CoalAge®

The Magazine for Coal Mining and Processing Professionals

OCT-NOV 2017 | A Mining Media International Publication | www.coalage.com

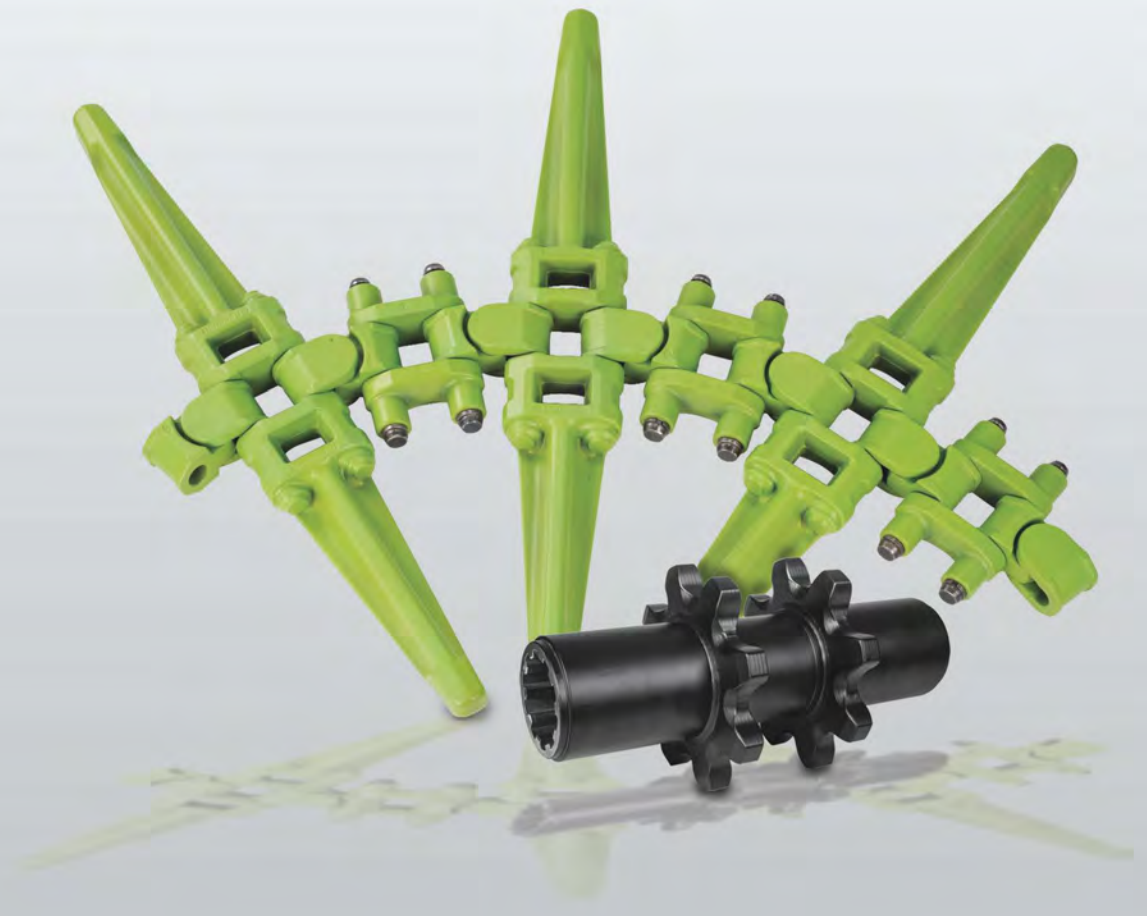
2017 Prep Plant Census — Interest in Processing Projects Returns

Stockpile Management

Conveyor Systems

YOUR MINING MACHINE DESERVES THE BEST CHAINS

Cincinnati Mine Machinery Company designed and installed the first Dual Sprocket Conveyor Chain. Our unique design utilizes superior metals and a proprietary heat treatment process for unparalleled strength. Our Dual Sprocket Conveyor Chain runs longer and stronger which means less downtime and lower cost per ton. So when it's time to choose, choose the strongest chain under the earth. For over 90 years, Cincinnati Mine Machinery continues to be **THE STRONGEST LINK.**



CINCINNATI MINE MACHINERY CO.
THE STRONGEST LINK.™

Contact us at 1•513•728•4040 or visit cinmine.com to learn more about Cincinnati Mine Machinery products.

Coal Age

NEWS/4

U.S. PREP PLANT CENSUS/15

Company	Plant Name	Raw Feed
Alabama (7)		
Drummond Co.	Shoal Creek	2,220
Jesse Creek Mining	Piney Woods	300
Seneca Coal Resources (ERP)	Concord	1,000
Southern Coal	GTM Modular Plant	250
Warrior Met Coal	JWR No. 4	1,300
Warrior Met Coal	JWR No. 5 (Idle)	1,000
Warrior Met Coal	JWR No. 7	1,400
Colorado (4)		
Arch Coal	West Elk	700
Blue Mountain Energy	Deserado	900
Bowie Resources Ltd.	Bowie (Idle)	850
Peabody Energy	Twentymile	2,000
Illinois (14)		

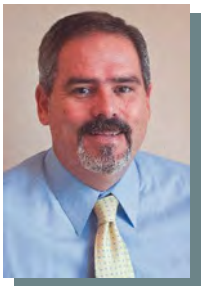
STOCKPILES/26

CONVEYORS/34

THIS ISSUE

This month, Coal Age *updates its annual U.S. Prep Plant Census. The total number of plants continues to decline, but two plants were commissioned this year. On the cover, a thickener clarifies process water at an operation that optimized its entire processing stream by improving its fine coal circuit (See Operating Ideas, p. 41). Photo courtesy of FLSmidth.*

The Sunset for Sue-and-Settle Litigation



BY STEVE FISCOR
PUBLISHER &
EDITOR-IN-CHIEF

Coal Age receives hundreds of press releases every month and sorting through them is normally a mundane task, as few pertain directly to coal mining and processing. More recently, however, there has been noticeable change in those issued by the environmental nongovernmental organizations (NGOs). The names of these environmental activists are familiar: National Resources Defense Council, the Environmental Defense Fund, the Sierra Club, Earthjustice, etc. The mainstream media considers these groups legitimate sources, but it's mostly rubbish and filed accordingly.

Since they lost their boardroom seats at the U.S. Environmental Protection Agency (EPA), these NGOs have been crying the blues. It's enough to make a depressed coal miner smile. The situation has become so dire that New York billionaire Michael Bloomberg ponied up an additional $64 million for the Sierra Club's Beyond Coal campaign and its allies last month. Yes, this guy wrote a sizable check to put you out of business.

If the Sierra Club hopes to complete Beyond Coal's mission of transitioning the entire country from coal completely to clean energy, they are going to need every penny. They claim responsibility for closing more than half of the existing coal-fired power plants in the past few years, but few realize the strategy relied on a coordinated ground assault with attorneys rather than public information. The EPA and utility commissions were ill prepared to defend against these types of legal maneuvers and litigation, and they paid dearly for it.

EPA Administrator Scott Pruitt knows how these groups operate, and the rules are about to change. Fulfilling a promise to end the practice of regulation through litigation, he issued an agency-wide directive designed to end "sue and settle" practices. "We will no longer go behind closed doors and use consent decrees and settlement agreements to resolve lawsuits filed against the agency by special interest groups where doing so would circumvent the regulatory process set forth by Congress," Pruitt said. "Additionally, gone are the days of routinely paying tens of thousands of dollars in attorney's fees to these groups with which we swiftly settle."

With the directive, Pruitt wants to ensure the EPA increases transparency, improves public engagement, and provides accountability to the American public. It calls for the timely publication of intents as well as complaints or petitions for review regarding environmental regulations. The directive also includes any states and/or regulated entities affected by potential settlements or consent decrees. The agency will no longer pay attorney's fees and litigation costs when settling with those suing the agency.

The NGO's will have to use Bloomberg's money to pay for its attorneys, who are advancing their agenda. Common sense has prevailed at the EPA and environmental tort reform has arrived. Unfortunately, most Americans do not realize how environmental policy was crafted behind closed doors during the Obama era and now they will not likely know how much money Pruitt has saved them by leveling the playing field.

Steve Fiscor, Publisher & Editor-in-Chief
sfiscor@mining-media.com

Coal Age

www.coalage.com

Mining Media International, Inc.
11655 Central Parkway, Suite 306
Jacksonville, Florida 32224 U.S.A.
Phone: **+1.904.721.2925**
Fax: **+1.904.721.2930**

Editorial

Publisher & Editor-in-Chief—Steve Fiscor, sfiscor@mining-media.com
Associate Editor—Jennifer Jensen, jjensen@mining-media.com
Technical Writer—Jesse Morton, jmorton@mining-media.com
Contributing Editor—Russ Carter, rcarter@mining-media.com
European Editor—Simon Walker, simon.iets@btinternet.com
Latin American Editor—Oscar Martinez, omartinez@mining-media.com
Graphic Designer—Tad Seabrook, tseabrook@mining-media.com

Sales

Midwest/Eastern U.S. & Canada, Sales—Victor Matteucci, vmatteucci@mining-media.com
Western U.S., Canada & Australia—Frank Strazzulla, fstrazzulla@mining-media.com
Scandinavia, UK and European Sales—Colm Barry, colm.barry@telia.com
Germany, Austria & Switzerland Sales—Gerd Strasmann, info@strasmann-media.de
Japan Sales—Masao Ishiguro, ma.ishiguro@w9.dion.ne.jp
Show Manager— Michael Schoppenhorst, michael@semcoproductions.com
Production Manager—Dan Fitts, dfitts@mining-media.com

BPA WORLDWIDE BUSINESS
NMA National Mining Association

MINING MEDIA INTERNATIONAL

Coal Age, Volume 122, Issue 8, (ISSN 1040-7820) is published monthly except January, June and November, by Mining Media International, Inc., 11655 Central Parkway, Suite 306, Jacksonville, Florida 32224 (mining-media.com). Periodicals postage paid at Jacksonville, FL, and additional mailing offices. Canada Post Publications Mail Agreement No. 40845540. Canada return address: Station A, PO Box 54, Windsor ON N9A 6J5, Email: circulation@mining-media.com. Current and back issues and additional resources, including subscription request forms and an editorial calendar, are available online at www.coalage.com.

SUBSCRIPTION RATES: Free and controlled circulation to qualified subscribers. Non-qualified persons may subscribe at the following rates: USA and Canada, 1 year, $56.00, 2 year, $96.00, 3 year, $162.00, Student, $16.00, Outside the USA and Canada, 1 year, $77.00, 2 year, $137.00, 3 year, $225.00 surface mail (1 year, $145.00, 2 year, $257.00 airmail delivery). For subscriber services or to order single copies, write to Coal Age, 11655 Central Parkway, Suite 306, Jacksonville, FL 32224 USA; call +1.904.721.2925 (USA) or visit www.mining-media.com.

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

POSTMASTER: Send address changes to *Coal Age*, P.O. Box 828, Northbrook, IL 60065-0828 USA.

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

Trust JENNMAR.

For more than 40 years, miners have trusted JENNMAR to deliver superior ground support products and innovative solutions to challenging strata conditions. From bolts and beams to channels and trusses to resin and rebar, we're proud to make the products that make mining safer and more efficient.

At JENNMAR, we're passionate about ground support ***and customer support*** and we'll continue to earn your trust, everyday.

JM USA®
JENNMAR

- Coal and Hard Rock Mining
- Tunneling
- Civil Construction

GLOBAL HEADQUARTERS
Pittsburgh, PA USA • **(412) 963-9071** • www.jennmar.com

MEC, Bowie Partner to Create Canyon Consolidated Resources

The now-closed Bowie portal in Colorado, the namesake for Bowie Resource Partners, will be folded into CCR.

Murray Energy Corp. (MEC), Bowie Resource Partners, Javelin Global Commodities, and Grupo CLISA have agreed to form a strategic partnership called Canyon Consolidated Resources (CCR), which will produce approximately 13 million tons per year (tpy) and own 214.8 million tons of coal reserves.

CCR will combine the assets of Bowie, the marketing and logistics platform developed by Bowie, MEC's management and operational expertise and coal from MEC's Lila Canyon mine, and the coal marketing expertise of Javelin and CLISA to create a western U.S. bituminous coal producer and marketer.

The partnership will operate three underground coal mines in Utah — the Sufco mine, which produced 5.4 million tons in 2016, the Skyline mine (4.5 million tons) and the Dugout Canyon mine (650,000 tons in 2016). The Lila Canyon mine produced 1.6 million tons in 2016 and currently has 42.3 million tons of coal reserves.

MEC will hold a 30.5% stake in CCR. Chairman of Bowie John Siegel will also control 30.5%, and 28.5 % will be held by second lien lenders via warrants. Javelin and CLISA will control 7.25% and 2.25%, respectively. Javelin is headquartered in the U.K. and CLISA is a trading and investment group based in Mexico with a focus on the energy industry.

CCR will purchase and market coal produced from Lila Canyon. Through a services agreement, MEC will provide certain operational, procurement and administrative services for CCR. The CCR investors expect to finance a portion of the partnership, and pay related fees and expenses, with the proceeds of debt financing. A portion of these proceeds will be used to recapitalize Bowie's existing capital structure. Jefferies is acting as sole financial advisor on the transaction.

In connection with the transaction, Bowie will refinance its existing senior secured credit facilities with new debt financing. Specifically, Bowie Resource Holdings LLC and Canyon Finance Corp. intend to offer up to $375 million of senior secured notes due 2022 through a private placement. Bowie intends to use the proceeds to refinance its existing senior secured credit facilities and finance the acquisition of Bowie by CCR. In addition, Javelin and CLISA will contribute cash to CCR in exchange for equity in CCR and certain exclusive export marketing rights. Jefferies is acting as sole initial purchaser and book-runner for the notes.

Armstrong Files for Bankruptcy

Illinois Basin coal producer Armstrong Energy Inc. filed petitions for reorganization under chapter 11 of the Bankruptcy Code in the Bankruptcy Court for the Eastern District of Missouri on November 1. The company took this action in order to transfer all of its

BREAKING NEWS

Alpha Completes Transfer of Idle Assets to Lexington Coal

Alpha Natural Resources (ANR) has closed the deal with Lexington Coal Co. (LCC) to convey real and personal properties located in Kentucky, Tennessee and West Virginia. While transferring mostly idle and non-active assets, substantial reclamation equipment and ongoing royalty payments associated with the properties, the conveyance also eliminates self-bonding in West Virginia nine years early.

New Lexington Coal CEO Steven Poe said the conveyance includes approximately 250 permits and bonding representing $192 million. "Having five mines that are currently in coal production, substantial infrastructure and capital, and an experienced, talented workforce will enable LCC to accelerate reclamation on a five-year timetable with less contingent exposure for the states in which we operate," Poe said.

Poe says LCC will mine to reclaim, which will lower the cost of reclamation and will bring in revenue while the company continues to divest isolated assets as markets warrant. "Our management team knows the properties and permits, and has a demonstrated track record of success," said Poe. "Having 100 million tons of reserves will ensure a long runway for the assets, providing job security and continued opportunities where we operate."

Specific economic terms were not disclosed, but LCC will receive approximately $199 million in cash and $126 million in installment payments to assist in the fulfillment of bonding, reclamation, water treatment and other obligations.

Alpha Natural Resources CEO David Stetson called the conveyance a win-win for the regulatory agencies and the communities in which the assets are located. According to Stetson, "LCC is well-capitalized to meet its responsibilities to those local communities and to do so years earlier than originally planned. The transaction also eliminates the risks associated with self-bonding, making this a transformational deal for West Virginia."

Funding for the transaction provided by key shareholders under a $150 million credit facility. "The deal with Lexington Coal represents a major step forward for Alpha," Stetson said. "The transaction is immediately accretive to Alpha's business through the elimination of more than $70 million of annual cash costs and will allow Alpha to improve its operations and balance sheet to the benefit of all stakeholders. The financing facilitating the transaction was provided by certain of our key shareholders, who were willing to offer very competitive terms and, in doing so, make a further commitment to Alpha's future."

Alpha will continue to operate 20 mines and nine prep plants in West Virginia, and the company still expects to produce 14 million tons of metallurgical and thermal coal in 2017.

TOP 10 COAL-PRODUCING STATES

(in Thousand Short Tons)
Week Ending (10/21/17)

	YTD '17	YTD '16	% Change
Wyoming	260,821	232,011	12.4
West Virginia	75,454	63,626	18.6
Pennsylvania	41,807	36,027	16.0
Illinois	39,307	35,095	12.0
Kentucky	35,583	34,300	3.7
Texas	30,027	31,269	-4.0
Montana	26,047	25,121	3.7
Indiana	25,723	23,166	11.0
North Dakota	23,261	22,398	3.9
Colorado	12,859	9,554	34.6
U.S. Total	635,561	575,457	10.4

assets to a new entity to be jointly owned by Knight Hawk Holdings LLC (Knight Hawk) and the company's secured noteholders.

Armstrong expects its mining operations and customer shipments to continue throughout the chapter 11 process.

"We remain firmly committed to serving our customers and to being a good employer by maintaining safe, productive operations as we undertake this process," said Armstrong Executive Chairman J. Hord Armstrong III. "We are confident that this court-supervised process is the best way to close the transaction expeditiously."

Upon the close of the transaction, Knight Hawk will take control of Armstrong's ongoing operations.

The company filed various motions with the Bankruptcy Court requesting authorization to continue paying employee wages and providing health care and other benefits. Armstrong has also asked for authority to continue existing customer programs and intends to pay suppliers in full under normal terms for goods and services provided after the filing date of November 1.

As of June 30, Armstrong controlled more than 445 million tons of proven and probable coal reserves in western Kentucky and currently operates five mines. Armstrong also owns and operates three coal processing plants and river dock coal handling and rail loadout facilities, which support its mining operations.

In August, Armstrong Energy Inc. mentioned it was facing possible bankruptcy because it continued to experience operating losses and the inability to repay an interest payment. The company's net loss for the first six months of 2017 was $32.6 million, higher than a net loss of $28.4 million in the second quarter of 2016.

Pruitt Proposes Repeal of Clean Power Plan

U.S. Environmental Protection Agency (EPA) Administrator Scott Pruitt issued a Notice of Proposed Rulemaking (NPRM) proposing to repeal the so-called Clean Power Plan (CPP). After reviewing the CPP, the EPA determined that the President Barack Obama-era regulation exceeds the agency's statutory authority. Repealing the CPP will also facilitate the development of U.S. energy resources and reduce unnecessary regulatory burdens associated with the development of those resources, keeping with the principles established in President Donald Trump's Executive Order on Energy Independence, the EPA said.

WORLD NEWS

Exxaro Signs Long-term Agreement With Transnet

Exxaro Resource Ltd. signed a coal export transportation agreement with Transnet, which will increase coal volumes from Waterberg to Richards Bay Coal Terminal (RBCT). The 10-year agreement between Exxaro and Transnet will allow for the transportation of a total of 7.8 million metric tons (mt) of export coal, of which 3 million mt will come from the Waterberg once all the projects are ramped up.

"Exxaro is proud to be developing the Waterberg area in collaboration with Transnet," said Mxolisi Mgojo, CEO of Exxaro. "This is an exciting milestone for Exxaro and is a realization of our vision to contributing to the unlocking of the Waterberg, thus creating jobs and powering economic development in South Africa. As such, we will be investing 50% of our R20 billion ($1.5 billion) coal capex program over the next five years in coal in the Waterberg area."

This agreement, which supersedes the old agreement, will enable Transnet to increase rail infrastructure capacity to service both domestic and export markets from the Waterberg area, Mgojo explained.

The new agreement comes at the time when Transnet's Waterberg program is in full swing with plans to complete the second phase of the project in March 2019. The Waterberg upgrade Phase 2 will grow export rail capacity to 6 million mt through incremental upgrades of the existing rail networks and yards using additional loops, while maintaining the existing axle load, electrical upgrades and improved train control systems.

CEZ Cuts Power Plant Emissions in Czech Republic

The largest Czech energy utility, the CEZ Group, has invested 100 billion crowns ($4.6 billion) in the second wave of greening of North Bohemia's brown coal power plants, Ota Schnepp, the CEZ spokesman for North and Central Bohemia, told *Czech News Agency* CTK.

"Power plants will always rate at the top positions among air pollution sources, as even after they decrease emissions to an absolute minimum, they will still be the biggest production giants," Schnepp said.

Compared to the early 1990s, emissions have been decreased by 92% for sulfur dioxide (SO_2), by 95% for particulate matter, by 50% for nitrogen oxides (NOx) and by 77% for carbon monoxide (CO), Schnepp said.

In the next years, all measurable emissions will drop by another 50% thanks to the investments within the second stage of greening, owing to the completely restored Tusimice and Prunerov 2 plants and the newly built plant in Ledvice, among other investments, he said.

The long-term strategy of CEZ is to achieve a carbon neutral energy production by 2050. In the past decade, CEZ has invested more than 5 billion euros in low carbon technologies. Some coal-fired blocs will be shut down by 2020 due to the end of their life cycle and stricter emission limits, Schnepp said.

The modernized Tusimice and Prunerov plants depend on coal from the Tusimice coal mines, therefore they will operate for as long as the mines are operating, with 25 years being the guaranteed operation span, he added.

The life cycle of the new, environmentally friendly plant in Ledvice is about 40 years, which covers the whole estimated remaining life of the Bilina mine supplying coal to it, Schnepp said. Schnepp said the life cycle of the Pocerady plant cannot be antici-

Continued on p. 7...

DATELINE WASHINGTON

Perry's Angry Critics

BY LUKE POPOVICH

It was the 17th century English playwright William Congreve who claimed "Hell hath no fury like a woman scorned." Congreve never met the renewable fuels industry.

Wind and solar lobbyists reacted furiously to a proposal by Secretary of Energy Rick Perry last month that would allow many utilities to recover the full value of their baseload power units for the reliable power they provide to the grid. The secretary agrees with the National Mining Association (NMA) that today's marketplace ignores the advantage coal and nuclear offer by storing their fuel "on-site" — unlike natural gas, wind and solar that rely on vulnerable or spotty transmission infrastructure or sunny and windy days to deliver electricity to your light switch.

Given recent weather events that have pummeled the country, and the dramatic collapse of baseload power units in the past decade, Perry thinks it's high time utilities charge for the reliability their units provide.

"No way!" sputtered the renewable industry's formidable Washington lobby. By suggesting the Federal Energy Regulatory Corp. (FERC) allow utilities to recover the reliability value of competing baseload plants, the government would be (gasp!) "meddling in the energy market." Worse, this would show raw "favoritism." And the renewable industry will have none of government meddling and favoritism.

If there are persuasive, credible criticisms of the secretary's proposal, these aren't among them. And if anyone could make them credible, it isn't the renewable industry.

In fact, the government has frequently intervened in the power generation market and has often shown favoritism — no more so than during the President Barack Obama era. Barry's intervention did for coal-based generation what Stalin did for First Amendment rights. He promised penal reform but gave us the gulags.

His Environmental Protection Agency (EPA) euthanized older coal plants with muscular regulatory intervention like the Mercury and Air Toxics Standard (MATS). MATS played a big part in forcing the announced retirement of 107,000 megawatts (MW) of power plants in the past seven years. FERC, then chaired by Obama appointees, largely stood by and watched this baseload obliteration. No free-market complaints from the renewable industry either.

The Obama administration also showered renewable fuels with production and investment tax credits that totaled $7.2 billion last year and will come to a tidy $41 billion by 2020. That doesn't count the renewable fuel mandates in dozens of states that guarantee wind and solar market share.

How important have these subsidies been to renewables? How important is water to fish? The Production Tax Credit (PTC) for wind expired five times from 1999 to 2013, and after each of these expirations domestic investment fell between 76% and 92%. Coincidence?

In addition to the PTC's $24/MWh gift for the first decade of a project's life, power purchase agreements can equal that subsidy for 20 years or more, said the Lawrence Berkeley National Laboratory. This generous safety net allows wind producers to offer below-market prices just to ensure they run and collect on the taxpayers' dime.

If these energy sources are cheaper than baseload power, why should taxpayers continue to subsidize them?

As the wind and solar folks were busily denouncing Perry for subsidizing coal, a congressional tax bill proposed curbing renewable fuel tax breaks. The market-distorting "subsidies" for coal quickly became market-enhancing "incentives" for wind. The industry's lobby, in full-throated opposition to the cuts, pledged it would "fight hard to see that wind energy continues to work for America." Translation: "They'll fight hard to see that American taxpayers continue to work for wind energy."

What FERC eventually does by year's end is anyone's guess. It's an independent commission and can require little or nothing from regional transmission authorities. But some market intervention by the commission now might spare it the need for far more intervention later.

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

"How important have subsidies been to renewables? How important is water to fish?"

"The Obama administration pushed the bounds of their authority so far with the CPP that the Supreme Court issued a historic stay of the rule, preventing its devastating effects to be imposed on the American people while the rule is being challenged in court," Pruitt said. "We are committed to righting the wrongs of the Obama administration by cleaning the regulatory slate. Any replacement rule will be done carefully, properly, and with humility, by listening to all those affected by the rule."

The CPP was put on hold in February 2016, when the U.S. Supreme Court issued an unprecedented, historic stay of the rule, Pruitt said.

"The CPP ignored states' concerns and eroded longstanding and important partnerships that are a necessary part of achieving positive environmental outcomes," Pruitt said. "We can now assess whether further regulatory action is warranted; and, if so, what is the most appropriate path forward, consistent with the Clean Air Act and principles of cooperative federalism."

The CPP required regulated entities to take actions "outside the fence line." Traditionally, EPA Section 111 rules were based on measures that could be applied to, for, and at a particular facility, also referred to as "inside the fence line" measures. Prior to the CPP being issued, every single Section 111 rule on the books, including a handful of existing source rules and around 100 new-source rules, obeyed this limit.

The EPA has now sent the NPRM to the Federal Register for publication. Upon publication, the public will have 60 days to submit comments.

The repeal package includes:

1. The "preamble," which lays out the proposed legal interpretation, policy implications, and a summary of the cost-benefits analysis of the proposed repeal; and
2. The "Regulatory Impact Analysis (RIA)," an in-depth cost-benefit technical analysis.

The Trump administration estimates the proposed repeal could provide up to $33 billion in avoided compliance costs in 2030.

The previous administration compared U.S. costs to an estimate of supposed global benefits, and failed to follow well-established economic procedures in estimating those benefits.

The Obama administration relied heavily on reductions in other pollutants emitted by power plants, essentially hiding the true net cost of the CPP by claiming benefits from reducing pollutants that had nothing to do with the rule's stated purpose, the EPA said.

The Obama administration counted "energy efficiency" results of their rule as an avoided cost, resulting in a cost estimate being considerably lower than it would have been if they used the Office of Management and Budget's longstanding requirements, the EPA said.

Forthcoming is an Advanced Notice of Proposed Rulemaking that will be reflective of an approach to regulatory action grounded within the authority provided by the statute, the EPA said.

Luminant to Retire Monticello Plant

Luminant recently announced its plan to retire its Monticello power plant in Titus County, Texas. In total, approximately 1,800 megawatts (MW) of power will be taken offline in January. The company estimates that approximately 200 employees will be impacted by Monticello's retirement.

Continued from p. 5...

pated. It would end in the 2020s, but if modernized, it could serve for another 20 years.

Mooiplaats Colliery Sold to MCH

At the end of September, Coal of Africa Ltd. (CoAL) sold the Mooiplaats Colliery to a consortium of investors, known as MCH, for R179.9 million ($13.2 million). MCH members include young black professionals, future Mooiplaats Colliery employees, communities, To The Point Growth Specialists Proprietary Ltd. and experienced coal mining executives, including Don Turvey. The consortium is funded by the newly established Last Mile Fund created by Africa Rainbow Capital, Bernard Swanepoel, Sipho Nkosi and Clinton Halsey. MCH's structure is compliant with the proposed requirements of the currently suspended third version of the South African Mining Charter.

"The sale of the Mooiplaats Colliery is the final step in the company's balance sheet restructuring strategy setting the course for CoAL to become a self-sufficient mid-tier coal mining company," said David Brown, CEO of CoAL. "The disposal will yield annual operational cost savings of approximately $1.4 million and the [the proceeds of the sale] will be used to settle Ferret, our Mooiplaats Black Economic Empowerment partner, funding for further development of the flagship Makhado Project or the potential acquisition of a cash generating asset. The sale also frees up valuable in-house human resources, facilitating additional focus on Makhado, ensuring the asset can be brought to production optimally."

The Mooiplaats Colliery is a thermal coal colliery situated in the Ermelo coalfields, adjacent to the re-commissioned Camden Power Station operated by state power utility Eskom. The underground Mooiplaats Colliery was developed by CoAL from an abandoned box-cut in early 2008 with the first coal extracted in the third quarter of 2009. Mining was undertaken by a contract miner until June 2011 and, following an operational assessment, CoAL retained the existing workforce and equipment, and commenced operating the mine. The reduction in global thermal coal prices from 2013 and rapidly increasing logistics costs resulted in the Mooiplaats Colliery being placed under care and maintenance in October 2013, and this status continues to present day.

Iran's Coal Output Increases

Iran's two major coal companies produced 303,440 metric tons (mt) of clean coal in the five months since the beginning of the current fiscal year (March 21-August 22), recording a 36% growth compared with last year's similar period, according to the Iranian Mines and Mining Industries Development and Renovation Organization. The majority of the production originated from the Tabas Parvadeh Coal Co., which produced 262,818 mt. The Central Alborz Coal Co.'s output totaled 40,622 tons for the same period. The South Khorasan Province's Tabas region is home to about 55%-76% of Iran's coal reserves, which have been estimated at 2.5 billion mt.

Canada's Sherritt Fined for Environmental Incident

A second coal-mining company in four months is being hit with a seven-figure penalty for polluting incidents that impacted fish in tributaries of the Athabasca River east of Jasper National Park in Alberta, according to *The Globe and Mail*.

Sherritt International Corp. agreed to pay a fine of $1 million after pleading guilty in provincial court to three counts under the federal Fisheries Act. The Toronto-based company was charged five years ago due to incidents where wastewater considered toxic to

Continued on p. 9...

As part of the retirement process, Luminant filed a notice with the Electric Reliability Council of Texas (ERCOT), which will trigger a reliability review. If ERCOT determines the units are not needed for reliability following this 60-day review, Luminant expects to stop plant operations on January 4.

The company said it will take the necessary steps to responsibly decommission the facility in accordance with all federal and state regulations. In addition, it will continue the ongoing reclamation work at the plant's mines, which ceased active operations in spring 2016.

Process of Transferring Ownership Continues for Navajo Station

Peabody Energy confirmed that a number of highly qualified potential investors have expressed interest in pursuing an ownership position in the Navajo Generating Station for operation beyond 2019, meeting a major milestone for identifying a new ownership structure. The ownership transition process, led by Lazard Fréres & Co. LLC, remains on track with the transition timeframe outlined by plant majority owner and operating agent Salt River Project, which has agreed to help facilitate an ownership transition subject to negotiation of definitive agreements.

"The Navajo Nation is committed to engaging in negotiations as this important process continues," said Navajo Nation President Russell Begaye. "The nation is encouraged by the expressed interest of potential owners as the process moves forward."

"We are pleased with the robust response to the plant's ownership transition process to date," said George Bilicic, Lazard vice chairman and global head of power, energy and infrastructure, who is leading the process. "In the next phase, we will continue an intense focus to develop a new ownership structure, working toward a final selection of investors and negotiating definitive agreements by the end of the first quarter of 2018."

"Lazard believes the Navajo Generating Station is a critical resource in the region for power generation and resource diversity, and from a total regional economic impact perspective. Lazard took on this project because we believe there will be an optimal path forward that solves the needs of the many stakeholders involved, including the Navajo, Hopi and ratepayers in Arizona," Bilicic said.

Development of the Navajo Generating Station was authorized by Congress and serves as a stable, affordable power source to move water across the state for the Central Arizona Project. The plant was sited on tribal lands, using Navajo and Hopi energy resources to cre-

PEOPLE IN THE NEWS


Larry Evans

Larry Evans has been appointed vice president of business development and strategy at **Corsa Coal Corp**. Previously, he owned SouthernApp Technical Services, a consulting company offering mining, civil and environmental engineering services in the coal mining sector. Prior to that, he was senior director of exploration and technical support for Walter Energy.

Sunrise Coal promoted *Lawrence D. Martin* to president. Martin joined Sunrise in 2007 as CFO. In 2016, he was named CFO of Hallador Energy Co. *Heather L. Tryon* was promoted to CFO. Previously, she served as Sunrise's controller, a position she has held since joining Sunrise in August 2014. Brent Bilsland will remain Hallador Energy's president, chief executive officer, and director.

Black Hills Energy named *Nick Gardner* to the position of vice president of the company's operations in South Dakota, northeastern Wyoming and southeastern Montana. Gardner joined Black Hills in 2000 as an engineering intern and progressed to positions of increasing responsibility with the company's natural gas operations in various states.

NACCO Industries announced that upon its completion of the proposed spinoff of Hamilton Beach Brands Holding Co., *Alfred M. Rankin Jr.*, will retire as president and CEO of NACCO while continuing to serve as non-executive chairman of the board of directors of NACCO. In addition, Rankin will become executive chairman of Hamilton Beach Brands Holding Co. following the spinoff. Rankin has provided more than 45 years of service to NACCO and its subsidiary companies. Butler will become president and CEO of NACCO and will join the NACCO Board of Directors upon Rankin's retirement. Butler will also continue to serve in his capacity as the president and CEO of North American Coal. Butler has served as senior vice president – finance, treasurer and CAO of NACCO since September 2012.

Wallace Taylor is now manager marketing and logistics for **Bowie Resource Partners**.


Myron Jones

Myron Jones is now vice president of purchasing and maintenance at **Cutlass Collieries LLC**.


Steven Gardner

President Donald Trump nominated *Steven Gardner* to be the director of the Office of Surface Mining, Reclamation and Enforcement (OSM) at the **U.S. Department of the Interior**. Gardner is currently serving as the president and CEO of ECSI LLC.


Dan Alexander

Dan Alexander started a new position as an adjunct faculty member at **West Virginia University**.

Bobby Lewis is now mine manager at **Pine Mountain Coal**. He was previously an engineer with Bledsoe Coal.

Daniel Elliott, former chairman of the surface transportation board, is now a partner at **Conner & Winters**.

Superior Industries Inc. hired *Terry O'Hearn* as its new conveyor components territory manager for the southcentral United States. O'Hearn will work with distributors in the region to market and sell conveyor components in Kansas, Missouri, Oklahoma, Arkansas and Texas.


Jim Williams

Motion Industries announced that *Jim Williams*, vice president of corporate purchasing and supplier relations, was elected 2018 Power Transmission Distributors Association president.

United Central Industrial Supply hired *Daron Steinmann* to the position of Western regional manager.

ate tribal jobs and revenues, helping the government fulfill its trust responsibility. It was commissioned to run 75 years through 2044.

The Navajo Generating Station recently has been running at about an 80% capacity factor and is competing cost-effectively to add reliability and resilience to the electric grid.

"The recent spike in Southwest power prices caused by high demand periods and higher natural gas costs demonstrates why the Navajo Generating Station and coal continue to be an essential component of a reliable, resilient and cost-effective energy portfolio for Arizona," said Kemal Williamson, Peabody president – Americas. "We will continue our efforts to make the plant among the lowest cost, most competitive baseload power plants in the region."

Fueled by Peabody's Kayenta mine, the Navajo Generating Station began operating in 1974. The mine and the power plant support 825 jobs and provide approximately 85% of the Hopi Tribe's annual general fund budget and 22% of the Navajo Nation's annual general budget. Virtually all of the mine's hourly workforce is Native American, and last year the mine contributed $430 million in direct and indirect economic benefits into regional economies.

West Virginia Senators Join Secretary of Labor for Mine Safety Tour

Recently, U.S. Sens. Joe Manchin (D-WV) and Shelley Moore Capito (R-WV) joined U.S. Secretary of Labor Alexander Acosta for a mine safety tour of ICG Beckley, LLC's Pocahontas Beckley mine in Raleigh County, West Virginia. Officials from the Mine Safety and Health Administration (MSHA) also participated in the mine safety tour.

Following an approximately 30-minute ride in a mantrip that transported the group underground, Secretary Acosta and the senators observed first-hand the operation's continuous mining machine, which employs a large rotating steel drum equipped with bits to extract coal from the seam. Installed on the continuous mining machine is a proximity detection system, which can detect the presence of personnel or equipment and avert pinning or crushing accidents.

"Touring a West Virginia coal mine with Sens. Manchin and Capito gives me a first-hand appreciation for the dedication of the men and women who work in the more than 13,000 mines around the country," said Acosta. "Through their hard work, America's miners fuel our modern-day life. The Department of Labor is committed to ensuring that all miners work in a safe and healthy work environment."

Prior to the mine safety tour, Acosta met with MSHA employees at the National Mine Health and Safety Academy in Beckley.

Pocahontas Beckley mine employs about 170 people, and in 2016, produced 982,725 tons of coal. ICG Beckley LLC is a subsidiary of Arch Coal Inc.

Lakeland Hopes for Profitable 2017 Following Hurricane Irma

The city-owned utility in Lakeland, Florida, is hoping for a quiet, profitable final couple of months of 2017 after grappling with weather-related issues, such as persistent rains and Hurricane Irma that affected both the operation and profitability of its 365-megawatt (MW) C.D. McIntosh coal-burning power plant.

In late spring and early summer, frequent wet, cloudy weather in supposedly "sunny Florida" held down Lakeland's generation load, forcing Lakeland Electric for a time to run only one coal train instead of the customary two. The municipal electric system gets

Continued from p. 7...

fish was allowed to flow from its open-pit Coal Valley mine about 120 kilometers (km) east of Jasper National Park into ecologically significant habitat for rainbow trout.

In June, Prairie Mines & Royalty Ltd. (formerly known as Coal Valley Resources) was handed almost $4.5 million in federal and provincial penalties after it also pleaded guilty to polluting tributaries of the Athabasca River.

Prairie Mines was charged after an earthen berm failed at its Obed Mountain coal mine about 50 km east of the park allowed an estimated 670 million liters of wastewater to escape into the river system in October 2013.

China to Launch World's Largest Clean Coal Power System by 2020

China is expected to boast the world's largest clean coal power system with high efficiency by 2020, the Xinhua-run Economic Information Daily reported. Since 2014, the coal-fired power sector has been renovating facilities to reduce emissions and save energy.

In 2015, the Ministry of Environmental Protection, the National Development and Reform Commission, and the National Energy Administration jointly issued a plan for coal-fired power plants to renovate facilities to cut emissions and conserve energy. It set a target of completing such renovations by 2020.

By the end of June, roughly 60% of the total installed capacity of coal-fired power units have been renovated, said Liu Bingjiang, director of the Department of Air Environmental Management, the Ministry of Environmental Protection. "Beijing, Tianjin and Hebei province have completed the plan, while the eastern regions have basically wrapped up the work," Bingjiang added, confident of achieving the target for 2020.

Currently, the focus of the country's air pollution control efforts lies in non-electricity sectors, such as steel, cement, sheet glass and electrolytic aluminum as the country has greatly reduced major pollutant discharge in the coal-fired power sector, the *Economic Information Daily* said.

The emissions of sulfur dioxide and nitrogen oxides in the coal power industry have been reduced from a peak of 10 million tons to millions of tons, according to Bingjiang. The coal power sector has become the sector that is ranked at the top in meeting emission standards, he added.

According to statistics from the China Electricity Council, by the end of 2016, the country's installed capacity of coal-fired power generators was 940 million kilowatts (kW), accounting for 57.3% of the total installed generating capacity. The coal-fired power output was 6 trillion kW per hour, representing 65.5% of the total power output.

Iran Seeks Mining Investment

In the past two months, Iran has signed agreements with South Korea, Austria and Denmark, and is on the way to signing similar accords with other countries, according to the *Financial Tribune*. The country is seeking $50 billion in investment for its mining industries up to 2022 and has signed agreements with several European and Asian banks in the past few months. Mehdi Karbasian, Iran's deputy minister of industries, mining and trade, speaking on the sidelines of the IMARC Mining Conference in Melbourne, Australia, said the plan was to attract capital across five years, but declined to say how much Iran had raised so far.

UNITED STATES POSTAL SERVICE STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION

(REQUESTER PUBLICATIONS ONLY)

1. Publication Title: *Coal Age* 2. Publication Number: 10407820
3. Date of Filing: October 2017 4. Frequency of Issue: Monthly
5. No. of Issues Published Annually: 9 6. Annual Subscription Price: Controlled
7. Complete Mailing Address of Known Office of Publication
Mining Media Int'l Inc., 11655 Central Parkway, Suite 306, Jacksonville, FL 32224
Contact Person: Steve Fiscor, 904-721-2925
8. Complete Mailing Address of Headquarters of general Business Office of Publisher:
Mining Media Int'l Inc., 11655 Central Parkway, Suite 306, Jacksonville, FL 32224
9. Full Names and Complete Mailing Addresss of Publisher, Editor and Managing Editor:
Publisher: Steve Fiscor, 11655 Central Pkwy., Ste. 306, Jacksonville, FL 32224
Editor: Steve Fiscor, 11655 Central Pkwy., Ste. 306, Jacksonville, FL 32224
10. Owner—Full Name and Complere Mailing Address:
Stephen J. Fiscor, Mining Media Int'l Inc., 11655 Central Parkway, Suite 306, Jacksonville, FL 32224
11. Known Bondholders, Mortgages and Other Security Holders Owning or Holding
1 Percent or More of Total Amount of Bonds, Mortgages or Other Securities: None
13. Publication Title: *Coal Age*
14. Issue Data for Circulation Data Below: September 2017
15. Extent and Nature of Circulation:

		Average No. of Copies Each Issue During Preceding 12 Months	No. of Copies of Single Issue Published Nearest to Filing Date
a.	Total No. Copies Printed (Net Press Run)	12,807	11,706
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)	7,538	7,590
	2. In-Country Paid/Requested Mail Subscriptions Stated on PS Form 3541 (include recipient direct-written, telemarketing and Internet requests, paid subscriptions including nominal rate, employer requests, advertiser proof copies, and exchange copies)	—	—
	3. Sales Through Dealers and Carriers, Street Vendors, Counter Sales and Other Paid or Requested Distribution Outside USPS	321	358
	4. Requested Copies Distributed by Other Mail Classes Through the USPS	—	—
c.	Total Paid/and/or Requested Distribution (Sum of 15b (1), (2), (3), and (4))	7,859	7,948
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)	4,401	3,425
	2. In-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. Nonrequested Copies Distributed Through the USPS by Other Classes of Mail (e.g., first class mail, nonrequested copies mailed in excess of 10% limit at standard mail or package services rates)	—	—
	4. Nonrequested Copies Distributed Outside the Mail (include pickup stands, trade shows. showrooms, and other sources)	294	171
e.	Total Nonrequested Distribution (Sum of 15d (1), (2), (3), and (4))	4,695	3,596
f.	Total Distribution (Sum of 15c and e)	12,554	11,544
g.	Copies Not Distributed	249	162
h.	Total (Sum of 15f and g)	12,803	11,544
i	Percent Paid and/or Requested Circulation (15c divided by 15f times 100)	62.6%	68.8%
16.	Electronic Copy Circulation		
a.	Requested and Paid Electronic Copies	1,567	1,697
b.	Total Requested and Paid Print Copies (Line 15c) + Requested/Paid Electronic Copies	9,426	9,645
c.	Total Requested Copy Distribution (Line 15F) + Requested/Paid Electronic Copies	14,111	13,241
d.	Percent Paid and/or Requested Circulation (Both Print & Electronic Copies) (16b divided by 16c x 100)	66.8%	72.8%

(x) I certify that 50% of all my distribution copies (electronic & print) are legitimate requests or paid copies.

17. Publication of Statement of Ownership for a Requester Publication is Required and Will be Printed in the October/November 2017 Issue of This Publication.
18. I Certify that All Information on This Form is True and Complete. I Understand that Anyone Furnishing False of Misleading Information or Who Omits Material or Data Requested May be Subject to Criminal and/or Civil Sanctions: Steve Fiscor, Publisher, 10/2/2017

steam coal from Foresight Energy's Sugar Camp longwall mine near Akin in Franklin County, Illinois, and Copper Glo Mining's underground mine in Claiborne County, Tennessee. Foresight is supplying 1.365 million tons to Lakeland over the next three years while Copper Glo is sending 150,000 tons to the municipality this year.

The high-sulfur coal is railed hundreds of miles to McIntosh, a single-unit plant in commercial operation since 1982.

The baseload plant's burn improved once hotter, drier weather descended upon the Lakeland area this summer.

Then came Irma.

When the powerful hurricane hit Florida as a Category 3 storm on September 10, electricity was disrupted across the state and electric systems were damaged and knocked out of service.

In some situations, Lakeland's for example, the above-ground coal stockpile was literally under water for days.

Lakeland Electric finally returned McIntosh to service in late September after the coal had been dried out, according to Tory Bombard, fuels manager for the municipality. In early October, the plant was running normally.

At present, Lakeland, a city of 100,000 in central Florida, has no plans to retire McIntosh or convert the plant to natural gas.

Production Comes to a Halt at Galatia

Murray Energy Corp.'s (MEC) once-bustling Galatia underground coal mining complex in Saline County, Illinois, is less busy these days after coal production essentially ceased this summer at the New Future mine, coming on the heels of a similar move at its sister New Era operation. State records show New Future produced only about 29,000 tons of steam coal in August, with most, if not all, coming from raw, above-ground coal that was run through the Galatia processing plant. According to state mining officials, New Future had 32 full-time employees at the end of August. More recent production and staffing figures were not available by early October.

American Coal Co., a subsidiary of Ohio-based MEC, has operated the Galatia mines since it was incorporated in 1998. The Galatia asset was acquired by MEC from Kerr-McGee Coal Corp., which opened the first deep mine on the property just outside the community of Galatia in the early 1980s.

Galatia's official status is uncertain as Gary Broadbent, MEC senior corporate counsel and director of investor and media relations, declined to comment when asked if New Future had closed.

However, the company said in a federal WARN Act notice in April that nearly 300 New Future miners would be laid off later in the year. That number comprised most of the remaining work force at New Future, the successor mine at Galatia after New Era was shut earlier this year.

New Future was seen as the lower-cost and more efficient of the two Galatia mines. But the company said in a prior statement about the April layoff that New Future had encountered "adverse mining conditions" and that the company was "reviewing all of its current options with respect to this operation."

MEC now has ownership control of St. Louis-based Foresight Energy, owner of four mines including three longwall operations in Illinois. Murray Energy has been transferring high-cost production to the Foresight mines.

That apparently is what MEC has done with respect to the nearly 3 million tons of high-sulfur steam coal that AmCoal was

contracted to sell to Louisville Gas & Electric Co. and Kentucky Utilities Co. by 2019. LG&E and KU are Kentucky's largest electric utilities, serving about 1.1 million customers. They are owned by Pennsylvania-based PPL Corp.

New Future produced just under 2 million tons of coal in the first six months of 2017, federal Mine Safety and Health Administration figures show, although its output tailed off during the second quarter. New Era has had no production this year, according to MSHA.

That is in sharp contrast to Galatia's recent mining history. In 2014, the Galatia complex turned out approximately 11.3 million tons of coal, with a permanent workforce of 935 people. It was one of the largest coal producers in Illinois, along with the Foresight mines.

For several decades, the Galatia complex's sprawling operations, highlighted by its brightly illuminated prep plant, have been a familiar sight to motorists driving between Harrisburg and Galatia.

DOE to Fund $26 Million for Carbon Capture Technologies

The U.S. Department of Energy (DOE) has announced up to $26 million in federally funded financial assistance for cost-shared research and development projects under the Office of Fossil Energy's (FE) Novel and Enabling Carbon Capture Transformational Technologies funding opportunity announcement. DOE anticipates selecting 14 projects for this funding, which will demonstrate the potential to provide step-change reductions in both cost and energy penalties associated with implementing carbon capture and enabling technologies for the coal and natural gas power generation sector. The projects will be managed by the National Energy Technology Laboratory (NETL).

This funding opportunity focuses on two areas of interest: development of novel transformational materials and processes and enabling technologies to improve carbon capture systems.

Selected projects under the development of novel transformational materials and processes area will support research developing and validating transformational materials and capture processes, such as novel water-lean solvents and other materials that can significantly increase CO_2 absorption performance, economics and other benefits. Projects may also focus on advanced membranes or hybrid materials and processes that can be tested at bench-scale on natural gas and/or coal-fired flue gas, showing potential to meet DOE's transformational carbon capture goals.

Selected projects under the enabling technologies area will support bench-scale research on addressing challenging issues associated with advanced carbon capture technologies. By developing these enabling technologies, overall improvement in carbon capture systems that is or is not specific to any one technology developer might be realized.

Signal Peak Appeals Judge's Order for Bull Mountain

On October 5, Signal Peak, which operates Bull Mountain mine in Montana, appealed a federal judge's ruling that put expansion plans for the mine on hold. The company said this ruling will result in the company being forced to lay off 30 employees at the mine at the end of October.

In August, U.S. District Judge Don Molloy issued an order vacating and setting aside a challenged mining plan environmental assessment and enjoined all federal coal within an

amended permit area boundary. He ruled that the federal Office of Surface Mining (OSM) had not considered the impacts of the mine's proposed expansion.

The current injunction will stop development operations in a part of the mine by the end of October and in another portion in March 2018, the company said. It added that the longwall mining would be idled indefinitely beginning in June 2019, cutting off tax and royalty revenues to the federal government, the state and local counties.

In 2013, Signal Peak applied to the OSM for approval of a mining plan modification that would allow Signal Peak to continue its development operations by mining 2,539.76 acres of federal coal leases that are interspersed with the larger area of private coal. The OSM approved the Mine Plan on February 24, 2015.

Six months later, on August 17, 2015, a lawsuit was filed by Montana Environmental Information Center. On August 14, 2017, the judge determined that the agency had not adequately considered the indirect impacts of the mine plan and burning coal.

Signal Peak's notice of appeal challenges the remedy portion of the district court's order, which it said refused to set a process for addressing remedy, and declined to dissolve the injunction on mining federal coal pending resolution of the remedy issues.

According to Signal Peak, the order will cause a substantial hardship to the mine and its employees, with 50 jobs at risk in March 2018, and 80 more mining jobs and 100 surface jobs at risk in June 2019.

"The public interest is better served by a stay that balances the specific environmental harms alleged by the appellee and noted by the district court, with the economic and social harms to the mine, its employees, and southcentral Montana," the company said in the court documents.

CALENDAR OF EVENTS

January 28-31, 2018: *44th Annual Conference on Explosives and Blasting Technique*, San Antonio, Texas. Contact: Web: www.isee.org.

February 7-9, 2018: *36th Annual World Trade and Transport Conference*, New Orleans, Louisiana. Contact: Web: http://mvttc.com/conference/.

February 25-28, 2018: *2018 Society for Mining, Metallurgy and Exploration (SME) Annual Conference & Expo*, Minneapolis, Minnesota. Contact: Web: www.smenet.org.

March 19-22, 2018: *Electric Power*, Gaylord Opryland Convention Center, Nashville, Tennessee. Contact: Web: http://2018.electricpowerexpo.com.

April 23-25, 2018: *Coal Processing Technology (CoalProTec 2018)*, Heritage Hall, Lexington, Kentucky. Contact: Mel Laurila, executive director, Coal Preparation Society of America (CPSA), Tel: 859-797-9118; Email: qcinc@aol.com; Web: www.coalprepsociety.org.

May 6-9, 2018: *Canadian Institute of Mining (CIM 2018)*, Vancouver Convention Center, Vancouver, BC Canada. Contact: Web: www.cim.org.

AS THE WORLD MOVES FASTER,
OUR BRAKES WORK HARDER.

HILLIARD
BRAKE
SYSTEMS

INDUSTRIAL BRAKES FOR A WORLD OF APPLICATIONS

HYDRO TURBINES | ELECTRIC GENERATORS | MARINE PROPULSION | WINCHES | DYNOMOMETERS | NUCLEAR COOLING PUMPS | FRICTION WELDERS | CRANE BRIDGE DRIVES
THEATRICAL / STAGE EQUIPMENT | CRANE HOISTS | MINE HOISTS | ELEVATORS | ESCALATORS | MARINE PROPULSION | MINING CONVEYORS | GENERAL MACHINERY
PAPER MILLS | TEXTILE MACHINERY | PACKAGING MACHINERY | POWER PLANT FANS | CONVEYORS | CAR SHREDDERS | GRINDING MILLS | KILNS | PAPER CONVERTING
WIRE PAYOFFS | STEEL PROCESSING LINES | AMUSEMENT RIDES | MATERIAL HANDLING | DRAGLINES | SKIP HOISTS | MINING CONVEYORS | MARINE | RAIL/CONVEYORS
MARINE/SHIPPING | WIND ENERGY | STEEL/METAL | BUCKET ELEVATORS | BARGE UNLOADERS | RAIL CAR DUMPERS | RAIL CAR POSITIONERS | PEOPLE MOVERS
HYDRO TURBINES | ELECTRIC GENERATORS | MARINE PROPULSION | WINCHES | DYNOMOMETERS | NUCLEAR COOLING PUMPS | FRICTION WELDERS | CRANE BRIDGE DRIVES
THEATRICAL / STAGE EQUIPMENT | CRANE HOISTS | MINE HOISTS | ELEVATORS | ESCALATORS | MARINE PROPULSION | MINING CONVEYORS | GENERAL MACHINERY
PAPER MILLS | TEXTILE MACHINERY | PACKAGING MACHINERY | POWER PLANT FANS | CONVEYORS | CAR SHREDDERS | GRINDING MILLS | KILNS | PAPER CONVERTING
WIRE PAYOFFS | STEEL PROCESSING LINES | AMUSEMENT RIDES | MATERIAL HANDLING | DRAGLINES | SKIP HOISTS | MINING CONVEYORS | MARINE | RAIL/CONVEYORS

MADE IN AMERICA, BUILT FOR THE WORLD

HilliardBrakeSystems.com

Hilliard Products are
Made in the USA

MINING MARKETPLACE

Resource Center

FREE TOOLS FOR YOUR CAREER SUCCESS.

Free case studies, white papers, presentations, business forecasts, and more. All designed to help you do business better.

The ASIA Miner · Coal Age · E&MJ Engineering and Mining Journal · Equipo Minero

Cement Americas · Rock Products · Concrete

RESOURCES.MININGMARKETPLACE.COM

U.S. Prep Plant Census 2017

Interest in processing projects returns

BY STEVE FISCOR, EDITOR-IN-CHIEF

The worst may have passed for the coal processing sector. The good news is that two new plants were added to the U.S. Prep Plant Census in 2017. Another encouraging sign is that the engineering firms that design and build these plants have noticed a renewed interest in projects. The recent shake-out in the coal business led to a few more plants being listed as idle this year, while a few older idled plants were removed after it was confirmed that they were scrapped.

The total number of U.S. prep plants dropped from 252 to 248 and the number of idled plants increased from 59 to 61. The census lists 17 anthracite plants in Pennsylvania. The total number of operating plants washing bituminous coal has now dropped to 170. West Virginia remains the leader with 70 plants (29% are idle), followed by Kentucky (52, 38% idle), and Pennsylvania (22 bituminous and two idle). Virginia and Ohio have 19 and 18 prep plants, respectively, with only a few idle.

The biggest single ownership change recorded in the 2017 U.S. Prep Plant Census would be the recent transfer of idled properties from Alpha Natural Resources to Lexington Coal. In West Virginia, the Lexington Coal name emerges for the first time with six listings. Revelation Energy purchased Lone Mountain Processing in Virginia from Arch Coal earlier this year.

Moving through the states, Warrior Met Coal's North River plant in Alabama, which had been listed as idle for many years, was removed. In Illinois, American Coal Co.'s Galatia plant is now listed as idle (See News, p. 10). With a raw feed capacity of 3,000 tons per hour (tph), the Galatia prep plant is one of America's largest prep plants. Pinnacle Processing's Pevler prep plant in Kentucky has been idled. The Ohio Valley prep plant in Ohio and the High Quality (Maple Creek) and Keystone plants in Pennsylvania have been torn down and removed from the census.

Ramaco Resources' Elk Creek prep plant is America's newest coal washing facility.

2 New Plants Start in 2017

Two new preparation plants were commissioned in 2017: Ramaco Resources' Elk Creek plant and JSW Steel's Caretta prep plant. Both are in West Virginia. Construction on the Elk Creek plant began in October 2016 and it was commissioned during November 2017. "Elk Creek is the newest prep plant in the U.S.," said Dennis Phillips, president, Raw Resources Group, the firm that designed and constructed the Elk Creek plant. "We have our own construction and electrical group and can do everything as far as building a plant except for the silos and some of the specialty plant equipment."

Elk Creek will produce both metallurgical and steam coal, but mostly met coal, Phillips explained. It has a raw feed capacity of 700 tph. For primary and intermediate separation, the plant uses a single large-diameter (48-inch), heavy-media cyclone. It uses spirals and froth flotation to recover fine coal.

The plant was commissioned in early November. "The process went well," Phillips said. "We had the usual balancing and water issues, but all the bugs were quickly worked out. Once we started running coal, the whole process went really smoothly."

The other plant that was commissioned this year was JSW Steel's Caretta prep plant. "Construction on the Caretta prep plant actually began three years ago, but it didn't start up until April of this year," said Bob Hollis, president of the Daniels Co., the firm that designed and built the plant. Located in McDowell County, West Virginia, the 500-tph Caretta plant provides metallurgical coal for JSW's steel mills.

At a recent meeting of the Coal Prep Society of America in Lexington, Kentucky, Hollis and several other engineers noted a renewed interest in processing projects. "We are certainly starting to see an upswing in this segment," Hollis said. "A number of coal operators are seriously considering plans for new preparation plants. There is still some concern about the market. They haven't decided to invest yet, but we are getting inquiries on a weekly basis about building new plants."

The current situation in the coal beneficiation sector can best be described as guarded optimism. In the next few years, several of the idled plants will likely be restored and new ones will be commissioned. The general consensus was that most of these new plants (60:40) would serve the met market and they will likely have a raw feed capacity of 500 tph to 600 tph. This is welcomed news for an industry that has suffered through several years of decline.

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)										
Drummond Co.	Shoal Creek	2,220	12.00%	< 1.2	—	—	•	•	—	—
Jesse Creek Mining	Piney Woods	300	—	—	—	•	—	—	—	—
Seneca Coal Resources (ERP)	Concord	1,000	—	—	—	•	—	—	•	—
Southern Coal	GTM Modular Plant	250	—	—	—	•	—	—	—	•
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	900	8.00%	< 1.2	—	—	•	•	—	—
Bowie Resources Ltd.	Bowie (Idle)	650	5.50%	< 1.2	—	•	—	—	—	•
Peabody Energy	Twentymile	2,000	—	—	—	•	—	—	—	•
Illinois (14)										
Alliance Resource Partners	Pattiki (Idle)	1,200	7.00%	> 2.5	2003	•	—	—	—	•
Alliance Resource Partners	Hamilton County	2,000	—	—	—	•	—	—	—	•
Alpha Natural Resources	Wabash (Idle)	—	—	—	—	—	—	—	—	—
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	•	—	—	—	•
Peabody Energy	Willow Lake (Idle)	1,400	—	—	2003	•	—	—	•	—
Indiana (16)										
Alliance Resource Partners	Gibson County North	950	—	1.2-2.5	2014	•	—	—	—	•
Alliance Resource Partners	Gibson County South	2,000	—	1.2-2.5	—	•	—	—	—	•
Blackhawk Mining	Augusta	250	—	> 2.5	2010	—	•	•	—	—
Blackhawk Mining	Freelandville No. 2	400	8.00%	> 2.5	2010	•	—	—	—	•
Blackhawk Mining	Log Creek	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 (52)										
Alliance Resource Partners	Dodge Hill (Idle)	300	—	—	—	—	—	—	—	—
Alliance Resource Partners	Dotiki	2,000	8.00%	> 2.5		•	—	—	—	•
Alliance Resource Partners	Elk Creek	1,200	8.00%	> 2.5	—	•	—	—	—	•
Alliance Resource Partners	MC Mining	1,000	8.00%	< 1.2	1991	•	—	—	•	—
Alliance Resource Partners	Onton No. 9	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	—	—	—	•	—	—	—	—
Alpha Natural Resources	Long Fork (Idle)	1,500	—	—	2002	•	—	—	•	—
Alpha Natural Resources	Martin County (Idle)	1,400	—	—	—	•	—	—	•	—
Alpha Natural Resources	Sidney - Big Creek	1,500	—	—	1991	•	—	—	•	—
Apex Energy (James H. Booth)	Big Creek	450	—	—	—	•	—	—	—	—
Appalachian Mining & Reclamation	Ivel	500	—	—	2007	•	—	—	•	—
Arch Coal	Raven (Idle)	800	10%	< 1.2	2008	•	—	—	•	—
Arch Coal	Supreme (Idle)	450	10%	< 1.2		•	—	—	•	—
Armstrong Coal Co.	Midway	600	—	—	—	•	—	—	—	•

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
—	•	—	•	—	—	—	—	—	—	—	•	—	IR	1992
•	—	—	—	•	—	•	—	—	—	•	—	—	—	—
•	•	—	•	•	—	—	—	—	—	—	•	•	IR	1995
—	—	—	•	•	—	•	—	—	—	—	•	—	Tag	2012
•	—	—	•	•	—	•	—	—	—	—	•	—	Mc/Tag	1974
—	—	—	•	•	—	•	—	—	—	—	•	—	Mc/Tag	1976
—	—	—	•	•	—	•	—	•	•	—	•	—	Mc/Tag	1978
—	—	—	—	—	—	•	—	—	—	—	•	—	Tag	2010
—	•	—	—	—	—	•	—	•	•	—	•	—	Mc	1983
—	•	—	—	•	—	•	—	—	•	—	•	—	Dan	2004
—	•	—	—	•	—	•	—	•	•	—	•	—	Tag	2008
•	—	—	—	•	—	•	•	•	•	•	•	—	FMC	1982
—	•	—	•	•	—	•	—	—	—	—	•	—	GMC	2013
—	—	—	—	—	—	—	•	—	—	—	—	—	R&S	1993
•	•	—	•	•	—	•	—	—	—	—	•	—	R&S	1982
•	—	—	—	•	—	•	—	—	—	—	•	—	R&S	1982
•	•	—	—	•	•	•	—	—	—	—	•	—	CDG	2011
•	•	—	—	•	•	•	—	•	—	—	•	—	CDG	2006
•	•	—	—	•	—	•	—	—	—	—	•	—	Mc	1970
•	•	—	—	•	•	•	—	—	—	—	•	—	CDG	2011
—	—	—	—	•	—	•	—	—	—	—	•	—	Tag	2000
—	•	—	—	•	•	—	—	•	—	—	—	—	Tag	2005
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	•	—	•	—	—	—	—	•	—	R&S/Tag	1976
•	—	—	—	•	—	•	—	—	—	—	•	—	Ram	2001
—	—	—	—	•	—	•	•	—	—	•	•	—	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
•	—	—	•	•	—	•	—	—	—	—	•	—	Pow	1979
•	•	—	—	•	—	•	—	—	—	—	•	—	Dan	1972
•	—	—	•	•	—	•	—	—	—	—	•	—	R&S	1989
•	•	—	•	•	—	•	—	—	—	—	—	—	R&S	—
•	—	—	—	•	—	•	—	—	—	—	•	—	Tag	—
•	—	—	—	•	—	•	•	—	—	—	•	—	Pow	2008
•	—	—	—	•	—	•	—	—	—	—	•	—	—	—
•	—	—	—	•	—	•	•	—	—	—	•	—	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.
Armstrong Coal Co.	Armstrong Dock	1,200	—	—	—	•	—	—	—	—
Armstrong Coal Co.	Parkway	400	—	—	—	•	—	—	—	—
Blackhawk Mining	Blue Diamond No. 64	900	7.00%	1.2-2.5	2010	•	—	•	—	—
Blackhawk Mining	Spurlock	900	—	—	—	•	—	—	•	—
Blackhawk Mining	Leatherwood	1,400	7.00%	1.2-2.5	2006	•	—	—	•	•
Blue Gem Mining	Blue Gem (Idle)	—	—	—	—	—	—	—	—	—
Booth Energy	Bear Branch (Idle)	400	—	—	—	•	—	—	•	—
Booth Energy	Beech Fork #1 (Idle)	500	—	—	—	•	—	—	•	—
Booth Energy	F.M. Burke (Idle)	550	8.50%	1.2-2.5	1994	•	—	—	•	—
Booth Energy	Perry County	1,350	7.50%	1.2-2.5	—	•	—	—	•	—
Booth Energy	Clintwood Elkhorn No. 2	650	—	—	—	•	—	—	•	—
Booth Energy	Premier Elkhorn	1,100	—	—	—	•	—	—	•	—
Four Rivers Coal Co.	Four Rivers	—	—	—	—	—	—	—	—	—
Harlan Cumberland Coal	Highsplint (Idle)	1,200	—	—	—	—	—	—	—	—
Harlan Cumberland Coal	Totz	600	2.00%	< 1.2	—	•	—	—	•	—
KenAmerican Resources	Paradise No. 9	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	—	—	•	—	—
McCoy Elkhorn Coal	Bevins Branch (Idle)	800	8.50%	1.2-2.5	2010	•	•	—	•	—
Metinvest	Sapphire	1,100	8.00%	—	2006	•	—	—	•	—
Nally & Hamilton Enterprises	Brookside (Idle)	1,200	—	—	—	—	—	—	—	—
NewLead Holdings	Coal Essence	—	—	—	—	—	—	—	—	—
Oxford Mining Co.	Schoate	—	—	—	—	—	—	—	—	—
Pinnacle Processing	Pevler (Idle)	—	—	—	—	—	—	—	—	—
Prairie Mining Co.	Highland (Idle)	2,000	9.50%	> 2.5		•	•	•	—	—
Quest Energy	Mill Creek	950	8.00%	< 2.5	—	•	—	—	•	—
Revelation Energy	Red Bird (Idle)	500	—	—	—	—	—	—	—	—
Revelation Energy	Bell County (Hignite)	650	8.50%	1.2-2.5	2009	•	—	—	•	—
Revelation Energy	Bledsoe No. 1 (Idle)	650	8.00%	1.2-2.5	2009	•	—	—	•	—
Revelation Energy	Cave Branch	1,800	—	—	—	•	—	—	•	—
Revelation Energy	Shamrock Beechfork (Idle)	1,400	8.50%	1.2-2.5	2010	•	—	—	•	—
Rhino Resources	Rob Fork	600	—	—	—	•	—	—	—	—
Sequoia Energy	Sequoia	750	—	—	—	—	—	—	—	—
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	•	—	—	—	—
Montana (1)										
Signal Peak Energy	Black Otter	2,000	—	—	2017	•	—	—	—	•
Ohio (18)										
American Energy Corp.	Century	3,000	8.50%	> 2.5	2012	•	—	—	—	•
B&N Coal	Orange	—	—	—	—	—	—	—	—	—
Buckingham Coal	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 Resources	Nelms	—	—	—	—	—	—	—	—	—
Rhino Resources	Sands Hill	300	—	—	—	—	—	—	—	—
Rosebud Mining	Bigler	300	—	—	—	—	—	—	—	—
Rosebud Mining	Kensington	335	27.00%	< 1.2	1995	•	•	—	•	•
Rosebud Mining	Mine No. 78	600	—	—	—	—	—	—	—	—
Rosebud Mining	Tusky	300	—	—	—	•	—	—	—	•
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)										
Anthracite Coal	Shamokin	—	—	—	—	—	—	—	—	—

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
•	—	—	—	•	—	•	•	—	—	—	•	—	GMC	2009
•	—	—	—	•	•	•	—	—	•	—	•	—	GMC	2009
•	•	—	—	•	—	•	—	—	—	•	—	—	Dan	1989
•	—	—	—	•	•	•	—	—	—	—	•	—	Tag	2007
•	—	—	—	•	—	•	—	—	—	—	•	—	R&S	1990
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	—	•	—	•	•	—	—	•	•	—	—	—
•	—	—	—	•	—	•	•	—	—	•	•	—	—	—
•	•	—	•	—	—	•	—	—	—	•	—	—	Liv	1980
•	—	—	—	•	—	•	•	—	—	•	•	—	Kil	1979
•	—	—	—	•	—	•	•	—	—	•	•	—	—	—
•	—	—	—	•	—	•	•	—	—	•	•	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	•	—	—	—	•	—	—	—	•	—	—	Dan	1976
•	—	—	•	•	—	•	—	—	—	—	•	—	Bays	2004
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	•	—	•	•	•	•	—	—	—	•	•	—	A&T	1980
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	•	—	—	•	—	•	—	—	—	•	—	—	—	1980
•	—	—	—	•	•	•	—	—	—	—	•	—	Mc	1982
—	—	—	—	—	—	—	—	—	—	—	—	—	—	1968
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	•	—	—	—	—	•	•	•	—	•	—	—	R&S	1981
•	—	—	—	•	—	•	—	—	—	—	•	—	R&S	1992
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	—	•	—	•	—	—	—	—	•	—	Dan	1980
•	•	—	—	•	—	•	—	—	—	—	—	—	Peters	1985
•	—	—	•	•	—	•	—	—	—	—	•	—	—	—
•	—	—	—	•	—	•	—	—	—	—	•	—	Pow	1990
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	•	—	Erwin	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	•	—	—	—	—	—	—	—	—	—	—	—	Mc	1978
•	—	—	•	•	—	•	—	—	—	•	—	—	Co	1997
—	—	—	—	•	—	•	—	—	—	—	•	—	Tag	2009
•	—	—	—	•	•	•	—	—	—	—	•	—	A&T/LCE	2002
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	•	—	•	—	—	—	—	•	—	Tag	2009
•	—	—	—	•	—	•	—	—	—	—	•	—	Tag	2009
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	—	•	—	•	—	—	—	—	•	—	LCE	2007
•	•	—	•	—	—	—	—	—	—	—	—	—	NH/ACS	1984
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	•	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	•	—	—	•	—	•	•	•	•	•	—	—	Mc	1980
—	—	—	—	—	—	—	—	—	—	—	—	—	—	2008
—	—	—	—	•	—	•	—	—	—	—	•	—	Tag	2008
—	—	•	—	—	—	•	—	—	—	—	—	—	—	—
—	•	—	—	—	—	•	—	—	—	•	—	—	Co	1976
—	•	—	—	•	—	•	—	—	—	•	—	—	Co	1980
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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.
Atlantic Coal	Stockton	—	—	—	—	—	—	—	—	—
Blaschak	Lattimer	—	—	—	—	—	—	—	—	—
Calvin V. Lenig Coal Prep	Lenig	—	—	—	—	—	—	—	—	—
Hudson Anthracite	Hudson	—	—	—	—	—	—	—	—	—
Jeddo Coal Co.	Jeddo No. 8	350	7.5%-16.5%	< 1.2	2004	•	—	•	—	—
Lehigh Anthracite Coal	Greenwood	300	—	—	—	•	—	—	•	—
Lenig & Kosmer	L&K Coal Washery	—	—	—	—	—	—	—	—	—
Mid Valley Coal Sales	Mid Valley	—	—	—	—	—	—	—	—	—
Reading Anthracite Co.	New St. Nicholas	1,000	—	—	—	—	—	—	—	—
Schuylkill Coal Processing	Schuylkill	—	—	—	—	—	—	—	—	—
Shamokin Filler Co.	Carbon	—	—	—	—	—	—	—	—	—
Silverbrook Anthracite	Alden	—	—	—	—	—	—	—	—	—
Stoudt's Ferry	Auburn	—	—	—	—	—	—	—	—	—
Stoudt's Ferry	Oaks	—	—	—	—	—	—	—	—	—
Stoudt's Ferry	Mount Penn	—	—	—	—	—	—	—	—	—
Superior Coal Prep	Superior	—	—	—	—	—	—	—	—	—
Pennsylvania-Bituminous (22)										
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	Cunnard	—	—	—	—	—	—	—	—	—
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	Amfire-Clymer	250	6.5%-8.75%	< 1.2	2005	•	—	—	Drum	—
Rosebud Mining	Amfire-Portage	300	6.5%-8.75%	1.2-2.5	2010	•	—	—	•	—
Rosebud Mining	Dutch Run	175	—	—	—	•	—	—	—	—
Rosebud Mining	Lady Jane	—	—	—	2005	—	—	—	—	—
Rosebud Mining	Logansport	—	—	—	—	—	—	—	—	—
Rosebud Mining	McVille	—	—	—	—	—	—	—	—	—
Unitmix	Unitmix No. 1	—	—	—	—	—	—	—	—	—
Tennessee (3)										
Cumberland Coal Co.	Turner	200	—	—	—	—	—	—	—	—
Mountainside Coal Co.	Mountainside	—	—	—	—	—	—	—	—	—
Ranger Energy	New River (Idle)	250	10.00%	< 1.2	—	•	—	—	—	•
Utah (3)										
Bowie Resources	Castle Valley	500	11.00%	—	2005					
Energy West	Cottonwood	—	—	—	—	—	—	—	—	—
UtahAmerican	West Ridge	600	—	—	—	—	—	—	—	—
Virginia (19)										
Arch Coal	Pardee	750	8.20%	< 1.2	2005	•	—	—	•	•
Booth Energy	Clintwood Elkhorn #3	650	—	—	—	•	—	—	•	—
Cheyenne Processing	Cheyenne (Idle)	600	—	—	—	—	—	—	—	—
Contura Energy	McClure River	1,100	6.75%-12%	< 1.2	1988	•	—	—	•	—
Contura Energy	Moss No. 3 (Idle)	825	6%-14%	< 1.2	2010	•	—	—	—	—
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	•	—	—	•	—
Donna B. Processing	Donna B. No. 1	—	—	—	—	—	—	—	—	—
Elite Tipples	Blackwood No. 2	—	—	—	—	—	—	—	—	—
Metinvest	Nora	400	8.00%	—	—	•	—	—	•	—
Metinvest	Wellmore No. 8	1,000	7.00%	—	2011	•	—	—	—	—
Ramaco Resources	Knox Creek	650	—	—	2010	•	—	—	•	—
Red River Coal	Stoker	—	—	—	—	—	—	—	—	—

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
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	—	•	—	—	—	—	—	—	•	—	LIN	1997
•	—	—	—	•	—	—	—	—	—	—	—	—	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
•	—	—	•	•	—	•	—	—	—	•	•	—	Mc	1972
—	•	•	•	•	—	•	—	—	—	—	—	—	Co	1990
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	2005
—	—	—	—	—	—	—	—	—	—	—	—	—	—	2001
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	—	•	—	•	—	—	—	—	•	—	Mc	1988
													Centry	2005
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	•	—	•	•	•	•	•	—	—	—	•	—	Pow	1995
•	—	—	—	•	—	•	•	—	—	•	•	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	•	•	—	•	—	—	—	•	•	•	R&S	1979
•	—	—	•	•	—	•	—	—	—	•	•	—	Pow	1992
•	•	—	•	•	•	•	—	—	—	—	•	—	Dan/Tag	1980
•	—	—	•	—	—	•	—	—	—	•	—	•	Co	1978
•	—	—	•	—	—	•	•	—	—	•	•	•	IE	1984
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	•	—	—	•	—	—	—	•	—	—	Pow	1981
•	—	•	•	•	—	•	—	—	—	—	•	—	Pow	1978
•	—	—	•	•	—	•	—	—	—	•	•	—	Pow	1978
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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.
Red River Coal	Red River No. 1	—	—	—	—	—	—	—	—	—
Revelation Energy	Lone Mountain	1,150	6.00%	< 1.2	2004	•	—	—	•	•
Revelation Energy	Coronet Jewell	900	6.80%	< 1.2	—	•	—	—	•	—
Revelation Energy	Pigeon Creek	1,400	—	—	—	•	—	—	•	—
Sigmon Coal Co.	Sigmon	—	—	—	—	—	—	—	—	—
West Virginia (70)										
Alliance Resource Partners	Tunnel Ridge	1,800	8.00%			•	—	—	•	•
Alpha Natural Resources	Delbarton	800	—	—	—	•	—	—	•	—
Alpha Natural Resources	Homer III/Black Castle	2,200	—	—	1998	•	—	—	•	—
Alpha Natural Resources	Kepler	900	6.50%	—	1999	•	—	—	•	—
Alpha Natural Resources	Kingston	700	6.50%	—	2010	•	—	—	•	—
Alpha Natural Resources	Mammoth	1,400	—	—	—	•	—	—	•	—
Alpha Natural Resources	Marfork	2,400	6.00%	< 1.2	2002	•	—	—	•	—
Alpha Natural Resources	Rum Creek/Bandmill	1,200	—	—	—	•	—	—	•	—
Arcelor Mital	Eckman	500	—	—	2011	•	—	—	•	—
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	1400	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	•	—	—	•	—
Award Development	Slaughter Creek (Idle)	—	—	—	—	—	—	—	—	—
Bay Star Coal Co.	Big Creek	—	—	—	—	—	—	—	—	—
Blackhawk Mining	Blue Creek	900				•	—	—	—	•
Blackhawk Mining	Fanco	650	10.00%	< 1.2	2004	•	—	—	•	—
Blackhawk Mining	Hampden	600	<4.00%	< 1.2	—	•	—	—	•	—
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	•	—	—	—	•
Blackhawk Mining	Wells	2,000	8.00%	1.2-2.5	2000	•	—	—	•	—
Booth Energy	Kiah Creek (Idle)	400	—	—	—	•	—	—	•	—
Booth Energy	Miller Creek	800	12.00%	< 2.0	2006	•	—	—	•	—
Booth Energy	Peach Orchard (Idle)	550	12.00%	< 1.2	—	•	—	—	•	—
Booth Energy	Terry Eagle (Idle)	400	—	—	—	•	—	—	•	—
Contura Energy	Power Mountain	1,200	6.00%	<1.2	2000	•	—	—	•	—
Coronado Coal	Mountaineer Pocahontas	600	—	—	2012	•	—	—	—	•
Coronado Coal	Saunders	900	—	—	—	•	—	—	•	—
ERP Compliant	Big Mountain	900	12.00%	< 2.5	1998	•	—	—	•	—
ERP Compliant	Federal (Idle)	1,300	6.70%	1.2-2.5	1998	•	•	—	•	—
ERP Compliant	Harris (Idle)	600	12.00%	1.2-2.5	1983	•	—	—	•	—
ERP Compliant Fuels	Remington (Idle)	600	13.50%	—	2005	•	—	—	—	•
Frasure Creek Mining	Deep Water (Idle)	—	—	—	—	—	—	—	—	—
JSW Steel	Caretta	500	—	—	—	—	—	—	—	—
Lexington Coal Co.	Black Bear (Idle)	1,800	6.2%-9.1%	< 1.2	2004	•	—	—	•	—
Lexington Coal Co.	Goals (Idle)	600	6%	—	2001	•	—	—	•	—
Lexington Coal Co.	Litwar (Idle)	450	5.5%-6%	—	2010	•	—	—	•	—
Lexington Coal Co.	Moore (Idle)	800	—	—	—	•	—	—	•	•
Lexington Coal Co.	Sprouse Creek (Idle)	1,400	—	—	—	•	—	—	•	—
Lexington Coal Co.	Stirrat (Idle)	450	—	—	—	•	—	—	•	—
Mepco	Coresco	500	—	—	—	•	—	—	—	•
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	•	—	—	•	—
Ramaco Resources	Elk Creek	700	—	—	—	•	—	—	—	•
Rhino Resources	Tug Valley	1,800	< 10.5%	> 1	2000	•	—	—	•	—
Seminole Coal Resources (ERP)	Gauley-Eagle	600	8.00%	< 1.2	2006	•	—	—	•	—

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
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	—	•	•	•	•	•	•	—	•	—	Pow	1981
•	—	—	•	—	—	—	—	—	•	•	•	—	Liv	—
•	—	—	•	•	—	•	—	—	—	—	•	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
•	—	—	—	•	•	•	—	—	—	—	•	—	Tag	2010
•	—	—	•	•	—	•	—	—	—	—	—	—	—	—
•	—	—	•	•	—	•	—	—	—	—	•	—	Mc	1980
•	—	—	•	•	—	•	—	—	—	•	—	—	H&P	1968
•	—	—	•	•	—	•	—	—	•	—	•	—	—	1974
•	—	—	—	•	•	•	—	—	—	—	•	—	—	—
•	—	—	•	•	•	•	—	—	—	—	•	—	Pow	1994
•	—	—	•	•	—	•	—	—	—	—	—	—	Pow	2010
•	•	—	•	•	•	•	•	•	•	—	•	—	Tag	2007
•	—	—	•	•	—	•	—	—	—	•	—	—	Co	1992
•	—	—	•	•	—	•	•	•	•	—	•	—	Pow	2007
•	—	—	•	•	•	•	•	—	—	—	•	—	IR	2006
•	—	—	•	•	—	•	—	—	—	—	•	—	Pow	1997
•	—	—	—	•	—	•	—	—	—	—	•	—	Dan	1992
•	—	—	—	•	—	•	•	—	—	—	•	—	Liv	—
•	—	—	•	•	—	•	•	—	—	—	•	—	Pow	2012
•	—	—	•	—	—	•	—	—	—	•	—	—	R&S	1979
•	—	—	•	•	—	•	—	—	—	•	—	—	R&S	1972
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	•	—	•	—	—	—	—	•	—	Tag	2009
•	—	—	—	•	—	•	•	•	•	—	•	—	Brooks	1994
•	—	—	•	•	—	•	—	—	—	•	—	—	Peters	—
•	—	—	—	•	—	•	—	—	—	—	•	—	Tag	2000
—	•	—	•	—	—	—	—	—	—	—	•	—	—	1996
•	—	—	•	•	—	•	—	—	•	—	•	—	R&S	1986
•	—	—	—	•	—	•	•	•	•	—	•	—	Dan/Pow	1995
•	—	—	•	—	—	•	—	—	•	•	•	—	R&S	1978
—	—	—	—	—	—	—	—	—	—	—	—	—		
•	•	—	—	•	—	•	—	—	—	—	•	—	—	—
•	—	—	—	•	—	•	—	—	•	—	•	—	L-A	1994
—	—	—	—	—	—	—	—	—	—	—	—	—	Dan	1978
•	—	—	•	•	—	•	•	•	•	—	•	—	R&S	1985
—	—	—	•	•	—	•	—	—	—	—	•	—	Tag	2007
•	—	—	—	•	•	•	—	—	—	—	•	—	Tag	2009
•	—	—	•	•	—	•	—	—	—	—	•	—	—	1975
•	•	—	•	—	—	•	•	•	—	—	•	—	R&S	1968
•	—	—	—	—	—	•	—	•	•	—	•	—	R&S	1968
•	—	—	—	•	•	•	—	—	—	—	•	—	Ind	1998
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	Dan	2017
•	—	—	•	•	—	•	•	•	•	—	•	—	R&S	1992
•	—	—	•	•	—	•	—	—	—	—	•	—	—	—
•	—	—	•	•	—	•	—	—	—	•	—	—	Liv	1980
•	—	—	—	•	•	•	—	—	—	—	•	—	Pow	2009
•	—	—	•	•	—	•	—	—	—	—	•	—	Dan	1978
•	•	—	•	—	—	•	—	—	—	—	—	—	—	—
—	—	—	—	•	•	•	—	—	—	—	•	—	Tag	2009
•	•	—	•	•	—	•	•	—	—	—	•	—	F&P	2006
•	—	—	•	•	—	•	—	—	—	—	•	—	Far	1970
•	•	—	•	•	—	•	•	—	—	—	•	—	F&P	2002
•	—	—	•	•	—	•	—	—	—	•	•	—	Liv	1970
•	•	—	•	•	—	•	•	—	—	•	•	—	Co	1967
•	—	—	•	•	—	•	—	—	—	—	•	—	Raw	2017
•	—	—	—	•	—	•	—	—	—	•	•	—	R&S	1981
—	—	—	•	•	—	•	—	—	—	—	•	—	Co	1975

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.
Seminole Coal Resources (ERP)	Katie	450	<4.0 & <8.0	< 1.2	2008	•	—	—	•	—
Seneca Coal Resources (ERP)	Pinnacle	1,250	—	—	—	•	—	•	•	—
Southern Coal	Bishop	600	8.00%	—	—	•	—	—	—	•
Southern Coal	Coal Mountain	300	—	—	—	•	—	—	—	•
Southern Coal	K2 (Idle)	500	—	—	—	•	—	—	—	•
Southern Coal	Red Fox (Idle)	300	—	—	—	•	—	—	—	•
Superior Processing	Superior	—	—	—	—	—	—	—	—	—
TMR Loading & Processing	Edna Ruth (Idle)	—	—	—	—	—	—	—	—	—
United Coal	Affinity	500	8.00%		—	•	—	—	—	•
United Coal	East Gulf	600	6.75%	—	2007	•	—	—	—	•
United Coal	Star Bridge	500	9.00%	—	—	•	—	—	—	—
Xinergy	Bull Creek	300	—	—	—	•	—	—	—	•
Xinergy	Clearco	300	—	—	—	•	—	—	—	•
XMV	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
—	—	—	•	•	—	•	—	—	—	—	•	—	Tag	1980
—	•	—	•	—	—	—	•	•	•	—	—	—	A&G	—
—	—	—	•	•	—	•	—	—	—	—	•	—	Tag	2013
—	•	—	—	•	—	•	—	—	—	—	•	—	Tag	2007
•	—	—	—	•	•	•	—	—	—	—	•	—	Dan	2010
—	•	—	—	•	—	•	—	—	•	—	•	—	Tag	2006
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	•	•	—	•	—	—	—	—	•	—	Tag	2011
•	—	—	•	•	—	•	—	—	—	•	•	—	R&S/Pow	1952
•	—	—	•	•	—	•	—	—	—	—	•	—	Ind	2006
•	—	—	—	•	—	•	—	—	—	—	•	—	ACS/Raw	2013
—	—	—	—	•	—	•	—	—	—	—	•	—	Dan	2013
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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

Stockpile Volumetrics: The Drone-based Solutions Buyer's Guide

Suppliers offer turnkey solutions that reveal a trend toward enabling eventual continuous monitoring

BY JESSE MORTON, TECHNICAL WRITER

Everyone in the drone-based stockpile volumetrics solutions sector could technically be labeled a startup. The sector is maybe a half decade old, and even the tenured players have barely been at it that long. Nonetheless, an idea whose time has come is usually punctual. Thus, the field is growing. And at mine sites around the world, increasingly inexpensive, accurate and fast drone-based solutions are changing expectations and workflows, and could soon make obsolete some longstanding inventory auditing norms.

Kespry

One of the bigger drone-based stockpile volumetrics solutions providers is in enough mines to have felt the subtle but defined sea change. "What is fascinating to see is the shift," said George Mathew, CEO, Kespry. "Initially people looked at the drone as a way of being able to reliably conduct an audit on a quarterly or biannual basis.

"It is no longer about the audit occurring on a semi-frequent basis, but is now about the concept of continuous inventory management and being able to understand what the change over time is."

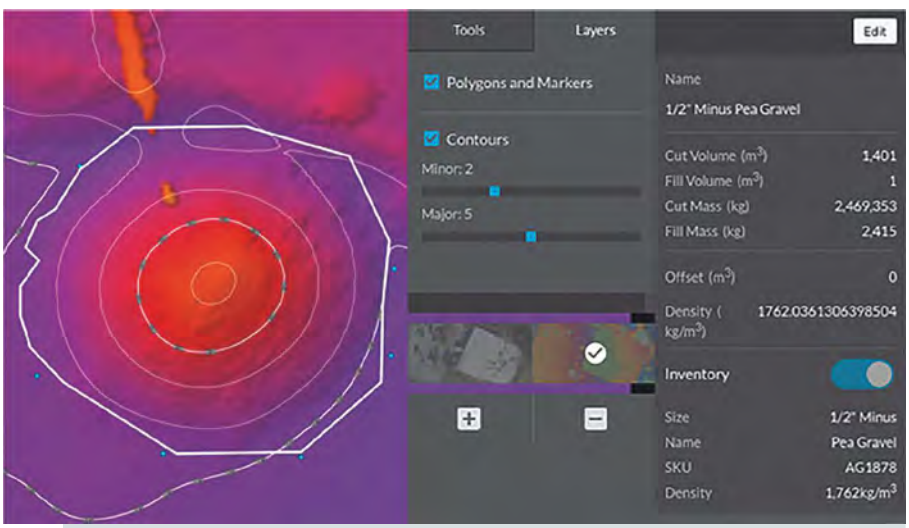
That push is driven in part by the speed and accuracy of drone-based solutions. The fact that it is gaining steam across the mining sector is also testament, at least in part, to the ease-of-use and reliability of Kespry's solution, Mathew said. "We think the impact of what we are accomplishing is to drive the efficiency in gross margin, specifically when it comes to better inventory management and inventory planning around mining and aggregates operations," he said. "That has been proven by the fact that we have the most of the large customers in the market from a mining and aggregates standpoint in North America."

Depending on who someone talks to, Kespry may be the biggest player serving in the mining sector. Headquartered in Menlo Park, California, the company serves 125 customers in North America, many of which operate Kespry drones at up to 40 mine sites across the U.S. and into Canada. It got there by crafting one of the more streamlined solutions now offered.

The solution is sold as a subscription. One subscription includes the hardware, the "data pipeline," access to the cloud platform, "the reporting layer," the "customer success" services, and flight insurance, Mathew said. The hardware consists of the drone, an iPad, communications array and batteries. The offering outsells those of competitors that aren't as inclusive and integrated because "customers have to get on with their day jobs, and to be tinkering around with the parts or pieces of this thing, and stitching it together themselves, is time-intensive and laborious," Mathew said. "We believe that having a fully integrated solution that isn't piecemealed in any way enables our customer to be push-button up and running and successful."

The drone was developed and is produced by Kespry. It is described as fully autonomous. "We don't have a joystick in the solution," Mathew said. "Your instruction set of the geofence and the asset area that you fly is punched into an iPad by drawing a polygon directly around the asset area with your finger," Mathew said. The user then checks off a working list of items regarding flight space and weather conditions. "Then you are pushing the start button and the drone automatically takes off and flies the asset area to collect the imagery and additional sensor-based information so that we can create the downstream processes and applications that support the inventory management-use case," Mathew said.

The user at any point can take control of the drone, he said. "There are four manual buttons built into the communications array that enable the drone's propellers to be shut off, that does vertical landing, that pauses the drone and that returns the drone home," Mathew said. "Other than



Kespry's turnkey solution, purchased as a subscription, includes access to cloud-based software enabling the user to manipulate models to extract specific information. (Image: Kespry)

that, the rest of the experience is completely autonomous in terms of how it delivers the workload."

The simplicity of mission planning and control empowers mining professionals with skills other than piloting. "Literally, people are doing it without any previous drone pilot training," Mathew said.

Upon landing, the drone automatically connects and speaks to the corresponding iPad. The iPad can store the data until it has the needed connectivity, and then it uploads it to the cloud platform. "No one else actually does that the way we do it," Mathew said. The platform synthesizes camera and sensor data into a 3-D model, "which is constructed using 2-D imagery converted to 3-D using photogrammetry," he said. "If you are using precision GPS, the model's accuracy is down to 3 centimeters of x, y and z," Mathew said. "That enables a level of accuracy that would be traditionally considered survey-grade."

The model can be used for multiple applications, to include inventory planning and stockpile volumetrics, which Mathews described as "hyper-accurate within 1%-2% of the actual material." The platform autocorrects for interference. "With all of the various things that get in the way of GPS signals, like ionospheric interference, solar flares, and storm conditions that create GPS drift, we correct for all that," he said.

Sharing the resulting images, graphics and numbers is easy, Mathew said. "Our entire reporting framework enables you to get the data out of Kespry into a nicely formatted report or a nicely packaged data set that can be brought into third-party tools very seamlessly as well as reported out to end users," he said.

The cloud platform generates two primary reporting deliverables. "We support a full-page layout PDF outputted report that is specific to an inventory management set of scenarios where you have a standard start date, a standard end date," and the change over time is presented, Mathew said. "The second step is supporting the data downloads themselves," he said. "In that regard, we have 35 file formats that we support natively."

The entire time allotment, from flight to report, is usually roughly three hours for a midsized site.

Kespry provides training on use of its system. For the Federal Aviation Administration Part 107 certification, "we point you to the right material, and you have to spend a good set of time studying for it," Mathew said. "The Kespry-specific training is quite literally just a few hours of work."

A subscription includes $1 million of flight liability insurance. It also includes what the company refers to as its customer success services, available for support and troubleshooting from 6 a.m. to 6 p.m. Pacific. "From a responsiveness standpoint, anytime an issue comes into Kespry

Hefty Drone Sets World Record for Flight

Recently, the Skyfront Tailwind multirotor drone set a world record for time aloft with a 4-hour, 34-minute flight. That time is better than the average for multirotor drones by an order of magnitude and beats some fixed-wing drones, which have their own limitations, Troy Mestler, CEO, said. "Those types of drones require a runway to take off and land and are difficult to pilot," he said. "The Tailwind is easy to takeoff. It is easy to land. It is easy to fly."

It is also powerful. The drone can tote a 3-kilogram payload for a flight of more than an hour. "This is a big advantage if you want to use LIDAR or carry large cameras to do volumetric analyses or survey large areas," Mestler said.

The Tailwind is powered by a hybrid-electric power source, dubbed NovaGen, which converts gasoline to electricity in flight. Mestler said it was conceived when he purchased his first drone and "was very disappointed" at the 20-minute flight time. He and a friend started Skyfront to address a problem shared by companies that use drones for commercial purposes. "We realized they were having trouble using the technology because of limited range and endurance," Mestler said. "It was basically becoming a real problem for them because they couldn't perform the types of jobs that they were being requested to." The Tailwind went from the drawing board to development in 2014. In September, Skyfront announced the drone had set a record. "We have video proof," Mestler said.

Long, automated flights and superior heft should translate into viability in the mine stockpile volumetrics space, Mestler said. The Tailwind can autonomously cover even the largest mines in a single flight, he said. "The big advantage here is the operator doesn't have to interact with the drone constantly to swap out batteries and relaunch it from different points within the mine," Mestler said. Additionally, being able to hoist a LIDAR system represents "a big advantage," empowering the miner with more accurate models and data, he said. "They can be used to generate really accurate 3-D colored models when they are combined with cameras," Mestler said, "and most mining drones only use photogrammetry, which is good but it has its drawbacks because that process, creating a photogrammetric model, can take time."

The company offers what it calls the Early Access Program. Basically, for a fee and a monthly rate, the company leases out the drone and provides the expertise to integrate it into the customer's workflows and hit the initial production targets. "As part of the program, we will integrate custom sensors and cameras and third-party software — whatever they are used to," Mestler said. Company personnel provide training, facilitate software integration, and conduct some tests to ensure goals are being met. Training typically lasts three days and topics include piloting, maintenance, data collection and processing. "The program is really about making sure that the Tailwind can serve the exact needs of the customer," he added.

The program allows the customer to evaluate the technology and the services provided. Participation can be canceled at any time for any reason, Mestler said. "We're willing to take this risk and provide the drones in this way because we are confident in the continued value that the Tailwind will provide."

Skyfront also assists in attaining the FAA license and insurance, and provides customer service response times of less than a business day, seven days a week, Mestler said. "If there is anything that needs to be built, any software that needs to be written in order to process data, if there is any troubleshooting that needs to take place, we will provide those services both on and off-site."

The Tailwind flew for more than 4.5 hours, a time far greater than the average multirotor drone.

from a trouble ticketing perspective, we are back in front of our customers literally within hours," Mathew said.

The typical customer trials a subscription and then purchases additional ones afterward. "In most cases, what our customers are saying is, I love the experience, I want to double, triple the amount of usage of Kespry subscription-based products in the hands of our users," Mathew said. Oldcastle Materials is one such company that started with a few subscriptions and ultimately ended up purchasing dozens, he said.

Future plans for the offering target enabling near-time continual auditing. "We know that getting accurate survey-grade quality information on what a mine topology site plan looks like within several hours of the data being collected is a big game changer," Mathew said. "We wanted to go after serving that market in terms of what they needed right now, but we totally agree that more near-time capability will be necessary in the future."

DroneView Technologies

Like others in the space, DroneView Technologies specializes in turnkey packages. Each package, however, is unique to the customer and based on their specific needs, Michael Singer, CEO, said. "We bring together all of the component pieces coupled with subject matter expertise — not only drone expertise but also photogrammetric processing and review capability, survey expertise, AutoCAD and Civil 3-D expertise, and reporting and technology expertise," he said. "It is the combination, availability and orchestration of these skills and resources that gets clients ultimately what they want."

The company operates as a technology-enabled services provider and consultancy, Singer said. It begins each relationship by assessing the customer's existing operations and processes. "Before you get to a drone, the question we like to focus on is what problem are you trying to solve, how they have solved that problem in the past, and is a drone the right tool to solve that problem," Singer said. "If we determine that a drone is the right tool, the question becomes what kind of equipment, what type of sensors would you fly to achieve whatever desired result."

At that stage, DroneView determines if it will be doing "all the work on their behalf, which we do for many," Singer said. "The question then becomes what role, if any, do they want to play in this process, from defining what they want to achieve to delivering the final product."

Sometimes the customer is equipped, trained and set to handle a particular phase of the workflow. "Others really just want the deliverable and want someone to do it on their behalf," Singer said. "Somewhere in between, we've had what we call the 'hybrid model,' which is a combination of the client and DroneView each performing some of the project tasks in order to achieve the desired result."

That arrangement is often the case when DroneView is called in to consult a potential customer that has hit a roadblock. "We've worked with companies that have possibly bought a drone but don't know how to get the highest and best value from that, so we offer specialized training," Singer said. "We offer solutions that help them achieve results."

To that end, the company has preferred drone platforms it suggests, but those suggestions hinge on the expectations and capabilities of the customer. "Depending on the size of the site and a few other factors, but predominately the size and the frequency, we'll have a point of view on what is the equipment platform that fits their environment best," Singer said.

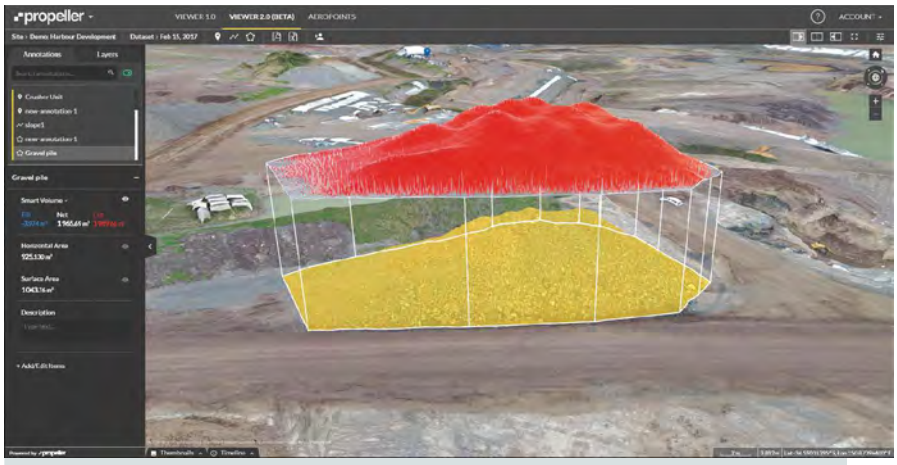
DroneView offers a cloud-based data and image processing and reporting platform. Or, depending on the circumstances, it utilizes other available offerings, such as Pix4D, GlobalMapper, Agisoft and Virtual Surveyor. "We have some clients that use some third-party component resources, and some that upload their images to our proprietary cloud platform for us to process on their behalf and deliver back the results, topography mapping, stockpile volumetrics and the like," Singer said. "There have been instances where someone used a third-party to develop some of those components and we do the finishing from there for quality assurance, quality checks, and then deliver from that the ultimate reporting of volumes and surfaces."

If the customer seeks to incrementally take on more of the drone work, Singer said, the company offers the requisite specialized training. Many of its staffers have more than 15 years of experience in the aerial mapping/geospatial services sector, and draw on the lessons learned from hundreds of completed projects across 20 states, he said. "We counsel customers so that they benefit from learning from our current expertise."

Thus, the training offered is often centered on setting the customer on the path toward ownership of the components of the process, usually starting with local image acquisition, Singer said. "What we have found works best is to work through the first project start to finish using a third

DroneView Technologies advises on which drones will provide the best results based on site specifics. Above, an image captured by a recommended drone. (Photo: DronevView Technologies)

party like ourselves to do the process; sort of do one on their behalf and let them watch. Then we let them do one and we train and correct," he said. "And then let them do one on their own and we play the role of consultant advisor should there be problems." For a customer without the FAA certificate and minimal previous experience, "they are going to get to the finish line, meaning they are going to get a report they could use much more efficiently, by going through this hand-holding process as they get up the learning curve," he said.



The Propeller Site Intelligence Platform features tools that facilitate determination of volumetrics, run-of-mine values, pit volumes and monthly reconciliations. (Image: Propeller Aero)

Propeller Aero

Propeller Aero's cloud software offering, the Propeller Site Intelligence Platform, is flexible, fast, accurate, and offers an array of "intuitive tools that allow everyone from the pit supervisor to the head office to gain insight and take action," Rory San Miguel, CEO, said. It "processes drone data into 3-D models that can then be used to obtain accurate stockpile volumes, cross sections, grades, heights and distances, at a fraction of the time and cost of traditional ground surveys."

The company recently partnered with civil engineering software firm Trimble, and opened North American headquarters in Denver, Colorado. Those developments reflect an expansion that is building on, among other things, 20 years of experience in the mining and aggregates sector. It is that experience that enables the company to understand the needs of customers in that space, San Miguel said. "Many competitors in this space were built as a one-size-fits-all solution, with little experience or interest in daily coal mine operations," he said. "On a mine you need to have specific tools to achieve site intelligence."

Those tools go beyond simply determining stockpile volumes. "Propeller has created tools that specifically help coal mines determine run-of-mine values, pit volumes, monthly reconciliations and more," San Miguel said. For example, the software's volume tools allow the user to measure depending on requirements. The Smart Volume tool enables automatic volume calculation. The Reference Level Volume tool allows volumes to be calculated to a predetermined level. The Surface-to-Surface Volume tool enables a user to measure to a design, underlying surface or previous survey.

"Propeller's Platform integrates tonnage and density calculators directly into the stockpile volume tool," San Miguel said. It also enables the user to view changes in stockpile volumes as a cross section. "In this case, Propeller reads the recorded height samples from various distinct datasets along a line that you have drawn, and renders the results on an interactive chart," he said.

The platform enables the user to pair a 2-D photo alongside the 3-D model, San Miguel said. "Propeller's viewer automatically chooses the closest photo to the area of the model that the miner is inspecting," he said. "The survey information complements the inspection process, providing another layer of information on which miners can make decisions."

Easy file sharing and reporting are among the platform's primary features. The 3-D model can be shared by configuring permission settings and issuing invitations to view or edit. It allows annotations to be exported in PDF and Excel spreadsheet format, San Miguel said. "The Excel report includes the volume, cut and fill value, density, and tonnage measurements taken from each stockpile, so that mines can easily manage reconciliations and run-of-mine calculations," he said. "The PDF report includes all of the above information as well as a 3-D and 2-D image of the annotation for easy inspection."

The platform can be packaged with DJI drones and Aeropoints ground control points for "a true end-to-end solution," San Miguel said. It can also be adopted by a company that has already invested in drones. "Our platform integrates with any drone or ground control solution, allowing for easy adjustments," he said. "Some of our competitors don't allow their customers this flexibility, forcing them to risk their drone survey operations on the performance of a single provider for the drone, flight planning, and processing."

Use of the platform as part of a drone-based stockpile volumetrics solution is faster than traditional aircraft surveying and can be more accurate than manual surveying. "While ground-based surveys capture just one point every 2 to 3 meters (m), an average stockpile surface within the Propeller platform is modeled using tens of thousands of points," San Miguel said. "The result is more precise 3-D surface models for higher accuracy volume calculations, safer and faster than before."

Recently, a coal miner tapped the company to determine the amount of coal being lost to the tires, tracks and general traffic going over an exposed seam. "Using our surface to surface tools, they are now implementing daily surveys to establish the volume of coal each day that has been removed from the area," San Miguel said. "We were able to prove to the site that they could clearly see a change between surveys down to +/- 0.03 m." That was achieved by capturing a surface, running a grader over an area and making a .05-m cut, and capturing the surface again. "Using our processing and volume compare tools, they could visually see and accurately measure the area that had changed."

The company provides training online and on-site. "Propeller also employs

a 24-hour support team of photogrammetric professionals, whose job is to teach our customers best practices for data collection and turn even the most challenging submissions into accurate 3-D models," San Miguel said. "The platform has a live chat function, so that all of our customers have a direct connection to our support team."

Stockpile Reports

In September, Stockpile Reports released its new app for Apple iOS 11. The new phone, released in September, is equipped with ARKit, an augmented reality (AR) functionality. That enables the Stockpile Reports Lite app to do two important things.

First, the new iPhone is equipped with a sensor that enables the app to take more accurate readings than could predecessor models, making it a relatively affordable and empowering tool for data collection, David Boardman, CEO, said. "Apple has released this ARKit that does very precise locations of your camera in 3-D space: where your camera is pointing, what angle, how it is moving," he said.

Stockpile Reports Lite, a new app available on the latest iPhone, enables the user to project a 3-D stockpile wherever the phone is pointed. Above, a virtual stockpile is dropped on a parking lot. (Photo: Stockpile Reports)

Second, the app can project the resulting interactive 3-D topographic models into the camera view. "You can drop a stockpile in your parking lot" or on your desk, or "view your entire site floating in the middle of your office," the company reported.

Fixed-Wing Drone Solution Enables Accuracy

Maker of the E384 and the E386 fixed-wing mapping drones, Event 38 Unmanned Systems recently made a sale to a company working in high-altitude Chilean mines. The sale was a lock due to Event 38 drones being "able to operate as high as 14,000 feet elevation and still cover relatively large areas," company founder Jeff Taylor said.

The company's most popular model is the E384, which is typically paired with the company's Drone Data Management System (DDMS), Taylor said. "We provide long endurance drones and a cloud-based post-processing service that simplifies and expedites data analysis," he said. The E384 flies "more efficiently than multirotors, allowing more time aloft" per flight over larger mine sites.

Longer flights can result in better data collection, Taylor said. "The E384 is able to fly much longer than most drone aircraft, opening up the ability to fly a cross-grid pattern for higher overlap and accuracy and still cover much more area per flight," he said. "The E384 can survey as much as 1,000 acres per flight."

The E384 is equipped with a survey-grade camera and GPS system. Flights are planned by importing a shapefile or KML to define the mission area. "The software will automatically create the grid to fly according to specified resolution requirements and other optionally specified parameters, like amount of overlap between photos," Taylor said. "Lastly, the mission is uploaded to the drone where it is executed independently of the ground control station."

While aloft, the drone talks to the ground control station laptop through a long-range telemetry link, he said. "The link transmits information about the drone like it's location, altitude, velocity and battery level continuously," Taylor said. "At the ground station, the operator has the ability to reroute the aircraft in flight or call it back to home at any time."

The drone can be upgraded with post-processed kinematic (PPK) GPS to increase accuracy. "With it, results are centimeter-level accurate without the need for ground control points," Taylor said. "Even without it, we found stockpile volume measurements to be within about 2% of values calculated by manually walking the piles."

Drone data is uploaded to the DDMS through an online portal. "DDMS automates the post-processing steps and can be used on low-power laptops since all tools can run in a browser," Taylor said. The user outlines the boundaries of each stockpile to be measured. The system then automatically produces an orthomosaic and a digital elevation model for each mission flown. "These can be downloaded in full resolution as GeoTIFFs to work with existing workflows, or be analyzed online through our web interface," Taylor said. "DDMS lets users organize their data by date and mission, and exports stockpile data in CSV format for archiving and tracking over time." PPK post-processing, if chosen, is not automated. Processing for a 75-acre site can take from two to three hours.

A miner can adopt only the DDMS, so long as the drones used and the data generated meet certain basic criteria. "Miners need a drone capable of collecting imagery with high overlap, low distortion and embedded GPS coordinates in each image," Taylor said. "They may optionally need the ability to set and record the locations of ground control points or a PPK GPS-enabled drone to produce higher accuracy models."

Use of the E384 and DDMS has been proven to cut the time and labor invested in stockpile volumetrics, Taylor said. In one example, stockpiles were previously outlined by walking the piles with a GPS receiver. "The drone was able to calculate the pile volumes to within 2% but required a smaller team and less time per site to perform," Taylor said, "taking the total personnel time investment from 10 hours to four."

Event38 provides full training and support. "We support our clients for the full life cycle of their aircraft, from setup and testing to regular maintenance," Taylor said. "We are happy to help new users get through every step of the process." Most clients set up and use their aircraft on their own by following instructions from the company, he said. "We are also available for in-person training on site."

That facilitates analysis and discussions, and brings the mine to the office, Boardman said. "When you actually see something in 3-D, you instinctually know what other relationships and information are in that data," he said. "With augmented reality it is now possible to bring those mine models, those specific stockpile measurements, to life in three dimensions literally on your desk in front of you."

In practice, the user selects the app, taps the Create New Measurement button, and then walks the pile in a set pattern while essentially filming it and some of the surroundings. The "extremely accurate" results are generated "within minutes," the company reported. "External tests have shown" those results to be "within 1% to 2% of LiDAR." The resulting 3-D models can be projected wherever the iPhone is pointed.

The app is the latest from a company that offers an array of solutions for company-wide inventory management. "Lots of times people have solutions for measuring specific stockpiles and stockpiles of a given site, but to get your financial house in order, you need to get company-wide inventory counts frequently so you can avoid financial fluctuations and write-offs," Boardman said. "By leveraging image processing we're able to provide solutions that are easy to use that can be highly distributed at very low cost so companies can now standardize inventory processes just like they do other payroll processes and HR processes and other things where they leverage economies of scale company-wide."

Those solutions typically divide into two parts.

The first is capturing data and performing measurements. That can be executed by phone or drone.

For the entry level drone service package, the customer schedules and the company flies the drones. Results are presented on the website. "On the other end of the spectrum, somebody may want to buy their own drones, which is fantastic, and fly them as much as they want," Boardman said. "They may want to buy some phones, and go out to do measurements from the ground." In that case, the customer purchases the hardware and absorbs the costs of ownership.

The second part is a platform accessible through an online portal for image and data processing, reporting and sharing. "Once all those pictures are taken and available, those are processed into volumetric measurements," Boardman said. "Then comes the next layer, which is managing your assets and managing your inventory." The platform enables finance people, GIS professionals, engineers, and leadership to manage and review management of company assets in one place, he said. By having an end-to-end solution that "addresses your large piles in a mine along with the smaller piles that might be in distribution yards or in transit," he said, "you can really quickly literally get a snapshot of all of your materials across the company."

That snapshot can take the form of a 3-D model that can be projected on a hallway or lunch table. Beyond that, the platform features automation and reporting tools that draw out qualitative metrics from the data, Boardman said. "There are lots of things that impact your inventory. Is there debris around a pile? Are piles combined with each other. Are piles up against a high wall where a judgement call needs to be made?" he said. "Those things are scored and tagged in our service."

That enables a user to "look across the company and see how many piles have issues that could be introducing risk into our inventory in terms of consistency of measurement," Boardman said. Such issues are identified automatically. "We're using image processing and machine learning to find piles and find surfaces so you get much more precise or much more consistent answers."

The company offers what Boardman calls dispute resolution. "If somebody doesn't like or doesn't understand a number that they are seeing, they can just press a button and our support staff gets on the phone and will manage that dispute that often comes up between finance and operations, and review that measurement, review the data and render an opinion," he said.

Training is provided. "Typically, in two days, we can get a client trained to where they are out there successfully measuring with the iPhone and successfully flying a drone," Boardman said. "If for some reason a company hasn't done drones before and they don't have their Part 107 license, we'll actually provide some training to prepare them for taking that test and passing it." The company also offers 24-hour customer support.

Aerotas

Headquarted in Costa Mesa, California, Aerotas is breaking into the mine site

Aerotas trains users on piloting measures required during an emergency event. Above, an Aerotas drone lifts off at a quarry. (Photo: Aerotas)

stockpile volumetrics space after honing its solution in a different sector. "We cut our teeth with land surveyors," Daniel Katz, cofounder, said. "That is who we know best and who we have worked with the most." For both miners and land surveyors, the deliverable in demand is similar, he said. "The thing about land surveyors is they live and die by accuracy," Katz added.

Affordable accuracy is one of the primary selling points of the company's end-to-end solution. "Our system is considerably less expensive than most other alternatives," Katz said. "We really focus on what is going to get you the best bang for the buck, not on the coolest, shiniest tech fix."

The solution includes the training, technology and insurance. Intangibles include post-implementation process optimization, Katz said.

Training starts with a remote-learning prep course for the FAA certification. "We took the FAAs 600-page study guide and reduced that down to about a three-hour online cram course," Katz said. "Our clients have about a 95% pass rate after going through our cram course."

Next is on-site pilot training. "It starts off in the office as we are going through a lot more of the theory and introducing the equipment," Katz said. "Then we go out to the field. We put the aircraft in the air. We go through a whole bunch of drills." Though most flights will be controlled by autopilot, users are trained in how to deal with potential emergency situations. "There are real life things that can happen that you need to know your people are confident in being able to deal with and address," he said. For example, if "a low-flying emergency helicopter comes flying over the mine unannounced, they need to be able to take that drone out of autopilot and get out of the way completely, confidently and calmly."

The solution includes the drone and its gear, photo processing services and online software.

The backbone of the solution is the drone, a quadcopter. "We've tested pretty much every drone under the sun and settled on the system we have known to be most effective and the most reliable," Katz said.

Flights typically follow a prespecified route. "You can set your flight plan one time and then you hit go," Katz said. "The drone takes off and it is completely autonomous."

Typically, a flight spans roughly a minute per acre. Afterward, the data is uploaded to the company's portal, where it is converted by technicians into a model, which can then be mined for more information. The model is accessible within a day. The time spent on getting "the answers they need from the portal, such as volumes, is also about 10 minutes," Katz said. "We hear things from potential clients like 'this seems too good to be true,' which is one of the barriers we run into."

The model presents volumetrics data "to within 98% to 99% accuracy," Katz said. From the portal, the user can export reports.

Once initial results have been attained, the company provides post-training process optimization guidance. "What you need to have are clear and well-defined operating procedures such that every time your people go out to operate this piece of technology they know exactly what they are trying to get and how to go about getting it," Katz said. "We turn the dials a little bit to make sure it plugs into each individual company as best as possible."

As part of the solution, Aerotas provides an insurance policy from Transport Risk Management. "In terms of insurance, you are going to have liability and what is called hull insurance, which is covering your aircraft and valuable goods," Katz said. Also included in the solution is support "for basically everything under the sun," Katz said. "We have provided you with the complete system, so we support you on every part of it.

"You have a question about insurance, you come to us. You push a button and something doesn't seem right, you call us. You want to get an airspace authorization with the FAA, you call us."

DroneMapper

DroneMapper offers an affordable solution designed to enable continuous stockpile monitoring at any sized operation, Pierre Stoermer, CEO, said. The company's main offering is photogrammetric software. "Either we process imagery for the client or the client licenses our Windows-based application(s) for their own use," he said. "We also offer end-to-end training on drone and camera selection, use of aftermarket applications for autonomous, high-quality imagery collections, imagery processing and extraction of value-added info using GIS software."

Unlike many of its competitors, DroneMapper has already broken into the coal space. For the last five years, Arch Coal used DroneMapper to process drone-captured images and data from its West Elk site. Arch also tapped the company to demo drone-based solutions at Thunder Basin, in northeast Wyoming. "They are interested in volumetrics, but they are really interested in safety and measurements of toes and crests, and to get measurements of slopes to determine if a slope is dangerous for cave-in," Stoermer said. The demo went well, he said. "Arch Coal has provided positive feedback."

DroneMapper is finalizing a white paper that will reveal how drone-based stockpile volumetrics solutions cut costs compared to traditional methods and facilitate continuous monitoring, Stoermer said. Toward both ends, multiple reports can be generated within a workday, empowering the miner with near-time actionable data, he said. To get there, the miner can purchase a perpetual license for the software ($2,000), run its own flights and handle its own data. "With a drone overflight, and if they did the processing themselves, they could eliminate the latency of sending images to us," he said. "They could utilize our software process right after they collect the data and yield results within two to four hours or maybe less."

The company offers training, which usually runs two days. It also offers exclusive online tutorials and hassle-free support, Stoermer said. "Our greatest differentiator is that you can speak with a human nearly anytime for support and there is no smoke and mirrors communicated."

Pix4D

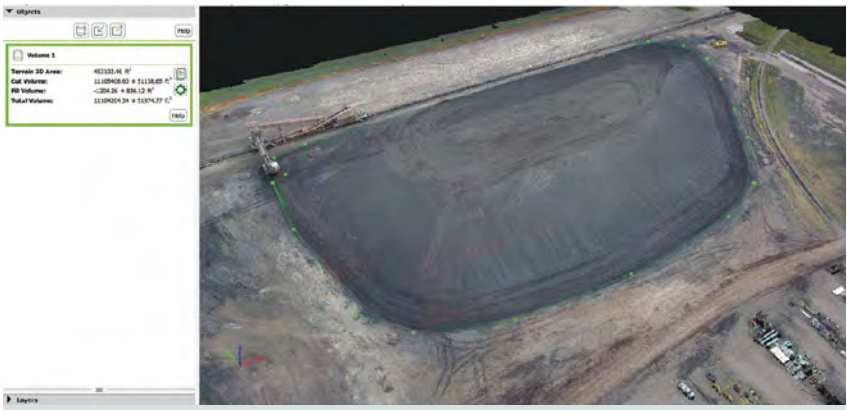
In hindsight, the spreadsheets will likely reveal the impetus behind the switch to drone-based volumetrics solutions is the bottom line. Having accurate actionable information on hand timely can help improve safety, streamline workflow and optimize operations, and provide fodder for solid planning. But what all that translates to for the board and investors is money saved.

For example, Great River Energy uses a Phantom drone and Pix4D photogrammetric processing software to arrive at

stockpile volumes for several reasons, foremost of which is cost-savings, Mark Myhra, fuels and logistics coordinator, Great River Energy, said. "Previous to using the drone, our auditors required another form of surveying besides the scales, so we had a fixed-wing airplane do a fly-over and send us results, which was very expensive and not very convenient if the weather did not cooperate," he said. "We paid for our drone and software just after a few flights."

Drones also save time, and are convenient to use," Myhra said. "The other alternate we had was to have someone go out with a Topcon stick and shoot points, which was very time-consuming, taking several hours instead of 15 minutes of flying and a few minutes uploading the data," he said. "Pix4D software takes a few hours to run after you hit go, but we usually run it overnight."

Third, drone-based models are sufficiently accurate, Myhra said. "Our coal stockpile can have a lot of steep slopes if stocking out or reclaiming," he said. This made it difficult to survey accurately. "With the drone, it seems to pick up the sharp edges rather well," Myhra said. "We usually get within a percent of our belt scales."



Great River Energy runs Pix4D software overnight to process drone-captured data. The drone-based volumetrics solution is accurate and saves both time and money, the company reported. (Image: Great River Energy)

Finally, drones are safe to use. "In the winter the conditions can get very difficult to walk on, so this was found to be a much safer option," Myhra said. "Some months we were not able to complete the survey in the past due to conditions of the stockpile."

Once adopted, drone-based volumetrics prove to be a threshold to other drone-based solutions, he said. "It opened the doors to many other aspects of using a drone on the plant site, such as doing contours, taking construction photos and helping with inspections."

Moving More For Less

The industry is asking for conveyors with higher capacities, lower energy costs and safer, more reliable components, along with less environmental impact. Here's how system suppliers are meeting those requests.

BY RUSSELL A. CARTER, CONTRIBUTING EDITOR

Conveyor systems offer mine operators a seemingly simple solution to a perpetual problem — getting bulk material from Point A to Point B in the quickest, lowest-cost and most reliable way possible. And at the most basic level, a sufficient number of frames, pulleys, idlers and motors, and a roll of conveyor belting can be arranged to transport just about any type of mined material almost anywhere. But, as the saying goes, "the devil is in the details." Simplicity and engineering elegance are not necessarily one and the same, and the frequent need to assign critical production flow to a single conveyor system can elevate the risk of high downtime costs to a level that makes faulty design, component failures or unplanned maintenance unacceptable.

The bulk conveying market is moving in the direction of larger, faster, longer and often more specialized conveyor systems that deliver high performance while remaining energy efficient, and in some cases, causing less impact on the local environment. A rundown of conveyor-related project news illustrates the trend.

Drives, Couplings Focus on Flexibility

The capital costs of these systems are significant budget items by themselves, and CEMA (Conveyor Equipment Manufacturers Association), the U.S.-based trade association for conveyor equipment suppliers, estimates that annual maintenance costs for a belt conveyor typically total about 5% of the purchase cost of the belt, and 2% of the cost of the structure and equipment. An unplanned shutdown of a main conveyor link at a large mine can quickly rack up additional lost-production costs, in addition to repair expenses, in the million-dollar range. To help customers avoid problems, suppliers maintain a steady stream of product and service improvements, along with technical guidelines, to keep conveyors running reliably and efficiently.

Voith's new compact TurboBelt 500 TPXL drive needs only half the volume of conventional drives to provide equal power to the conveyor.

For example, the mechanism used to transmit power to large conveyors has a direct impact on system simplicity and reliability. **Bosch Rexroth** pointed out that its direct drives provide superior torque control from standstill, enabling trouble-free starting with a loaded conveyor. The drives' precise pressure limitation prevents overloading or straining of the conveyor structure. The motor is installed directly on the pulley shaft without a gearbox, foundation or fluid coupling, which makes for a simple drive solution that installs easily and saves valuable space around the pulley.

Some of the main operational features of direct drives include torque control that protects the belt from overloads; soft starts and stops to keep belt stress to a minimum; the convenience of low speeds for belt inspection; and high-starting torque that can be maintained for an unlimited period of time. Bosch Rexroth noted that because the design of hydraulic direct drives is modular, it allows an optimal solution to be sized and tailored for any conveyor, small or large, from a few kilowatts up to megawatts of installed power — and the original solution can be adjusted in the future if necessary. Hydraulic direct drives are easy to upgrade or adapt as needs change and develop over time.

Last year, **Voith** unveiled its TurboBelt 500 TPXL fluid coupling — the first model in the new TPXL family, which combines the advantages of hydrodynamic drive

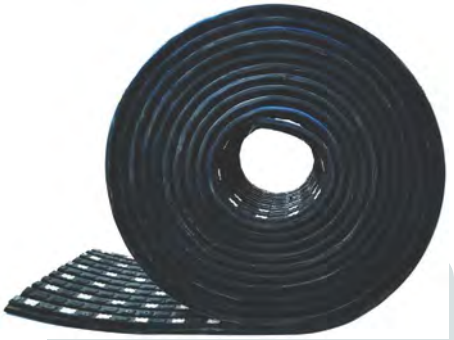
principles with intelligent control technology. The integrated controller makes it possible to adapt the output torque of the coupling exactly to the startup parameters of the belt conveyor system. In addition, Voith said its engineers were able to significantly reduce the dimensions of the new coupling, so that the TurboBelt 500 TPXL only requires half the volume of conventional coupling types for the same force transmission. In addition to the operational advantages, the company noted that the new series of couplings also offers attractive procurement and operating costs. Voith offers a version with bearings on both sides for stand-alone use as well as a variant with bearings on the output side for direct motor connection.

Power transmission via the TurboBelt 500 TPXL is wear-free and does not require a mechanical connection. New vanes with the XL profile double the power density of the coupling in comparison to conventional coupling types. This means that only half the volume is required to transmit the same force. The hydrodynamic circuit of the coupling limits the torque in the driveline to a fixed, defined value, which protects the belt and the drive components from damage due to overloading. This minimizes maintenance costs and increases the lifetime of the system. Motors can be run up to speed under no-load conditions and staggered in time using the fill control system. This minimizes the current peaks that always occur when motors are switched on and reduces the load placed on the power grid.

The Roller Derby

ASGCO has added Semi-Ceramic Pulley Lagging to its product portfolio, enabling it to offer customers a choice between full ceramic coverage with its Arrowhead Ceramic Pulley Lagging for high-tension drive pulleys, as well as partial (40% coverage) ceramic lagging for smaller pulleys, non-drive pulley's and bend pulleys.

According to the company, Semi-Ceramic Pulley Lagging provides a solution when conventional rubber lagging fails to correct belt spillage and wears prematurely. The aluminum oxide ceramic tiles are embedded in rubber on all sides and separated by a horizontal groove to channel away water and dirt. Among the more important features of the product, said ASGCO, are its pre-chemical backing that provides an exceptional bond for rubber-to-metal applications; improved

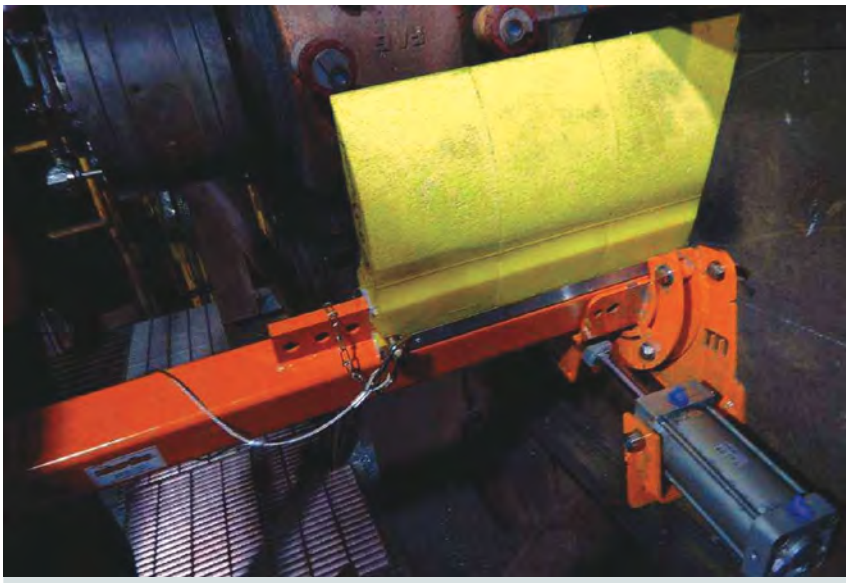


ASGCO's new Semi-Ceramic Pulley Lagging expands its product line to offer full or partial lagging solutions for most applications.

ceramic tile that provides robust performance in dry, wet or muddy applications; superior bonding strength due to 3 mm of the neoprene compound vulcanized into the bottom-side of the lagging; and rounded corners to allow for better adhesion between the rubber and the tile.

The HXF-40 and SDX-2200 idler roller lines from **Komatsu Mining** (Joy) are super-duty systems that surpass CEMA F and E idler load standards, respectively. The HXF-40 series incorporates a 40-mm spherical roller bearing, and is specifically designed for high-tonnage mining and industrial applications. Bearing protection features include:

- A patented, engineered shaft that reduces overall roll weight and increases performance;
- Patented retaining sleeve creates a smooth contact surface for the rotating lip seal;
- Back seal that allows for a large grease reservoir;
- Flinger to employ natural centrifugal forces generated by a rotating idler roll, redirecting potential contaminants away from the bearing cavity;
- Triple labyrinth seal to retard lateral movement and provide a barrier to contaminants reaching the bearing;
- Counter-bored shell with protected weld contributes to proper bearing alignment; and
- Lip seal to provide added protection for the bearing.



Martin Engineering has designed its new Safe to Service (STS) blade cleaners to improve worker safety and reduce maintenance downtime.

The SDX-2200 is a super-duty idler meeting the requirements for CEMA E applications up to 2,200-lb load rating. According to the company, its combination labyrinth and contact seal has been proven in the field to be superior to cartridge-type or conventional labyrinth seals used in other heavy-duty idlers.

The SDX-2200 idlers offer up to a 2-in. engineered shaft for additional load capacity, along with an adjusting nut that provides additional protection to the seal area and establishes a precise bearing adjustment; a positive hold down that includes drop-in rolls that are factory assembled and positively secured; an external labyrinth seal featuring a unique roll head and nut combination to produce an extremely long path, close tolerance labyrinth seal; and interchangeable rolls (wing and center), either sealed or regreaseable, that are interchangeable.

Metso says its Energy Saving Idler system reduces the load typically carried by conventional roller systems by 50%, in addition to cutting belt power consumption by up to 35%.

Metso's Energy Saving Idler (ESI) system, according to the company, can provide reductions of up to 35% in power consumption of long distance belts, besides increasing the service life of the equipment. The ESI design replaces the conventional central roller with a pair of lighter idlers mounted on a pivoted rocker arm, decreasing the spacing on the belt and the pressure on the central roller, which normally receives 70% of the total load. With this new configuration, the load applied on each roller, as well as the contact pressure with the belt, is reduced by 50%.

In addition, the company said customers can gradually replace the central roller on existing belt systems with the

ESI rocker arm and lighter idlers. ESI can be introduced sequentially during maintenance shutdowns. The pivoted rocker arm bracket is supplied with the same attachment configurations of the conventional roller and it may be mounted on a conventional bracket without requiring any adjustments.

Cutting Carryback

Carryback is one of the main conveyor maintenance problems, and cost generators, encountered in mining applications. CEMA has estimated that carryback can total as much as 3 tons per week on a 60-in.-wide belt traveling at 800 ft/min. Annually, this totals more than 150 tons of material for one belt. If carryback on a conveyor can be reduced from 3% to 1%, it can result in a 67% reduction in conveyor maintenance costs.

Martin Engineering aims to minimize this problem, and enhance worker safety, with a new family of heavy-duty conveyor belt cleaner designs, engineered so the blade cartridge can be pulled away from the belt for safe access and replaced by a single worker. Martin Engineering developed the Safe to Service (STS) blades to secure both primary and secondary cleaners rigidly to the conveyor mainframe, while offering more versatility and easier access. Initially available on the Martin QC1 Cleaner HD, Martin QC1 Cleaner XHD and Martin SQC2S Secondary Cleaner, external servicing reduces confined space entry and eliminates reach-in maintenance, while facilitating faster blade replacement.

"Routine maintenance and replacement of blades that require reach-in or chute entry is an unpleasant and potentially dangerous task for workers," said Daniel Marshall, product engineer for Martin Engineering. "We developed the STS system so operators could work on the product safely from outside the chute wall, without breaking the plane of entry."

The system was originally developed for a client who needed a safer method for workers to replace cleaner blades on the large conveyor system. After field-testing, operators found that the STS design lowered the chance of injury and required fewer workers to perform maintenance.

"Though the STS is currently geared toward heavy-duty conveyor systems, we're working on expanding the technology to accommodate more of our product line," Marshall explained. "Our ultimate goal is to reduce and eventually eliminate reach-in and chute entry injuries related to blade cleaning and maintenance."

Designed for conveyor speeds up to 1,200 ft/min and belt widths from 18 in. to 120 in., the STS system is claimed to be well-suited to heavy-duty applications. Primary cleaner urethane blades come color-coded to suit specific applications and are set in a multihole cartridge, allowing the sliding blade rack to be correctly aligned with the material path for effective cleaning. The SQC2S Secondary Cleaner is designed to allow the system to handle belt reversals and rollback with no damage to the belt or splice.

COAL ProTec

coal processing technology

conference and exhibition

april 23-25, 2018

lexington, ky

Three days of workshops and presentations
Two days of exhibits and events
One of the best venues for a coal industry gathering

The Coal Preparation Society of America (CPSA) brings back the latest in coal processing technology expertise, equipment and networking events to the Lexington Convention Cen - ter. Now as a biannual event, the coal prep industry returns to the city equidistant between the Illinois Basin and the Appalachian coal fields.

A day of workshops walks you through coal handling and processing and the keynote session the next day provides valuable insight as to where the U.S. coal industry is headed. Technical presentations on new plant construction and modifications, coal cleaning and coal byproducts give ideas on how to grow this industry into the future.

The exhibition has over 100 booth spaces filled with the latest equipment and services to help you be more productive and profitable. More detailed information is available at:

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

keynote presentations

18 months after the election, where does coal go from here?

-Heath Lovell, Vice President – Public Affairs for Alliance Coal
Mr. Lovell has been with Alliance since 2006 and held several other positions including general manager of River View Coal, LLC and general manager of Webster County Coal, LLC

U.S. coal export boom - here to stay?

-Ted O'Brien, who joined Xcoal in 2017 with a role split between Capital Markets and Marketing, where he evaluates global investment opportunities in mines and infrastructure, and supports Xcoal's core business of marketing coking coal and thermal coal to customers around the world

Full day of workshops (7 Professional Development Hours)
Three technical sessions (Another 6 PDH's) + keynote
All for a full conference registration of only $199
that includes admission to the exhibition
Register at: www.coalprepsociety.org

Workshop 1 - Conveyors 101
Presented by: Jerad Heitzler, Foundations Training Manager
Martin Engineering

This workshop will give participants practical solutions and the correct actions to resolve problems that are typical with belt conveyors. Topics include:

- How splices afftect system performance
- Conveyor blet storage
- Prevention of belt damage
- Root cause analysis of belt mistracking and proper tracking techniques

Workshop 2 - Coal Prep 101
Presented by: Barbara Arnold, President, PrepTech, Inc.

This workshop covers a broad range of topics including a review of coal properties important to utilization, coal sizing, cleaning and dewatering operations. Equipment sections will provide descriptions of common types of coal preparation processes and the factor that influence their performance. A fundamentals section will show participants how to interpret characterization data obtained from particle sizing and float-sink (washability) analyses. Ancillary topics include coal sampling and analysis, coal handling and wear materials.

Sample Technical Presentations:

- An innovative solution to aging infrastructure
- Low cut point spiral
- Maximize coal yield in dual cut point separations
- Energy unbound
- Coal to carbon fiber

schedule of events

monday april 23	tuesday april 24	wednesday april 25
exhibitor setup 8am - 5pm	keynote session 9am - 10am	advanced coal byproducts 9am - 11am
conveyor 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	

Modeling Solves Coal Flow Problems

BY JASON SCHWARTZ

The James H. Miller Jr. plant in Alabama is one of the top 10 largest coal-fired power plants in the United States, responsible for 46% of the power generation in Alabama. The plant converted to Powder River Basin (PRB) coal about 20 years ago to gain the environmental benefits of the coal's low sulfur properties. The downside of PRB coal is the 12,000 tons per hour (tph) that the facility needs to consume to maintain an equivalent power output.

With 3,000 tph moving on one belt alone, the Miller plant still passed 100% of its coal through a single transfer system. There were both spillage and heavy dusting issues so management was considering new chute work to replace end-of-life equipment.

The engineer assigned to fossil fuels had other ideas. He created an aggressive scope of work that included all of Miller management's and operations' collective wishes over 20 years, combined with his vision of how to add reliability and redundancy paths for the plant. With so much coal traveling through one building, the engineer was trying to address the fact that any upset condition could knock out half the power for state of Alabama.

This concern translated into a 28-page document, outlining requirements for probably the largest and most complicated material-handling project ever undertaken at a running power plant — one where a principal mandate was that the plant continued to move coal through the same area that was to be updated. This work was to take place in a building that was overstressed structurally and mechanically, and the concept was to add 50% in additional material-handling capacity.

Acensium was one of two contractors that responded to the Request for Proposals (RFP) and the only one willing to put in a bid and move forward.

Working with the Miller team, Acensium developed retrofit plans encompassing the needs of both operations and management at the facility. By providing 3-D laser scanning, digitization and modeling of the plant, risks of schedule delay and work stoppage due to design issues or unforeseen conflicts during installation were significantly reduced.

The on-site consulting team confirmed that the building, which had an additional floor added in 1998, was severely overstressed. Laser scans detected deflection in some of the support beams. In response, Acensium performed all necessary structural retrofit design, creating a new skeleton to put into the existing building while it was still operational. The largest beam of this skeleton, weighing in at more than 21,000 pounds (lb), had to be placed under the existing structure and utilities.

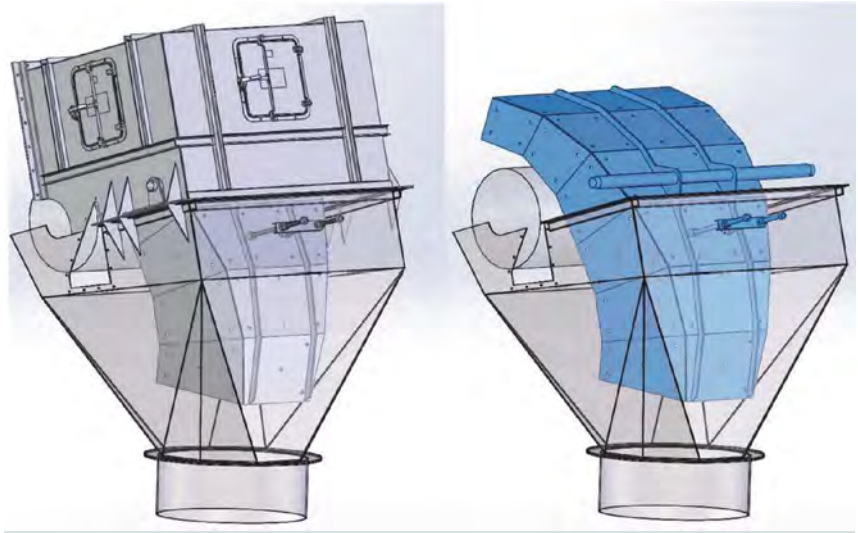
Maintaining tolerances were absolutely critical during this retrofit. With most projects, plus or minus 1 inch (in.) is acceptable to get the job done. At Miller, with so much material moving through such a confined space, it was a fundamental project requirement to maintain tolerances within 1/16-in. to avoid critical system failures. This was accomplished through progressive laser scanning, supporting the installers all the way through the entire job.

Part of the design included splitting the coal flow to facilitate feeding multiple systems at one time. The flow was split through an unconventional geometry arrangement that helps to ensure redundancy and increase overall efficiency at the plant.

Acensium was able to accomplish every goal set by the Miller plant, and this was accomplished while not interrupting operations. The final system is very complex with multiple coal flow paths, including significant falls. This highly redundant system runs with no pluggage or interruptions of any kind.

The Miller fossil fuels engineer is already looking ahead to projects into 2020 and Acensium built dedicated future-proofing into the new system to support this growth. The organization recorded detailed scans of as-built conditions, including changes in conduit, electrical, fire protection, wash-down, structural members and chute work. In the current phase, the team is running models to examine different ways of bringing coal into the building and forecasting the impact of any future changes.

The final facet to this very detailed, complex engagement was time. Miller needed this project fast-tracked, and while this process should have taken anywhere from 12-18 months to move from concept to design, Acensium took 9 months from the initial purchase order to the day the client started demolition.



Part of the design includes splitting the coal flow to facilitate feeding multiple systems at one time.

Jason Schwartz is the principal for Acensium and be reached at www.acensium.com.

Optimizing Fine Coal Circuits

FLSmidth is providing an ongoing design and operational guidance to increase fine coal output and productivity improvements at one of New South Wales' premier open-pit coal mines. A site survey as part of the program identified the problems impacting production and total output. From that survey two goals were identified. The long-term goal is optimized performance and productivity throughout the coal handling and preparation plant (CHPP). Along the way, a medium-term goal is to make the installed equipment fit for purpose and improve equipment efficiencies and reliability.

Initial stages have focused on optimizing the performance of the reflux classifier and the capabilities of the thickener, which is also being upgraded to meet current and future production targets. With certain feeds, the thickener cannot process the refuse stream at the required rate, which has meant contaminated process water, resulting in blockages in the clarified water lines and clogged valves, strainers and nozzles.

A critical contributing factor is the refuse underflow now being treated by filters for dewatering rather than the initial design where refuse was diverted straight to a tailings dam.

With the high proportion of slimes in the clarified water circuit, the circuit was frequently blocking, requiring corresponding unscheduled maintenance to unclog the valves — and leading to substantial losses in production time and productivity.

Optimizing the reflux classifier circuit was undertaken as a number of incremental steps and achieved improvements in availability and reliability.

The first phase involved reviewing and assessing the fluidizing water circuit and impacts on the fine coal circuit and equipment operations. Phase two involved reviewing the density control and calibration, adjustments to the PLC code and replacement of the density probes. The result of these steps is reliable and accurate density control with minimal operator adjustment is required. The third phase was to improve the mechanical reliability of the reflux classifier.

As part of that process, the dart valve was upgraded to a two-arm assembly with shrouds, a change that has improved reliability of the valve's operation and minimal splashing.

Optimizing the fine coal circuit solved problems with the thickener and water use internally.

Reports from the mine indicate the investment in the program is paying off. Individually most of the improvements have been nominal, but, combined, are now delivering results with 3%-5% increases in output from the fine coal circuit regularly achievable.

The fine coal circuit is now achieving target production requirements and is expected to meet future production targets. Circuit maintenance is now on a scheduled basis. Water quality to the circuit has improved and work is ongoing in this area.

With the success of this first stage, the mine has planned for additional similar investigations, looking to achieve similar improvements in processing circuits across the site.

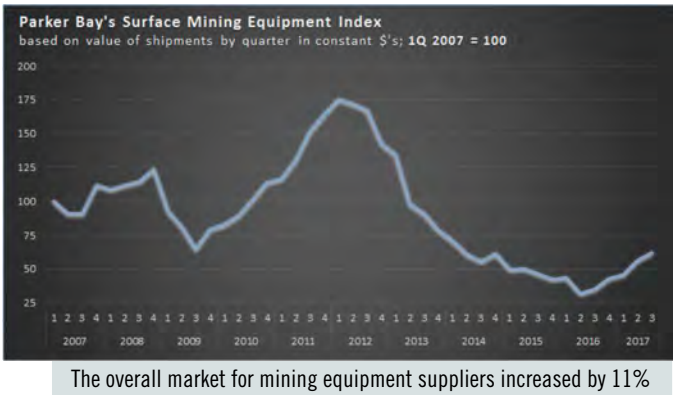
Mining Equipment Market Continues to Recover

The amount of large surface mining equipment shipped worldwide, the latest deliveries to mines during July-September 2017, increased by more than 10%. Those gains come on top of very strong increases in the previous quarter and bring these equipment markets to nearly double that of the cyclical bottom reached in the second quarter of 2016. As measured by Parker Bay's Surface Mining Equipment Index, the dollar-weighted shipments reached 62.3 (Q1 2007 = 100). While a very substantial rebound from the depths of the last cyclical contraction, the value of deliveries worldwide remains more than 60% below the peak level achieved in the first quarter of 2012.

These deliveries continue the trend that started in the third quarter of 2016 and reinforce the other indications of a sustained and growing recovery and expansion of mining and equipment markets worldwide. Not every market segment expanded during the third quarter, but the overall market increased by approximately 11% quarter-to-quarter. When comparing the latest shipments to those of a year ago, the gain is 83% (number of units).

Mining trucks, by far the largest product sector, increased by nearly 20%, surpassing 600 units deliveries for the first time since the second quarter of 2013. The gains recorded by manufacturers of excavators/loaders were even greater during the third quarter (+43%) after lagging behind truck shipments during earlier stages of this expansion phase. In contrast, however, crawler and wheel dozer shipments lagged these primary production products with shipments contracting by 17% vs. the second quarter and up just 6% year-over-year. This latest result may be anomalous and could represent a more pressing need for miners to focus their still restrained capex on those products essential to maintaining and growing output. Miners may be turning to used equipment markets to fulfill dozing requirements for the short term. A recovery and acceleration is expected in dozer deliveries in the near future.

Within these product groups, the average size of machines delivered continued to decline, a trend that has marked the current recovery. The value of machines shipped increased by a somewhat slower pace than unit shipments, this despite the low growth in lower-priced dozers. As further evidence of this shift to smaller machines, average truck payload was just 136 metric tons (mt) vs. 149 mt for the second quarter and 170-mt-plus during the peak years, 2012-2013. While increases in "ultra-class" truck shipments have been significant, they have lagged behind increases in delivery of smaller trucks, especially those in the 90- to 110-mt range. This reflects a need to replace these smaller trucks, but is also a reflection of shifts in geographic markets to regions where miners rely on trucks in these smaller size classes.



The overall market for mining equipment suppliers increased by 11% quarter-to-quarter.

Mines in Russia/CIS, India and Indonesia continue to pace the current expansion. Deliveries to miners in Russia/CIS more than doubled year-over-year and these have now been outpaced by equipment buyers in Australasia with Indonesian miners and contractors far ahead of their counterparts in Australia. Changes in other regions varied from +288% in Europe and the Middle East to -14% in North America. But these figures point out that quarter-to-quarter variations may not reflect longer-term trends. For example, the very sharp gains in Europe and the Middle East reflect the small numbers of units required in a region in secular decline. Nevertheless, there does appear to be a continuing and significant dichotomy between faster growth in equipment demand from Russia/CIS, Africa and parts of Australasia, and slower recovery of shipments to the mature regions dominated by the largest world-class mines: North America, Latin America, Australia. At some point in this expansion, it is expected that the largest miners in these regions will switch from restrained to more expansive capex (including several potentially large "greenfield" developments) and attendant equipment buying. But, that is not yet reflected in shipments to date.

The distribution of shipments by mineral market continues to reflect a somewhat unexpected strength in buying by coal miners in select national markets. Coal mines accounted for nearly half of all unit shipments in the thirs quarter, down moderately from the peak levels achieved in the second half of 2016, but well about historical norms. A substantial majority of these machines were placed in service in Russia, Indonesia and India, while coal operators in the large surface coal producing countries that dominated during the expansion phase, Australia, the U.S., Canada and South Africa, remained largely on the "sidelines." In time, these sectors will likely ratchet up capex and equipment purchases, but, owing to economic and political constraints, perhaps not to the levels that existed before the last contraction.

The three major metals — copper, gold and iron — increased their share of shipments to nearly 40% of third-quarter totals with copper mines in particular surging vs. the second quarter.

Increased demand from iron ore mines likewise reflects improving market conditions and a growing necessity to replace aging equipment. But the location of the latest buying does not reflect the oft-talked about surge in autonomous-operating haulers. Very few were shipped in the third quarter. Moreover, fewer than one-third of deliveries to iron ore mines went to the dominant-producing countries, Australia and Brazil, while more than

half of shipments went to iron mines in Russia/CIS. Given the announced increasing capex plans by the largest Australian and Brazilian producers, these shares are judged to be anomalous and likely to revert to more traditional demand patterns.

The overriding attribute of this overview of third-quarter shipments is one of optimism. The mineral and equipment market conditions that have evolved over the past 12-18 months and led miners to increase their purchases of new machines are still in place and expected to continue for the next year, and likely longer. Current demand remains sufficiently below the levels obtained at the 2012 peak, such that further growth appears very likely, and fully warranted by mineral supply/demand conditions in nearly all product, geographic, and mineral sectors.

CCTI Parnters With UW to Further Develop Cleaner Burning Coal Processes

Clean Coal Technologies Inc. (CCTI), a company that converts run of mine coal into a cleaner burning and more efficient fuel, recently signed a memorandum of understanding (MoU) with the School of Energy Resources at the University of Wyoming (UW) in Laramie. The focus of the agreement is to further develop the performance and commercial potential of CCTI's coal-beneficiation technology.

"UW, through its Carbon Engineering Initiative, is sharply focused on advantaging and maximizing the potential of Wyoming's mineral resources, especially coal, both domestically and overseas, and our technology fits very well in Wyoming actualizing their strategies," said CCTI CEO Robin Eves. "With one of CCTI's top priorities being to beneficiate Powder River Basin (PRB) coal, the synergies achievable from joining hands with the School of Energy Resources are compelling for us."

"The CCTI technology is proven at pre-commercial scale in the field and is a prime technology for us to investigate and support its development," said Richard Horner, director special projects and emerging technology for the UW School of Energy Resources. "We view the CCTI technology as an exciting and serious candidate that might be deployed to improve the competitiveness of Wyoming coal."

There are proprietary features of the CCTI technology that could be incorporated into the school's "coal refinery" concept, which has been under development for two years. Within the scope of the concept, different technology platforms can be linked and leveraged to make wide ranging fuels, materials, and chemical products while producing minimum waste or environmental hazard.

Matrix to Distribute NLT's N-Connex System

Matrix Design Group, LLC (Matrix) signed a distribution partnership agreement with Northern Light Technologies (NLT) for distribution and service of the N-Connex system throughout the United States and Africa. N-Connex is an award-winning networking system designed specifically for harsh environments, integrating voice and high-speed data communications, asset and personnel tracking, control and automation, video surveillance, condition monitoring and other solutions into a single modular, Wi-Fi and Ethernet-based platform.

"Matrix is excited to again team with NLT to deliver this innovative new solution," said Matrix President David Clardy. "Matrix has always prided itself on delivering high-quality, production-enhancing and cost-effective technology solutions to its customers and we look forward to adding the N-Connex system to our product suite."

"NLT is looking forward to working with the Matrix team to expand the N-Connex install base throughout the U.S. and African markets," said NLT Digital Managing Director Tim Haight. "We believe the networking solutions provided by the N-Connex system are really going to impress the operators in these new markets, bringing a level of connectivity and information to these industries that has been unavailable to date at reasonable price points."

The advantage of the N-Connex system lies in its ability to create a completely custom, modular network for any operation, from underground hard rock mines to process plants, from tunnels to heavy industry. Using an easy to expand and troubleshoot Wi-Fi and Ethernet solution, an operation can continue to grow while assured their data, communications and Wi-Fi-connected Internet of Things (IoT) equipment will be able to grow with them.

MSHA Issues Equipment Alert for Kidde

The Mine Safety and Health Administration (MSHA) issued an alert for Kidde fire extinguishers in concert with an alert from the U.S. Consumer Product Safety Commission. Kidde has recalled 134 models of plastic-handled fire extinguishers manufactured between 1973 and present day. Some extinguishers have been known not to work when needed, others to come apart under pressure — one death has been reported. Some were sold under Kidde's brand, some under the name of other retailers. Kidde will replace all defective models.

Liebherr Completes Field Tests for T236 Hauler

At an international press event recently in Leoben, Austria, Liebherr showcased its T 236 mining truck. This 100-metric-ton (mt) haul truck, which is powered by a diesel-electric drive system, is the first in this class with a four-corner, oil immersed braking system. Since its debut at MINExpo 2016 in Las Vegas, the T 236 has successfully completed its testing phase and has recently started its first field operation trials at the Erzberg iron mine in Austria.

Capitalizing on decades of proven experience in off-highway truck technologies, the T 236 takes advantage of Liebherr's electric-drive system innovations with the vertically integrated Litronic Plus Generation 2 AC drive system.

An industry first, Liebherr's Litronic Plus Isolation system ensures the safety of maintenance personnel through the elimination of hazards by design. To ensure safety, the T 236 is equipped with double-pole battery, starter motor and hoist system isolators as standard. Each plug and drive power module are electrically interlocked to grounding devices. Operating on a voltage level of 690 VAC and 900 VDC enables regular site technicians to carry out system maintenance.

The revolutionary in-line electrical power train layout minimizes cable length, while the maintenance-free IP 68-rated plug-and-drive power modules ensure reliable operation in all-weather situations. Combined with the extended life service intervals and minimized maintenance time offered by the ground-level service points, the T 236 ensures maximum uptime.

The ergonomic T 236 cab and the superior properties of the front-wheel suspension system promotes driver efficiency with comfort, safety, acceleration and handling for improved performance.

The next evolution in Electric Drive System design, Liebherr's Litronic Plus Generation 2 drive system introduces advanced Active Front End technology. Making efficient use of electrical energy during retarding events, the drive system controls engine speed with almost no fuel consumption. A variable-speed hydraulic system reduces parasitic losses to provide maximum power, while lowering fuel consumption when power is not required.

With its high takeoff torque and continuous power to ground capability, the T 236 is less sensitive to grade and payload variations. The T 236 is the first diesel-electric truck in class to incorporate an oil immersed braking system with four corner retarding capabilities, providing reliable braking technology.

First Aid and Trauma Technology

American Rock Salt, the largest producing salt mine in the U.S., has gone above and beyond compliance to improve safety — by installing the life-saving Mobilize Rescue System throughout its facilities. American Rock Salt's environmental manager, Joe Bucci Jr., explained that the mine has a safety program that is "both proactive and effective."

"That being said, if an accident does occur, having the right life-saving training, supplies and equipment is vital," Bucci said. "The implementation of the Mobile Rescue System throughout our mine will help ensure that proper medical care is administered quickly and effectively."

Called the "Cadillac of First Aid Kits" by *WIRED*, the Mobilize Rescue System includes an innovative diagnostic app that will help miners assess, manage and monitor medical emergencies until professional first responders arrive. Each unit includes all the equipment necessary to manage severe bleeding, seizures, choking, cardiac arrest, opiate overdoses and much more.

"The app provides 'just-in-time' training that empowers bystanders to provide life-saving care," said Seth Goldstein, director of training and education at Mobilize Rescue Systems. "The app ensures that an immediate responder, the person present when the emergency occurs, doesn't

Jason Gotham, president and co-founder of Mobilize Rescue Systems, and Joe Bucci Jr., the environmental manager at American Rock Salt.

have to rely only on memory in the heat of the moment."

www.mobilizerescue.com

Dust Suppressants and Ground Control Agents

Quaker Chemical Corp. recently showcased its DUSTGRIP dust suppressants and MINETECH ground control agents.

DUSTGRIP JFP-95 presents as a solid material in a cylindrical shape and can be added to any system through a variety of prefabricated manifolds, the company reported. This eliminates the need for a liquid addition pump, and allows the strength of the suppressant solution to be adjusted quickly, or completely shut off. The solid material allows for a more compacted container size than a liquid dust suppressant, which means less storage area.

MINETECH ground control agents can be dispensed through low- or high-pressure dispensing systems for rapid cavity filling and strata consolidation, the company reported. These products provide good penetration into small fissures, have excellent adhesion, chemical resistance and durability, and are fast acting. They are engineered for minimal disruption to the workplace for installation.

www.quakerchem.com

Komatsu Introduces New Dozer

Komatsu recently introduced the D375A-8 crawler dozer, which features an EPA Tier 4 Final certified engine that produces more than 20% more horsepower while the dozer is traveling in the reverse direction. The additional horsepower yields faster cycle times and a productivity increase of up to 18%.

This mining-class dozer also comes with structural enhancements for increased durability of the mainframe and track frame. The D375A-8 also features an improved suspended undercarriage, larger viscous cab mounts, and a new air-suspension heated and ventilated seat for overall operator comfort.

"Whether its reclamation, large construction or production mining applications, the D375A-8 is the right machine for the job," said Joe Sollitt, product manager, Komatsu America. "The durability improvements to this new model drive down the total cost of ownership while the more powerful Tier 4 final engine significantly increases performance and production.

The improvements to the undercarriage, cab suspension, and operator interface will make D375A-8 operators more comfortable and productive throughout their shift."

Under the hood, SAA6D170E-7 engine has a net horsepower of 609 hp in the forward direction and 748 hp in the reverse direction. No selective catalytic reduction (SCR) system or diesel exhaust fluid (DEF) required. A variable geometry turbocharger (VGT) improves low speed response and boost. It comes equipped with a high pressure, common rail fuel injection system. The dozer has dual Komatsu diesel particulate filters (KDPFs) and high-efficiency exhaust gas recirculation coolers. The three-speed transmission with an automatically engaging lockup torque converter provides increased fuel efficiency and faster ground speeds during long pushes.

CONSULTANTS AND SERVICES

FOR SALE

CONTACT YOUR LOCAL SALES REPRESENTATIVES FOR ADVERTISING INFORMATION:

Midwest/Eastern U.S. & Canada
Victor W. Matteucci
Tel: +1 440-257-7565
vmatteucci@mining-media.com

Western U.S., Canada & Australia
Frank Strazzulla
Tel: +1 949 459-1767
fstrazzulla@mining-media.com

Germany, Austria & Switzerland
Gerd D. Strasmann
Tel: +49 2191 931497
info@strasmann-media.de

Scandinavia, U.K. & European
Colm Barry
Tel: +46 (0) 40 414178
colm.barry@telia.com

Japan
Masao Ishiguro
Tel: +813 3719 0775
ma.ishiguro@w9.dion.ne.jp

ADVERTISING INDEX

This index is provided as an additional service. The publisher does not assume liability for errors or omissions.

Confirmation of MSHA Nominee Seems Likely

BY HENRY CHAJET

In the September "Legally Speaking" column, Washington D.C., defense counsel Avi Meyerstein discussed his top 10 list of needed Mine Safety and Health Administration (MSHA) reforms derived from his history of contested cases:

- Stress safety priorities;
- Seek consistent regulatory applications without improper changes;
- Accept clear and historically recognized compliance mandates;
- Require meaningful district manager citation validity conferences;
- Appoint a powerful MSHA headquarters ombudsman;
- Require inspector mitigating circumstances information collection and training;
- Enhance inspector enforcement training;
- Require human factor accident analysis, including drugs and alcohol;
- Recognize agency achievements since 1978; and
- Adopt efficiency and effectiveness tools to build on achievements, recognizing the steep reduction in the number of mines.

It remains unclear whether the United States Congress or the President Donald Trump administration will adopt any of these MSHA priorities soon, or instead will continue to ride on "automatic pilot," set by agency bureaucracy, often promoted to district or national leadership roles by the prior administration.

However, progress was made on October 4 when President Trump's MSHA nominee, David Zatezalo, a former coal miner and engineer who rose through the ranks to become the chief executive officer of Rhino Resources, discussed some of his safety and health priorities. He responded calmly and professionally to praise, questions, requests and criticisms from U.S. senators, all posed in a cooperative and friendly manner, even by Democrats who earlier had expressed concerns about his nomination, or announced their opposition. Some Democrats already filed document requests with the Department of Labor seeking information about the nominee's prior company. Yet, the tone of the hearing and seemingly unanimous support from Republicans, who hold a majority of Senate seats, led this author to believe that Senate confirmation is likely, before the end of the year.

Among Zatezalo's stated priorities for MSHA improvements were promoting new technology and solving technical issues, like those related to proximity detectors intended to protect coal miners from moving equipment. Other priorities he described were protection against silica health risks, currently undergoing a Department of Human and Health Services (HHS) study, and speeding up the MSHA equipment approval process to permit new safety advances.

Among criticisms by Democrats was Zatezalo's company's two "pattern of violations" notice letters, to which Zatezalo replied that he accepted them as a management improvement opportunity, rather than as impetus to "lawyer up." Further Senate questioning led to Zatezalo expressing his support for MSHA's small mines assistance programs, an area of reorganization under the last administration. While the discussion at the hearing addressed general safety and health improvements, and small mine goals applicable to metal and non-metal mining, as well as coal. Almost the entire hearing was focused on the coal industry. Hopefully, the noticeable silence on needed metal and non-metal reforms will be addressed by Zatezalo when he takes office. In fact, he will be faced almost immediately by ongoing rule-making efforts to repair the damage predicted from the former President Barack Obama administration's last-minute amendments of the metal/nonmetal "work-place examination" (WPE) and record-keeping rules.

Hearings on the latest MSHA proposals will be held this month, permitting Zatezalo's input on the final rule, after he is confirmed. Similarly, the nominee will have input into the continuing evolution of the agency's controversial "pattern of violations" rules and criteria. The regulation spurred years of intense criticism, but after an aggressive implementation period, was not used in the last two years of the Obama administration. Zatezalo should be confirmed well before MSHA is expected to conduct its next pattern of violations screening, in mid-2018, to identify candidates that may be subject to burdensome and expensive compliance plan or closure order risks.

Finally, it is noteworthy that the nominee was asked, and promised to return to the committee, to seek help whenever he perceived a funding problem that could interfere with his expressed safety goals. To the author, the question implies an increased interest by the members of the Senate Committee to oversee MSHA more intensely than they have in the last four years.

Henry Chajet is senior counsel with Husch Blackwell. He can be reached at henry.chajet@huschblackwell.com.

"Further Senate questioning led to Zatezalo expressing his support for MSHA small mines assistance programs, an area of reorganization under the last administration."

WE KEEP IT SOLVED

PROBLEM SOLVERS

Not every conveyor is the same. Things happen that are out of your control and adjustments need to be made. It might be the environment, the changing product conditions or safety issues that need a special component to keep operations running.

PPI offers an array of products that can help with just about any set-back your conveyors face. We have idlers made of different materials designed to shed carryback and ease the maintenance process, pulleys that contend with spillage, guards to keep things safe and monitoring devices to pinpoint what is happening with conveyors.

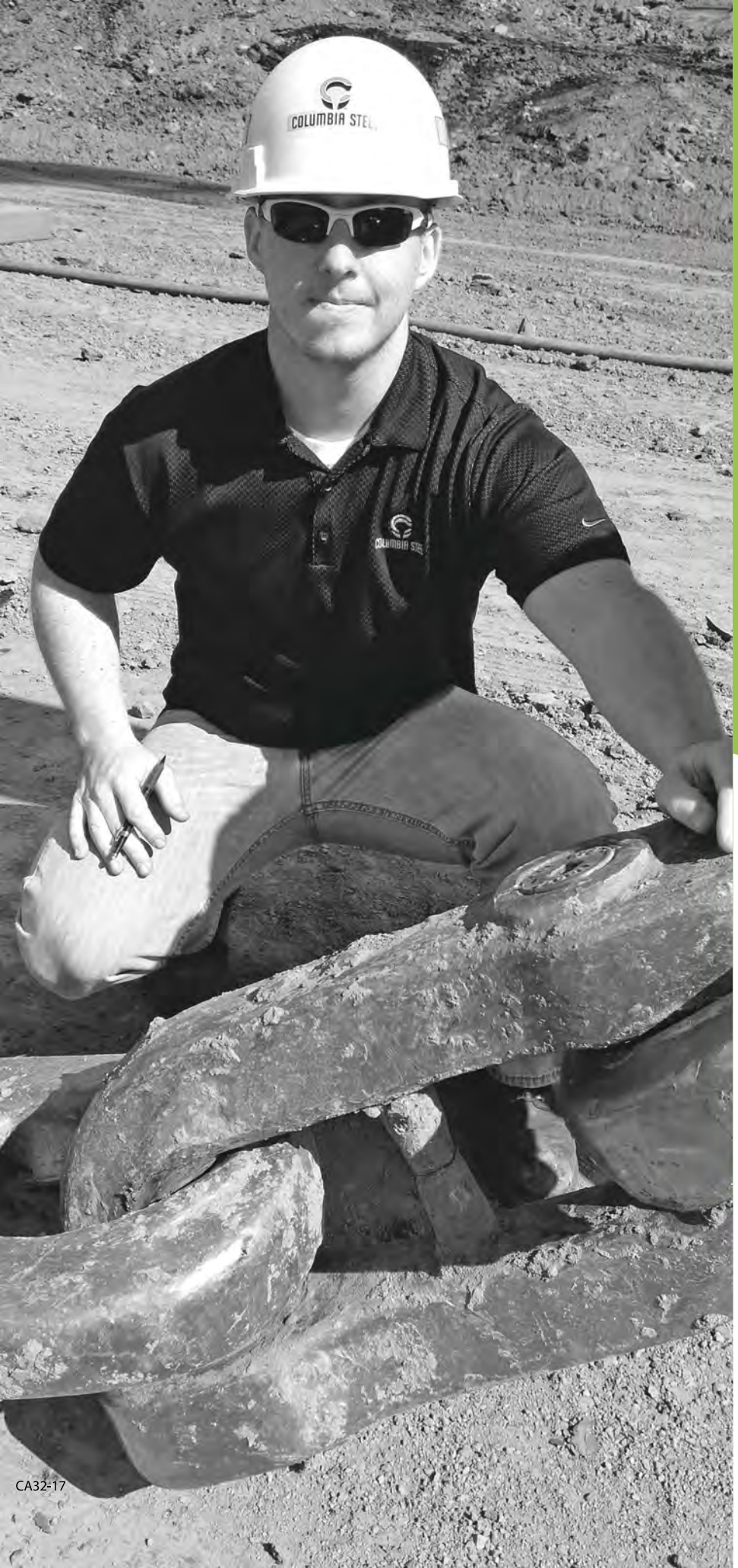
Whatever set-backs come your way, ***WE KEEP IT MOVING***

PPI™ 40 1977-2017 years

USA | CANADA | CHILE

ppi-global.com
sales@ppi-global.com
800-247-1228

HARD ROCK · COAL · AGGREGATE · CEMENT · FORESTRY · POWER · GRAIN · FOOD · PACKAGE HANDLING · CONTRACT MANUFACTURING



WHEN STUFF NEEDS FIXING FAST.

GET UP AND RUNNING WITH COLUMBIA STEEL'S EZ RIGLOK® HAMMERLESS PIN LOCKING SYSTEM FOR EASIER, SAFER FIXES.

Our patented EZ RigLok system is a pin retention design field-proven in many Columbia dragline products — hoist links, swivel links, clevises, and now available in repair links.

COLUMBIA STEEL®

+1-503-286-0685 1-800-547-9471

COLUMBIASTEEL.COM

CA32-17