Focus

MINING

INSIDE

Mining roundtable
Experts from various sectors of the mining industry met in Salt Lake City to discuss topics regarding the current state of the industry. They talked about education of the general public, the government and students; technology; labor shortages; tariffs; commodity pricing; industry stability and more.

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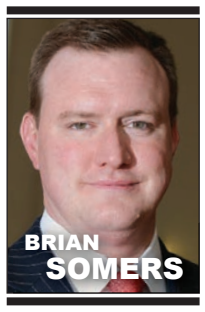
Mining Lists

A Legacy of Mining

The mining industry has always been important to Utah's economy - and always will be

Mining is a foundational industry in Utah.

Circling the rotunda in the Utah State Capitol building is a cyclorama that depicts eight important scenes from Utah's territorial years. Along with depictions of pioneers building irrigation systems and the driving of the Golden Spike, is a painting titled "General Connor Inaugurates Mining."



The panel shows U.S. Army Maj. Gen. Patrick E. Connor in the midst of a rudimentary mining operation. General Connor, often referred to as the "Father of Utah Mining," organized Utah's first mining district on Sept. 17, 1863, which encompassed the east side of the Oquirrh Mountains.

Utah's first mining district is still its most productive, as it is home to Rio Tinto Kennecott's Bingham Canyon Mine, one of the largest copper mines in the world.

In what might be considered one of Utah's first economic development incentives, before Utah was a state, the territorial legislature offered a cash prize to anyone who discovered a recoverable coal source within 40 miles of Salt Lake City.

Many communities around our state were founded to support the development Utah's vast and diverse mineral resources. Utah's modern mining industry continues to sustain many of those same communities today, as well as making a substantial contribution to the state's overall economy.

According to data compiled by the National Mining Association, Utah's mining industry contributed $5 billion to the state's gross domestic product and supported over 41,000 jobs in 2018.

Utah ranks eighth in the nation for non-fuel mineral production (base metals, precious metals and industrial minerals), and 12th in the nation for coal production.

Utah's mineral production increased 14 percent in 2018, after having grown 9 percent the year before. Last year, Utah produced $1.7 billion in base metals, including molybdenum, beryllium, magnesium and copper, with copper accounting for 78 percent of the total base metal production value. Utah also produces precious metals, with $289 million in gold and silver production in 2018.

Utah produced $1.2 billion in industrial minerals in 2018, including phosphate, potash, lime, cement, salt, Gilsonite, clay, gypsum and others. These operations are spread throughout the state and the minerals they produced are used in a variety of agricultural, industrial, extractive, manufacturing and other industries.

Utah has substantial uranium and vanadium reserves. The White Mesa Mill in San Juan County is the only operating uranium mill in the nation and is currently producing vanadium and processing alternate feeds from other producers and sites around the county.

Utah also has some of the largest unconventional fuel resources in the world. The Uintah Basin contains massive reserves of both oil shale and oil sands, both of which continue to be developed by a number of operators.

Utah produced nearly 14 million short tons of coal last year — valued at $454 million — from eight mines producing on coal leases in Carbon, Emery, Sevier, Sanpete and Kane counties. Notably, Utah coal producers exported 4.6 million short tons of coal to the Asian market, the largest amount since 1996.

Utah is the only state in the nation that produces magnesium metal, beryllium concentrate, potassium sulfate and Gilsonite. Magnesium, beryllium and potash are included on

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LEGACY

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the Department of Interior's list of minerals that are considered critical to the nation's economic and national security. Utah also has proven reserves or historical production of a number of other minerals on the critical-minerals list.

Although Utah's total mining employment is not as large as other sectors, such as manufacturing or business and professional services, it leads the state in terms of average wages.

According to data from the Utah Department of Workforce Services (DWS), the average monthly wage for workers in the Utah mining industry (for which DWS includes the both mineral and oil and gas extractive sectors) was $6,449 in 2018. That is higher than professional/business services ($4,934), financial activities ($5,659), manufacturing ($4,817) and even information/IT ($6,381).

The positive economic impact of Utah's mining industry is especially pronounced in the rural parts of our state. In many rural counties, mining operations are among the largest employers and largest taxpayers. Mining operations not only provide direct employment, tax revenue and mineral royalty revenue, they also support an array of jobs in direct service industries such as transportation, logistics, equipment supply and repair, heavy construction, industrial consumables and many more.

Mining industries also provide wages that are substantially above average county wages, and even (as discussed above) statewide average wages. For example, according to DWS data, average monthly wages for mining workers in Carbon County in 2018 were $7,542. That is 124 percent higher than the average month wage ($3,370) in the county. In Emery County, average monthly mining wages were 61 percent higher than the county average monthly wage in 2018. In Sevier County, mining wages are 91 percent higher and in San Juan County it's 106 percent.

Some public policy entities in Salt Lake City promote the idea of "replacing" mining jobs in rural Utah with jobs in the tourism and hospitality industries. The data from DWS show why this is an unworkable proposition.

Mining jobs in Carbon County paid 639 percent more than jobs in the leisure and hospitality industry in 2018 ($7,242 average monthly wage vs. $1,020). In Emery County, mining jobs paid 358 percent more. Even in counties with more well-developed tourism industries, wages in mining still provided far greater wages to workers. In Grand County, mining wages were 207 percent higher than leisure/hospitality wages in 2018. In San Juan County, it was 203 percent.

Simply put, mining jobs provide family- and community-sustaining wages, especially in rural Utah.

Of course, no one should argue against economic diversification in any part of Utah's economy. Improving tourism infrastructure, recruiting new industries, increasing education and workforce training options, incentivizing tele-work for tech and other jobs that could be performed off the Wasatch Front and promoting entrepreneurship and small-business formation are all efforts that should continue to be pursued to strengthen Utah's rural economies.

However, economic development activities should be additive, not subtractive. We should be looking to supplement and diversify rural economies, not to replace industries and jobs that have sustained those economies for generations. Efforts to promote rural economic development that do not include plans to support traditional industries like mining, oil and gas, energy production, manufacturing and agriculture will not succeed.

Despite any popular perception to contrary, mining is a growth industry. Why? Because demand for minerals increases as technological innovation increases. For example, it is estimated that early cell phones from the 1980s used 25-30 different minerals. The smartphones of today can use up to 75 different mineral elements.

Every time you use your smartphone to take a photo or video that gets uploaded to the cloud, you increase the need for data storage, which increases the need for reliable electricity to power the data centers that hold those bytes — not to mention the copper and other mineral contained in rows and rows of data servers, the minerals used to construct the building itself, the minerals used in the utility infrastructure to support the building, and on and on.

The modern lifestyle we enjoy is simply not possible without mining. From its earliest territorial days, mining has been critical to Utah's economy and the robust economic growth our state is experiencing today cannot continue without it.

Brian Somers joined the Utah Mining Association as its president in 2019. Somers has over 20 years of experience in legislative affairs, strategic communications and executive leadership. Prior to UMA, he led the Utah Science Technology and Research Initiative (USTAR) as its managing director.

The State of Our Industry

A MINING ROUNDTABLE

A special thanks to the attorneys of Babcock Scott & Babcock PC for hosting and moderating the discussion.

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Jared Jackson, J.R. Simplot Co.
Greg Madsen, Wheeler Machinery
Brian Somers, Utah Mining Association
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Bradley Babcock

Bradley Babcock is the director of engineered systems and process for Cementation AG in Salt Lake City. He has a wealth of technical experience in engineering, logistical analysis, system simulation, procurement and construction management in the mining, power and materials handling industries.

Brian Babcock

Brian Babcock is a shareholder at Babcock Scott Babcock in Salt Lake City. His practice is concentrated on both commercial and residential construction, contract disputes, defective construction, collections and real estate matters. He has acted as a judge pro tem for the Utah 3rd District Court.

Bob Babcock

The son of a professional engineer, Bob Babcock is a shareholder at the law firm of Babcock Scott Babcock in Salt Lake City. His practice is concentrated on construction contract claims and litigation in both public and private proceedings. In addition to his law degree, he is a civil engineer.

Lennie Boteilho

Lenny Botielho is the senior project manager for Ames Construction. He has been in the mining industry for 30 years and has extensive experience in all aspects of permitting, including county, state and local. His experience includes work in Canada, Peru, Chile, California, Nevada, New Mexico and Utah.

Jed Iverson

Jed Iverson is the estimating manager for Brahma Group Inc., a large industrial contractor in Salt Lake City. He has been with the company since 2008 as project engineer, project manager and area manager. He graduated from Brigham Young University with a degree in construction management.

In this roundtable discussion, members of the mining industry discuss various topics regarding the current state of the industry, such as: education of the general public, the government and students; technology; labor shortages; tariffs; commodity pricing; and industry stability.

BOB BABCOCK: ***Brian, as president of the Utah Mining Association (UMA), do you have any comments on the industry as a whole in Utah?***

BRIAN SOMERS: I think the industry in Utah has some great advantages. We have a very diverse mining industry — meaning the mining sector is not wholly dependent on one type of mineral or resource. Also, there is a lot of historical support for mining in the state, especially in some of the rural communities where mining has been the bedrock of their economic development for a number of years. Even in Salt Lake, the Kennecott operation is, by and large, accepted. Overall, I think Utah is a mining-friendly state. As to the health of the industry, I think it is healthy and growing. It is not growing as quickly as the tech sector or other parts of the economy, but it is growing. That is what's important.

BOB BABCOCK: ***As you all know, along the Wasatch Front, the aggregate mining industry receives a lot of political pressure from the "not-in-my-backyard" concept. But the rural areas of the state are a lot more accepting and are actually happy about the employment opportunities it brings. What can the industry do to help get a different response along the Wasatch Front?***

BRADLEY BABCOCK: I think it's truly important for the public to be educated. With the aid of the Utah Mining Association, I think the state can accomplish — or at least help — accomplish that. It is important for the public to understand that you can't have a Tesla without copper from Kennecott or a lithium mine. People want new highways and they want their houses built on the side of a hill. Well, you can't get that without Geneva Rock taking the aggregate out of the mountainside.

JARED JACKSON: We need to do a better job of that as an industry. There are those who oppose mining and they are putting a lot of effort into communicating that to the public. We need to be better at showing the relation between the products that we enjoy and the mining industry. If you want a car, a cell phone or a computer, you need a mine to be able to supply that. More than that, we also need to show the benefits the industry brings to the economy and our local and state communities.

GREG MADSEN: The mining industry has a reputation for being unsafe and environmentally wrong. I think a lot of that is a legacy reputation. Frankly, the industry deserved and earned that reputation. But, that is no longer the case. Now, some mines have recently gone 1 million man-hours without a lost-time accident. That is 12 working lifetimes. Twenty years ago, I would have thought that was impossible. And on the environmental side, I don't know a group of people that are more environmentally conscious than miners. We need to do a better job communicating these safety and environmental advances to the general public so we can change our reputation. For instance, the UMA has a fourth-grade education program. In a PowerPoint presentation, they try to educate students about things that most people would never think about, such as: If it's not grown, it's mined. There are 56 minerals in an iPhone. (They show) before and after photographs of mining clean-ups and they also share a list of occupations that exist in the mining industry.

BRADLEY BABCOCK: I think this is a great starting point. We ought to be repeating these programs in the junior highs where they have career days and at high school career days as well. We need to keep reminding them what is out there.

BRIAN SOMERS: One thing the UMA is trying to develop now is a way of informing high school students of the diversity of career options that are available in the mining field. I think that mining is not always at the forefront of high school students' minds. And we, as an industry, need to do a better job of helping people understand that the mining field holds really great job opportunities.

BOB BABCOCK: ***We have talked about the importance of the educating the public. What about the education of the government?***

BRADLEY BABCOCK: I think it is very important for the government to be informed before any crisis hits. That way, when their constituents come knocking at their door demanding that they take action, they will be more inclined to make a less-rash and more-informed decision.

JARED JACKSON: I think a lot of it is reminding people — government included — that we have to mine where the minerals and resources are. We are at the mercy of the land. Kennecott is not on the west of Salt Lake for our convenience. It is there because the resources are there. While many people may wish that all the resources were out in the middle of the desert away from the population, that's just not the case.

RICHARD WHITE: It is interesting, because once you get down into

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Jared Jackson

Jared Jackson manages J.R. Simplot's phosphate mining facility north of Vernal. He has been with Simplot for 11 years in roles of managing the mining department, managing the milling department and managing maintenance activities. He has a master's degree from the University of Utah in mechanical engineering.

Greg Madsen

Greg Madsen is the product manager of large mining equipment at Wheeler Machinery in Salt Lake City. He spent 12 years in the ground-engaging tool industry before joining Wheeler. He has a civil engineering degree and an MBA from Brigham Young University and started two industrial manufacturing companies.

Brian Somers

Brian Somers joined the Utah Mining Association as its president in 2019. He has over 20 years of extensive experience in legislative affairs, strategic communications and executive leadership. Prior to UMA, he led the Utah Science Technology and Research Initiative (USTAR) as its managing director.

Richard White

Richard White is a consulting and environmental engineer in Draper. He has 41 years' experience in the assessment of environmental impact in the mining, oil and gas and infrastructure industries. He holds a B.S. in watershed science and as M.S. in civil and environmental engineering from Utah State University.

Cody Wilson

Cody Wilson is a shareholder at Babcock Scott Babcock in Salt Lake City, where he concentrates on construction law and litigation (large commercial, industrial, highways). Prior to practicing construction law, he worked in the construction industry, ultimately managing $20 million-plus projects.

METAL MINES

Listed Alphabetically

THE List

Mine Name	Commodity	Mine Location	Mining Method	Owner	Year Opened
Bingham Canyon Mine	Copper, Gold, Silver, Molybdenum	Bingham Canyon, Salt Lake Co.	Surface	Rio Tinto Kennecott	1906
Lisbon Valley Mine	Copper	Lisbon Valley, San Juan Co.	Surface	Lisbon Valley Mining Co.	2004
Henry Mountains Complex (Tony M & Bullfrog Mines)	Uranium	Henry Mountains, Garfield Co.	Underground	Energy Fuels Inc.	*
La Sal Complex (Beaver & Pandora Mines)	Uranium, Vanadium	La Sal Mountains, San Juan Co.	Underground	Energy Fuels Inc.	*
Spor Mountain Mine	Beryllium	Spor Mountain, Juab Co.	Surface	Materion Natural Resources	1968
US Magnesium Facility	Magnesium	Great Salt Lake, Tooele Co.	Solar Evaporation	US Magnesium LLC	1972
Rocky Range Mine	Copper	Milford, Beaver Co.	Surface	Tamra Mining Co. LLC	*
White Mesa Mill Facility	Uranium, Vanadium, Alternative Feeds	Blanding, San Juan Co.	Mill	Energy Fuels Inc.	1980

THE Enterprise UTAH'S BUSINESS JOURNAL

*Did not disclose. Please note that some firms chose not to respond, or failed to respond in time to our inquiries.

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MINERAL MINES

Listed Alphabetically

THE List

Mine Name	Commodity	Mine Location	Mining Method	Owner	Year Opened
Enefit American	Oil Shale	Uinta Basin, Uintah Co.	Surface	Enefit American Oil	*
Grantsville Facility	Limestone, Limestone Products	Grantsville, Tooele Co.	Surface	Lhoist North America	*
Red Leaf Resources	Oil Shale	Uinta Basin, Uintah Co.	Surface	Red Leaf Resources Inc.	*
Redmond Mine	Salt, Bentonite	Redmond, Sevier Co.	Underground, Surface	Redmond Minerals	1958
Sevier Playa	Potash	Sevier Dry Lake, Millard Co.	Solar Evaporation	Crystal Peak Minerals	*
US Gypsum	Gypsum	Sigurd, Sevier Co.	Surface	US Gypsum	*
Utelite Mine	Expanded Shale	Coalville, Summit Co.	Surface	Utelite Corp.	1962
Western Clay	Bentonite	Aurora, Sevier Co.	Surface	Western Clay Corp.	1963

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Carbon and Emery counties where the economy has been coal from Day One, the public and the local governments are very educated in, and supportive of, the mining industry. If a new road needs to be built for one of the mines, the county will build it. Of course, it is built with the mine's money. But it is now a county road.

CODY WILSON: ***How has technology impacted the industry?***

GREG MADSEN: A lot of people think that there isn't a lot of technology or education in mining, which is increasingly less true. It is high tech. And we need people with state-of-the-art skills in computers, robotics, automation, engineering and environmental areas. One of our challenges is the increasing technology and people who are able to deal with the increasing technology. For example, diesel mechanic jobs, for the most part, require a four-year degree. It's just not the way it used to be. It's high tech. It's computer science.

BRIAN SOMERS: In many cases it's the mining, industrial and agricultural industries that are actually making the advancements, which eventually get rolled into the consumer side with cars and other things. Today it is a much different and much more sophisticated industry. That has been reflected in the fact that not only are there increased job opportunities, but there is also a much-improved safety record and a much-improved environmental record because of the advances that are being made by implementing technology in the mining space.

RICHARD WHITE: You can still get a job right out of high school, but you're going to be a lot better off if you at least get some technical education. That way you have some background knowledge in the technology being used in the industry. You are able to get into some pretty fascinating technology. For example, look at the GPS units that are mounted on something as simple as a dozer. Those satellites are telling that dozer what to do and the operator is just keeping if from going over the cliff.

BOB BABCOCK: ***Switching gears a little, what is the industry seeing as far as labor-related challenges?***

GREG MADSEN: We are starving for qualified technicians. It is a challenge to attract young people and help them recognize mining as an occupation that they might be interested in. Referring back to the discussion on educating the public, we need to educate the public on the amount of high-paying jobs within the mining industry.

RICHARD WHITE: We have that same challenge in the coal industry. There is a lot of gray hair in the industry that is retiring. Mines are having a hard time replacing all of the engineers and managers that are retiring.

JED IVERSON: We are not just having a hard time replacing engineers who are retiring, but recruiting and keeping craftsmen. I think this generation — the millennials — are choosing different paths. But, with how well the industry is doing, we need the millennials. What the Brahma Group has done to find and train people, is we have set up recruiting and training centers, one in Salt Lake and another in Page, Arizona. We make sure they are MSHA- and Kennecott-trained so we can put them to work. In the last month, we have trained 200 people at these centers.

JARED JACKSON: You have to get creative — like what Brahma Group is doing — and form some of your own training programs. At Simplot, we cannot find enough diesel technicians. So, we partnered with Wheeler Equipment and our local technical college and put together an internship program. We take diesel technician students and give them some experience at the mine on mining equipment and at the Wheeler shop in Vernal — all in an effort to get them interested in working with mining equipment.

BOB BABCOCK: ***What about tech schools? Are they keeping up with the demand?***

BRADLEY BABCOCK: I think the tech schools are trying. The problem is, you get kids that are coming out of school that have the mindset of, "My grandfather and my father all worked in the mines. I don't want to work in the mines." And the fathers are telling them, "You don't want to work in the mines."

RICHARD WHITE: It is tough because the grandpas and dads both worked under conditions that were pretty tough. They don't realize that safety protocols have advanced substantially. Technology has advanced and overall things are different now. It takes a pretty forward-thinking kid to say, "I want to be in this industry." Universities and schools are building programs to teach them — if they can just convince the kids to get into those programs.

BRIAN SOMERS: The state has done a lot of things on workforce development. They have various Pathways programs now. I think the diesel mechanic Pathway is the only one that is directly targeted at the mining industry. Why don't we have an electrician Pathway? Why don't we have some of these other Pathways so that kids can understand that mining is not just going underground or being an equipment operator? I think there is an opportunity, through these Pathway programs, for government to do a better job and work more collaboratively with the industry to help with workforce development.

GREG MADSEN: Even with the success of the Pathways program, we are still dying for diesel mechanics. We are unable to fulfill our current demand or come anywhere close to it.

BRIAN BABCOCK: ***With that, this question is specifically targeted at the construction contractors in the room. How are your companies dealing with labor issues? You are broad enough to be able to move people back and forth to deal with all the fluidity in the mining markets. How do you market that to your employees and potential future employees?***

LENNIE BOTEILHO: Ames Construction has spent a lot of time going to colleges and universities and working with their internship programs in an attempt to educate students on what is out there in the mining world. We are trying to inform them that the mining industry is a lot more than just running equipment. It goes all the way to the management level. This year we were able to get two interns in a mining program. We made 17 offers and got two. We have gone a step further and started buying software and giving it to the universities to teach the students how to use it, since the universities won't buy it themselves. We have bought Primavera, AutoCAD, AGTEK, etc. But, universities are mostly stuck on their curriculum and it is hard to get them to change it, although we have had a couple universities adapt some things.

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ROUNDTABLE

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RICHARD WHITE: Another difficult aspect is that graduates may understand the theoretical background — which you have to have — but they don't understand how it practically applies or how to implement it in real-world situations. The trade schools do a much better job at practical applications, but the universities still stay pretty theoretical.

BRADLEY BABCOCK: That is one of the problems. I taught at the university level for two years. At the university level, they expect you to publish or perish — not to throw any stones at the publishing industry. I think that shifts the focus from teaching to publishing. But if the industry could put people in as adjunct professors, you wouldn't have the same restrictions: publish or perish. That way, the students would likely be taught a much more practical understanding along with the traditional theoretical understanding.

LENNIE BOTEILHO: The mining program in Nevada has been able to work with various mining companies to have their managers and more-senior employees teach one or two days a week in a couple of the mining classes. Their students are coming out with a better understanding. Yes, you have to know the formulas and all of that, but students also need a little of the hands-on feeling as well. Montana Tech is a great example. They produced a lot of good mining engineers. They had people teaching the programs that used to be miners. Now, it has transitioned away from that. So, now, their program has kind of struggled to fill their classes the last few years.

GREG MADSEN: It is interesting, this talk about technology and the lack of trained, educated and qualified people is the same conversation that is being had in Australia, or in the tar sands of Canada or in the copper mines of Peru and Chile. It is a global issue. It doesn't matter where it is in the world. If there is mining, they are talking about lack of trained, educated, qualified employees. So, the message is: "If you want to see the world, if you want to work and live in Australia, Canada or South America, mining is a great way to do it."

RICHARD WHITE: I think that is part of the problem, too. If you have grown up along the Wasatch Front, and that is where your family is, it is where you want to stay. Now, if they are single, they may be more inclined to move out of the country. Then it is easier since you aren't moving a family around. So, if they are a diesel mechanic, they are more likely to say, "Well, if I'm going to be a diesel mechanic, I'm going to be a diesel mechanic at a trucking company because I can stay here."

BRIAN SOMERS: I think that is part of the education process, too. There are definitely jobs that require transplanting around the world. But, there are other jobs in the mining industry that absolutely don't. Look around the room. You all are examples of that. You have been here for a long time, making your living in the mining industry.

LENNIE BOTEILHO: I think it's difficult to get people to travel. It doesn't matter if it is the mining or the construction side at this point. We struggle with that. I get a call from a client asking for our help in South America. Then I spend weeks trying to put a team together and I might find one or two people who want to go. It is just hard to get people to get up and go now. You can offer to pay them a lot of money and they still won't go.

BOB BABCOCK: ***Has anyone made any inroads in the immigrant population? Typically, they are a little more motivated and willing.***

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MINE SAFETY

The history isn't great, but statistically, it's safer to work in today's modern mines than in the neighborhood shopping mall

At 10:28 on the morning of May 1, 1900, an explosion ripped through the Winter Quarters No. 4 mine near Scofield. Many miners died instantly from the blast, and many more in the connected Winter Quarter No. 1 died from toxic gases as they tried to escape.

At least 200 miners died that day. Every household in the town of Scofield was affected, leaving 107 widows and 270 fatherless children. There were not enough caskets in the state of Utah to bury all the dead — 75 had to be brought in from Denver.

At the time, it was the worst mine disaster in U.S. history and remains the fifth-worst to this day.

Almost 24 years later and 37 miles from Scofield, a series of three explosions killed all 172 miners who were working in the Castle Gate No. 2 mine.

Why bring up these tragedies — the two worst mine disasters in the history of Utah's mining industry — in an article on mine safety? We need to show just how far the mining industry has come with regard to its safety record. Although there have been tragic accidents since Scofield and Castle Gate, we have not experienced anything of a remotely similar scale.

That is true of the larger mining industry in the United States, as well. Of the 15 largest mine disasters in U.S. history, all of them occurred prior to the Great Depression. In the year 1931, there were 1,688 fatalities in U.S. mine operations. In 2018, there were 27, the second-lowest number on record.

In just the past 30 years, the injury rate for in the mining industry — which includes both fatal and non-fatal injuries — has declined from 8.36 injuries per 200,000 employee-hours to 2.04 injuries per 200,000 employee-hours today.

According to data from the Bureau of Labor Statistics, in 2018, a worker was statistically twice as likely to be injured working in a retail store than in a mine. Workers were 53 percent more likely to be injured working in a hotel than in a mining operation.

The purpose in citing these statistics is not to minimize the dangers that workers in mining and service operations face. Mine workers face myriad of dangers associated with working with many types of heavy equipment, powered haulage, exposure to explosive and combustion hazards, chemical hazards, respiratory and ventilation hazards, electrocution, damage to hearing, musculoskeletal injuries, dangers associated with highwalls, landslides, rockfalls, cave-ins, flooding and many more.

That miners face these diverse and very real dangers every single day and still have a lower injury rate than a retail or hospitality operation is simply astounding.

This remarkable safety record is not achieved by happenstance. It is the result of extraordinary and unceasing effort. It is the result of mining and service companies dedicating the time, focus and resources needed to create a culture of safety — of "Zero Harm." It is the result of companies taking the necessary steps to ensure that safety is instilled in employees, not just as a behavior but as a fundamental value, so that safety doesn't just become an exercise in following procedures or rules, but a way of thinking that permeates all of an employee's actions on the job.

The phenomenal improvements in mining industry's safety record is also the result of significant and steady investments in safety systems and equipment, as well as the industry innovating new technologies to keep their workers safe.

Today, for example, we're seeing the increased use of IoT — Internet of Things — solutions in mines. There are remote sensing applications such as motion detections systems in hard hats to signal possible medical emergencies in workers, fatigue sensors for haul truck drivers and proximity sensors for mining equipment. The mining industry has also been an early adopter and innovator in autonomous and semi-autonomous systems, including drones, robots, remote operation of powered haulage equipment and more.

Utah's mining industry is extremely diverse. We have surface and underground mines that extract a large variety of base and precious metals, coal and industrial minerals. Utah's mine operators use myriad mining techniques and equipment, and many mines are paired with extremely modern and efficient mills, smelters and plants.

Each mine in Utah has site-specific risk factors. The common thread, however, is their excellent safety performance and their ongoing commitment to promoting a culture of Zero Harm.

Liz Radley is the director of education and outreach for the Utah Mining Association.

The widow and children of a miner killed when an explosion tore through the Winter Quarters No. 4 mine near Scofield in Carbon County prepare for the funeral. The disaster killed over 200 workers and left 107 widows and 270 fatherless children.

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BRADLEY BABCOCK: I think it would be interesting to put some education at the border and integrate immigrants into skills that are needed and put them into locations that are in need of those services and skills. The industry could help solve some of the issues at the border, if we could somehow educate and place immigrants into jobs.

RICHARD WHITE: I am seeing professional level immigrants in the mining industry. I have hired guys from Ghana, a woman from China, and a guy from Iraq. They all came in with Ph.D.'s. I am not seeing a lot on the technical level when I am around the mines. I don't know if that's just because they are not available or what.

RICHARD WHITE: Think about if you had a technical training school in El Paso where you bring immigrants in for two years. You set up requirements for them and promise a green card upon completion of the program. There has to been a way to figure this sort of thing out. There is a massive workforce available. And, we have the need.

GREG MADSEN: There is a great example of that in Perth, Australia. WesTrac, a Caterpillar dealer, has brought in 900 people into their three-year technical training program — most from South Africa. They have language classes, computer skills, everything. That is what it has taken WesTrac to get enough technicians on its staff.

CODY WILSON: ***We have spent a lot of time talking about labor and education, which I think is an indication of where the industry's biggest challenges may be. Let's switch gears and talk about commodity prices and government regulations.***

GREG MADSEN: Coal is struggling. Not just in the state, but globally. With the price and environmental superiority of natural gas, coal is struggling. We have copper mines that are mothballed — or really — on care and maintenance. So, commodity price increases would really help that. And we have a huge iron ore deposit down in Iron County that has been mined in the past that is not being currently mined. From a political perspective, things look a lot more stable and I think the overall outlook for the industry is much brighter than it has been in the past. There is a lot more long-term confidence.

JED IVERSON: I think with the upcoming election year, there is certainly the potential that things will slow down, but we still feel really confident. We feel like it is going to continue to grow.

BRIAN SOMERS: I think this brings up the larger point of the uncertainty the industry faces from government regulation, especially on the federal side. When the federal government has policies that lead to the artificial demise of an industry, it is not just the mines that are affected. It's also the companies supporting the operations, as well. The policymakers need to understand that it is not only a copper mine or a coal mine that is being mothballed, but truckers, construction workers, engineers, lawyers and other supporting roles that are being put out of work. Beyond that, the state and local governments are losing income through mineral revenues, property taxes, income taxes, etc., etc.

BRIAN BABCOCK: ***How do you get stability in the mining industry? Is there a way, or is it more of a pipe dream?***

BRIAN SOMERS: It is very difficult to have stability when there are so many different levers that can be pulled to make life really problematic for the industry. But, I think if you are electing people that understand the importance of the mining industry, that could help. I do think that the answer to this question ties into what we have already talked about. And that is informing the general public — the people that are voting policymakers into office — of the importance of our industry.

RICHARD WHITE: Unless you're Materion, which mines the largest beryllium deposit in the world, then you are subject to global economic forces that you cannot control.

BRIAN SOMERS: Yes, that and you are also in direct competition with other countries that are not playing fair in the global markets. For instance, I don't think that Kennecott is less efficient in extracting some of their rare earths than China. I think they are far more efficient. But, in China, there is a lack of environment and labor regulations, which Kennecott has to abide by.

BRIAN BABCOCK: ***What about tariffs then? How do you think tariffs play into trying to help the rest of the world play fair?***

BRADLEY BABCOCK: That's a tough one. It costs the consumer a lot of money when you put tariffs in place. But, obviously, it's a negotiating tool that is being used to play tough in the hope that others come to the table and you can pull back and get back to business. It is a dicey situation.

JARED JACKSON: It is kind of a two-edged sword. For instance, take the phosphate industry as an example. We would love to have tariffs on those countries that are importing phosphate into the U.S. that are not on a level playing field, so to speak. They do not have to abide by the same environmental, safety and labor regulations. On the other side, we also would like to export our products to these same countries, as well. I think people are just anxious to see how the tariffs will play out. There could be some benefits to the industry. But there also could be some aspects that could negatively impact the mining industry.

CODY WILSON: ***How do we encourage the industry to put more people in the political arena? Or, how do we encourage people from the industry to become more politically active?***

BRADLEY BABCOCK: I think that our industry could be truly benefitted by having professionals from our industry being voices of reasons in the state legislature.

BRIAN SOMERS: I think the pressure that has come from environmental organizations has got a lot of folks in the industry wanting to put their heads down and go about their business. But, we're in a world where you can't do that. You have to be participating in the political process. You need to be willing to pick up the phone and let them know that the bill they are contemplating is going to cause problems for the industry. We have got to make sure we have a seat at the table to keep the state mining-friendly long term.

GREG MADSEN: We are really fortunate in Utah to have Gary Herbert and Rob Bishop, who, I think, are both very supportive of the mining industry. We are a mining-friendly state at this point. Maybe there needs to be a lot more thought going into what we need to do to keep it that way.

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BRIAN BABCOCK: ***Any comments on infrastructure or transportation?***

GREG MADSEN: I would mention two things about that. The first is access to West Coast ports can be huge for coal and iron ore. The other is improving transportation of petroleum and bitumen out of the Uintah Basin. That could be economically and significantly big for mining here as well.

BRADLEY BABCOCK: The access to West Coast ports is huge. Currently, California does not want any coal shipped out of their ports. There is a big court battle in California about this right now. We have been trying to get a port in Washington that we can ship coal out of. It has been so difficult that there has been talk of going down through Texas since there is, in essence, a blockade on the West Coast that won't let us export any coal. In the past, we were able to export coal through the Port of L.A., but that has since been shut down.

RICHARD WHITE: That is a real problem. The Emery mine was going to ship a million tons of coal each year to China. Then when the Long Beach port shut down, the mine was unable to do that. Nobody could ship off the West Coast. It is a real problem. Since it is a political issue, it is going to remain a real problem for a long time.

BRIAN SOMERS: This is where the state is still involved in trying to get an export terminal. The Governor's Office of Energy Development is in that. They are looking at options in Mexico and elsewhere. I think this goes back to the discussion of making sure we are electing people that understand the needs of the industry and the opportunities that are available — you know — understanding the export markets, among other things.

BRIAN BABCOCK: ***In closing, what would you like the readers of The Enterprise to know about the mining industry?***

JED IVERSON: We are optimistic about the future. The reason it is difficult to find employees is because everyone is so busy. I think that is a good problem to have. We are hiring a lot of people into high-paying jobs. And, it is a good industry.

GREG MADSEN: Mining makes modern life possible. It is absolutely critical to the economic stability and political security of the country. It is also an industry that is plagued, to a point, by an ancient history of being unsafe and environmentally unfriendly or unclean. But that was the past. It is neither the present, nor the future. Lastly, it is a great industry to work in.

JARED JACKSON: I would like to get the public thinking, in general, what would happen if the mining industry went away. You would not be able to have a car, a cell phone, a computer or supply food to our population. I would also like to refer people to the UMA to learn more about the mining industry's importance for the state of Utah. Go to their website, www.utahmining.org. You can find a lot of great information there about the benefits that mining provides our state.

BRIAN SOMERS: $80,000 is the average salary in the mining industry. That is significantly higher than the state average. In many rural counties, the mining industry is critical for keeping people employed in family-sustaining jobs.

RICHARD WHITE: It is not just the salaries the miners are being paid, but the grocery store and hardware store, along with all their employees, are there because the mine is there.

LENNIE BOTEILHO: If the mine shuts down, think about how many other businesses go out of business, as well. There's a lot of supporting businesses that support one mining operation. And, typically, those jobs pay pretty well, too.

MINING SERVICE PROVIDERS

Listed Alphabetically

THE List

Company Name	Contact Information	Services Provided
ACF West Inc.	acfwest.com 800-804-1393	Geosynthetic solutions
ACZ Laboratories	acz.com 970-879-6590	Environmental testing
Ames Construction Inc.	amesconstruction.com 801-977-8012	Heavy civil & industrial construction
Atkinson Construction	atkn.com 303-985-1660	Heavy civil & industrial construction
Barney Trucking	barneytrucking.com 800-524-7930	Trucking services
Barr Engineering	barr.com 801-333-8400	Engineering & environmental consulting
Boart Longyear	boartlongyear.com 801-972-6430	Drilling equipment & service
Bowen Collins & Associates	bowencollins.com 801-495-2224	Engineering & environmental consulting
Brahma Group Inc.	brahmagroupinc.com 801-521-5200	Industrial construction & project management
Brunel	brunel.net 801-987-5946	Recruitment & workforce solutions
C&G Construction	cgconst.com 435-882-1529	Civil construction, excavation, steel erection
Cumberland Surety Inc.	cumberlandsurety.com 800-767-8622	Insurance, underwriting, surety bonds
Dark Horse Timber	darkhorsetimber.com 435-525-1012	Mining timbers, lumber services
DC Power Solutions	dcpower.cc 800-326-0691	Large battery sales & service
Dorsey & Whitney	dorsey.com 801-933-7360	Legal services—natural resources practice
DP Systems	dpindustrialinc.com 801-886-2170	Industrial scaffolding, insulation, siding
Duff and Phelps	duffandphelps.com 415-693-5367	Corp. finance, valuation, advisory services
Em Strategies Inc.	emstrats.com 775-826-8822	Environmental consulting
Epiroc LLC	epiroc.com 844-437-4762	Equipment distribution & service
ERM-Rocky Mountain	erm.com 801-204-4300	Environmental, health, safety consulting
Fabian Vancott	fabianvancott.com 801-531-8900	Legal services—natural resources practice
FLSmidth	flsmidth.com 801-871-7000	Production facilities, equipment, services
Fulton Pacific Co.	fultonpacific.com 707-446-6020	Packaging solutions
GeoStrata	geostrata-llc.com 801-501-0584	Engineering & geoscience services
Geotemps Inc.	geotemps.com 775-746-7146	Recruitment & workforce solutions
Gerhart Cole	gerhartcole.com 801-849-0055	Geotechnical engineering
Golden West Industries Inc.	goldenwest-industries.com 435-637-5402	Chemical solutions for mining, materials handling
Golder Associates	golder.com 801-312-9320	Consulting, design, construction services
HDR Inc.	hdrinc.com 801-743-7800	Engineering, architecture, environmental services
Holland & Hart	hollandhart.com 801-799-5826	Legal services—natural resources practice
Hunt Electric	huntelectric.com 801-975-8844	Electrical contractor
ICM Solutions	wheelercat.com 801-978-1432	Crushing and paving products
Industrial Supply	indsupply.com 801-484-8644	Industrial supplies, MROP materials
Ingenium Design	ingeniumdesign.us 801-413-7672	Engineering & design services
Jennmar Services	jennmarservices.jobs 435-637-9300	Recruitment & workforce solutions
Job Industrial Services Inc.	jobindustrial.com 801-433-0901	Engineering, procurement, construction mgmt.
Komatsu Equipment Co.	komatsueq.com 877-566-2878	Equipment distribution & service

Company Name	Contact information	Services Provided
Komatsu Mining	mining.komatsu 435-636-6100	Equipment distribution & service
Liebherr USA Co.	liebherr.com 307-686-0948	Equipment distribution & service
Magnum Development	magnumdev.com 801-993-7001	Chemical, gas storage; clean energy storage
McNeil Engineering	mcneilengineering.com 801-255-7700	Civil engineering & design services
Milex Technologies	milextech.com 775-340-4942	Light tower & custom equipment manufacturer
Millcreek Engineering Co.	millcreekeng.com 801-904-2260	Engineering & construction management
Monsen Engineering	monsenengineering.com 800-821-0672	Product supply for design/ build industry
NOW CFO	nowcfo.com 801-598-9390	Outsourced CFO, controller, acctg. services
Parr Brown Gee & Loveless	parrbrown.com 801-532-7840	Legal services—natural resources practice
Parsons Behle & Latimer	parsonsbehle.com 801-532-1234	Legal services—natural resources practice
Ray Quinney & Nebeker	rqn.com 801-532-1500	Legal services—natural resources practice
Richwood Industries	richwood.com 800-237-6951	Bulk handling equipment distribution & service
Robinson Transport Inc.	haulcoal.com 435-529-7472	Trucking services
Rocky Mountain Industrial	rmiwyoming.com 307-472-5519	Flame-resistant, winter clothing; PPE supply
Savage Services Corp.	savageservices.com 801-944-6600	Transportation, logistics, operations services
SITECH Intermountain	sitech-im.com 801-978-1619	Mining/construction technology systems
Smith Power Products	smithpowerproducts.com 800-658-5352	Equipment, engine rebuild & service
Snell & Wilmer	swlaw.com 801-257-1900	Legal services—Natural resources practice
Sonoran Process Equipment Co.	sonoranprocess.com 801-627-2472	Equipment & aftermarket service provider
Stantec Consulting	stantec.com 801-617-3200	Engineering, architecture, project mgmt. services
Stoel Rives LLP	stoel.com 801.328.3131	Legal services—natural resources practice
Strata Worldwide	strataworldwide.com 800.691.6601	Advanced mining safety solutions
SWCA Inc.	swca.com 801.322.4307	Environmental consulting
TIC-The Industrial Co.	tic-inc.com 303-325-0300	Heavy civil & industrial construction
Tierra Group International	tierragroupinternational.com 801-210-9600	Civil & geotechnical engineering
Tram Electric Inc.	tramelectric.com 435-637-7291	Electric motor rebuild & service
Utah Metal Works	umw.com 877-221-0099	Industrial scrap & recycling services
VCI	govci.com	Heavy industry research, advisory, investment serv.
Victaulic	victaulic.com 610-559-3300	Mechanical pipe joining solutions
W.W. Clyde & Company	wwclyde.net 801-802-6800	Heavy civil & industrial construction
Wagstaff Crane Service	wagstaffcrane.com 801-277-3820	Crane service & engineering
Wanzek Construction	wanzek.com 701-282-6171	Heavy civil & industrial construction
WESCO	wesco.com 801-975-0600	Industrial supply chain solutions
Western Cultural Resource Management	wcrminc.com 303-449-1151	Cultural resource consulting services
Wheeler Machinery Co.	wheelercat.com 801-796-8333	Equipment distribution & service
Wollam Construction Co.	wollam construction.com 801-934-9170	Heavy civil & industrial construction
Zooks Solutions Inc.	zookssolutions.com	Recruitment & workforce solutions

THE Enterprise UTAH'S BUSINESS JOURNAL

COAL MINES

Ranked by Short Tons Produced 2018

THE List

	Mine	County	Coal Field	Company	Thousand Short Tons Produced
1	**SUFCO**	Sevier	Wasatch Plateau	Wolverine Fuels	4,842
2	**Skyline No. 3**	Carbon/Emery/Sanpete	Wasatch Plateau	Wolverine Fuels	3,614
3	**Lila Canyon Mine**	Emery	Book Cliffs	UtahAmerican Energy/ Murray Energy Corp.	2,816
4	**Castle Valley No. 3**	Emery	Emery	Rhino Resource Partners	600
5	**Dugout Canyon Mine**	Carbon	Book Cliffs	Wolverine Fuels	557
6	**Coal Hollow Mine**	Kane	Alton	Alton Coal Development	488
7	**Emery**	Emery	Emery	Bronco Utah Operations	442
8	**Castle Valley No. 4**	Emery	Emery	Rhino Resource Partners	400

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