Discussions are under way with a number of other interested regional industrial customers, many of whom have already tested samples of our coal over the past few months," said Minergy CEO Morné du Plessis.

"We are extremely pleased with both the timing and the progress made at Masama coal project, we are transitioning from mine development into a mining operation at full production," he said.

The coalfields in Botswana lie in close proximity to South Africa.

Currently Minergy is mining 110,000 mt per month, resulting in 70,000 to 80,000 mtpm of saleable coal. The saleable coal target is expected to increase to 100,000 mtpm in early 2020. "Our ramp up plan is on track, several opportunities to significantly increase production will be assessed going forward," he said.

A coal resource of 386 million mt has been defined in terms of the preliminary workings for the Masama project and comprises open castable and underground mineable resources in the measured, indicated and inferred resource categories. Open castable coal reserves are currently in the process of being calculated and raw coal reserves are likely to range between 55 million and 65 million mt, with resultant saleable coal reserves likely in the range of 30 million to 40 million mt. The 386 million mt of total coal resource of Masama, approximately 82 million mt is considered open castable, giving a life of mine of 22 years. The remaining approximately 304 million mt is considered mineable by underground mining methods and could significantly extend the life of the mine.

Morné du Plessis said depending on the economics at the time, opportunities to significantly increase production include increased supply to industrial customers, export opportunities or power generation. "Increased production would require additional capex primarily to increase the capacity of washing plant and plant infrastructure, and completion of an additional box cut," he said.

India Readying Coal Blocks for Auction to Foreign Miners Before End of 2019

BY AJOY K. DAS

India's Ministry of Coal has finished the process of identifying Greenfield

coal blocks across the country that could be put up for auction by global resource majors. The move comes close on the heels of the government amending existing coal mining rules that will pave the way for 100% foreign direct investments (FDI), which will permit global miners to undertake commercial coal mining through wholly owned Indian subsidiaries enjoying free pricing regime and without any end-use restrictions.

According to government officials, the process of identifying appropriate coal blocks for foreign miners had been put on a fast track since the Ministry of Coal wanted to start the auction process by December and complete signing of contract with successful foreign bidders by 2020. However, the ministry has not yet set any specific timeline for the commencement of production from the coal blocks to be auctioned.

Nonetheless, the government is simultaneously holding consultations with coal-bearing states to frame the necessary policy interventions that would ensure that successful overseas bidders could bring Greenfield coal blocks into production within the shortest possible gestation period.

The policy interventions on the table for consideration include a "single window" for securing all mandatory approvals necessary before commencement of production like foreign and environmental clearances from the federal ministries. The federal Ministry of Coal is also asking coal-bearing state governments to automatically grant mining leases immediately after contracts are signed with successful bidders at the forthcoming auctions.

Officials said auctions to be held before the end of the year are intended to woo global miners like Glencore, BHP Group, Anglo American Plc and Peabody Energy. However, the officials declined to comment on reports that some global resource majors like BHP Group and Glencore have expressed intentions to cut investment exposures in coal mining.

Opening the domestic coal mining industry to foreign miners would end the near monopoly of government-run Coal India Ltd. (CIL), accounting for more than 80% of India's supply. The coal industry, however, remains divided on whether the introduction of major global coal mining companies into India would impact the current dominance of CIL in the medium and long term.

According to a former CEO of CIL, major global coal companies coming into India were unlikely to erode the dominance of CIL in the short and medium term. They said that CIL could continue to secure coal blocks under preferential allotment dispensation for government-run companies. Overseas miners would have to commit large funds to secure coal assets through competitive bidding and amortization of such upfront investments, bringing the assets into production and ensuring positive returns on investments (RoI) would take a very long time giving continued long head-start to CIL.

According to an internal assessment of CIL, any new entrant in coal mining would take five to six years to bring a Greenfield coal asset into operation and another three years of operation to achieve full-capacity utilization providing the state miner enough time to ready itself for competition from private investors.

While the Indian government was expecting infusion of technology and mining efficiencies from global miners, the fact was that most global coal miners' operations were in underground mining where Indian coal mining was predominantly open cast, officials said adding that about 30%-45% of global coal production was accounted for from underground mines compared to 90% Indian coal production from open-cast mining.

Holding a contrarian view, a section of Ministry of Coal said overseas miners would ensure higher mechanizations, state-of-art technology and achieve lower cost of production offering competition to the Indian state-run miner. According to rough estimates by the government, cost of production of CIL averaged at around Rs 1000 ($15) per ton while foreign miners could achieve cost of production of an average Rs 800 ($11) per ton.

CALENDAR OF EVENTS

November 5-7, 2019: *MetCoke World Summit 2019*, Nashville, Tennessee. Contact: Web: www.metcokemarkets.com/metcoke-summit.

November 13-15, 2019: *XIX International Coal Preparation Congress & Expo 2019*, New Delhi, India. Contact: Web: www.icpc2019.in/.

November 24-28, 2019: *International Conference on Coal Science and Technology*, Krakow, Poland. Contact: Web: https://iccst2019.com/gb/.

January 23-24, 2019: *Coaltrans USA*, Four Seasons Hotel Miami, Miami, USA. Contact: Web: http://coaltrans.com/events/usa/Overview.

January 26-29, 2019: *International Society of Explosives Engineers*, Denver, Colorado. Contact: Web: www.isee.org.

February 23-26, 2019: *The annual Society for Mining, Metallurgy and Exploration (SME) conference and exhibition*, Phoenix, Arizona. Contact: Web: www.smenet.org.

April 20-22, 2019: *CoalProTec*, Lexington, Kentucky. Contact: Web: www.coalprepsociety.org.

September 28-30, 2019: *MINExpo INTERNATIONAL*, Las Vegas, Nevada. Contact: Web: www.minexpo.com.

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untrue," Brock said. "The growth rate has slowed, but this is not a cottage industry that is going to go away."

He detailed 111 GW of coal-fired power currently under construction globally that should be commissioned by 2024. "Another 300 is currently being planned," Brock said. "As a point of reference, the U.S. has approximately 240 GW of installed coal-fired capacity."

Turning his attention to the seaborne coal market, he reminded the audience of the importance of this market, citing stats from IHS Markit that predicts global seaborne thermal coal demand to grow by 60 million tons in aggregate by 2030, net of declines in the Western world. He contrasted it with lack of production growth to meet that growing demand. "Glencore has already announced it's not growing production," Brock said. "This is a huge opportunity for U.S. operators to export more coal."

Despite declining 40% domestically since 2001, coal-fired power generation has grown 78% globally over the same time period. Coal's share of global generation has remained flat at 38% since 2001. "New coal-fired generation has been keeping pace with natural gas and renewables around the world," Brock said. "The reason we have these conflicting trends in the U.S. is due to regulations. Regulatory overreach and subsidies for renewables have restricted innovation and driven capital to competing energy sources."

He explained how transportation has surpassed the electric power sector in greenhouse gas emissions in 2017. "If you really believe in man-made climate change, the primary target should be the transportation sector," Brock said.

The 2020 U.S. presidential elections are approaching quickly and many of the candidates have endorsed environmental initiatives, including the New Green Deal. "Before we go down that path, people need to know the facts," Brock said. "The U.S accounts for 15% global CO_2 emission from fossil-fuel combustion. Of that, 24% is attributed to coal. Total U.S. CO_2 emissions from coal amount to 3.6% of global emissions from fossil-fuel combustion. Add natural gas to the mix and the number increases to 8%. According to WoodMackenzie, the transition to a 100% renewable grid would require a $4.5 trillion investment over the next 10 to 20 years to replace an existing grid."

"That's a big number," Brock said. "That money could be spent on education, healthcare and other productive uses. It would pay off all student debt three times over."

Developing Trends With Natural Gas

U.S. natural gas production has increased 50% in the last decade, Brock said. "The expansion drove prices lower and fundamental gaps are emerging that could impact the future price of natural gas," he said. "There are various challenges on the supply side and we're becoming increasingly reliant on an unstable industry. Natural gas storage capacity is largely unchanged. As demand grows, volatility will increase and we will see higher costs during the peak seasons. It's becoming clear that E&P investors are looking for a capital return, not a production growth. This is setting up for an enormous price squeeze."

Eight independent producers in the Marcellus and the Utica shales now contribute 17% of U.S. natural gas production — that's a 42% increase from 2013 levels, Brock explained. "Despite the glut of additional production over the past five years, the market cap of these producers has fallen 77%," he said. "Their shareholders no longer have the same belief in the business model. The reason is that the producers are not generating sustainable rates of return. If you look at returns of 4% over the last five years and the cost of capital is 8%, they are not covering their cost of capital. The shareholders are asking them to cut CAPEX and return money through share buybacks and dividends."

Brock said the E&P industry has already seen several bankruptcies in the last two years and that trend could continue as their $150 billion in debt comes due in the next three to four years. Brock asked: "As a power consumer, how do you feel about basing your future on an industry whose sustainability is being questioned by their own shareholders?"

It's also becoming difficult to connect supply with demand centers. Brock discussed the 600-mile Atlantic Coast Pipeline, which has been delayed two years. "This underground pipeline is a major construction project that will be funded by four energy companies: Duke Energy, Dominion Power, Southern Cos. and Piedmont. Similarly, the 300-mile Mountain Valley Pipeline is a $4.6 billion project that has secured full capacity for 20 years. Both projects have suffered delays due to regulatory issues and environmental opposition. How can utilities rely on emerging gas supply if there are no pipelines to connect them to it?"

The U.S. saw a precursor of this play out during the 2018 Bomb Cyclone (December 27-January 9), "which we simply call winter," Brock said. "It was a cold snap and 65,000 PJM customers needed an incremental 1,400 kiloWatt-hours per day. Coal stepped up and supplied 57% of that need and oil accounted for 23%, but natural gas didn't show. In times of high demand, coal-fired generation is always above 40% because it's there; it's on the ground. I'm not telling you we should not have natural gas. We absolutely should. We should use all of the resources available to, but power generation decisions need to be based on sound engineering and economics principles."

The most important opportunity that confronts all of us the need to communicate with all stakeholders on the value of coal, Brock explained. "We need to speak with facts and discuss our accomplishments as far as safety and environmental stewardship," Brock said. "We are the only ones who tell our story."

2019 US Prep Plant Census

Several plants change hands as bankruptcies force owners to liquidate

BY STEVE FISCOR, EDITOR

This year *Coal Age*'s 2019 Prep Plant Census tallies 155 preparation plants processing bituminous coal. The total population is 223 and 68 of those plants are currently idle. Some of them may reopen and many will not. West Virginia remains the industry leader with 63 plants, followed by Kentucky (58), Pennsylvania (20), Indiana (17) and Virginia (18).

The biggest change to this year's census is ownership and name changes. During the last year, several bankruptcies were announced: Cambrian Coal, Colonial Coal, Westmoreland and Revelation (Blackjewel). New owners emerged from the bankruptcy sales and they ranged from existing large- and medium-size coal operators to creditors to entrepreneurs.

After purchasing the Armstrong coal assets in Kentucky, Murray Energy Corp. (MEC) formed Murray Kentucky Energy and began investing in the operations. The raw feed for the Midway plant was upgraded from 600 tons per hour (tph) to 1,200 tph. The Armstrong Dock is now known as Genesis and the Parkway plant is now the Pride prep plant.

MEC entered the metallurgical coal business when it purchased the Concord plant in Alabama (Oak Grove mine) and the Katie prep plant in West Virginia (Maple Eagle mine) through the Colonial bankruptcy. MEC formed a new holding company, Murray Metallurgical Coal Holdings, for these mines.

Bluestone Resources purchased the Pinnacle operation near Pineville, West Virginia, from the Colonial Coal bankruptcy during 2018. During the last year, they invested $7.4 million in the plant, replacing the belting on the conveyors, installing pumps and piping as well as new screening media. The clean coal and refuse conveyors were completely refurbished.

After completing the upgrade, Bluestone commissioned the plant in early August and was then forced to idle it due to market conditions. As of press time, they had managed to recall as many of the displaced workers as they could.

"We worked around the clock to find a solution that would get our workers back on the job," said Jay Justice, owner, Bluestone Resources. "Our hard-working employees are the life-blood of our company and our state, and anytime there are layoffs, even temporarily, we know the pain and stress that causes a person and their loved ones. It's something that we take extremely seriously. That's why I was incredibly happy to report we were in a position to reopen the plant and get our folks back to work."

Three companies bought active operations from Cambrian Coal during its bankruptcy sale. American Resources Corp. bought the Perry County Coal operations. Richmond Hill Capital Partners, a hedge fund that loaned money to Cambrian, bought the Clintwood Elkhorn Complex, which has plants in Kentucky and West Virginia. Pristine Clean Energy purchased Premier Elkhorn in Kentucky.

Industrial Minerals Group purchased several assets from Revelation Energy, which is owned by Blackjewel. They formed INMET Mining as a holding company for the operations they acquired during the bankruptcy process. The Cave Branch prep plant in Kentucky, and the Lone Mountain and Pigeon Creek prep plants in Virginia, now belong to INMET Mining. SunCoke Energy purchased the Coronet Jewell operation from Revelation Energy.

Chuck Ungurean formed CCU Coal & Construction and purchased the Buckingham operation in Ohio from Westmoreland Coal. Ungurean owned Oxford Coal and sold it to Westmoreland in 2015 and then repurchased the assets in February. CCU is now facing tough times with American Electric Power announcing the closure of the Conesville power plant. The company recently issues Warn notices to employees.

Arch Coal sold the Raven plant in Kentucky to CBD Resources during March 2019.

A private owner purchased Federal No. 2 from ERP Environmental Fund and renamed it Phoenix Federal No. 2. The operation remains idle.

JRL Energy Completes Upgrades

In January 2019, JRL Energy completed an upgrade to the Coalgood plant in Kentucky roughly 18 months after they purchased the operation. An MMD sizer was placed on the plant's feed side to decrease the size of the feed for better separation and a more balanced material flow. They also added an additional clean coal transfer belt that gave them the ability to store and load different coal qualities.

When JRL purchased the plant and brought it online in spring 2017, they added froth cell agitators, a coarse refuse belt sampler, clarified water pump and base, and magnetite bin.

Coalgood is a very well-designed plant using a heavy-media vessel and large-diameter heavy-media cyclone, according to JRL. Prior to its purchase, the plant was idle for five years and JRL has invested more than $2 million to put the Coalgood prep plant back into service, which includes the sizer upgrade. They worked with Powell for engineering services. Management said the best part of getting this plant back online is seeing so many great people going back to work at a site with so much history and tradition.

Company	Plant Name	Raw Feed	Product Ash %	Quality	Year of Last Upgrade	Type of Plant HM	Type of Plant WO	Primary Sep. Jig	Primary Sep. Ves.	Primary Sep. HM Cycl.
Alabama (7)										
Bluestone Resources	Glade	200	—	—	—	•	—	—	—	•
Camellia Met Mining	Piney Woods	300	—	—	—	•	—	—	—	—
Murray Metallurgical Holdings	Concord	1,000	8.50%	< 1.0	2011	•	—	—	—	•
Peabody Energy	Shoal Creek	2,220	12.00%	< 1.2	—	—	•	•	—	—
Warrior Met Coal	JWR No. 4	1,300	—	—	2010	•	—	—	•	•
Warrior Met Coal	JWR No. 5 (Idle)	1,000	—	—	2008	•	—	—	—	•
Warrior Met Coal	JWR No. 7	1,400	—	—	2012	•	—	—	—	•
Colorado (4)										
Arch Coal	West Elk	700	—	—	—	•	—	—	•	—
Blue Mountain Energy	Deserado	800	8.00%	< 1.2	2017	•	—	—	•	—
Peabody Energy	Twentymile	2,000	—	—	—	•	—	—	—	•
Wolverine Fuels	Bowie (Idle)	650	5.50%	< 1.2	—	•	—	—	—	•
Illinois (12)										
Alliance Resource Partners	Pattiki (Idle)	1,200	7.00%	> 2.5	2003	•	—	—	—	•
Alliance Resource Partners	Hamilton County	2,000	—	—	—	•	—	—	—	•
American Coal Co.	Galatia (Idle)	3,000	7.50%	2.5	2014	•	—		•	—
Arch Coal	Viper	700	9.00%	> 2.5	2015	•	—	—	•	—
Foresight Energy	Deer Run (Idle)	2,000	9.00%	> 2.5	—	•	—	—	•	—
Foresight Energy	Pond Creek (Mach)	2,000	7.80%	2.5	—	•	—	—	•	—
Foresight Energy	Shay	850	8.00%	3.5	2009	•	—	—	•	—
Foresight Energy	Sugar Camp	4,200	9.00%	2.5	2014	•	—	—	•	—
Knight Hawk Coal	Creek Paum	550	—	—	—	•	—	—	—	•
Knight Hawk Coal	Prairie Eagle	850	—	—	2012	•	—	—	—	•
Knight Hawk Coal	Red Hawk	250	—	—	—	—	•	•	—	—
Peabody Energy	Gateway	1,000	—	—	1998	•	—	—	—	•
Indiana (17)										
Alliance Resource Partners	Gibson County North (Idle)	950	—	1.2-2.5	2014	•	—	—	—	•
Alliance Resource Partners	Gibson County South	2,000	—	1.2-2.5	—	•	—	—	—	•
American Resources Corp.	Gold Star (Idle)	170	—	—	—	—	—	—	—	—
Blackhawk Mining	Augusta (Idle)	250	—	> 2.5	2010	—	•	•	—	—
Blackhawk Mining	Freelandville No. 2 (Idle)	400	8.00%	> 2.5	2010	•	—	—	—	•
Blackhawk Mining	Log Creek (Idle)	600	8.50%	> 2.5	—	•	—	—	—	•
Blackhawk Mining	Patoka River (Idle)	400	—	> 2.5	—	•	—	—	•	—
Lexington Coal Holdings	Kindill No. 2 (Idle)	1,200	—	—	—	—	—	—	—	—
Lexington Coal Holdings	Sycamore (Idle)	400	10.50%	> 2.5	1997	•	•	—	•	—
Peabody Energy	Bear Run	1,600	—	—	—	•	—	—	—	•
Peabody Energy	Francisco	650	—	—	2008	•	—	—	•	—
Peabody Energy	Somerville Central	600	—	—	—	•	—	—	—	•
Peabody Energy (UMI)	Somerville North	375	—	—	—	•	—	—	—	•
Peabody Energy	Wild Boar	650	—	—	2010	•	—	—	—	•
Solar Sources	Carbondale	400	—	—	1985	—	•	—	•	—
Sunrise Coal	Carlisle	900	—	> 2.5	—	•	—	—	—	•
Sunrise Coal	Oaktown	1,600	—	> 2.5	2016	•	—	—	—	•
Kentucky (58)										
Alliance Resource Partners	Dodge Hill (Idle)	300	—	—	—	—	—	—	—	—
Alliance Resource Partners	Dotiki (Idle)	2,000	8.00%	> 2.5		•	—	—	—	•
Alliance Resource Partners	Elk Creek (Idle)	1,200	8.00%	> 2.5	—	•	—	—	—	•
Alliance Resource Partners	MC Mining	1,000	8.00%	< 1.2	1991	•	—	—	•	—
Alliance Resource Partners	Onton No. 9 (Idle)	700	—	—	2011	•	—	—	—	•
Alliance Resource Partners	Pontiki (Idle)	800	8.00%	< 1.2	1991	—	—	—	—	—
Alliance Resource Partners	River View	3,000	—	> 2.5	2015	—	—	—	—	—
Alliance Resource Partners	Warrior	1,200	—	—	—	•	—	—	—	—

Intermediate Sep.			Fine Coal			Centrifugal	Online Analyzers			Controls				
LD Cycl.	HM Cycl.	WO Tables	Froth	Spiral	Column	Dryer(s)	E	M	A	Man.	PLC	DCS	Builder	Year
—	—	—	•	•	—	•	—	—	—	—	•	—	Tag	2012
•	—	—	—	•	—	•	—	—	—	•	—	—	—	—
•	—	—	•	•	—	•	—	—	—	—	•	•	R&C	2011
—	•	—	•	—	—	—	—	—	—	—	•	—	IR	1992
•	—	—	•	•	—	•	—	—	—	—	•	—	Mc/Tag	1974
—	—	—	•	•	—	•	—	—	—	—	•	—	Mc/Tag	1976
—	—	—	•	•	—	•	—	•	•	—	•	—	Mc/Tag	1978
—	—	—	—	—	—	•	—	—	—	—	•	—	Tag	2010
—	•	—	—	•	—	•	—	•	•	—	•	—	Mc	1983
—	•	—	—	•	—	•	—	•	•	—	•	—	Tag	2008
—	•	—	—	•	—	•	—	—	•	—	•	—	Dan	2004
•	—	—	—	•	—	•	•	•	•	•	•	—	FMC	1982
—	•	—	•	•	—	•	—	—	—	—	•	—	GMC	2013
•	•	—	•	•	—	•	—	—	—	—	•	—	R&S	1982
•	—	—	—	•	—	•	—	—	—	—	•	—	R&S	1982
•	•	—	—	•	•	•	—	—	—	—	•	—	CDG	2011
•	•	—	—	•	•	•	—	•	—	—	•	—	CDG	2006
•	•	—	—	•	—	•	—	—	—	—	•	—	Mc	1970
•	•	—	—	•	•	•	—	—	—	—	•	—	CDG	2011
—	—	—	—	•	—	•	—	—	—	—	•	—	Tag	2000
—	•	—	—	•	•	—	—	•	—	—	—	—	Tag	2005
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	•	—	•	—	—	—	—	•	—	R&S/Tag	1976
—	—	—	—	•	—	•	•	—	—	•	•	—	Dan	2000
—	•	—	•	•	—	•	—	—	—	—	•	—	GMC	2014
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	•	—	•	—	—	—	•	—	—	Co	2002
—	—	—	—	•	—	•	—	—	—	•	—	—	Co	2005
—	—	—	—	•	—	•	—	—	—	—	•	—	Dan	2011
•	—	—	—	•	—	•	—	—	—	—	•	—	Dan	1990
—	—	—	—	—	—	—	—	—	—	—	—	—	R&S	1951
—	•	—	—	—	—	•	—	—	—	•	•	—	CPE	1982
—	•	—	—	•	—	•	•	•	—	—	•	—	Tag	2010
•	—	—	—	•	—	•	•	—	—	—	•	—	Dan	1997
—	—	—	—	•	—	•	•	—	—	—	•	—	Tag	2000
—	—	—	—	•	—	•	—	—	—	—	•	—	GMC	1998
—	—	—	•	•	—	•	—	—	—	—	•	—	GMC	2010
•	—	—	—	—	—	—	•	—	—	—	—	—	Dan	1985
—	•	—	—	•	—	•	—	—	—	—	•	—	Dan/ACS	2007
—	•	—	•	•	—	•	•	•	•	—	•	—	Pow/GMC	2008
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	•	—	•	•	—	•	—	—	—	—	•	—	GMC/Mc	2011
—	•	—	—	•	—	•	—	—	—	—	•	—	GMC	2006
•	—	—	•	•	—	•	—	—	—	•	—	—	Liv	1974
•	—	—	—	•	—	•	—	—	—	—	•	—	GMC	2004
—	—	—	—	—	—	—	—	—	—	—	—	—	Liv	1977
—	—	—	—	—	—	—	—	—	—	—	—	—	GMC	2009
•	—	—	—	•	—	•	—	—	—	—	•	—	GMC	2008

Company	Plant Name	Raw Feed	Product Ash %	Quality	Year of Last Upgrade	Type of Plant HM	Type of Plant WO	Primary Sep. Jig	Primary Sep. Ves.	Primary Sep. HM Cycl.
American Resources	Perry County	1,350	7.50%	1.2-2.5	—	•	—	—	•	—
American Resources	Supreme (Idle)	450	10%	< 1.2		•	—	—	•	—
American Resources (Deane)	Mill Creek	800	8.00%	< 2.5	—	•	—	—	•	—
American Resources (McCoy Elkhorn)	Bevins Branch	1,350	8.50%	1.2-2.5	2010	•	•	—	•	—
Apex Energy (James H. Booth)	Big Creek	450	—	—	—	•	—	—	—	—
Arch Coal	Raven (Idle)	800	10%	< 1.2	2008	•	—	—	•	—
Blackhawk Mining	Blue Diamond No. 64	900	7.00%	1.2-2.5	2010	•	—	•	—	—
Blackhawk Mining	Leatherwood	1,400	7.00%	1.2-2.5	2006	•	—	—	•	•
Blackhawk Mining	Spurlock	900	—	—	—	•	—	—	•	—
Blue Gem Mining	Blue Gem (Idle)	—	—	—	—	—	—	—	—	—
Bluestone Resources	Evanston (Idle)	400	—	—	2007	•	—	—	—	—
Bluestone Resources	Jones Fork (Idle)	700	—	—	2011	•	—	—	—	—
Bluestone Resources	Licking River (Idle)	300	—	—	—	•	—	—	—	—
Bluestone Resources	Pine Mountain (Idle)	400			2010	•	—	—	—	—
Cambrian Coal	Bear Branch (Idle)	400	—	—	—	•	—	—	•	—
Cambrian Coal	Beech Fork No. 1 (Idle)	500	—	—	—	•	—	—	•	—
Cambrian Coal	F.M. Burke (Idle)	550	8.50%	1.2-2.5	1994	•	—	—	•	—
Contura Energy	Long Fork (Idle)	1,500	—	—	2002	•	—	—	•	—
Contura Energy	Martin County (Idle)	1,400	—	—	—	•	—	—	•	—
Contura Energy	Sidney - Big Creek	1,500	—	—	1991	•	—	—	•	—
Four Rivers Coal Co.	Four Rivers	—	—	—	—	—	—	—	—	—
Harlan Cumberland Coal	Highsplint (Idle)	1,200	—	—	—	—	—	—	—	—
Harlan Cumberland Coal	Totz	600	2.00%	< 1.2	—	•	—	—	•	—
INMET Mining	Cave Branch	1,800	—	—	—	•	—	—	•	—
JRL Energy	Coalgood	—	—	—	2019	•	—	—	•	—
KenAmerican Resources	Paradise No. 9 (Idle)	800	8.00%	> 2.5	2011	•	—	—	—	•
Kentucky Proc. & Equp.	Pleasant View (Idle)	900	—	—	—	—	—	—	—	—
Kingdom Coal	Enterprise - Roxana	875	9.00%	1.2-2.5	2009	•	—	—	•	—
Lipari Energy	Pioneer	350	—	—	2010	—	—	•	—	—
Metinvest	Sapphire	1,100	8.00%	—	2006	•	—	—	•	—
Murray Kentucky Energy	Genesis	1,200	8.50%	> 2.5	—	•	—	—	—	•
Murray Kentucky Energy	Midway	1,200	8.50%	> 2.5	—	•	—	—	—	•
Murray Kentucky Energy	Pride	400	8.50%	> 2.5	—	•	—	—	—	•
Nally & Hamilton Enterprises	Brookside (Idle)	1,200	—	—	—	—	—	—	—	—
NewLead Holdings	Coal Essence	—	—	—	—	—	—	—	—	—
Oxford Mining Co.	Schoate	—	—	—	—	—	—	—	—	—
Paringa Resources	Poplar Grove	400	—	—	—	—	—	—	—	—
Pinnacle Processing	Pevler (Idle)	—	—	—	—	—	—	—	—	—
Prairie Mining Co.	Highland (Idle)	2,000	9.50%	> 2.5		•	•	•	—	—
Pristine Clean Energy	Premier Elkhorn	1,100	—	—	—	•	—	—	•	—
Revelation Energy	Bell County-Hignite (Idle)	650	8.50%	1.2-2.5	2009	•	—	—	•	—
Revelation Energy	Bledsoe No. 1 (Idle)	650	8.00%	1.2-2.5	2009	•	—	—	•	—
Revelation Energy	Red Bird (Idle)	500	—	—	—	—	—	—	—	—
Revelation Energy	Shamrock Beechfork (Idle)	1,400	8.50%	1.2-2.5	2010	•	—	—	•	—
Rhino Resources	Rob Fork	600	—	—	—	•	—	—	—	—
Richmond Hill	Clintwood Elkhorn No. 2	650	—	—	—	•	—	—	•	—
Sequoia Energy	Sequoia	750	—	—	—	—	—	—	—	—
Stella Natural Resources	Ivel	500	—	—	2007	•	—	—	•	—
Vision Mining	Vision No. 9 (Idle)	250	—	—	2004	—	—	—	—	—
Western Kentucky Minerals	Joe's Run Processing	—	—	—	—	—	—	—	—	—
Maryland (2)										
Alliance Resource Partners	Mettiki	1,350	—	—	—	—	—	—	—	—
Arch Coal	Dobbin Ridge (Idle)	150	10.0%-18.0%	1.2- 2.5	2010	•	—	—	—	—

Intermediate Sep.			Fine Coal			Centrifugal	Online Analyzers			Controls				
LD Cycl.	HM Cycl.	WO Tables	Froth	Spiral	Column	Dryer(s)	E	M	A	Man.	PLC	DCS	Builder	Year
•	—	—	—	•	—	•	•	—	—	•	•	—	Kil	1979
•	—	—	—	•	—	•	—	—	—	—	•	—	—	—
•	—	—	—	•	—	•	—	—	—	—	•	—	R&S	1992
•	•	—	—	•	—	•	—	—	—	•	—	—	—	1980
•	•	—	•	•	—	•	—	—	—	—	—	—	R&S	—
•	—	—	—	•	—	•	•	—	—	—	•	—	Pow	2008
•	•	—	—	•	—	•	—	—	—	•	—	—	Dan	1989
•	—	—	—	•	—	•	—	—	—	—	•	—	R&S	1990
•	—	—	—	•	•	•	—	—	—	—	•	—	Tag	2007
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	2007
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	—	•	—	•	•	—	—	•	•	—	—	—
•	—	—	—	•	—	•	•	—	—	•	•	—	—	—
•	•	—	•	—	—	•	—	—	—	•	—	—	Liv	1980
•	—	—	•	•	—	•	—	—	—	—	•	—	Pow	1979
•	•	—	—	•	—	•	—	—	—	—	•	—	Dan	1972
•	—	—	•	•	—	•	—	—	—	—	•	—	R&S	1989
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	•	—	—	—	•	—	—	—	•	—	—	Dan	1976
•	—	—	•	•	—	•	—	—	—	—	•	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	•	•	—	•	—	—	—	—	•	—	Bays	2004
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	•	—	•	•	•	•	—	—	—	•	•	—	A&T	1980
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	—	•	•	•	—	—	—	—	•	—	Mc	1982
•	—	—	—	•	—	•	•	—	—	—	•	—	GMC	2009
•	—	—	—	•	—	•	•	—	—	—	•	—	GMC	2008
•	—	—	—	•	•	•	—	—	•	—	•	—	GMC	2009
—	—	—	—	—	—	—	—	—	—	—	—	—	—	1968
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	•	—	—	—	—	•	•	•	—	•	—	—	R&S	1981
•	—	—	—	•	—	•	•	—	—	•	•	—	—	—
•	—	—	—	•	—	•	—	—	—	—	•	—	Dan	1980
•	•	—	—	•	—	•	—	—	—	—	—	—	Peters	1985
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	—	•	—	•	—	—	—	—	•	—	Pow	1990
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	—	•	—	•	•	—	—	•	•	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	—	•	—	•	—	—	—	—	•	—	Tag	—
—	—	—	—	—	—	—	—	—	—	—	•	—	Erwin	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	•	—	—	—	—	—	—	—	—	—	—	—	Mc	1978
•	—	—	•	•	—	•	—	—	—	•	—	—	Co	1997

Company	Plant Name	Raw Feed	Product Ash %	Quality	Year of Last Upgrade	Type of Plant HM	Type of Plant WO	Primary Sep. Jig	Primary Sep. Ves.	Primary Sep. HM Cycl.
Montana (1)										
Signal Peak Energy	Black Otter	2,000	—	—	2017	•	—	—	—	•
Ohio (15)										
American Energy Corp.	Century	3,000	8.50%	> 2.5	2012	•	—	—	—	•
B&N Coal	Orange	—	—	—	—	—	—	—	—	—
CCU Coal & Construction	Buckingham	700	—	—	—	•	—	—	—	•
Cline Resources	Buckeye	800	—	—	—	•	—	—	•	—
East Fairfield Coal Co.	East Fairfield	200	—	—	—	—	—	—	—	—
OhioAmerican Energy Inc.	Star Ridge (Idle)	425	8.00%	> 2.5	—	•	—	—	—	•
Oxford Mining Co.	Conesville	800	—	—	2015	•	•	•	—	—
Oxford Mining Co.	Oxford	—	—	—	—	—	—	—	—	—
Penn Ohio Coal Co.	Stonecreek	—	—	—	—	—	—	—	—	—
Rhino Resource Partners	Nelms	—	—	—	—	—	—	—	—	—
Rhino Resource Partners	Sands Hill	300	—	—	—	—	—	—	—	—
Rosebud Mining	Tusky	300	8.50%	2.75	—	•	—	—	—	•
State Line Resources	Negley (Idle)	200	—	—	—	•	—	—	•	—
Waterloo Coal Co.	Benedict	250	10.00%	< 2.5	—	—	•	•	—	—
Waterloo Coal Co.	Dundas	375	8.00%	< 2.5	—	•	—	—	—	•
Pennsylvania-Anthracite (17)										
Atlantic Coal	Stockton	—	—	—	—	—	—	—	—	—
Black Creek Breaker Co.	Black Creek	—	—	—	—	—	—	—	—	—
Blaschak Coal Corp	Blaschak	—	—	—	—	—	—	—	—	—
Blaschak Coal Corp	Latimer	—	—	—	—	—	—	—	—	—
Calvin V. Lenig	Coal Prep	—	—	—	—	—	—	—	—	—
Carbon & Metal Tech	Pine Creek	—	—	—	—	—	—	—	—	—
D Dale Lenig	Dale Lenig	—	—	—	—	—	—	—	—	—
Gale Mining Co.	Ginther	—	—	—	—	—	—	—	—	—
Lehigh Anthracite	Greenwood	300	—	—	—	•	—	—	•	—
Lenig & Kosmer	Glenn Lenig	—	—	—	—	—	—	—	—	—
Meadowbrook Coal Co.	Meadowbrook	—	—	—	—	—	—	—	—	—
Molesevich & Sons Construction Co.	Atlas	—	—	—	—	—	—	—	—	—
PAC 23 Mining Co	Split Vein	—	—	—	—	—	—	—	—	—
Reading Anthracite	New St. Nicholas	1,000	—	—	—	—	—	—	—	—
Schuylkill Coal	Schuykill	—	—	—	—	—	—	—	—	—
Sherman Coal Co.	Sherman	—	—	—	—	—	—	—	—	—
Superior Coal Prep	Superior	—	—	—	—	—	—	—	—	—
Pennsylvania-Bituminous (20)										
CONSOL Energy	Bailey Central	8,200	8.00%	< 2.5	2013	•	—	—	•	—
Contura Energy	Cumberland	1,600	8.25%	> 2.5	1996	•	—	—	•	—
Contura Energy	Emerald	1,850	8.00%	> 2.5	2003	•	—	—	•	—
Corsa Coal	Cambria	425	< 9.0%	<1.2	—	•	—	—	—	•
Corsa Coal	Shade Creek	650	<12.0%	< 1.8	2008	•	—	—	•	•
Homer City Processing	Homer City	1,200	12.00%	< 2.5	1996	•	—	—	—	•
ICS Energy Group LLC	Wilson Creek	400	6%-9%	< 1.2	—	•	—	—	—	•
Jericho Fuels	Tipple 4J	—	—	—	—	—	—	—	—	—
Jill Mining	Cannard Tipple	—	—	—	—	—	—	—	—	—
Murray American Energy	Eighty Four (Idle)	1,000	7.00%	< 2.5	—	•	—	—	•	—
Original Fuels	Original Fuels	650	—	—	—	—	—	—	—	—
PennAmerican	DiAnne	500	—	—	—	—	•	•	—	—
Piney Creek	Piney Creek (Idle)	—	—	—	—	—	—	—	—	—
River Hill Coal	Tosco	350	8.00%	< 1.2	2008	•	—	—	—	—
Robindale Energy Services	RES Plant	300	8.00%	< 1.2	—	•	—	—	—	•
Rosebud Mining	Clymer	275	6.5%-8.75%	< 1.2	2017	•	—	—	•	—

Intermediate Sep.														
LD Cycl.	HM Cycl.	WO Tables	Fine Coal Froth	Spiral	Column	Centrifugal Dryer(s)	Online Analyzers E	M	A	Controls Man.	PLC	DCS	Builder	Year
—	—	—	—	•	—	•	—	—	—	—	•	—	Tag	2009
•	—	—	—	•	•	•	—	—	—	—	•	—	A&T/LCE	2002
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	•	—	•	—	—	—	—	•	—	Tag	2009
•	—	—	—	•	—	•	—	—	—	—	•	—	Tag	2009
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	—	•	—	•	—	—	—	—	•	—	LCE	2007
•	•	—	•	—	—	—	—	—	—	—	—	—	NH/ACS	1984
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	•	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	•	—	•	—	—	—	—	•	—	Tag	2008
—	—	•	—	—	—	•	—	—	—	—	—	—	—	—
—	•	—	—	—	—	•	—	—	—	•	—	—	Co	1976
—	•	—	—	•	—	•	—	—	—	•	—	—	Co	1980
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	—	•	—	—	—	—	—	—	—	—	Wil	1962
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	1963
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	•	•	—	•	•	•	•	—	•	•	R&S	1983
•	—	—	•	•	—	•	•	•	•	—	•	—	Dvo	1978
•	•	—	•	•	—	•	•	•	•	—	•	—	R&S	1977
—	•	—	—	•	—	•	—	—	—	—	•	—	Tag	2009
•	—	—	—	•	—	•	—	—	—	—	•	—	Tag	1966
•	—	—	•	•	—	•	—	•	•	•	•	—	H&P	1978
—	—	—	—	•	•	•	—	—	—	—	•	—	Tag	2011
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	•	—	•	•	—	•	•	•	•	—	•	—	F&P	1996
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	•	•	—	•	—	—	—	—	—	—	Wil	1962
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	1976
—	—	—	•	•	—	•	—	—	—	—	•	—	Tag	2012
—	—	•	—	•	•	•	—	—	—	•	—	—	—	1976

Company	Plant Name	Raw Feed	Product Ash %	Quality	Year of Last Upgrade	Type of Plant HM	Type of Plant WO	Primary Sep. Jig	Primary Sep. Ves.	Primary Sep. HM Cycl.
Rosebud Mining	Portage	300	6.5%-8.75%	< 1.2	2017	•	—	—	•	—
Rosebud Mining	Dutch Run	400	6.5%-8.75%	< 1.2	2011	•	—	—	•	—
Rosebud Mining	Lady Jane	300	6.5%-8.75%	< 1.2	2005	—	•	•	—	—
Rosebud Mining	Mine 78	500	6.5%-8.75%	< 1.2	2017	•	—	—	—	•
Tennessee (3)										
Bluestone Resources	Baldwin (Idle)	400			2012	•	—	—	—	—
Kopper Glo Mining	Kopper Glo	—	—	—	—	—	—	—	—	—
Mountainside Coal Co.	Mountainside	—	—	—	—	—	—	—	—	—
Utah (3)										
UtahAmerican	West Ridge	600	—	—	—	—	—	—	—	—
Wolverine Fuels	Castle Valley	500	11.00%	—	2005					
Wolverine Fuels	Hunter	—	—	—	—	—	—	—	—	—
Virginia (18)										
Arch Coal	Pardee	750	8.20%	< 1.2	2005	•	—	—	•	•
Bluestone Resources	Ramsey (Idle)	650	—	—	2011	•		—	—	—
Bluestone Resources	Sigmon (Idle)	400	—	—	2010	•	—	—	—	—
Contura Energy	McClure River	1,100	6.75%-12%	< 1.2	1988	•	—	—	•	—
Contura Energy	Tom's Creek	1,100	7%-12%	1.2-2.5	2004	•	—	—	•	—
Coronado Coal	Amonate (Idle)	600	5.00%	< 1.2	—	•	—	—	•	—
Coronado Coal	Buchanan	1,300	5.00%	< 1.2	2007	•	—	—	•	—
G&B Processing	No. 1 Tipple	—	—	—	—	—	—	—	—	—
INMET Mining	Lone Mountain (Idle)	1,150	6.00%	< 1.2	2004	•	—	—	•	•
INMET Mining	Pigeon Creek (Idle)	1,400	—	—	—	•	—	—	•	—
Maven Energy	Maven No. 1	—	—	—	—	—	—	—	—	—
Metinvest	Nora	400	8.00%	—	—	•	—	—	•	—
Metinvest	Wellmore No. 8	1,000	7.00%	—	2011	•	—	—	—	—
Ramaco Resources	Knox Creek	650	—	—	2010	•	—	—	•	—
Red River Coal	Red River No. 1	—	—	—	—	—	—	—	—	—
Red River Coal	Stoker	—	—	—	—	—	—	—	—	—
Richmond Hill	Clintwood Elkhorn No. 3	650	—	—	—	•	—	—	•	—
SunCoke Energy	Coronet Jewell	900	6.80%	< 1.2	—	•	—	—	•	—
West Virginia (63)										
Alliance Resource Partners	Tunnel Ridge	1,800	8.00%			•	—	—	•	•
Arch Coal	Baybeck (Idle)	300	—	—	1996	•	—	—	—	—
Arch Coal	Beckley	600	6.0%-10.0%	< 1.2	2013	•	—	—	•	—
Arch Coal	Cardinal	1,400	7.00%	< 1.2	2015	•	—	—	•	—
Arch Coal	Dobbin Ridge	300	7%-18%	.08-2.5	2012	•	—	—	—	•
Arch Coal	Eastern (Idle)	800	10.00%	1.2-2.5	2001	•	—	—	•	—
Arch Coal	Holden 22	550	11.00%	< 1.2	2005	•	—	—	•	—
Arch Coal	Leer	1,400	7.00%	< 1.2	2012	•	—	—	—	•
Arch Coal	Sawmill Run (Idle)	700	9.0%-15.0%	1.2-2.5	2007	•	—	—	•	—
Arch Coal	Sentinel	575	9.0%-12.0%	1.2-2.5	2013	•	—	—	•	—
Argus Energy	Kiah Creek (Idle)	400	—	—	—	•	—	—	•	—
Award Development	Slaughter Creek (Idle)	—	—	—	—	—	—	—	—	—
Bay Star Coal Co.	Big Creek	—	—	—	—	—	—	—	—	—
Blackhawk Mining	Blue Creek	900				•	—	—	—	•
Blackhawk Mining	Fanco (Idle)	650	10.00%	< 1.2	2004	•	—	—	•	—
Blackhawk Mining	Hampden	600	<4.00%	< 1.2	—	•	—	—	•	—
Blackhawk Mining	Harris	600	12.00%	1.2-2.5	1983	•	—	—	•	—
Blackhawk Mining	Kanawha Eagle	800	6.00%	< 1.2	2001	•	—	—	—	•
Blackhawk Mining	Panther	1,200	10.00%	< 1.2	2005	•	—	—	•	•
Blackhawk Mining	Rocklick	2,800	9.00%	1.2-2.5	2000	•	—	—	•	—
Blackhawk Mining	Toms Fork	700	13.00%	1.2-2.5	2004	•	—	—	—	•

Intermediate Sep.							Online Analyzers			Controls				
LD Cycl.	HM Cycl.	WO Tables	Fine Coal Froth	Spiral	Column	Centrifugal Dryer(s)	E	M	A	Man.	PLC	DCS	Builder	Year
—	•	—	•	•	—	•	—	—	—	—	•	—	Mc	1972
—	•	—	•	•	—	•	—	—	—	—	—	—	Co	1990
—	—	—	•	•	—	•	—	—	—	•	—	—	—	1976
—	•	—	•	•	—	•	—	—	—	—	•	—	—	2008
—	—	—	•	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
													Centry	2005
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	•	—	•	•	•	•	•	—	—	—	•	—	Pow	1995
—	—	—	•	—	—	—	—	—	—	—	—	—	—	—
—	—	—	•	—	—	—	—	—	—	—	—	—	—	—
•	—	—	•	•	—	•	—	—	—	•	•	•	R&S	1979
•	•	—	•	•	•	•	—	—	—	—	•	—	Dan/Tag	1980
•	—	—	•	—	—	•	—	—	—	•	—	•	Co	1978
•	—	—	•	—	—	•	•	—	—	•	•	•	IE	1984
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	—	•	•	•	•	•	•	—	•	—	Pow	1981
•	—	—	•	•	—	•	—	—	—	—	•	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	•	—	—	•	—	—	—	•	—	—	Pow	1981
•	—	•	•	•	—	•	—	—	—	—	•	—	Pow	1978
•	—	—	•	•	—	•	—	—	—	•	•	—	Pow	1978
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	—	•	—	•	•	—	—	•	•	—	—	—
•	—	—	•	—	—	—	—	—	•	•	•	—	Liv	—
•	—	—	—	•	•	•	—	—	—	—	•	—	Tag	2010
•	—	—	•	•	—	•	—	—	—	•	—	—	Co	1992
•	—	—	•	•	—	•	•	•	•	—	•	—	Pow	2007
•	—	—	•	•	•	•	•	—	—	—	•	—	IR	2006
•	—	—	•	•	—	•	—	—	—	—	•	—	Pow	1997
•	—	—	—	•	—	•	—	—	—	—	•	—	Dan	1992
•	—	—	—	•	—	•	•	—	—	—	•	—	Liv	—
•	—	—	•	•	—	•	•	—	—	—	•	—	Pow	2012
•	—	—	•	—	—	•	—	—	—	•	—	—	R&S	1979
•	—	—	•	•	—	•	—	—	—	•	—	—	R&S	1972
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	•	—	•	—	—	—	—	•	—	Tag	2009
•	—	—	—	•	—	•	•	•	•	—	•	—	Brooks	1994
•	—	—	•	•	—	•	—	—	—	•	—	—	Peters	—
•	—	—	—	—	—	•	—	•	•	—	•	—	R&S	1968
•	—	—	—	•	—	•	—	—	—	—	•	—	Tag	2000
—	•	—	•	—	—	—	—	—	—	—	•	—	—	1996
•	—	—	•	•	—	•	—	—	•	—	•	—	R&S	1986
•	—	—	—	•	—	•	•	•	•	—	•	—	Dan/Pow	1995

Company	Plant Name	Raw Feed	Product Ash %	Quality	Year of Last Upgrade	Type of Plant HM	Type of Plant WO	Primary Sep. Jig	Primary Sep. Ves.	Primary Sep. HM Cycl.
Blackhawk Mining	Wells	2,000	8.00%	1.2-2.5	2000	•	—	—	•	—
Bluestone Resources	Bishop	650	8.00%	—	—	•	—	—	—	•
Bluestone Resources	Keystone No. 1 (Idle)	400	—	—	2004	•	—	—	—	•
Bluestone Resources	Keystone No. 2 (Idle)	450	—	—	—	•	—	—	—	•
Bluestone Resources	Pinnacle	1,250	—	—	2019	•	—	•	•	—
Bluestone Resources	Red Fox (Idle)	300	—	—	—	•	—	—	—	•
Contura Energy	Delbarton	800	—	—	—	•	—	—	•	—
Contura Energy	Goals (Idle)	600	6%	—	2001	•	—	—	•	—
Contura Energy	Homer III/Black Castle	2,200	—	—	1998	•	—	—	•	—
Contura Energy	Kepler	900	6.50%	—	1999	•	—	—	•	—
Contura Energy	Kingston	700	6.50%	—	2010	•	—	—	•	—
Contura Energy	Litwar (Idle)	450	5.5%-6%	—	2010	•	—	—	•	—
Contura Energy	Mammoth	1,400	—	—	—	•	—	—	•	—
Contura Energy	Marfork	2,400	6.00%	< 1.2	2002	•	—	—	•	—
Contura Energy	Power Mountain	1,200	6.00%	<1.2	2000	•	—	—	•	—
Contura Energy	Rum Creek/Bandmill	1,200	—	—	—	•	—	—	•	—
Coronado Coal	Mountaineer Pocahontas	600	—	—	2012	•	—	—	—	•
Coronado Coal	Saunders	900	—	—	—	•	—	—	•	—
ERP Environmental Fund	Big Mountain (Idle)	900	12.00%	< 2.5	1998	•	—	—	•	—
Frasure Creek Mining (Essar)	Deep Water	—	—	—	—	—	—	—	—	—
JSW Steel	Caretta	500	—	—	—	—	—	—	—	—
Lexington Coal Co.	Black Bear	1,800	6.2%-9.1%	< 1.2	2004	•	—	—	•	—
Lexington Coal Co.	Sprouse Creek (Idle)	1,400	—	—	—	•	—	—	•	—
Metinvest	Affinity	550	8.00%		—	•	—	—	—	•
Metinvest	East Gulf	600	6.75%	—	2007	•	—	—	—	•
Metinvest	Star Bridge	500	9.00%	—	—	•	—	—	—	—
Murray American Energy	Harrison County	1,500	10.00%	> 2.5	—	•	—	—	•	—
Murray American Energy	Marion County	1,400	8.50%	> 2.5	—	•	—	•	•	—
Murray American Energy	Marshall County	2,800	9.50%	> 2.5	—	•	—	—	•	—
Murray American Energy	Monongalia County	1,500	8.00%	> 2.5	2000	•	—	•	•	—
Murray American Energy	Ohio County	1,800	9.50%	> 2.5	2015	•	—	—	•	—
Murray Metallurgical Holdings	Katie	450	<4.0 & <8.0	< 1.2	2008	•	—	—	•	—
Phoenix Federal No. 2	Federal No. 2 (Idle)	1,300	6.70%	1.2-2.5	1998	•	•	—	•	—
Prime Processing (ArcelorMittal)	Eckman	500	—	—	2011	•	—	—	•	—
Ramaco Resources	Elk Creek	700	—	—	—	•	—	—	—	•
Rhino Resource Partners	Tug Fork	1,800	< 10.5%	> 1	2000	•	—	—	•	—
Southeastern Land	Miller Creek	800	12.00%	< 2.0	2006	•	—	—	•	—
Southeastern Land	Peach Orchard (Idle)	550	12.00%	< 1.2	—	•	—	—	•	—
Superior Processing	Superior	—	—	—	—	—	—	—	—	—
Xinergy	Bull Creek	300	—	—	—	•	—	—	—	•
Xinergy	Clearco	300	—	—	—	•	—	—	—	•
XMV (ArcelorMittal)	Black Wolf (Idle)	—	—	—	—	—	—	—	—	—

Key to plant designers: A&G=Allen & Garcia, A&T=A&T Manufacturing, AIR=AIRC, Bri=Bristol Steel, CDG=Coalfield Development Group, CEE=CEE Engineering, Chil=Childress Services, CLI=CLI, Corn=Cornette Engineering, CPE=Coal Processing Engineers, Co.=designed by the mining company, Cyc=Cyclone Machine, Dan=Daniels, Dvo=Dravo, EIW=Eagle Iron Works, EIM=Eimco, Env=Envirotech, Erw=Erwin Industries, F&P=Farnham & Pfile, FMC=FMC, Far=Fairmont Machine, GMC=General Mine Contracting, H&P=Heyl & Patterson, H-S=Holmes-Shaney, Ind=Indiana Steel, IN=Industrial, IR=Industrial Resources, Int=Interstate, Jef=Jeffrey, KHD=KHD Humboldt Wedag, Jam=F.F. Jameson, Kai=Kaiser, Kil=Kilborn Engineering, L-B=Link-Belt, Lin=Lincoln Contracting, Liv=J.O. Lively, L-A=Long-Airdox, Mc=McNally Systems, MP=Minerals Processing, NH=Norton Hambleton, Nor=Norwest, Pet=Peters Equipment, Pow=Powell Construction, PM=Process

Intermediate Sep. LD Cycl.	HM Cycl.	WO Tables	Fine Coal Froth	Spiral	Column	Centrifugal Dryer(s)	Online Analyzers E	M	A	Controls Man.	PLC	DCS	Builder	Year
•	—	—	•	—	—	•	—	—	•	•	•	—	R&S	1978
—	—	—	•	•	—	•	—	—	—	—	•	—	Tag	2013
—	•	—	•	•	—	•	—	—	—	—	•	—	Tag	2007
•	—	—	•	•	•	•	—	—	—	—	•	—	—	—
—	•	—	•	—	—	—	•	•	•	—	—	—	A&G	—
—	•	—	—	•	—	•	—	—	•	—	•	—	Tag	2006
•	—	—	•	•	—	•	—	—	—	—	—	—	—	—
•	—	—	•	•	—	•	—	—	—	—	•	—	—	—
•	—	—	•	•	—	•	—	—	—	—	•	—	Mc	1980
•	—	—	•	•	—	•	—	—	—	•	—	—	H&P	1968
•	—	—	•	•	—	•	—	—	•	—	•	—	—	1974
•	—	—	•	•	—	•	—	—	—	•	—	—	Liv	1980
•	—	—	—	•	•	•	—	—	—	—	•	—	—	—
•	—	—	•	•	•	•	—	—	—	—	•	—	Pow	1994
•	—	—	•	•	—	•	•	•	•	—	•	—	R&S	1985
•	—	—	•	•	—	•	—	—	—	—	—	—	Pow	2010
—	—	—	•	•	—	•	—	—	—	—	•	—	Tag	2007
•	—	—	—	•	•	•	—	—	—	—	•	—	Tag	2009
•	—	—	•	•	—	•	—	—	—	—	•	—	—	1975
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	Dan	2017
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Machinery, Ram=Ramsey, Raw=Raw Resources, R&S=Roberts & Schaefer, Rol=Roller, See=Seeco, Sim=Simon Carves, Tag=Taggart (DRA Global acquired Taggart), Wil=Wilmont, Wem=Wemco

Key to header: Raw feed = capacity (tons per hour), Quality = lb-SO2/mmBtu (<1.2, low sulfur; 1.2-2.5, medium sulfur; and >2.5, high sulfur), HM=Heavy Media; WO=Water Only, LD=Large Diameter (greater than 30 inches), Cycl=Cyclones,

Ves. = Vessel, Analyzers: ash, A; elemental, E; and moisture, M. Controls: Man = Manual, PLC = Programmable logic controller, and DCS = Distributed control system

Key to coal companies: Alliance = Alliance Coal Co., AMCI = American Metals & Coal Int'l, CONSOL = CONSOL Enegry

Easing Your Strip-ratio Burden

Suppliers hope to give miners options for moving more for less

BY JESSE MORTON, TECHNICAL WRITER

At Point Lick Energy's Camel Creek site, three Volvo A60H 60-ton articulated haulers manage about 98% availability over a six-month period. (Photo: Volvo Construction)

Powder River Basin (PRB) miner investor reports released this year reveal increasing strip ratio was driving up costs at a few of the mines.

For example, the now-defunct Cloud Peak Energy (CPE) reported in an annual report that higher strip ratios, increasing at a time of "sustained low customer demand," rendered Cordero Rojo "uneconomic." In its Q1 2019 report, the company said that, generally speaking, "higher strip ratio" at its mines drove up cost per ton for the period.

Western Fuels Association reported in its annual report that by 2023, the strip ratio at its flagship Dry Fork mine "will have increased by over 40%." The non-profit reported increasing strip ratio is "a challenge other mines in the PRB have experienced for several years."

That trend shows up as increase in cost per ton, usually from blowing through more diesel and explosives to access the same seam. CPE, Arch, Peabody and Western Fuels all reported increases in costs per ton at their PRB ops for 2018 or for Q1 2019.

Recent news from suppliers in the space spotlights solutions that speak to the growing need of surface mines to move more for less, and to do it safely. Most of the solutions promoted are now field proven. And what they all have in common is they promise the miner more optionality, allowing the miner to find their own ways to cut costs.

Never Get Bogged Down

Point Lick Energy's Camel's Creek site in West Virginia reported it deployed three Volvo A60H 60-ton articulated haulers and a Volvo EC750E excavator to tackle 100-ft-thick overburden. The equipment is moving roughly 2,000 yd^3 per day, according to Larry Grogg, general superintendent of the mine.

"We have used 40-ton trucks for reclamation but decided to go with the 60 tons," Grogg said. "In six months, they have between 2,100 and 6,800 hours on them, and are running at 98% to 99% availability."

Grogg described the haulers as perfect for the project because initially "we had no rock base and rough weather conditions."

The trucks "never got bogged down in the mud, they pulled right through," Grogg said.

They also handled the hills with ease. "Right now our haul road is 2,700 ft with 8% to 10% grades," Grogg said. With the A60H trucks, when coming downhill, the operators don't have to use the brakes, he said. "The engine retarder system works great at holding the trucks to a steady speed," Grogg said. "The operators love them, especially the comfort of the ride and the backup cameras."

Volvo told *Coal Age* the A60H is now widely deployed at mine sites in the U.S. similar to Camel's Creek. The hauler was first released at bauma 2016 and announced at MINExpo later that year. MINExpo proved to be roughly the midpoint of a decade-long uptick in demand for articulated haulers in general, Eric Fatyol, product manager, Volvo Construction Equipment, said.

"By CONEXPO-CON/AGG 2017, we had Tier 4F market-ready A60H units that we began demoing with target customers throughout the United States," Fatyol said. "From there, the A60H exceeded all expectations for sales in North America, and we've had to ramp up production to meet demand. Today, North America is Volvo's biggest market for the A60H, and about 95% of those customers are using them in mining and aggregate applications."

The A60H is the largest fully articulated hauler on the market, Fatyol said. Because it can go where rigid trucks can't, it enables miners to "extend their working season to be year-round and work in all weather conditions, access otherwise inaccessible areas of the mine, and avoid building new haul roads," he said.

Features include on-board weighing, Hill Assist, the Dump Support System, and the Dynamic Volvo Engine Brake system.

On-board weighing, which is fully automatic, is part of the Haul Assist

system and comes standard. Fatyol described it as using load indicator lights to alert both the hauler operator and the excavator operator when the desired load has been reached and when it has been exceeded. "The hauler operator can also see, in real-time, the actual tonnage displayed on the in-cab Contronics display, which also includes a new Econometer feature showing fuel economy in the form of gallon per transported ton, per work cycle for the last 10 cycles," he said. That data also integrates with Volvo's telematics system, CareTrack, allowing it to be analyzed in the back office.

Hill Assist holds the truck in place on steep slopes. "The feature automatically activates when arriving at a complete stop on a hill and is disengaged when the operator accelerates," Fatyol said.

The Dump Support System allows the operator to configure an alert system based on percentage side inclination of the truck. "This feature can be configured three ways: off, on with an alarm, and on with an alarm and a complete bed stop," Fatyol said.

With the Dynamic Volvo Engine Brake system, the torque and shift points can be adjusted against the load, inclination and rolling resistance. "That improves brake life by reducing the need to use the brake and retarder pedal when going downhill," Fatyol said. "It also leads to significant increases in max torque."

Fatyol described the hauler as ideal for miners that want to upgrade from smaller trucks to bigger ones with the benefits that brings, such as increased production and lowered costs, and without many process changes. For example, the A60H puts down ground pressure similar to the A40 or A45 models, he said. "This is why the A60H works so well in less-than-pristine underfoot conditions."

For another example, for over-the-road transport, the hauler can be moved fully assembled on a beam-style trailer.

The A60H is backed by a lifetime frame and structure warranty, under which the frame and articulation joints are protected for the entirety of the initial period of ownership or for the life of the machine. The company also offers ActiveCare Direct, a machine monitoring service.

"ActiveCare Direct is a pretty dramatic shift in our industry's approach to telematics," Fatyol said. Typically telematics entails sending the customer every undiagnosed fault code, burdening the customer with the responsibility to analyze the raw data and determine what steps to take, he said. "Instead, Volvo ActiveCare Direct sends not just the fault code, but also the probable cause, recommended solution and potential consequences of not taking action," Fatyol added.

The level of interest from customers like Camel's Creek mine in bigger articulated trucks has Volvo looking at possibly designing a bigger unit than the A60H. For the near term, however, it will likely remain the largest available, Fatyol said. "We're currently restricted by the capability of tires to handle higher loads in off-road conditions," he said. "So, until tires advance, we're likely capped out at 60 tons for articulated haulers."

Pursue Continuous Improvement

FLANDERS reported in a white paper that field results show a miner who adopted its Freedom Level 3 shovel control system package saw a 24% increase in productivity.

With the system, a lower-performing shovel became one of the highest performing units in the fleet without increased maintenance costs.

Such results are the norm when upgrading a shovel with a Freedom package, company leadership reported. "In mining, the bottom line boils down to producing for the lowest cost-per-ton," Doug Patterson, global business development director, FLANDERS, said. "By selecting the proper electrical upgrade, not only can productivity increase, but also reliability, which drives maintenance costs down and availability up," he said. "The total cost of ownership and cost per ton are notably reduced."

Released in 2012, Freedom, an open architecture platform, centers on shovel control software designed to enable optimized shovel performance. The software leverages a cycle decomposition algorithm that helps determine when certain functionalities should be used. Those functionalities include dig force control, boom jack reduction, and production monitoring.

Dig force control offers assistance in controlling digging motion in the bank, which decreases time spent in the bank and increases boom and gantry life, the company reported.

The boom jack reduction functionality alerts to the early signs of a

FLANDERS's Freedom shovel upgrades employ a detailed cycle decomposition algorithm that helps determine when certain functionalities should be used, the company reports. (Photo: FLANDERS)

boom jack event. "Preliminary testing shows a dramatic reduction in the number of Stage 2 boom jack events," the company reported.

The production monitoring functionality tracks cycle times and truck times, and builds shift time breakouts.

Other functionalities include an auto brake, swing impact detection and control loss detection.

Freedom is offered in three packages that include component changeouts with OEM and aftermarket solutions, such as FLANDERS' high-performance excavator-duty motors.

With the Freedom Se base package, FLANDERS replaces obsolete shovel control components, such as field drives, with DCS800 hardware and a specialized screen, typically installed in one day.

With the Freedom Si package, analog technology is upgraded to digital, and hardware, software and the control cabinet is replaced.

For both, the Freedom software jibes with existing systems "and provides enhanced troubleshooting capabilities," the white paper stated.

With the Freedom Level 3 system package, a FLANDERS M21 or F22 crowd motor is deployed. "FLANDERS motors outperform all other competitors by increasing available power significantly within existing frames to increase operating speeds and production volumes," the white paper states.

Offered with the Freedom Level 3 package is Optimized Bank Performance (OPB), a machine monitoring system that captures and reacts to data from the boom and gantry structure. "This real-time monitoring enables enhanced performance and increased productivity while staying within the machine's existing OEM limits," FLANDERS reported. "Using Freedom Level 3, structural abuse to the machine is reduced while hoist power is optimized during a portion of the dig cycle."

Patterson said OBP goes beyond enhancing baseline production capability. "The inherent operator assist function allows even a newer or mediocre operator to improve his productivity, while still protecting the machine mechanically and structurally," he said.

Freedom upgrades are proven to up overall performance while contributing to extended longevity of mechanical and structural components, the company reported. "The FLANDERS OBP product relies on continuous structural monitoring through the use of strain gauges in the boom and gantry, as well as torque control for each motion," Patterson said. "These feedbacks are not just for monitoring but are actually used in the algorithms for adaptive control of each motion. Stress on the shovel is actually decreased."

After years in the field at mines around the world, the Freedom packages effectively prove that "innovators

and those who are passionate for continuous improvement more often outperform the market, no matter what is happening in specific sectors," Patterson said. "Its proven track record over many years minimizes the natural concern many people might have with trying something new or different."

Lose Some Weight

Field results from coal mines in Australia prove Columbia Steel's TwistLink Chain for draglines offers optimal performance while weighing significantly less than standard chain, the company reported. Naturally, going forward TwistLink is expected to see more widespread adoption at sites in North America, Mark Barton, manager, Columbia Steel, told *Coal Age*.

"Most TwistLink chain users are based in Australia and it is installed on at least five draglines in North America," Barton said. "In the coming years, Columbia Steel anticipates more TwistLink chain trials and adoption by North American dragline operators."

Offering the benefits of standard chain, TwistLink weighs almost a quarter less, allowing operators to increase the load of overburden in every swing of the bucket, he said. "Reducing chain weight can potentially allow for the use of a larger bucket," he said. "Some dragline operators choose lighter weight rigging to reduce the load on their dragline."

The chain is cast from the same H-series steel alloy as the company's XtraLife chain, which is described by the company as the industry standard. The material offers "high tensile strength and toughness," and provides "good resistance to abrasion and excellent ability to handle impact" and shock loading, Columbia Steel reported.

TwistLink is available with Columbia Steel's Xtend Process high-carbide overlays and manganese overlays.

Company literature described the chain as contoured for smooth operation and increased flexibility. Other benefits include increased surface area in the bite region, increased cross-sectional strength, the resulting cost savings, and the availability of weld-in repair links.

Columbia Steel's TwistLink weighs roughly 22% less than standard chain equivalent. (Photo: Columbia Steel)

Barton said the solution should speak to American customers seeking to optimize their rigging. "Any dragline rigged with 2 ¼-in. to 4 ½-in. sized chain can make the switch to TwistLink," he said.

Since its release in 2002, the solution has helped the company build a reputation for making chain with "superior reliability and long wear life," Barton said. "TwistLink chain is an example of Columbia Steel's commitment to help dragline customers improve productivity and safety with innovative wear part solutions."

Match Performance to the Task

With higher horsepower and its improved controls, Komatsu America Corp.'s newly released PC2000-11, equipped with a Tier 4 Final engine, can strip more overburden and load more trucks per hour than its predecessor, the PC2000-8, the company reported.

Announced in September, the excavator uses "EPC valves to control the work equipment, which optimizes hydraulic flow for improved multi-function performance," Robert Hussey, product marketing manager, Komatsu America, said. "The machine also has 9% more net horsepower," he said. "The direct benefit of these two changes are more power when digging and faster cycle times when loading trucks."

Enabling the miner to best match performance capability to the task, the PC2000-11 offers four working modes.

Power Plus mode is "for customers who need the maximum available production," Hussey said. It offers 12% more productivity than the PC2000-8.

Economy 1 mode provides the maximum amount of fuel savings, up to 15% in comparison to the predecessor unit.

Between the two are Power mode and Economy mode.

The excavator has auto-idle and auto-idle shutdown, both of which save fuel, Hussey said. "For other support work around the coal mine, the PC2000-11 has a heavy-lift functionality, which initiates the maximum power of the boom circuit, increasing lift force by 10%."

Compared to the PC2000-8, it features stronger boom plates and castings, strengthened track and center frames, larger-diameter carrier rollers, and improved hydraulic cylinder seals. Thus, components are built to last, the company reported.

When maintenance is required, "a ground-level service center reduces the labor hours for preventative maintenance services," Hussey said. "Standard engine pre-lubrication, an automatic greasing system, and hydraulic filter bypass detection increase long-term durability and reliability, ensuring the customer is receiving maximum value for each hour the unit is in production and reducing maintenance costs."

As a Tier 4 final machine, the excavator requires "the use of additional technology and aftertreatment to achieve compliance with EPA emission mandates," Hussey said. However, the maintenance routine and amount of consumables used is less than other Tier 4 Final aftertreatment solutions in the marketplace, he said.

"Unlike some other Tier 4 Final solutions, Komatsu's PC2000-11 does not require a selective catalytic reduction system and therefore does not require diesel exhaust fluid as an additional consumable fluid," Hussey said.

KomVision is a standard feature on this machine. It is a seven-camera system that provides the operator with a bird's-eye view of the working area on a dedicated 10.4-in. LCD touch screen in the cab, Hussey said. "In overburden stripping applications, there are often a high number of haul trucks involved, so the KomVision system helps improve operator awareness in the working area."

The excavator is designed to load 70-ton to 200-ton haulers.

The PC2000-11 excavator succeeds the PC2000-8 and offers more HP with a Tier-4 engine. (Photo: Komatsu America Corp.)

Decrease Downtime

Caterpillar announced a drive system upgrade for the 7495 rope shovels that, the company reported, increases durability and component life, decreases downtime, and reduces costs. The upgrade reconfigures the crawler undercarriage to allow drive shaft and tumbler replacement from the outboard side.

The upgrade is designed to be a direct replacement, requiring no machining of the crawler frame.

With the upgraded drive system, "thrust loads are evenly distributed on large tapered roller bearings as opposed to bronze thrust plates," the company reported. Bearings are sealed and continuously coated with fresh grease. "The result is increased durability in harsh environments and alignment with 25,000-hour planned rebuilds."

The system is field tested, the company reported.

The 7495 has a 120-ton dipper payload and features an IGBT Acutrol drive system that comes standard. The original equipment is described by the company as being comprised of components that ensure system performance and "a long, trouble-free life."

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Evaluating the Stability of Shale Gas Wells in Longwall Barrier Pillars

Researchers evaluate the stability of shale gas wells in longwall barrier pillars

BY PETER ZHANG, DANIEL SU, AND JUN LU

Unconventional shale gas development in longwall mining regions has given rise to safety concerns in longwall mines. With the recent shale gas boom, approximately 1,500 shale gas wells have been drilled through current and future coal reserves in Pennsylvania, West Virginia and Ohio over the past 15 years. Longwall mining removes coal from underground in large blocks and causes the surface and subsurface to move as overburden strata above longwall panels settle to fill the mined void.

When gas wells are located in longwall pillars, the longwall-induced subsurface movement can influence their stability, inducing stresses and deformations in gas well casings in the coal pillars. If gas well casings are damaged or ruptured by excessive stresses and deformations, natural gas could leak into active longwall mines, potentially causing a fire or explosion in underground workings. For these reasons, unconventional shale gas wells in longwall pillars not only present safety concerns in longwall mines, but also cause safety and economic concerns for the gas companies.

To address this issue, the National Institute for Occupational Safety and Health (NIOSH) has been conducting research on gas well stability in longwall pillars to provide technical guidance for state and federal regulatory agencies as well as the coal and gas industry. Researchers have studied the critical factors through field experiments and developed numerical models to evaluate the stability of shale gas wells in longwall barrier pillars, as described in this article.

Review of Current Gas Well Pillar Regulation

The current gas well pillar regulation is the PA 1957 gas well pillar study (commonwealth of Pennsylvania, 1957). This study was completed by the Joint Coal and Gas Committee based on gas well failures caused by coal mining in the state of Pennsylvania prior to 1957. The study included 77 gas well failure cases that occurred over a 25-year span in room-and-pillar mines with full or partial pillar recovery in the Pittsburgh and Freeport coal seams. The mining depth in those mines ranged from 55 feet to 750 ft. The 1957 study provided guidelines for pillar sizes around gas wells under different overburden depths up to 750 ft, which became a gas well pillar regulation in Pennsylvania as well as for other states.

Because the technical guidelines developed in the 1957 study were based on data from room-and-pillar mining under shallow cover, they have been found to be inadequate for longwall gas well pillars, especially under deep cover. In fact, gas well casing failures have occurred in longwall chain pillars even though the chain pillar sizes met the requirements by the 1957 study. Although barrier pillars are usually

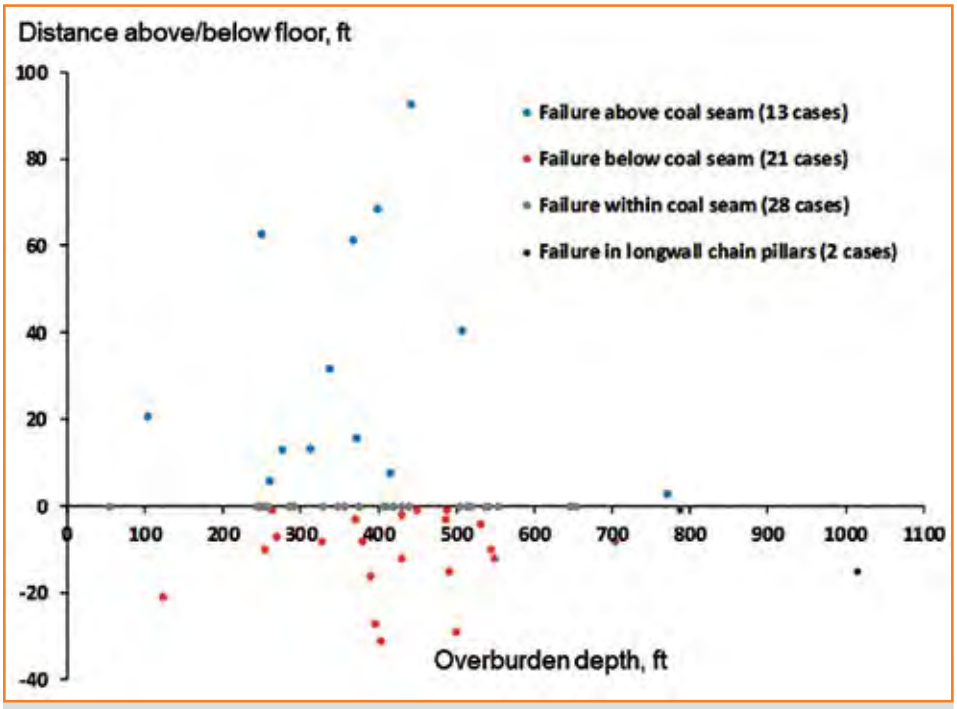


Figure 1—The locations of gas well failures as a result of retreat mining.

larger than required by the 1957 study, there is still no guarantee that the gas wells are stable in all circumstances, and other factors have to be taken into consideration when evaluating stability.

Critical Factors Influencing Gas Well Stability in Barrier Pillars

The stability of gas wells in barrier pillars is mainly influenced by overburden depth, gas well location relative to the gob, overburden geology and floor stability. First, overburden depth determines how much abutment pressure could be induced over the barrier pillars. The greater the overburden depth, the larger the induced abutment pressure in the barrier pillars and thus the greater the stresses in the gas well casings. In this respect, the gas wells in barrier pillars under deep cover are potentially subjected to higher induced stresses in the casings near coal seams depending on how far the wells are away from the gob.

Overburden depth also influences where gas well failures could occur. Figure 1 shows locations of gas well failures as a result of retreat mining. Because no cases of gas well failures in barrier pillars could be found, the failure cases from the PA 1957 study as well as two failure cases in longwall chain pillars in the Pittsburgh seam are used to show potential failure locations along the vertical axis of a gas well. Based on these available cases, gas well failure can occur in three locations: in the coal seam, within about 100 ft of the roof strata, and within 40 ft of the immediate floor. The figure also indicates that at greater overburden depth, the failures are more likely to occur either in the coal seam or in the floor.

Although barrier pillars relatively large in size generally have no stability issues, the location of the gas wells in barrier pillars — i.e., the distance of gas wells to the edge of the gob — still has an effect on gas well stability. This effect is shown in Figure 2 using the failure cases from the 1957 study and the cases in the longwall chain pillars in the Pittsburgh seam. The case history demonstrates that the majority of failures occurred when the gas wells were located within about 50 ft horizontally from the gob edge, and few failures occurred up to 80 ft from the gob. This trend suggests that the possibility of failure diminishes greatly with the gas wells that are located farther away from the gob. However, with limited cases from longwall mining, it is still early to come to a conclusion that the gas wells in barrier pillars are safe if they are located beyond the range in which gas well failures have occurred.

Overburden geology, especially weak claystone layers and massive strong sandstone/limestone layers, also influences the stability of gas wells in barrier pillars. Claystone layers are common in the overburden of the Pittsburgh coal seam, and some claystone layers are moisture-sensitive and can become very weak when saturated with water. With longwall mining, large horizontal movements can occur at the claystone layers over barrier pillars due to its low modulus and low friction along the interfaces with other strong rocks. These movements, including vertical compaction and horizontal sliding, could induce significant stresses in gas well casings, potentially causing casing failure. Large horizontal movement up to 5.5 in. has been measured in the overburden strata about 55 ft from the longwall gob under shallow overburden depth of 604 ft in the Pittsburgh seam. This movement,

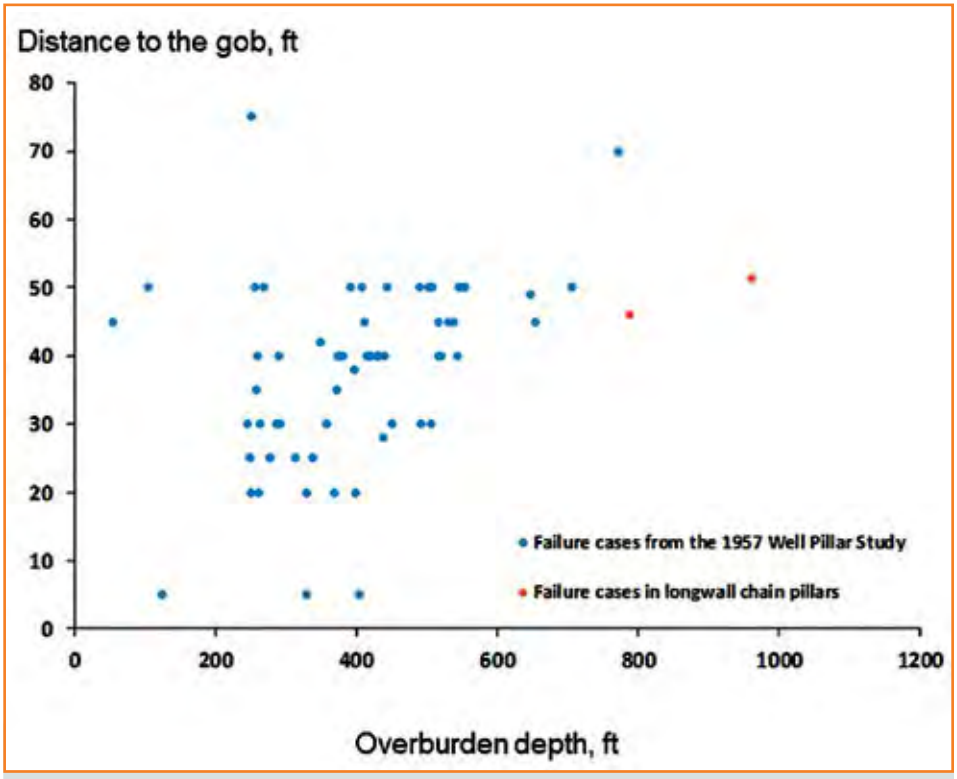


Figure 2—The distance between the wells and the edge of the gob has an effect on gas well stability.

which occurred near a stream valley and along the interfaces of weak claystone and strong sandstone layers, is likely to be associated with low friction and normal pressure along the interfaces under shallow overburden depth. Under deep cover, however, horizontal movement in the overburden over a barrier pillar would be small due to higher friction along the bedding planes. A small horizontal movement of 0.46 in. has been measured about 137 ft from the longwall gob under an overburden depth of 1,185 ft. Therefore, large horizontal displacement over barrier pillars is more likely to occur at weak claystone layers near a stream valley under shallow overburden depth, potentially inducing high shear stress in gas well casings.

Finally, claystone floor is also a concern for mining around gas wells under deep cover. Claystone is commonly present in the floor of the Pittsburgh seam and can become very weak if the floor is wet. A claystone floor, if weakened by water, can induce high vertical and shear stresses in gas well casings under deep cover. Recent experience has shown that gas well failures tend to occur in claystone floor as mining depth becomes greater.

Assessing Gas Well Stability in Barrier Pillars

To assess the stability of gas wells in barrier pillars, we must quantify subsurface movements and their effect on the gas well casings, which is made simpler by way of numerical modeling. NIOSH has developed numerical models that consider geologic and mining factors as well as the construction of the gas well casings. As an example of gas well pillar evaluation, a case is presented to demonstrate the effect of longwall-induced subsurface deformations on the gas well casings in barrier pillars. This case involves two Marcellus shale gas wells located within a barrier pillar between two longwall bleeders in the Pittsburgh coal seam. The gas wells remain intact after longwall mining without any safety issues.

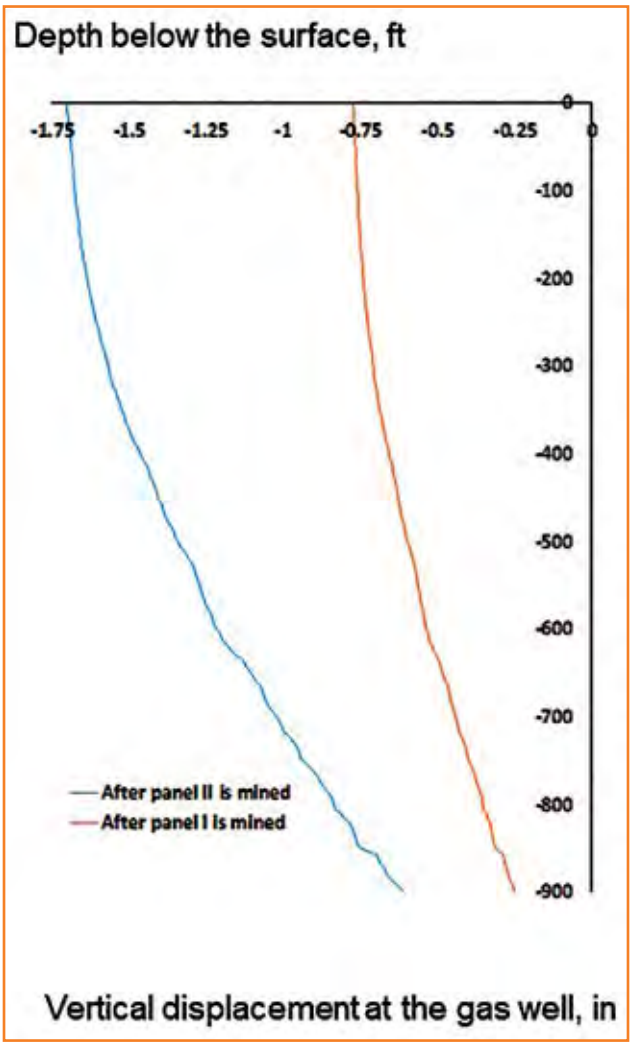
A FLAC3D model — a proven numerical modeling software used for geotechnical analysis — was set up based on the geological and mining conditions near the gas wells. The model included sufficient details to simulate the mining sequence and longwall retreating as well as gas well casings. Shale gas wells are generally completed with five casings: surface, water protection, coal pro-

tection, intermediate and production. The coal protection casing is usually placed down to 250 ft below the coal seams. Longwall-induced subsurface movements transfer deformations to the gas well casings through back-filled cement. Because the modulus of steel is high, a small amount of subsurface movement will induce high stresses in the casings. In response to subsurface movements, the casings are likely to experience vertical compression, horizontal compression, and shear. The numerical model is capable of simulating longwall-induced subsurface movements in the overburden and calculating the resulting induced stresses in the gas well casings.

The first longwall panel was mined before the gas wells were drilled and installed. The gas wells were drilled within the center of a 145-ft-wide (rib-to-rib) barrier pillar. The bleeders for the second panel were developed later, and the second panel was mined about 350 ft away from the gas wells. The overburden depth at the gas well site was 850 ft. The average mining height of the two longwall panels was approximately 7 ft.

Figure 3 shows the predicted vertical displacement in the subsurface along the gas wells after both panels are mined. The maximum vertical displacement at the surface is predicted to be 0.75 in. after Panel I mining and 1.75 in. after Panel II mining. Since the gas wells were installed after the retreating of Panel I, mining of Panel II would induce about 1 in. of vertical displacement at the gas well site on the surface. The vertical displacement along the gas wells in the subsurface gradually reduces down to about 0.25 in. at the coal seam level after Panel II mining. Overall, the gas wells are shortened for about 0.75 in. between the surface and the coal seam.

Figure 4 shows the predicted horizontal displacement in the subsurface along the gas wells after both panels are mined. The maximum horizontal displacement at the surface is 1.25 in. after Panel I mining and -0.25 in. after Panel II mining. Importantly, the direction of the longwall-induced horizontal displacement would be toward the gob. Thus, after the first panel mining, the ground moves toward the first panel. However, the ground would move back toward the second panel after the second panel is mined. Since the gas wells were installed after the first panel mining,



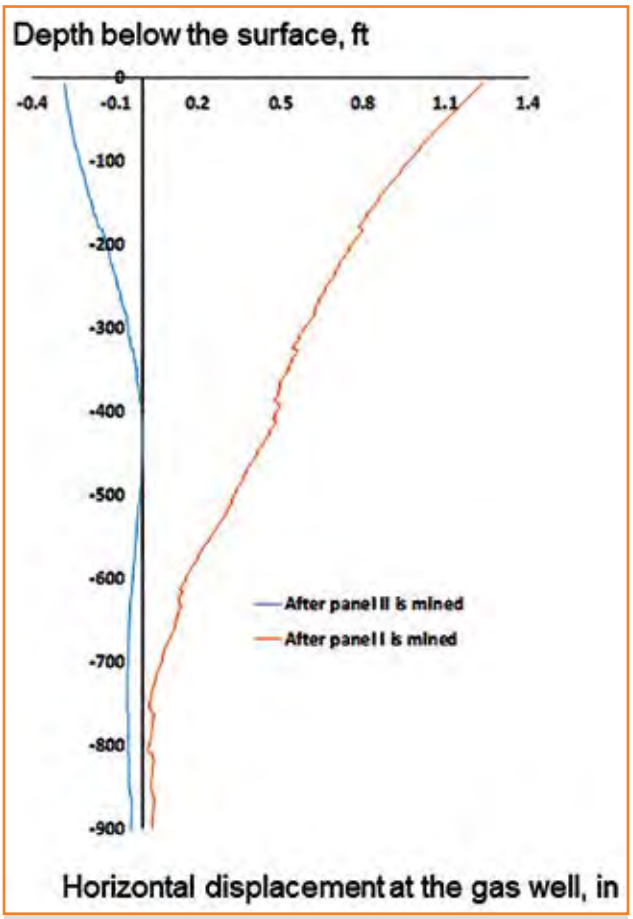


Figure 3 (left)—The predicted vertical displacement in the subsurface along the gas wells after both panels are mined.

Figure 4 (above)—The predicted horizontal displacement in the subsurface along the gas wells after both panels are mined.

mining of the second panel would effectively induce about 1.5 in. of horizontal displacement at the gas well site on the surface. The horizontal movement reduces at deeper depth and diminishes to almost zero near the coal seam level.

Other techniques can also be used to assess gas well stability in barrier pillars, such as the von Mises yield criterion, which is commonly used to determine structural safety of engineering materials. For the same case described above, the authors applied this technique and found that high von Mises stress occurs at the weak claystone layers and also increases with depth. Based on this criterion, the casings will yield if the von Mises equivalent stress is greater than the yield strength of the steel.

In summary, the gas wells in barrier pillars are likely to be influenced or even damaged by longwall mining, but the influence is much less than that in longwall chain pillars. However, even if the risk of gas well failure in a barrier pillar is perceived to be low, a thorough assessment should still be performed in that any gas leakage from shale gas wells could pose a serious risk to underground mine workers. In many cases, the assessment is to determine the appropriate precautions that should be put into place during longwall retreating. Therefore, it is important to understand and quantify how the gas wells in longwall barrier pillars could be influenced by longwall mining and to make appropriate decisions on what measures should be taken to ensure safety for both longwall mining and gas production.

Disclaimer

The findings and conclusions in this paper are those of the authors and do not necessarily represent the official position of the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention.

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Coal Age

EQUIPO MINERO

Coal Production Grows in India

The world's third-largest coal producer scales up to meet future demand

BY RAJESH NATH AND AJMAL FAWAD

India's total coal output grew during fiscal year 2018 to 675 million metric tons (mt) from 663 million mt the previous year, an increase of 1.8%. Most of the country's coal production (84%) originates from the collieries of Coal India Ltd. (CIL).

In addition to power generation, India also requires significant amounts of coal to produce steel and cement. To meet these needs and minimize imports, the government has placed domestic coal production on a fast track, setting a target of 1.5 billion mt by fiscal year 2020. The government has set a goal of 1 billion mt of coal production for CIL by fiscal year 2020, which would be 433 million mt more than the 567 million mt it produced in fiscal year 2017. In two years, the government hopes to double current coal production levels.

CIL has eight subsidiaries: Bharat Coking Coal Ltd., Central Coalfields Ltd., Eastern Coalfields Ltd., Western Coalfields Ltd., South Eastern Coalfields Ltd., Northern Coalfields Ltd., Mahanadi Coalfields Ltd., and Central Mine Planning & Design Institute Ltd. Other state coal holdings include Singareni Collieries Co. Ltd. (SCCL), Neyveli Lignite Corp. (NLC) and Mineral Development Corp.

SCCL is jointly owned by the government of Andhra Pradesh and government of India. The Singareni coal reserves stretch across 350 kilometers (km) of the Pranahita, Godavari Valley of Andhra Pradesh with a proven geological reserves aggregating to 8.791 billion mt. SCCL produced around 62 million mt of coal in fiscal year 2017. It has 47 mines, including 18 open-cast mines and 29 underground mines. To achieve the government's target of 100 million mt by 2020, SCCL is planning to start 20 to 25 new mines.

Coal Reserves in India as of January 4, 2018 (millions of mt)

Type of Coal	Proved	Indicated	Inferred	Total
Prime Coking	4,649.00	664.00	0	5,313.00
Medium Coking	13,914.00	11,709.00	1,879.00	27,502.00
Semi Coking	519.00	995.00	193.00	1,708.00
Non Coking	129,705.00	125,796.00	28,996.00	284,498.00
Tertiary Coal	593.81	99.34	894.53	1,587.68
Total	149,380.81	139,263.34	31,962.53	320,608.68
Lignite	6,540.70	26,388.80	12,734.07	45,663.58

Coal Project Pipeline

CIL has 117 ongoing mining projects valued at Rs 200 million ($2.8 million) or more. Of that, 63 are on schedule. The largest projects include Kusmunda (50 million mt) and the Gevra expansion project (70 million mt).

An additional 129 new projects, with a targeted capacity of nearly 494 million mt have been identified, of which reports for 101 projects have been formulated. Out of these 101 projects, 30 projects with a capacity of 330 million mt have been approved.

During fiscal year 2018, six new coal mines came online: Aradhagram, Manoharpur, Gare Palma IV/8, Talaipalli, Dulanga and Pachwara North. Construction has started on a new coal handling plant at JVR open-cast mine, Sathupally in Khammam district. ALPS Coal Beneficiation Services will set up a coal washery at Chedra village in the Latehar district of Jharkhand. GPC plans to set up the Khadsaliya-I lignite mining unit at Khadsaliya, Lakhanka and Thalsar. Paras Power & Coal Beneficiation will set up a coal washery in Bilaspur, Chhattisgarh. MNH Shakti will set up a project in Sambalpur, Orissa.

South Eastern Coalfields Ltd., a CIL subsidiary, will establish the country's largest coal washery with a capacity of 25 million mt per year (mtpy) in the Korba district of Chhattisgarh. The project would be known as Kusmunda coal washery. It will be an integral part of the Kusmunda open-cast coal mine, one of three mines operated by the SECL in Korba coalfields with estimated reserves of more than 10 billion mt.

CIL currently operates 15 washeries. Three non-coking coal washeries with feedstock capacity of 13.5 million mtpy and 12 coking coal washeries with feedstock capacity of 23.3 million

Raw Coal	2016-2017	2017-2018
1. Growth of Production (India)	2.90%	2.70%
Growth of Production (CIL)	3.70%	3.27%
2. Growth of Off-take (India)	2.80%	6.80%
Growth of Off-take (CIL)	2.40%	6.81%
3. Closing Stock (average monthly take off)	77.28 mt	62.04 mt
4. Colliery Consumption/ Off-take	0.29 mt	0.24 mt
5. Stripping Ratio (OBR/RC)	2.62	2.74
6. Import growth (overall-Coal)	- 5.91%	9.06%
– Coking Coal	-6.50%	12.87%
– Non-Coking Coal	-6.32%	7.99%
7. Avg. pit head value/Ton Coal (Non Captive Public)		

Production of Coal Over the Years (millions of mt)				
Cos.	2014-2015	2015-2016	2016-2017	2016-2017
ECL	40.00	40.21	40.52	43.57
BCCL	34.51	35.86	37.04	32.61
CCL	55.65	61.32	67.05	63.41
NCL	72.48	80.22	84.10	93.02
WCL	41.15	44.82	45.63	46.22
SECL	128.28	137.93	145.33	144.71
MCL	121.38	137.90	139.21	143.06
NEC	0.78	0.49	0.60	0.78
CIL-Total	494.23	538.75	559.46	567.37
SCCL	52.54	60.38	59.53	62.01
Others*	24.48	40.10	43.8	46.02
All India	609.18	639.23	662.79	675.40

Production of Coal and its Share by Type of Mining				
Type of mining		Open-cast	Underground	Total Production
2016-2017	Production	618.44	44.35	662.79
	Share (%)	93.3%	6.69%	100%
2017-2018	Production	633.57	41.83	675.40
	Share (%)	93.8%	6.2%	100%
Growth (%)		2.45%	-5.68%	1.90%

mtpy. The company will set up 15 coal washeries in the next three years. Nine are thermal coal with a capacity of 94 million mtpy and six are coking coals with a capacity of 18.6 million mtpy.

CIL and Bharat Coking Coal Ltd. will set up 12 new coking coal washeries by fiscal year 2020. CIL is working to acquire coking coal assets, increase domestic production and minimize the diversion of coking coal to thermal plants. Coking coal imports could be reduced by 20%-25%.

During fiscal year 2018, CIL approved five open-cast projects with annual capacity of nearly 25 million mtpy and budgeted capital of Rs 42.6 billion ($600 million).

Sectoral Off-take of Raw Coal (mt)					
Cos.	Achieved (2016-2017)				
	Power	Steel	Cement	Others	Total
CIL	486	0	5	89	580
SCCL	57	0	3	4	65
Others	27	0	0	19	45
Total	570	0	8	112	690

In SCCL, there are 20 mining projects (14 open-cast and six underground) valued at Rs 200 million ($2.8 million) and under various stages of implementation with capital costs of Rs 68 billion ($961 million). Of these projects, 14 are on schedule.

Several new mines are proposed to be opened in SCCL, including Bellampally OC-2, Kasipeta-2, Shanthi Khani continuous miner, Koyagudem OC-2 Pit-1, JVR OC2, Manuguru OCP, K.T.K. OC-2, PVK continuous miner and KKOC. They are expected to produce 1.3 million mtpy.

Three washeries, each of 1-million-mtpy capacity are in operation on a BOO basis, Ramagundam, Mandamarri and Manuguru. Three more coal washeries with 10-million-mtpy capacity are in the pipeline: JVR, 4 million mt; RG-II, 3 million mt; and Khairagura, 3 million mt.

Coal Imports

Coal is imported from other countries to bridge the gap, especially low-ash coal. Under the import policy for 1993-1994, coal was put under Open General License (OGL) and importers are free to import coal based on requirement.

In 2017-2018, India's coal imports were 208.25 mt versus 190.95 mt in 2016-2015. The share of coking coal was 22.57% and non-coking coal was 161.245 mt, which accounted for 77%.

Indonesia, with 46.01%, remains the leading supplier, followed by Australia with 22.15% and South Africa with 18.48%. They accounted for 86.64% of India imports in 2016-2017.

In 2017-2018, total exports were 1.504 mt. Bangladesh accounted for 50.41% of exports followed by Nepal (46.30%) and Bhutan (2.99%).

Geology and Reserves

India is fifth for world coal resources. It is third for identified reserves.

Coal in India is mainly distributed along the present day river valleys i.e., Damodar Valley, Sone-Mahanadi Valley, Pench-Kanhan Valley, Wardha-Godavari Valley, etc. There are 69 major coalfields located in the peninsula of India and 17 are located in the northeastern region. The bulk of the coal reserves are in the southeastern quadrant in West Bengal, Jharkand, Orissa, Chattisgarh & Madhya Pradesh.

India coal reserves estimated by the Geological Survey of India are 319.020 billion mt, up to a depth of 1,200 m, as of January 4, 2018.

Future Projection of Production From Projects (millions of mt)						
Projects	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Existing + Completed	190.57	190.57	185.03	177.24	177.64	164.96
Ongoing	315.56	354.93	399.76	437.56	502.65	561.48
Future	0.07	2.55	12.81	45.89	93.40	181.66
Total	506.21	548.05	597.60	660.68	773.70	908.09

Out of 319 billion mt of coal reserves, "prime" coking coal are 5.3 billion mt, medium and semi-coking coals are 27.5 billion mt & 1.70 billion mt and non-coking coals 284.6 billion mt. Most of these resources occur in Gondwanas and the balance is in the Tertiary formations.

Currently, lignite reserves in the country have been estimated at around 45.664 billion mt, most of which occur in Tamilnadu. Other states where lignite deposits are located: Rajasthan, Gujarat, Kerala, Jammu, Kashmir and Union Territory of Pondicherry.

Basically, Indian coals have high mineral matter (ash) content unlike Pennsylvanian and Carboniferous coals of America and Europe, respectively.

Coal Resources

India ranks second among the coal producing countries of the world in terms of annual coal production. However, with coal resources, it has less than 1% of world coal resources. Of the 319 billion mt of Indian coal resources up to a depth of 1,200 meters (m), about 149 billion mt are proven or confirmed. This amounts to about 9% of world proven coal resources.

Indian coals, in general, are of inferior quality owing to high ash percentage, when compared with coal available in the international trade arena. Despite this, Indian coals in general merit are more environmentally friendly because of:

- Low sulfur content;
- Low chlorine content; and
- Low toxic trace elements.

Additional advantages for industrial use:

- High ash fusion temperature;
- Low iron content; and
- Refractory nature of ash.

The exploration database, created so far, is adequate for preparation of a long-term perspective plan for mining coal in the country.

Coal deposits in India are confined to eastern, southern and central parts, consisting of 27 major coalfields. The shares of overall coal resources of different states of 98.21% are: Chhattisgarh, 17.93%; Jharkhand, 26.06%; Madhya Pradesh, 8.77%; Telangana, 6.80%; Maharashtra, 3.86%; Odisha, 24.86%; and West Bengal, 9.93%.

Balance share of coal reserves is distributed over Arunachal Pradesh, Assam, Meghalaya and Nagaland.

Quality wise, resources are 11% coking coal and 89% of non-coking coal. Out of total non-coking coal:

- superior grades A, B and C with ash content 24% or less and;
- inferior grades with ash content between 24%-45%.

The Jharia coalfield is the main source of prime coking coal. Superior-grade non-coking coals are available in the Raniganj coalfield of West Bengal, Central India coalfield of Madhya Pradesh and Talcher coalfields of Orissa.

Imports of Coal to India in 2017-2018

Type of Coal	Quantity (mt)
Coking	47.0
Non-Coking	161.2
Total	208.3

Imports of Coal to India By Country During 2017-2018

Country	Quantity (mt)	% Share
Indonesia	96	46
Australia	46	22
South Africa	38	18
USA	12	6
Russia	4	2
Others	11	28
Total	208	100

Exports of Coal From India by Destination During 2017-2018

Country	Quantity (mt)	% Share
Bangladesh	.80	50
Nepal	.70	46
Bhutan	.01	3
United Arab Emts	0	0
Others	0	0
Total	1.50	100

The ash of Indian coal is of inherent nature and has a high presence of near gravity material (NGM). This makes washing Indian coal rather difficult.

Conclusion

India's mining sector has grown at a slower rate compared to GDP, resulting in a decrease in the contribution of mining sector to India's GDP from 1.3% in 2002 to just 1% in 2012. With the current growth rate, India will require 160 million mt of iron ore imports (10% of global seaborne), 300 million mt of thermal coal imports (25% of global seaborne trade) and 70 million mt of met coal imports (20% of global seaborne) in 2025. This will create uncertainty due to high dependence on imports, with possible supply shortages depending on the global situation.

The annual growth in the mining sector in India has varied from 3% to 8%. Any effort to have unusual growth may bring environmental issues, besides safety hazards to employees and material engaged in the mines.

There is a limit to growth in this sector. A lot must be done to reach the target. Going by the country's projection of a growth rate of 8% in GDP, it would be good if the coal sector grew annually by 12% in a consistent manner.

This can be done by opening large coal projects and making them operational in the shortest possible time. The goal is to make the country self sufficient. Opening the coal sector for commercial mining, to private investors to compete with CIL, is key.

The apex court's decision should be an opportunity for the government to review coal sector policies and establish appropriate reforms. It is time to think, address and find the right way forward to resolve the challenges that have emerged from the cancellation of allotment of coal blocks.

Rajesh Nath is the managing director and Ajmal Fawad is the business analyst for VDMA India.

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www.coalprepsociety.org or call Mel Laurila, CPSA Executive Director, at +1 859 797 8119

schedule of events

monday april 20	tuesday april 21	wednesday april 22
exhibitor setup 8am - 5pm	keynote session 9am - 10am	non-energy uses of coal 9am - 11am
pump workshop 10am - 1pm	exhibit open 10am - 5pm	exhibit open 9am - 2pm
coal prep workshop 1pm - 5pm	new plant construction 2pm - 4pm	coal cleaning technologies 2pm - 4pm
	member's night out 6pm - 10pm	

Full day of workshops (7 Professional Development Hours)
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Conference delegate registration is $199 (early member registration by February 20, 2020) that includes admission to the exhibition
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- United Central Industrial Supply
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The exhibitor must be a corporate member of the CPSA and can reserve space at:

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The Closing of Deer Creek

A unique solution had to be developed to permanently seal the Deer Creek mine.

The Deer Creek coal mine in Huntington Canyon, Utah, was closed in 2015 after 41 years of service. It produced coal from two seams, Blind Canyon and Hiawatha, at a depth of between 1,200 feet (ft) and 2,600 ft. PacifiCorp owned the mine and burned the coal at one of its nearby power plants.

The mine closure plan, however, was anything but simple. Due to the location of the mine, the owners faced unique challenges that required resolution prior to sealing the entries to avoid long-term environmental issues.

The Challenges

The volume of groundwater in the mountain, and the predicted additional accumulation over time, was calculated to potentially build up to extreme pressures behind the portal seals, which could have resulted in a catastrophic collapse of the mountain top. Substantial damage from landslides and contamination of the river below were all major concerns.

PacifiCorp turned to Strata Worldwide — which had completed other, more routine projects at Deer Creek during its lifespan — and they discussed and tested possible solutions for a proactive reclamation project. It was decided that instead of sealing the water inside the abandoned mine, Strata would design a way to capture the water and control its flow path down into large pipes to be carried out of the mine. The pipeline would then transport the water into the valley below, where it could be used by the neighboring power plant in their operations.

The primary challenge was the adequate control and management of the discharge water from the mine. All aspects of the post-closure water management program required permits from the Utah Division of Oil, Gas and Mining as well as the U.S. Mine Safety and Health Administration. It was also subject to comment by other stakeholders, including the Sierra Club.

It took some time to get to the starting point at Deer Creek, as the review by regulators and potential contractors to determine a complete scope of work took about two years. Strata, acknowledging the complexity of the project's elements, took time to ask questions and verify parameters and data prior to submitting what ended up being a successful bid. In the meantime, facets of the work evolved. What was initially set to be a series of interlocking plugs for the groundwater and water discharge from the mine became a series of 26 dams.

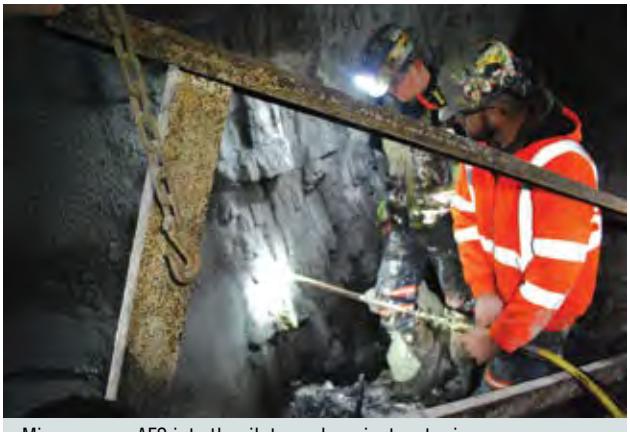
Those dams, strategically placed throughout the underground locations at Deer Creek, were intended to direct water toward the portals and prevent discharge outside of the desired flow path. In the end, the flow path to the portals was determined by the slope directions of the entries and the dams constructed by Strata.

Strata's work involved preparatory site work and constructing the dams, which consisted of placing many 3-ft x 3-ft x 4-ft interlocking concrete blocks. A subfloor foundation of concrete was also added to support the blocks, and once installed, the entire dam was sprayed with a waterproofing membrane. This alleviated and prevented any potential leakage from the direction the groundwater was set to follow.

At the conclusion of the installation phase, Strata conducted a test of flooding the area to evaluate how the new dams functioned. It was noted that several dams were experiencing seepage, and Strata realized the water was migrating around the dams through the coal ribs in some areas. The crews then brought in the Advanced Foam Solutions (AFS) product.

Strata AFS is a rapidly curing hydrophobic polyurethane foam designed to be injected into rock fissures, gravel layers, joints, cracks and voids to fill voids and consolidate strata. It is ideal for controlling and diverting water — including high volumes of gushing water.

The crews drilled into the mine's ribs and floor, injecting the solution, and the AFS quickly cured to create a sol-



Miners pump AFS into the rib to seal against water ingress.

A series of 14-in. HDPE drainpipes is placed in each plug to direct water down the mountain.

id, impermeable barrier that sealed against the water flow. Afterward, crews mixed a combination of bentonite (an absorbent aluminum phyllosilicate clay) and shotcrete, and sprayed the lower half of the area where water would likely accumulate due to gravity and grade.

The dams varied in height from 4 ft to more than 8 ft, according to the surveys and specifications of the mine owner.

Following the completion of the dams, Strata designed and constructed a series of high strength "plugs" in the mine's portals, each measuring about 25 ft in thickness and containing roughly 200 yards of concrete. The concrete fill for the plugs had to be completed in one continual pour, so Strata engineered and constructed sturdy form walls using EVG 3D panels and No. 9 rebar that would hold the pressure. This project and the plugs were the first of their kind.

Strata crews concreted all ribs, floor, and roof in the impacted areas before building and shotcreting the plug form walls. A series of 14-in. HDPE drainpipes was placed in each plug to catch underground water and allow it to exit the mine and travel down the mountain through a pipeline to the power plant.

This new infrastructure system was proactively placed within the mine to prevent water accumulation from ever becoming an issue for the now-closed coal mine.

Work was completed in December 2017 and took a total of 55 days. It was wrapped up on schedule, under budget and without injuries to the 10 crew members from Strata or any other on-site contractors. It is important to note that price, cost and time schedule were all critical to the client so that the work would be completed during their preset reclamation calendar and fall within compliance with state and federal outlines. No post-work issues arose from regulatory stakeholders.

"We were very satisfied," reported Mine Manager Devin Leroy. "Strata came in and did a great job in a very time-sensitive situation. Excellent job, and got it done in a safe manner."

Strata also reported that no sizable obstacles emerged during the course of the project, and all points of completion were met successfully.

This article was written and submitted by Strata Worldwide.

Western Coal Operators Opt for Dry Coal Processing

Caste Valley Mining adds an FGX system in Utah.

FGX Septech, located in Lexington, Kentucky, has recently set up dry (pneumatic) coal cleaning plants at GCC Energy in Colorado and Rhino Energy in Utah. The GCC Energy plant is processing 90 tons per hour (tph) of bituminous coal producing 7.5% ash clean coal from a feed ash of 15.8% at a recovery of 90%. The Rhino Energy plant at Castle Valley Mining will process 180 tph of bituminous coal. The pilot-scale study showed a similar reduction in ash to those results achieved at GCC Energy.

Raymond James, Amegy Bank Form Alliance to Serve Energy Clients

Raymond James and Amegy Bank announced a strategic alliance that enables Amegy to offer enhanced services and product offerings to its energy-related clients. This will be done through a referral and fee-sharing arrangement with Raymond James for all energy investment banking services. Amegy energy clients will have access to Raymond James' fully integrated global equities and investment banking platform, including mergers and acquisitions expertise, debt and equity origination, structuring, underwriting, and equity research with growing retail and institutional distribution capabilities.

The alliance will allow clients to leverage the investment banking capabilities of Raymond James with Amegy's energy commercial banking abilities, according to the two companies. The alliance will focus on serving energy clients in the upstream, midstream, downstream, and energy services sectors in both the public and private markets. Raymond James has one of the largest equities platforms in North America, covering nearly 1,200 companies — including more than 150 in energy — and more than 2,400 domestic and 800 international institutional accounts.

SKF Urges Miners to Rethink Bearings

In a traditional transaction-based model, suppliers' profits depend on numbers of parts sold and not on improvements in machine performance. There's a fundamental conflict of interest, as longer component life means fewer sales for the supplier. SKF is now offering a forward-thinking, fee-based Rotating Equipment Performance (REP) service, where customers can benefit from maximizing machinery's productivity, reliability and efficiency.

Under a REP contract, the customer pays a fixed monthly or quarterly fee dependent on SKF meeting agreed targets for machine production level, uptime or other KPIs. The all-inclusive fee covers provision of bearings, seals, lubrication and condition monitoring. SKF's engineering expertise in this specialized area ensures the ideal specification and application of all elements, which is important as 90% of industrial bearings fail because they are wrongly specified, installed, lubricated or used.

REP can be applied to both long-established and modern equipment, including conveyor belts, pumps, crushers, etc. SKF experts discuss the needs of the machinery and the business before proposing a solution. Importantly, REP helps bring the customer's maintenance and production departments together, with a strong focus on uptime and output.

Accella Tire Fill Systems is Now TyrFil

Carlisle Construction Materials changed the name of its polyurethane tire fill business from Accella Tire Fill Systems to Carlisle TyrFil. Carlisle acquired the unit as part of its purchase of the Accella Performance Materials family of companies in November 2017. The brand, which is a leading global tire flat-proofing solution for the Off-the-Road (OTR) equipment marketplace, has offered the industry a trusted, go-to-source for tire fill (commonly referred to in the industry as foam fill) flat-proofing technology for nearly 50 years.

Hawk, FLO-CORP Merge

Leading manufacturers and suppliers of advanced process instrumentation and cloud-based monitoring technology, Hawk Measurement America and FLO-CORP, recently merged to create a complete flow, level and asset-monitoring solutions provider.

"This is a very exciting event for both companies, for our employees, and our customers," said Jack Evans, president of Hawk Measurement. "By combining HAWK's award-winning measurement technology, together with FLO-CORP's measurement monitoring solutions within a subscription-based platform, we are increasing our ability

to provide unmatched customer support, innovative technologies and system solutions."

The combined company is privately held and will operate under the HAWK brand. Les Richards will remain CEO of Hawk Measurement Systems, Jack Evans as president of Hawk Measurement, and Dave Grumney, CEO of FLOCORP, will be vice president of sales for Hawk Measurement.

BelAZ Sells Fleet of Haul Trucks to Coal India

BelAZ signed a contract to supply 77 136-metric-ton (mt) BELAZ-75137 haul trucks to Coal India Ltd., the world's largest coal-producing company. According to the agreement, BelAZ will also supply spare parts and provide service maintenance for eight years of operation of the equipment to be delivered. The haul trucks will be working in Gevra open-cast coal mine. The company will also establish a service center near the mine. The first trucks are scheduled to arrive during November.

Petr Parkhomchik, general director, BelAZ, signs deal with CIL for 77 haul trucks.

Force Control Celebrates 50 Years of Oil Shear Brakes, Clutches

Force Control Industries (FCI) is celebrating 50 years of manufacturing long-lasting oil shear clutches, brakes and clutch brakes.

"We specialize in difficult applications where traditional brakes and clutches have failed," said FCI President Joe Besl. "Our products usually last five to 10 times longer than whatever we're replacing, with no adjustment or maintenance required. That's a significant savings for our customers over the life of the product."

Unlike dry brakes and clutches, oil shear technology provides a film of transmission fluid between the brake disc and the drive plate. As the fluid is compressed, the fluid molecules in shear transmit torque to the other side. This torque transmission causes the two components to reach the same relative speed. Since most of the work is done by the fluid particles in shear, wear is virtually eliminated.

In addition to transmitting torque, a patented fluid recirculation system helps to dissipate the heat from the friction surface to the housing where it is cooled. The fluid serves to continually lubricate all components of the oil shear units, significantly increasing their service life.

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a.	Total No. Copies Printed (Net Press Run)	11,922	11,898
b.	Legitimate Paid and/or Requested Distribution (By Mail and Outside the Mail)		
	1. Outside Country Paid/Requested Mail Subscriptions Stated on PS Form 354: (include recipient direct-written, telemarketing and Internet requests, paid subscriptions including nominal rate, employer requests, advertiser proof copies, and exchange copies)	7,573	7,783
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c.	Total Paid/and/or Requested Distribution (Sum of 15b (1), (2), (3), and (4))	7,573	7,783
d.	Nonrequested Distribution (By Mail and Outside the Mail)		
	1. Outside Country Nonrequested Copies Stated on PS Form 3541 (include sample copies, requests over 3 years old, requests induced by a premium, bulk sales, and association requests, names obtained from business directories, lists and other sources)	3,678	3,444
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	4. Nonrequested Copies Distributed Outside the Mail (include pickup stands, trade shows, showrooms, and other sources)	200	200
e.	Total Nonrequested Distribution (Sum of 15d (1), (2), (3), and (4))	3,878	3,644
f.	Total Distribution (Sum of 15c and e)	11,451	11,427
g.	Copies Not Distributed	471	471
h.	Total (Sum of 15f and g)	11,922	11,898
i	Percent Paid and/or Requested Circulation (15c divided by 15f times 100)	66%	68%
16.	Electronic Copy Circulation		
a.	Requested and Paid Electronic Copies	1,570	1,581
b.	Total Requested and Paid Print Copies (Line 15c) + Requested/Paid Electronic Copies	9,143	9,364
c.	Total Requested Copy Distribution (Line 15F) + Requested/Paid Electronic Copies	13,021	13,008
d.	Percent Paid and/or Requested Circulation (Both Print & Electronic Copies) (16b divided by 16c x 100)	70.2%	72.0%

17. Publication of Statement of Ownership for a Requester Publication is Required and Will be Printed in the October 2019 Issue of This Publication.
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Weir Expands Coal Dewatering Solutions

Weir Minerals decided to go big with the Aspir WFH1730 jumbo centrifuge, a high-capacity, horizontal fine-coal dewatering centrifuge built on proven principles, such as G force and basket angle. The machine was specifically engineered to process 100 metric tons per hour (mtph) of fine coal. It uses a proven scroll/basket design, combined with high-quality wear components, and maintenance-friendly wet end, specifically designed to handle varying feed densities.

"The design of the inlet/effluent arrangement is such that when the centrifuge is presented with a dilute feed the jumbo simply centrifuges the effluent directly out of the bottom of the machine eliminating any potential of effluent splashing over into the product chamber," said Paul Jerks, product manager for Weir Minerals Aspir. "The product chamber is further protected by a labyrinth seal between the effluent and product chamber."

Central to the Aspir range are the coarse and fine coal centrifuges that are engineered to deliver performance and availability in the most arduous coal dewatering applications. Designing the system around G-force and basket angle ensures maximum throughput with highest dewatering efficiency at minimal operating costs.

The Aspir WFH 1730 features a cyclone inlet (patent pending) that aids in the process of separating solids and water prior to the fine product being introduced to the basket. Additionally, this inlet assists in bringing the product up to basket speed thereby reducing coal breakage, which increases fines and moisture content. The horizontal orientation allows for a reduced number of gears and shafts within the centrifuge and offers in situ replacement of the modular drive assembly. "Together with the ceramic lined working faces and hinged effluent chamber providing ample clearance of parts providing unfettered access to wet end components, the Aspir WHF 1730 jumbo centrifuge is not only one of the most technologically advanced fine coal-dewatering centrifuges available today, but is also one of the easiest to maintain," Jerks said.

The horizontal basket design with its hinged door arrangement and container lock securing mechanism makes for quick and easy access to the wet end for any maintenance inspections. Once open, there is direct access to the basket and high capacity scroll.

Paul Jerks added, "The horizontal basket design, unlike a vertical basket centrifuge, uses centrifugal force and gravity to its advantage in that effluent naturally wants to pass through the basket aperture thereby enhancing the centrifuge's dewatering effect."

www.global.weir

Ventilation Controls

JENNMAR's J-Panels are an economical solution for underground mine ventilation control and can be used in conjunction with J-SEAL or 1-Day J-SEAL, specialized MSHA-approved foaming cement. These seals are designed to be installed with a JENNCHEM continuous placer type pump and are also used for general backfilling applications in coal or hard rock mining. J-SEALs are significantly thinner in design than competing brands, yet maintain greater shear strength. The rapid strength gain provides immediate ground support to the surrounding strata with quicker cure times to meet seal approval specifications in days rather than weeks.

www.jennmar.com

Submersible Pumps

Atlas Copco Power Technique recently introduced three new electric submersible pumps to the market. Designed specifically for drainage and sludge pumping applications are two sludge/trash pumps, the WEDA S30 and S60, in addition to a drainage pump, the WEDA D80.

According to the manufacturer, the pumps are 15% to 30% lighter than comparable models and up to 15% more compact. Other improvements include rotation and phase failure protection, efficient motor covering a wide range of voltages, high-quality chrome clog-free impeller, reinforced cable entry, adjustable wear-resistant rubber diffusors, and built-in starter and motor protection system.

The WEDA D80 drainage pump features a rated power of 31 hp and a weight of 400 lb. It has a discharge of 4 in. and 6

in. and comes with a cartridge seal solution to simplify service activities and increase productivity.
www.wedapump.com

Truck-mounted Water Tank

Austin Engineering has commissioned the first of its locally manufactured high-performance, truck-mounted water tanks. The result of a significant redesign process, the new Stairway Access Tank (SAT) includes a number of features to improve efficiency, operator safety and truck stability.

Custom-built to suit most haul trucks, the new SAT starts at 14,000-liter (3,700 gallons) capacity and includes all spray equipment along with the company's unique "Water Wise" system.

The first tank off the production line has a 198,000-liter (52,300 gallon) capacity fitted to a CAT 793C haul truck and is claimed, by the manufacturer, to be the biggest water truck in Australia.

The most obvious external feature of the Austin water tank is a stairway from the top of the tank structure down to a large (137 cm x 259 cm) access port for easy entry and exit for personnel and maintenance equipment to the tank interior. The fill port is located behind the water dam to ensure any overflow flows away from the cab and deck to the rear of the truck.

Inside the tank, the unique design of the new Austin SAT directly tackles the safety concerns surrounding the confined workspace in mine site water tanks, addressed by a recently completed 10-year study by the National Institute for Occupational Safety and Health (NIOSH).

Part of the study looked into operator access to the tank and ease of movement once inside.

Traditional access inside the tank has been through a series of semicircular portholes in the baffle system, which, although adequate, slowed access and movement, especially in the case of an emergency. The diameter of the portholes — generally 60 cm (2 in.) wide x 74 cm (29 in.) high — also restricted operator maneuverability and the physical size of any equipment that could be used inside the tanks.

The new SAT from Austin features a series of oversize rectangular access ports — 63 cm wide x 155 cm high — throughout a unique baffle system to replace the traditional portholes and significantly improve operator safety and comfort inside the tank.

The engineered corrugated baffle system, which interlocks the baf-

fles for increased structural integrity, controls both transverse and longitudinal water surging and reduces the overturning forces by 19% to improve truck stability. Maximum overturning force is delayed by about one second — providing an increase in the time to react to any side force.

The design of the corrugated baffle system also allows for a lighter-weight tank, which translates to additional payload and less operating cost. Additionally, the alignment of the oversize access ports, combined with the horizontal baffle system, gives unobstructed movement within the tank.

To improve the worksite environment inside the tank during maintenance periods an air exchange system has been developed for the tank.

www.austineng.com.au

Breaker Bar Maintenance and Repair

Stedman Machine Co.'s engineered jack screw wedge design on its Grand Slam horizontal shaft impactors simplifies breaker bar maintenance and repair. Streamlined breaker bar rotation or replacement minimizes downtime and maximizes ease of use. Regular maintenance extends the life of the breaker bars for horizontal shaft impactors.

The Grand Slam impactor's unique design allows for fast, safe rotation or removal of rotor breaker bars by a single operator. Opening the hinged front or rear housing allows unobstructed access to all areas of the crushing chamber and rotor. The maintenance crew member opens the hinged housing, removes the H-retainer and inserts the rotor lock table to secure the rotor. The breaker bars easily slide out after simply removing the jack screw wedge.

www.stedman-machine.com

Hybrid Apron Feeder

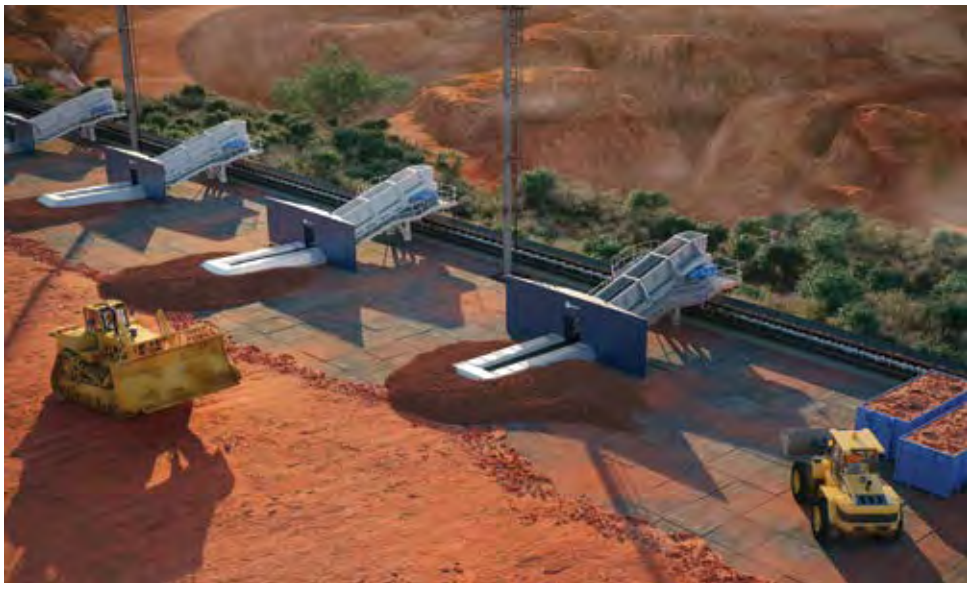
With a low-profile loading deck and a completely modular design, the HAB Feeder provides an affordable solution for adjustable-rate feeding of abrasive materials, according to FLSmidth.

The HAB Feeder is a robust, power-efficient and high-tonnage hybrid belt-over-apron feeder that offers combined advantages of both apron

and belt technologies. It provides a cost-effective solution for feeding abrasive materials, such as mineral sands, iron ore and bauxite, in mid-tier ROM applications and stockyard management operations.

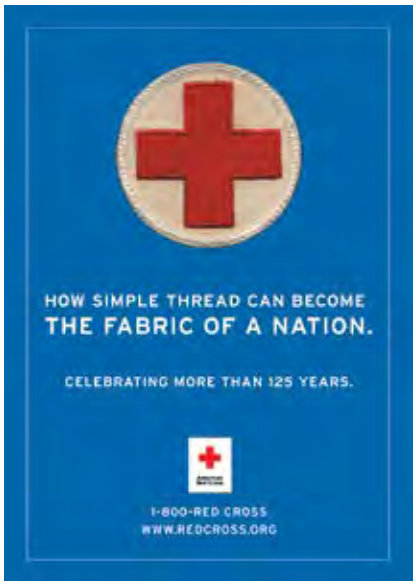
The low-profile loading deck easily accommodates different types of loading methods, including direct truck tipping, side tipping, front-end loading, dozing and ROM bypass tips, in order to prevent double handling. The feeder's modular design allows for transportation within a standard-size container, simplifying freight solutions to remote locations around the world. Modularity also allows for specific discharge heights, depending on the required application.

The HAB Feeder design incorporates a number of safety features, including a startup alarm that is located behind the wing walls, an emergency stop on either side of the feeder, and an emergency bar at the feeder opening.



FLSmidth Manager of Capital Equipment PC Kruger said, "The HAB Feeder is specifically designed to feed abrasive materials at an adjustable rate on to conveyor belts and sizers. Because it is entirely modular, the HAB Feeder can be installed with minimal site preparation, anywhere near a stockpile. It is semimobile for simple on-site relocation or repositioning. Moving the feeder is as easy as dragging or pushing it with standard stockyard equipment."

https://flsmidth.io/HAB-PR



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With Changing Mine Safety Problems, Why Not Different MSHA Solutions?

BY AVI MEYERSTEIN

The current system of mine safety and health regulation is at a crossroads. More than 40 years after the passage of the Mine Act, the mining industry has changed significantly, but the government regulatory system has not.

This is particularly true with enforcement, which is largely as it always has been, with two fundamental presumptions at its core. First, it presumes that workplaces are filled with widespread hazards and violations. Second, it presumes that only the extensive presence of federal mine inspectors can possibly keep mines from hurting their workers.

At one time, these were fair presumptions. In 1919, a staggering 2,904 people died in mining. In 1977, when the Mine Act passed, it was 273. But, today, the landscape is radically different. These tragic numbers are down by more than 99% in the last 100 years. Last year, 27 people died in the mining industry.

The fact that these numbers are historically low, of course, should not in any way diminish the significance of the lives lost. Every death is the end of an entire world. No one should have to work in a hazardous environment. Everyone must always strive toward zero. Yet, safety demands that we look at where we are today compared with where we once were and ask: What has changed about our problems? What should change about our solutions?

One change is safety resources. Of course, the Mine Safety and Health Administration (MSHA) is a part of that. Also, when the Mine Act passed, there was already under way a massive investment by the industry to professionalize and institutionalize safety and health programs and training. Today, companies often have extensive safety staff and programs that exceed government requirements.

Another change is the outcomes. Mining's 27 fatal accidents and 2.4 recordable injury rate last year are far below many other industries. In 1977, Congress singled out mining to have its own enforcement agency. If we looked for an industry to single out today, it's doubtful mining would even make the short list.

Of the accidents that still occur, many result from human factors. Even the most well-meaning, hard-working, and best-trained people are vulnerable to falling asleep, taking a shortcut, suffering a medical event or making a mistake.

If the problems have changed during the last 40 years, what about the solutions? What about the enforcement model and its underlying assumptions?

Moreover, how can MSHA contribute to the best safety outcomes with the fewest resources? How can it best support safe operations in maintaining and even enhancing safety while also focusing its most significant enforcement attention on those who clearly lack the capacity, knowledge, or will to invest in safety and health as they should?

One new initiative could address all of these questions — a Voluntary Protection Program (VPP). MSHA would set a high bar for companies to participate in the program. To get in and stay in, a company must show it has the right systems and programs in place and that it gets results, with injury rates better than industry averages. Those that qualify would still have several regular inspections each year, but the focus would change.

First, the inspector could spend time off-site reviewing programs, policies, training, recent incidents and other safety key performance indicators. Then, the inspector could spend one to two days on-site, speaking with workers and walking through key areas to confirm what the numbers should already show — that the site has safety in order. Of course, any violations observed would be cited, but the nature and magnitude of the inspection would be different. From the combination of off-site and on-site auditing, MSHA would be able to confirm that a wall-to-wall, multiweek inspection is not necessary at this site.

What does MSHA get out of VPP? It gets to multiply its resources and direct them to the operators that still struggle with safety and compliance for one reason or another. Those operators need MSHA's expertise and/or enforcement attention. What do VPP operators get? They get back more of their own resources, too. Rather than accompanying MSHA inspectors for weeks or months a year, they can reinvest this safety dividend in safety and health — by growing innovative programs and deepening a culture of safety.

What does safety get out of this? Results. When operators who know what they're doing can do more of it, and MSHA can spend more time and energy on those who are failing, the entire industry takes a step forward.

Where the safety upside could be significant, as with VPP, and the downside is limited by high standards and close oversight, why can't MSHA rebalance for safety's sake? It's worth a close look. The problems in mine safety have changed. The solutions should, too.

Avi Meyerstein is a partner at Husch Blackwell. He can be reached at avi.meyerstein@huschblackwell.com.

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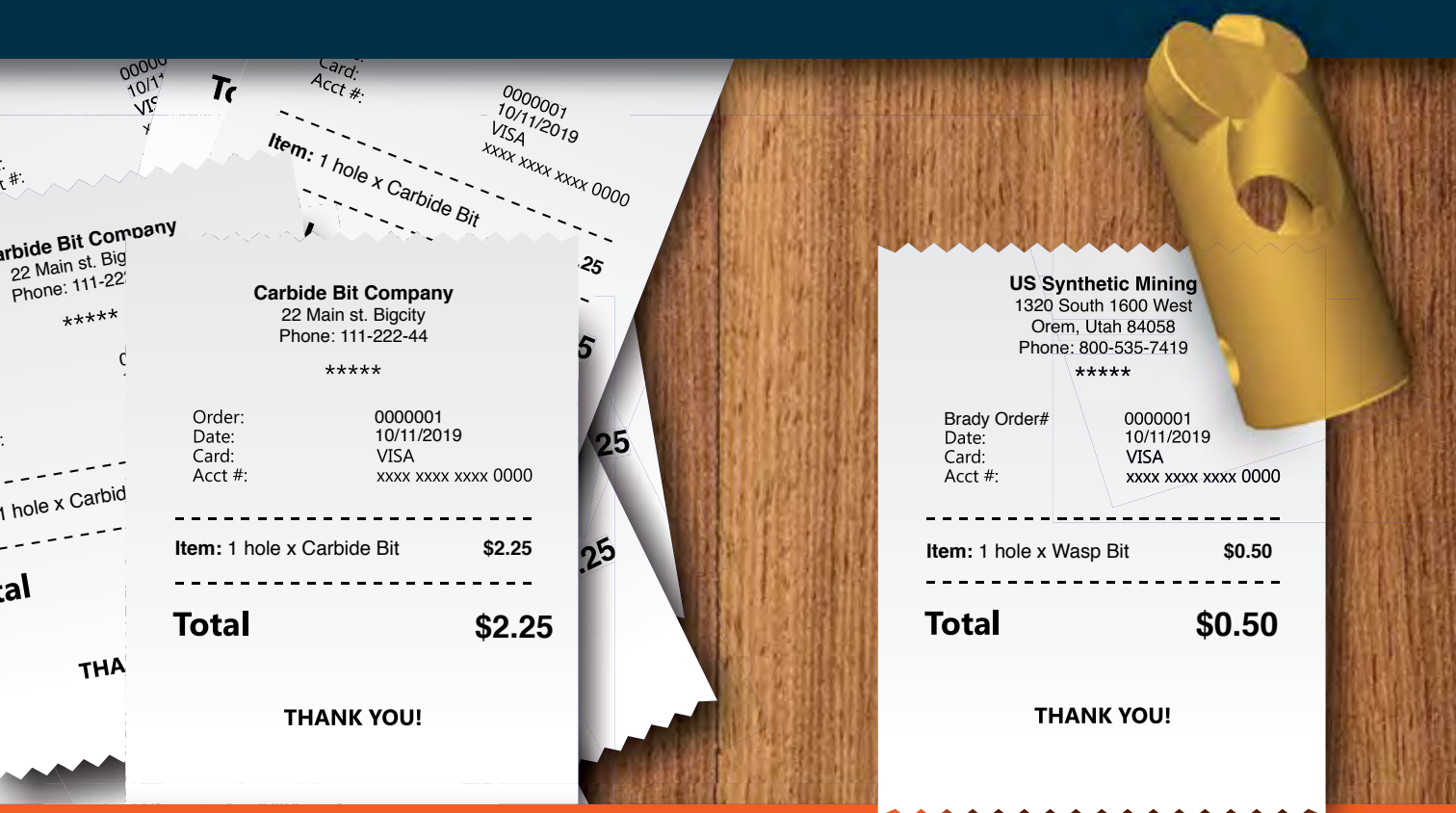

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