



THE DOE RUN COMPANY

2018

Sustainability
Report



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2018 Message from the CEO

<http://doerun.com/media/news/2018-letter-from-ceo/>



Doe Run president and CEO, Jerry Pyatt, shares updates about the company, the global lead industry, our workforce and our communities in Southeast Missouri.

Welcome to The Doe Run Company's 2018 Sustainability Report. This marks the 10th anniversary of our inaugural report utilizing Global Reporting Initiative (GRI) indicators.

A critical part of our mission is to deliver a sustainable supply of select minerals, metals and services that meet the changing needs of the world's growing population. We do this by balancing our social, economic and environmental responsibilities as we mine lead, copper and zinc from underground mines in Missouri. We also **recycle lead batteries** and other lead waste to return this vital metal to be used in batteries and other products. These annual sustainability reports provide us with an opportunity to reflect on how we are living up to our **Sustainability Principles**, and provide transparent updates to our stakeholders and communities.

Global Market Challenges & Opportunities

Lead metal prices, as reported on the London Metal Exchange, recovered in 2017 from a period of softness in 2015 and 2016, but declined by 3% in 2018. In addition, tariffs put in place by China on lead, copper and zinc imports had a negative economic impact on the company, since significant portions of our concentrates are sold to Asia.

Despite price pressures, we expanded our **exploration efforts** and added new ore bodies to our resources (we locate new resources at about the same rate as we mine them), including some that contain other high-value metals. These resources include cobalt, a highly desirable metal for batteries. In the past, these cobalt reserves could not be mined economically. Doe Run has piloted a proprietary process to extract cobalt and other valuable metals from complex ores. The company is actively working to commercialize this process in conjunction with expansion of its mines. Cobalt reserves in Missouri have the potential to position the state as a battery production center based on its geology, battery manufacturing and recycling plants, its central location, and access to rail, highway and river transportation.

Growth opportunities must be balanced with ongoing commitments. Doe Run is the last of what once was several hundred lead mining companies that operated in Missouri. Over the last 10 years, Doe Run has spent nearly \$70 million remediating historical sites, some of which were previously remediated to earlier requirements. We are committed to paying our fair share for clean-up of the mining operations of our predecessors, but we believe clean-up should be based on risk-based science. Read more about our **remediation efforts**.

Missouri Impact and the Future

As a major employer in southeastern Missouri, Doe Run's economic contribution is significant. We spent more than \$181 million on Missouri vendors in 2018 and \$1.78 billion over the last 10 years. We also paid more than \$106 million in royalties in the last 10 years. Overall, our Missouri economic impact is estimated at approximately 1 billion dollars per year.

Over the last 10 years, we have spent nearly \$450 million on **environmental projects**, including nearly \$73 million spent over five years to construct new water treatment plants. Many of these projects also significantly increased our ongoing operating costs.

Regulatory spending is a common challenge for industries like ours, putting pressure on our ability to expand operations or invest in new technologies. Nevertheless, after years of planning and implementation, we are pleased to be the first company in the U.S. to install the **Railveyor underground** electric rail system to transport ore for milling. Innovations that reduce costs and improve performance are vital to sustaining our industry and strengthen the underlying foundation of the business.

Our Workforce

Our commitment to building a lasting future for our company requires additional talent to help us achieve our goals. In 2018, we **hired 177 new employees**, many to replace retiring employees. Based on national labor statistics as well as mining industry labor growth projections, we expect hiring demands to continue. Doe Run offers strong benefits and average wages that are higher than those reported for mining and manufacturing in Missouri. We encourage those interested in joining our team to check out our **careers page** regularly.

We firmly believe that workforce development should start early. We sponsor a number of educational opportunities in science, technology, engineering and math (STEM) to prepare our future workforce, including **curriculum support**, college and university scholarships, summer camps and tuition reimbursement for employees. In 2018, we contributed \$178,987 to these efforts.

We also supported the communities where we operate by **donating property**, valued at \$1.6 million, to support healthcare and emergency response services.

Safety is fundamental to our company, and we achieved several **health and safety milestones** at our operations, and have drastically reduced blood-lead levels of employees to well below regulatory requirements. In order to operate safely, we train and prepare. In 2018, our own Steve Setzer, Doe Run electrician and mine rescue team captain, was inducted into the **National Mine Rescue Hall of Fame** for his contributions to mine rescue training.

Sometimes, even the best training and safety practices are insufficient. As we prepared this report in 2019, we were deeply saddened that we recently lost a good friend and employee in an accident at our recycling facility. We are cooperating with the Occupational Safety and Health Administration (OSHA) to investigate the cause of the accident.

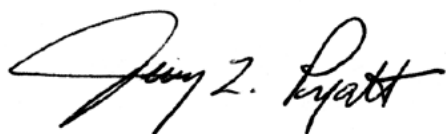
Batteries' Role in Clean Energy

Batteries have a tremendous role in the path toward cleaner energy. While no single chemistry can perform all duties equally, lead's advantages of being safer, more sustainable, domestically sourced, 99% recycled and affordable make it a clear choice not only for electric vehicles but also for renewable energy storage. Global energy demand is expected to **increase by 30%** between 2018 and 2040, and it's clear that renewable energy sources such as wind and solar will be needed to meet this demand. We are proud to be among an elite group of companies supporting research at **Argonne National Laboratories**, aimed at establishing a foundation for the next generation of advanced lead battery technology.

The lead battery industry as a whole has an annual economic impact of \$28.5 billion to the U.S. economy and provides more than 20,000 jobs in 30 states. Approximately 70% of the lead used by U.S. battery manufacturers is sourced domestically through recycling. Doe Run is part of this success story – we recycle approximately 13.5 million batteries at our Resource Recycling facility each year.

The challenges and opportunities our business faces are not unique. A strong U.S. economy means consumers and employees have more choices and increased leverage. Regulation inequities across the globe also impact companies like ours. After being in business for 154 years, we are experienced in managing the risks and embracing the opportunities of our industry because of the deep talent in our organization. We invite you to learn more about our company through our sustainability stories and data tables, and welcome your feedback **here**.

Sincerely,

A handwritten signature in black ink, reading "Jerry L. Pyatt". The signature is fluid and cursive, with the first name "Jerry" and last name "Pyatt" clearly legible.

Jerry L. Pyatt

President and Chief Executive Officer

Corporateinfo@doerun.com

Community Engagement

<http://doerun.com/media/news/community-engagement-2/>



In 2018, Doe Run donated buildings and land worth over \$1.6 million to our community in Southeast Missouri to support community health, safety and education initiatives.

Nearly a decade ago, a team of Doe Run employees defined eight Sustainability Principles to direct our business decisions. Two principles keep us accountable to our communities.

They are:

- We will respect community values, priorities and interest in our business decisions.
- We will provide enduring benefits that enhance our communities.

When asked, community members have told us the top challenges facing our Southeast Missouri region include education and workforce readiness, health care, and infrastructure. That's why Doe Run focused our community engagement in those areas over the last decade. In 2018, Doe Run donated buildings and land worth over \$1.6 million to be repurposed to meet community needs, as well as supported many area education initiatives.

Our goal is to provide enduring benefits to the community. A bridge or building benefits the community for generations. A scholarship can put a student on the path to a stable career for the rest of their life.

– *Steve Batts, vice president and chief operating officer*

Property Donations Support Community Health and Safety

Access to health care can be a challenge for many residents in our communities. It can take an hour for some rural residents to reach doctors, dentists and other health care providers. That's why Doe Run donated its former bowling alley building in Viburnum, Missouri, to Missouri Highlands Health Care. The facility is expanding health-related services to the communities in Iron and neighboring counties.

"Residents in the area often drive long distances to get the treatment they need," said Karen White, chief executive officer of Missouri Highlands Health Care. "With this building, we're expanding our services, and increasing access for residents in the seven-county area Missouri Highlands serves."

Missouri Highlands will relocate its existing medical clinic and behavioral health services to the new building and, based on feedback from the community, is considering adding other types of care, including dental services, substance abuse treatment and wellness education.

"We built the bowling alley for the community in 1975. After the bowling alley closed, it was time for it to have a new purpose," said Steve Batts, vice president and chief operating officer. "Expanded access to health and wellness services closer to home is so important in helping our communities and neighbors thrive. We are eager to see how Missouri Highlands reinvents the space."

Other capital donations in 2018 included:

- Transferring ownership of the 5.6-acre baseball complex and concession stand to Iron County C-4 School District.
- Donating Doe Run land adjacent to the Herculaneum American Veterans (AMVETS) Post MO-0042 to that organization.
- Transferring the Herculaneum Fire Station building and its land from Doe Run ownership to the Herculaneum Fire Department. We originally donated \$750,000 for construction of the fire station on our property in 2007. The station features five apparatus and equipment bays, training and conference rooms, weight training room and shower facilities, fire chief offices, and a bunk room for 24-hour, on-site staffing.

"Doe Run's donations have been a tremendous asset to the fire department over the years," said Herculaneum Fire Chief Kevin Baker. "With this donation, we now will have the infrastructure and collateral necessary to finance the equipment or improvements the fire department may need. We greatly appreciate the relationship we have had for decades with Doe Run."

Education and Workforce Readiness

Doe Run concentrates much of its community investment on education and workforce readiness because of the lifelong impact these programs make in the lives of area students and institutions.

“Nothing has a more lasting benefit than access to education,” said Sharon Gietl, Doe Run vice president – information technology and human resources.

A major focus for today’s students is science, technology, engineering and math (or STEM), education that prepares them for the workforce of tomorrow. The **U.S. Bureau of Labor Statistics** projects that STEM jobs will grow by 18.7% from 2010 to 2020.

The mining and lead battery industries provide quality jobs across the United States, as well as here in our Southeast Missouri home, for students interested in many STEM fields – engineering, electrical, advanced technologies and more. Today, the U.S. lead battery industry alone directly employs more than 20,000 people across the country, and mining operations employ more than 195,000.

In 2018, Doe Run helped students access summer camps, industry events and job training. This included two scholarships to the 2018 **Missouri University of Science and Technology** (Missouri S&T) Summer Explosives Camp for high school juniors and seniors, and sponsoring two college students to attend the annual Society for Mining, Metallurgy & Exploration conference.

Other education contributions made by Doe Run and our employees include:

- Annually providing five scholarships to Missouri S&T and three to Mineral Area College.
- Teaching minerals education to area students through the Serendipity career day at Salem Middle School, various classroom visits and the annual Fall Rocks event.
- Donating funds and providing expertise to Kaleidoscope Discovery Center’s model mine display.



Doe Run originally donated \$750,000 for construction of The Herculaneum Fire Station Building in 2007. In 2018, the fire station and land were transferred to the Herculaneum Fire Department.



Doe Run donated \$45,000 to support new ventilation lab equipment for the mining and explosives engineering department at Missouri University of Science and Technology.

- Providing funding for robotics equipment for Green Forest R-2 School District, for upgrades to the Missouri S&T Mining Ventilation Lab, for Project Lead The Way's STEM curriculum at Valley R-VI, and for a newly established licensed practical nursing program at the Southwest Baptist University (SBU) Salem Campus.

When it comes to our support of local schools, we sometimes receive questions about Doe Run's property tax appeal with Reynolds County. We are pleased that we have resolved the taxation dispute with Reynolds County. Learn more about this topic [here](#).

Doe Run Employee Inducted into National Mine Rescue Hall of Fame

<http://doerun.com/media/news/doe-run-employee-inducted-into-national-mine-rescue-hall-of-fame/>



Doe Run's Steve Setzer was inducted into the National Mine Rescue Hall of Fame in recognition of more than 30 years of dedication to mine rescue. Doe Run's Gray and Maroon teams continue their commitment to mine rescue by achieving safety milestones at competitions throughout the year.

After 54 regional competitions, 13 national contests and two national championship titles, employee Steve Setzer received the ultimate recognition for his decades of mine rescue leadership – induction into the National Mine Rescue Hall of Fame.

With more than three decades of dedication to mine rescue excellence, Steve joined other honorees in the Metal and Nonmetal (MNM) National Mine Rescue Hall of Fame during the National Metal and Nonmetal Mine Rescue Competition in July 2018. Steve also won the National Trainer Competition at this event, and led our Maroon Mine Rescue Team to earn second place out of 43 teams. He joins Doe Run retiree Denny Dickerson, who was inducted into the Hall of Fame in 2016.

"I'm proud to work alongside my fellow mine rescue teammates to improve efficiency and safety for our industry. We achieve more together, and I owe this recognition to my team and to my supportive family," said Steve Setzer, electrician at Brushy Creek Mine.

Steve has served as captain of Doe Run's Maroon Team for the last 17 years and the team trainer for the past seven. As captain, Steve led the team to win national championship titles in 2010 and 2014.

One of the aspects I enjoy most is passing down what I've learned to the next generation of miners — people, like my son, who have followed in my footsteps as a mine rescuer at Doe Run.

– *Steve Setzer, electrician and Maroon Team captain*

Andrew Hampton, instrument tech at Fletcher Mine and Mill, nominated Steve for the National Mine Rescue Hall of Fame. "Steve is always challenging team members to do their best. His passion for mine rescue drives innovative thinking that helps make us better," Andrew said. "When the call comes to help his coworkers, Steve is there."

In 2010, Steve led a team that safely evacuated employees during a truck fire in one of our mines. In recognition of their service during this emergency, Steve and his fellow rescuers received a Certificate of Honor at the Joseph A. Holmes Safety Association annual meeting in Washington, D.C.

Steve's leadership roles include serving as president of the Missouri Mine Rescue Association, inaugural vice president of Holmes Mine Rescue Association, and vice president of the United States Mine Rescue Association.

In addition to the Maroon Team's second place win in the national competition, our mine rescue teams took home several awards at regional competitions in 2018. The Gray Team won first place in the field competition, first aid competition and team trainer competition at the Northern Regional Mine Rescue Contest. At Missouri University of Science and Technology's Annual Mine Rescue Contest, the Gray Team won first place in the first aid competition, and the Maroon Team won first place in the team trainer competition.

Our commitment to safety also helped us reach safety milestones at several of our locations in 2018. Learn more about our recent mine rescue and safety achievements on our [Awards page](#).

Employees Drive Safety at Doe Run

<http://doerun.com/media/news/employees-drive-safety-at-doe-run/>



Doe Run employees are encouraged to implement new ideas to enhance employee safety at our operations. Richard Snow, electrician, proposed and led educational courses on electrical safety at Resource Recycling.

When it comes to safety, we won't be satisfied with our performance until we have zero accidents. In 2018, employees helped create and launch several new safety initiatives to help us improve.

"Every Doe Run employee, from interns to upper management, is charged with thinking about the safest way to do their job," said Justin Province, production superintendent at Resource Recycling. "I tell my team that no one knows how to do their job as well as they do, so we rely on employees to elevate safety issues and help develop solutions."

In 2018, employees assisted in several safety improvements across the company, thanks to their contributions to our first ever SLAM safety competition. Employees submitted their best ideas for improving worker safety, using the SLAM (which stands for Stop, Look, Analyze, Manage) risk management framework from the Mine Safety and Health Administration (MSHA). The employees with the top three safety solutions received a prize. Richard Snow, an electrician who has worked at Doe Run for 13 years, was one employee with a winning idea.

“One of the issues we had was co-workers calling the electrical shop when their equipment stopped running for no apparent reason. Frequently, the solution was simply resetting the electrical trip breakers – just like restarting your computer when it locks up,” said Richard. “But employees didn’t know how to do this. By the time they notified the maintenance department and an electrician could reach them, they may have lost 30 minutes of production time. I proposed training employees to identify when a situation requires a simple reset, and to safely do it themselves, so they can more quickly get their equipment back up and running.”

Richard taught dozens of hands-on classes for employees. The work led to more in-depth electrical training for supervisors as well.

Improving safety is a continuous process. Our employees are often the best source for new ideas, which is why we are empowering employees to help create new programs that solve safety issues.
– *Anthony Staley, general manager – Resource Recycling*

Learning from Near-Incidents

The number of incidents at Resource Recycling was reduced in 2018, largely because of a new process for examining and learning from the incidents that didn’t happen.

“Part of reducing our incident rate is giving near-incidents as much attention as actual accidents,” said Justin. “We introduced a new process where the management team and general manager review each incident and near miss to understand what happened and come up with plans to prevent similar incidents in the future. Our employees help elevate these situations to our attention.”

Among the changes we’re implementing at Resource Recycling are a new trenching and excavation policy to keep employees safe near open trenches, and a new parking policy that will better secure vehicles when they’re parked within the plant.

At our Southeast Missouri Mining and Milling Division (SEMO), we are improving employee task training on equipment. Beginning in 2019, employees will have the opportunity to practice at their own pace until they can safely use machinery in a productive work setting. We are also rolling out tools to make it easier for employees to document and cordon off potentially hazardous areas. In addition, employees will focus on reporting near-incidents so we can catalog and learn from them to prevent actual incidents.

Despite our ongoing commitment to continuous safety improvement, like any workplace, accidents can still happen. Tragically, we experienced a fatality at our Resource Recycling facility in March 2019, as we were working on this report. We are cooperating with the Occupational Safety and Health Administration (OSHA) to investigate the cause of the accident.

Reducing Blood Lead Levels

Resource Recycling achieved another year of record-low employee blood-lead levels in 2018. In lead mining and lead battery recycling, blood-lead levels measure the trace amount of lead in the bloodstream. Our employees have their blood tested regularly to ensure their safety. We remove workers from high-exposure jobs if they reach 30 micrograms of lead per deciliter of whole blood (µg/dL), but use a much more stringent level of 19 µg/dL as a tracking milestone to be even more protective. By comparison, the adjusted OSHA standard for medical reassignment of an employee is 53 µg/dL.

Employees at every operation are required to follow specific hygiene and safety procedures. At locations where there is more lead dust, such as some buildings at Resource Recycling, employees are required to wear more protective equipment, like a full-face respirator. Other locations, like the mines, have very limited exposure because the lead is still in hard rock form. Depending on an employee's job duties and location, precautions may include:

- Wearing personal protective equipment, such as a full-face respirator, glasses and gloves;
- Wearing a uniform that is laundered after use;
- Washing hands and changing uniforms before eating; or
- Showering before heading home for the day.

We work one-on-one with any employee with levels above the threshold to make sure they are following hygiene best practices, and we may even reassign them to another area of the plant if necessary. In 2018, only 11 employees at Resource Recycling had levels over 19 µg/dL, compared with 134 employees just two years earlier. Blood-lead levels also dropped at SEMO, where only four employees exceeded 19 µg/dL.

“Managing employee hygiene practices is another place where our employees have brought new ideas to us,” said Justin. “We have ongoing safety meetings and follow protective equipment and hygiene policies to help reduce exposure. Additionally, employees’ job and work area knowledge help them see other solutions that can make a huge impact on safety.”

For example, the crews at the blast furnace control area at Resource Recycling identified that covering the control room walls with plexiglass made it easier to clean potential lead dust from the wall. Read more about how we are keeping blood-lead levels low [here](#).

Safety Milestones

In 2018, several of Doe Run's locations achieved important safety milestones as a result of our safe work practices:

- Sweetwater Mill surpassed 21 years with no lost-time accidents.
- Brushy Creek Mill surpassed 12 years with no lost-time accidents.
- SEMO Port surpassed 12 years with no lost-time accidents.
- Our manufacturing subsidiary, Fabricated Products, Inc.'s (FPI), Seafab Metals location surpassed 18 years with no lost-time accidents.

Read more about our safety achievements [here](#).

Equipping the Mine of the Future

<http://doerun.com/media/news/equipping-the-mine-of-the-future/>



Doe Run piloted three innovative examples of mining technology that increase mine production and improve safety, including the use of drones both aboveground and below to inspect hard-to-reach places.

Technology helps people do their jobs better, faster and safer. Mining is no exception. In 2018, we piloted three technologies that increase mine production and improve safety.

“Doe Run and our predecessors have always been known for innovation, whether we come up with a novel idea or use existing technology in a new way,” said Clay McNail, superintendent, Fletcher and Sweetwater Mines. “To stay competitive, we continuously examine how to reduce costs while increasing productivity.”

Miners who first worked the Viburnum Trend in the 1960s would be amazed to see the technologies transforming how we work. In many cases, Doe Run is one of the first companies to pilot these innovations, which keeps our business competitive and helps attract the next generation of employees.

– *Brian Mangogna, general manager – SEMO operations*

Rail-Veyor

In 2018, our Casteel Mine became the first mine in the United States, and only the second commercial operation in the world, to install the Rail-Veyor continuous rail hauling system. The Rail-Veyor system operates like an underground electric light rail system. The fully automated system currently transports ore over three miles underground and can be expanded further if necessary.

“This technology has the potential to revolutionize underground mining,” said Steve Dismuke, technical services superintendent at Buick Mill, and project manager for Rail-Veyor. “As an early adopter of the system, this can provide us with efficiencies that other companies don’t have. We expect other companies will want to come and see our rail in operation.”

Previously, a hoist system at Casteel Mine brought ore to the surface, where it was trucked by road to be processed at Buick Mill. The hoist system operated at a maximum capacity of 3,600 tons of ore each day, which gave us no room to increase production in this mine. Now that we can load rail cars on a continuous loop, we can transport 800 tons more ore to the mill each day, and still have the hoist system as a backup option.

“One of the added benefits of Rail-Veyor is that it will reduce traffic on community roads,” said Steve. “The train will replace 200 one-way haul truck trips each day.”

Rail-Veyor requires only one operator to start and monitor the system. The operator uses a series of cameras to observe the rail system in real time from any location with an internet connection. This enables the operator to quickly identify potential issues or maintenance requirements. Employees who previously worked on the loaders and hoist system now operate Rail-Veyor or hold other underground jobs, giving them new opportunities and helping maximize production. Rail-Veyor is expected to provide strong savings year over year.



Casteel Mine is the first mine in the U.S. to pilot the Rail-Veyor continuous rail hauling system. The underground Rail-Veyor loads rail cars on a continuous loop to transport ore to Buick Mill – reducing our environmental impact by replacing 200 one-way haul truck trips aboveground.

Flying High with Drones

From flying several hundred feet above ground to nearly 1,000 feet below ground, camera-equipped drones are changing the way we operate. In 2018, we purchased two drones after a team of employees in information technology, environmental management and operations tested the technology and made the business case for several applications.

“Drones are particularly helpful in conducting inspections in hard-to-reach places. With a drone, I’m able to view all sides of our 550-foot emissions stack in a matter of minutes while remaining safely on the ground,” said David Boren, operations technology analyst at Doe Run. “In the past, this would have taken hours, and required riding an elevator 300 feet and climbing a ladder beyond that point.”

David has also flown a separate drone deep underground, where it can collect data and imagery in mining areas unsafe for human exploration, such as large open areas no longer supported by pillars. Flying a drone underground has its challenges because GPS does not function underground, so drone pilots must remain in visual contact with the drone. We use a smaller, lightweight drone in the mines (about three pounds), which can be more vulnerable to air currents.

Back on the surface, we use a heavy-duty eight-pound drone with a high-definition camera and GPS in conjunction with a surface survey kit and specialized software to estimate volume in stockpiles of metal concentrates, generate topographic images and calculate topography changes between flights.

“Drones have helped us reduce risk and time to carry out common tasks,” added Gen Sutton, environmental, health and safety (EHS) technical supervisor and drone pilot. “We can safely view mine tailing dams, roofs, ductwork, and practically any location on land or in our mines that could potentially expose employees to hazards, in a fraction of the time while obtaining views we were previously unable to see.”



David Boren uses a heavy-duty eight-pound drone to generate topographic images and estimate volume in stockpiles of metal concentrates.

Technology is, and will continue to be, one of the largest contributors to Doe Run’s success. From exploration to transportation to mineral processing and recovery, technology is deeply ingrained in our day to day operations.

– David Boren, operations technology analyst

FARA: Field Analysis and Reporting Application

The same sort of technology that gives you remote control and monitoring at home is changing the way we work underground. Innovative software and sensors are revolutionizing how we understand and manage information at our mines in real time.

Our Fletcher Mine is the first underground mine in the world to pilot the Field Analysis and Reporting Application (FARA) for data collection and analysis. FARA is a fleet and personnel management system designed for mines, quarries and construction sites to give supervisors immediate insight into productivity.

We mounted 53 small Bluetooth beacons strategically around Fletcher Mine and installed iPads on our trucks and loaders. Whenever a vehicle passes a beacon, FARA documents its location and time from the beacon. This information tells employees above and below ground where vehicles are and how quickly they are working.

“We can determine haulage rates from different parts of the mine to help us better forecast production,” said Clay McNail, mine superintendent at Fletcher Mine. “It’s also possible to get a more accurate time and reason why the vehicles broke down.”

Other benefits of FARA include:

- Quicker and more efficient data sharing about equipment our employees operate and the ore they examine. This is accomplished in real time via iPads instead of manually recording the data at the end of the shift.
- Faster equipment troubleshooting and maintenance, thanks to the ability to share pictures of broken equipment with maintenance crews via smart devices.
- Recognition of employees who proactively enter data in the system on our digital scoreboard, leading to quicker adoption.
- Better identification of bottlenecks in our processes, which leads to faster solutions and increased productivity.

“The way employees use this technology matches the way the next generation of workers already operate in their everyday lives,” said Andrea Deml, Doe Run operations analyst.

“Ultimately, the same type of technology that makes it easier to navigate traffic in our cars is helping us increase productivity and safety underground.”

Evolution of Our Environmental Management

<http://doerun.com/media/news/evolution-of-our-environmental-management/>



Since 2009, we've invested approximately \$450 million in efforts aimed at minimizing the environmental impact of mining and milling. A new environmental data management tool at Resource Recycling makes it easier to collect data and adjust our operations for improved environmental performance.

Operating in a manner that protects the environment is one of our guiding principles. For the past 10 years, we have reported on our efforts to reduce our environmental footprint in our annual Sustainability Report. This has been a decade of focus, innovation and purposeful investments.

"Since 2009, we've invested approximately \$450 million in efforts aimed at reducing air emissions, improving water quality and lessening our environmental impact at our mines and mills, as well as at our Resource Recycling facility," said Michael Montgomery, who was promoted to vice president – environmental affairs in 2019. "Our data shows that these investments have significantly reduced our air emissions and improved the quality of water discharged from operations."

Highlights from Our Southeast Missouri Mines and Mills:

- **Five water treatment plants:** We invested nearly \$73 million over five years to construct water treatment plants at our mines and mills. The plants use a chemical process to clean water from our operations before it is released to the environment.
- **Four concentrate enclosures:** These buildings store lead concentrates after the milling process. We added negative pressure ventilation systems to our buildings, which reduce the potential of fugitive emissions.
- **Geothermal HVAC:** We installed geothermal heating, ventilation and air conditioning (HVAC) systems at Brushy Creek Mine and Mill's building and the SEMO central office. The geothermal system uses 25% to 50% less electricity than conventional heating and cooling systems, reducing overall carbon dioxide and greenhouse gas emissions.
- **Waste management facilities:** An employee-led effort to redefine our procedures for managing waste resulted in the installation of new hazardous and non-hazardous waste storage areas at all mine and mill operations.
- **ISO 14011 certifications:** We established new processes and systems to achieve International Organization for Standardization (ISO) 14001 environmental management certification at our six mines and four mills. These certifications include ongoing third-party audits of our environmental procedures.

Highlights from the Resource Recycling Facility:

- **Dry lime scrubber:** In anticipation of more stringent National Ambient Air Quality Standards (NAAQS), Resource Recycling built a dry lime scrubber that successfully reduced air emissions. Today, our Resource Recycling SO₂ air monitors report average emissions around 40 parts per billion, approximately half of the EPA's requirement (75 parts per billion).
- **Building enclosures and new baghouses:** We took measures to enclose much of the plant and install six new baghouses and ventilation systems to collect lead particles and other airborne materials before releasing air outside.
- **Water treatment plant:** We constructed a new water treatment plant to capture and treat wastewater from the recycling process. We also installed a closed-loop water system for several of our processes, which reduced our consumption of fresh water.

"We have invested heavily in environmental projects over the past 10 years," said Michael.

"Regulatory requirements continue to tighten so we must not only focus on today's requirements but also anticipate future standards."

Improvements in Data Management

It's been said you can't manage what you don't measure, so data-tracking systems have been critical to guiding our environmental journey. Over the past decade, we have refined our data gathering process to add efficiency to our environmental efforts. Most recently, Resource Recycling added a new environmental data management tool to help us more easily collect data, make comparisons and adjust our operations for improved environmental and operational performance.

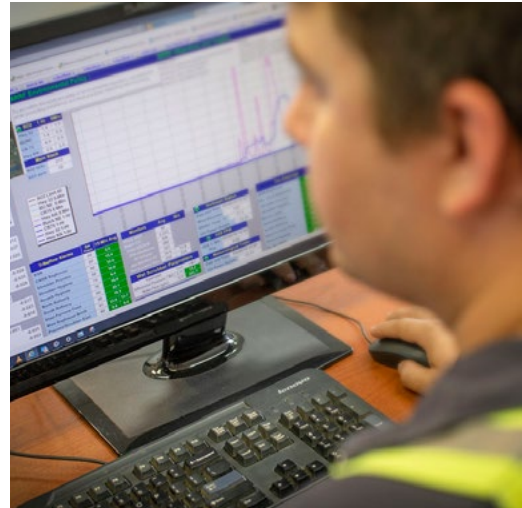
"We maintain years of emissions data on our plant," said Maggie Crocker, environmental compliance manager at Resource Recycling. "In the past, creating new reports from an old database required an outside consultant and took weeks. With the new tool, I can pull the data myself in under an hour."

The new data management tool, an environmental historian, pulls data directly from hundreds of instruments and monitors throughout the facility. Supervisors and managers can access real-time information remotely, enabling them to adjust our operations quicker.

"With this new platform, we can pull detailed reports and analyze production data alongside environmental data, so we can more easily evaluate how our performance in one area impacts the other," said Maggie. "This sets us up for the future by helping operations understand the potential environmental impact of decisions made."

In addition, we've increased the functionality of our Environmental Task Management System (ETMS), which we implemented 10 years ago to help track the thousands of environmental requirements that needed ongoing monitoring at our SEMO and Resource Recycling operations. Now we can manage the majority of our inspections through ETMS as well, which takes less time and ensures documentation is electronically filed and saved.

Improved environmental data systems have helped Doe Run keep ISO 14001 certifications at all six mine sites, four mill sites and Resource Recycling. These certifications recognize that our operations have implemented environmental management programs for managing our impact and improving our environmental performance. Read more about ISO certifications [here](#).



An environmental historian tool pulls data from instruments across the plant to measure environmental efforts at Resource Recycling.

Mine Expansion Sustains Missouri Operations

<http://doerun.com/media/news/mine-expansion-sustains-missouri-operations/>



Doe Run uses a 16-foot drill bit to tunnel 1,150 feet into the ground to open up a new mine ventilation shaft, which enhances airflow to help safely explore new ore bodies in Southeast Missouri.

Our mine development activities require significant capital investment and ensure our future.

The Big Bear Vent Shaft, which was near completion at the end of 2018, is an example of the investments we make to expand and sustain our Missouri mines. Located at the southernmost point of Doe Run's Fletcher mine, the new shaft will support mining activity almost four miles from the main shaft at Fletcher Mine.

"We're constantly searching for new ore bodies in the Southeast Missouri region so we can maintain our production rates and meet global demand for minerals and metals," said Doug Aholt, project engineer. "In recent years, our exploration crews discovered a rich ore body of galena, the mineral form of lead, in the region. In order to reach the ore body, we needed to develop this area of our underground mine, which includes blasting new tunnels, bringing in utilities, such as electric and water, and adding ventilation."

First, we installed ductwork and fans to ventilate the area under development. After developing the area further, we realized a new vent shaft would not only enable faster ore recovery, it would also allow expanded, future development more distant from our production shaft. In 2016, we began work on the new vent shaft, which will improve airflow and make mining the area more efficient.

Every dollar we spend in capital improvements, like the Big Bear Vent Shaft, is a commitment to the future.

– *Steve Batts, vice president and chief operating officer*

One of the most important aspects of mining underground is air ventilation,” continued Doug. “When we blast the rock, we need to divert dust created by the explosion from the area, and keep a flow of fresh air. The challenge with expanding our mines is that these new areas are farther away from existing vent shafts, so it takes longer to clear the air before we allow employees to return to the area.”

The new 1,150-foot-deep vent shaft will more quickly ventilate this area of the mine after each blast. This in turn speeds up ore recovery and allows faster progress into the mine.



Doug Aholt oversees construction on the Big Bear mine ventilation shaft with a team of contractors.

“Many aspects of this project were not easy,” said Doug. “But expanding our mining operation is critical to the long-term health of our business.”

The Big Bear Vent Shaft will help manage airflow as we explore other parts of this region as well. Our exploration teams are also engaged in various stages of new developments near many of our other existing operations.

“These new ore bodies will help maintain production levels in the Viburnum Trend,” said Steve Batts, vice president and chief operating officer. “This region is our home, and these exploration and expansion projects can help us continue to be a major employer and contributor in this community into the future.”

Missouri's Rich Mining History

<http://doerun.com/media/news/missouris-rich-mining-history/>



As good stewards of our environment, we strive to protect the communities where we live and work. This includes investing in remediating and repurposing historic lead sites that have shaped the state's rich mining history.

Good earth. Early settlers used the term to reference the lead minerals easily found at or near the earth's surface in Southeast Missouri. This led to centuries of mining in an area that later became known as the Old Lead Belt.

The abundant minerals represented income opportunities for settlers, and 100 years later assured Missouri's place in history as home to one of the largest and purest lead ore deposits in the world. So it's not surprising that French settlers named their settlement La Terre Bonne ("the good earth") in 1720, which later was incorporated as the city of Bonne Terre.

Over the next three centuries, dozens of mining companies and thousands of individuals mined in St. Francois County, and their efforts played an important role in lead production from the Civil War period through World War II. By the 1970s, most lead mining had moved south to the Viburnum Trend area of Missouri.

In St. Francois and neighboring counties, mineralization occurs near the earth's surface. In addition, mining byproducts were purchased for use as foundation fill and for agricultural purposes, further exposing the soil to small amounts of minerals.

“Our predecessor company, St. Joseph Lead Company, first purchased land in Missouri in 1864, and mined in the area for more than 100 years,” said Chris Neaville, asset development director, who oversees remediation for Doe Run. “Over the last decade, we have spent nearly \$110 million to remediate former operations sites and residential soils in areas where lead in soils exceeds the threshold established by the U.S. Environmental Protection Agency (EPA).”

We, along with government agencies and community groups, continue working to address legacy issues in St. Francois County from historic mining operations of St. Joseph Lead Company and others. As a part of that effort, a contractor is sampling the yards to assess lead levels. The EPA reviews the results and determines which locations require remediation. Soil and Land Services LLC (S&L Services), along with others, is currently conducting the soil remediation efforts in the area, and in 2018 had completed remediation at 100 residential properties in St. Francois County. Read more about the yard remediation process [here](#).



Soil & Land Services is remediating yards in St. Francois County, where lead mineralization occurs naturally and historic mines once operated.

Making Room for a Transportation Hub

Along the Mississippi River in the city of Herculaneum, some 30 miles south of St. Louis, Doe Run is preparing our former smelter site for new purposes. In 2018, we safely completed demolition of the smelter facilities. Office and support buildings, as well as the casting and alloying facility, will remain to serve existing battery customers.

“I’ve lived in Herculaneum 40 years and this is the biggest change to the landscape since the 550-foot smelter stack was constructed in the 1990s,” stated Dennis Mitchell, Doe Run’s maintenance project supervisor, who oversees the remediation work at the smelter.

These changes will make Herculaneum a prime location for new development. We have a commercial port adjoining our property, rail runs through the property and we are less than two miles from Highway 55, which stretches from New Orleans to Chicago.

— *Dennis Mitchell, maintenance project supervisor*

At the start of each workday, Dennis held a safety meeting with crews to discuss the day's work, any particular obstacles, equipment and personnel needs, and to address any challenges.

"When preparing for big jobs, like demolition, it's important to have a safety plan in place. We worked closely with our outside crews to ensure a safe environment," Dennis added.

Crews used water-suppression cannons and fire hoses, sometimes creating a stream as high as 120 feet, to minimize dust during dismantling. In 2018, we recovered and recycled 12,000 tons of scrap steel and other materials. We also removed and replaced soil in the green-space areas surrounding the plant.

In addition, Doe Run donated valuable land to Herculaneum organizations in 2018. [Read more here.](#)

Remediating Former Mine Sites

Modern mining practices include preparing mine closure plans well in advance of an actual mine closure. That has not always been the case, which is why we are participating in remediation efforts at the closed Block P mine in Montana – a federal Superfund site once owned by our predecessor, St. Joseph Lead Company.

Work has taken place over several years, the result of rugged terrain and short summers that provide a narrow window of opportunity in which to work. In 2018, remediation crews filled and restored areas of ground subsidence, or settling, that had occurred in the upper level of the mine. The ground settling potentially allowed surface water to infiltrate the mines, where it could pick up mineral contaminants before flowing out of the mine.

"We have seen reduced water seepage from the mine and improved water quality in the creek downstream," said Chris. "We will continue to monitor the area and water quality, and in 2019 we will work on plugging a mine tunnel opening on the hillside."

Performance Data

<https://doerun.com/sustainability/performance-data/>

Social

Workforce Summary

102-8 (G4-10) Number of Employees by Division (Calendar Year)

(number of employees) ⁽¹⁾	2016	2017	2018
Southeast Missouri Mining and Milling Division (SEMO)	700	705	727
Metals Division (Resource Recycling and Herculaneum)	313	322	329
Corporate Headquarters ⁽²⁾	130	142	150
Fabricated Products Inc. (FPI)	41	40	39
Total Number of Employees⁽¹⁾	1,184	1,209	1,245

2018 Male and Female Employees by Division (Calendar Year)

	2016		2017		2018	
(number of employees)	Male	Female	Male	Female	Male	Female
SEMO	652	48	656	49	671	56
Metals Division	296	17	301	21	306	23
Corporate Headquarters	76	54	87	55	98	52
FPI	35	6	34	6	34	5
Total Number of Employees	1,059	125	1,078	131	1,109	136

Number of Employees by Employment Type (Calendar Year)

(number of positions)	2016	2017	2018
Permanent Hourly Positions	846	854	871
Permanent Salary Positions	331	351	367
Temporary Positions	3	0	4
Contracted Positions	4	4	3
Total Number of Employees	1,184	1,209	1,245

2018 Male and Female Employees by Employment Type (Calendar Year)

	2016		2017		2018	
(number of employees)	Male	Female	Male	Female	Male	Female
Permanent Hourly Positions	822 ⁽²⁾	24	832	22	850	21
Permanent Salary Positions	232 ⁽²⁾	99 ⁽²⁾	242	109	254	113
Temporary Positions	1	2	0	0	2	2
Contracted Positions	4	0	4	0	3	0
Total Number of Employees	1,059	125	1,078	131	1,109	136

(1) Employee counts for G4-10 include all categories of employees.

(2) In 2017, the Remediation Department headcount was moved from SEMO Division to Corporate Headquarters.

401-1 (LA1) New Employee Hires by Gender (Calendar Year)

Total number⁽¹⁾ and rate⁽²⁾ of new employee hires entering employment during the reporting period broken down by gender.

	2016		2017		2018	
	Number	Rate	Number	Rate	Number	Rate
Male	85	96.6%	129	87.8%	159	89.8%
Female	3	3.4%	18	12.2%	18	10.2%
Total Number of Employees	88⁽³⁾		147⁽³⁾		177⁽³⁾	

- (1) Employee counts exclude hiring and termination of temporary employees. Historically, the majority of the hourly workforce has been drawn from the temporary pool of employees.
- (2) The rate is calculated by dividing the hires by gender by the total number of hires.
- (3) Increased hiring year-over-year reflects new hires primarily replacing those who retired or left voluntarily.

Employees Leaving by Gender (Calendar Year)

Total number⁽¹⁾ and rate⁽²⁾ of employees leaving employment during the reporting period broken down by gender.

	2016		2017		2018	
	Number	Rate	Number	Rate	Number	Rate
Male	132	86.8%	109	90.8%	132	89.8%
Female	20	13.1%	11	9.2%	15	10.2%
Total Number of Employees	152		120		147	

- (1) Employee counts exclude hiring and termination of temporary employees. Historically, the majority of the hourly workforce has been drawn from the temporary pool of employees.
- (2) The rate is calculated by dividing the terminations by gender by the total number of terminations.

New Employee Hires by Age Group (Calendar Year)

Total number⁽¹⁾ and rate⁽²⁾ of new employee hires entering employment during the reporting period broken down by age group.

	2016		2017		2018	
	Number	Rate	Number	Rate	Number	Rate
30 or younger	47	53.4%	65	44.2%	85	48.0%
31 to 40	16	18.2%	45	30.6%	45	25.4%
41 to 50	18	20.5%	26	17.7%	29	16.4%
51 and above	7	8.0%	11	7.5%	18	10.2%
Total Number of Employees	88⁽³⁾		147⁽³⁾		177⁽³⁾	

- (1) Employee counts exclude hiring and termination of temporary employees. Historically, the majority of the hourly workforce has been drawn from the temporary pool of employees.
- (2) The rate is calculated by dividing hires by age group by the total number of hires.
- (3) New hires primarily replaced those who retired or left voluntarily.

Employees Leaving by Age Group (Calendar Year)

Total number⁽¹⁾ and rate⁽²⁾ of employees leaving employment during the reporting period broken down by age group.

	2016		2017		2018	
	Number	Rate ⁽⁴⁾	Number	Rate ⁽⁴⁾	Number	Rate ⁽⁴⁾
30 or younger	20	13.1%	18	15.0%	40	27.2%
31 to 40	27	17.6%	35	29.2%	34	23.1%
41 to 50	29	19.0%	20	16.7%	23	15.7%
51 and above ⁽³⁾	76	50.3%	47	39.2%	50	34.0%
Total Number of Employees	152		120		147	

- (1) Employee counts exclude hiring and termination of temporary employees. Historically, the majority of the hourly workforce has been drawn from the temporary pool of employees.
- (2) The rate is calculated by dividing the terminations by age group by the total number of terminations.
- (3) In 2016, 55% of departures reflect retirement. In 2017, 79% of departures reflect retirement. In 2018, 27% of departures reflect retirement. A competitive workforce and job opportunities in more urban areas contributes to turnover.
- (4) Doe Run continues to strive to accurately measure its environmental, economic and social data. Due to rounding, some percentage totals may not always equal 100%, but are accurate.

Health and Safety Performance

403-1 (LA6) Occupational Safety and Health

Employee Blood-Lead Average

The adjusted Occupational Health and Safety Administration's (OSHA) standard for medical reassignment of an employee is 53 micrograms of lead per deciliter of whole blood ("µg/dL").⁽¹⁾ Doe Run sets its maximum limit at 30 µg/dL. If any employee has a blood-lead average that reaches 30 µg/dL, they are temporarily reassigned to other work.

(in µg/dL)	2016	2017	2018
Southeast Missouri Mining and Milling Division (SEMO), including remediation and demonstration plant	8.28	8.10	6.51
Metals Division (Resource Recycling, Herculaneum, Glover) ⁽²⁾	14.83	13.35	10.12
Corporate Headquarters ⁽³⁾	N/A	N/A	N/A
Fabricated Products Inc. (FPI)	7.60 ⁽⁴⁾	6.80 ⁽⁴⁾	7.40⁽⁵⁾
Average	10.20	9.64	7.63

Employee Blood-Lead Data

Doe Run monitors and reports the number of employees with a blood-lead average greater than 19 µg/dL in the calendar year. The adjusted OSHA standard for medical reassignment of an employee is 53 µg/dL.⁽¹⁾ Doe Run sets its maximum limit at 30 µg/dL.

(# of employees with blood-lead levels >19 ug/dL)	2016	2017	2018
SEMO	23	5 ⁽⁶⁾	4⁽⁶⁾
Metals Division (Resource Recycling, Herculaneum, Glover) ⁽²⁾	134	26 ⁽⁶⁾	11⁽⁶⁾
Corporate Headquarters ⁽³⁾	N/A	N/A	N/A
FPI	2	1	1⁽⁵⁾
Total	159	32⁽⁶⁾	16⁽⁶⁾

Total Lost-Time Accidents

According to OSHA, lost time is defined as a nonfatal traumatic injury that causes any loss of time from work beyond the day or shift it occurred, or a nonfatal nontraumatic illness/disease that causes disability at any time. According to Mine Safety and Health Administration (MSHA), lost time is defined as days which the employee would have worked but could not because of an occupational injury or an occupational illness.

(number of employees)	2016	2017	2018
SEMO (includes Glover)	7	3	3
Metals Division (Resource Recycling, Herculaneum)	6	4	5
Corporate Headquarters	0	0	0
FPI	0	0	0
Total number of work-related fatalities, companywide	0	0	0
Total	13	7	8

Total OSHA Recordables and MSHA Reportables

Total OSHA recordables and MSHA reportables are incidents that require lost time, restricted duty, prescription medication, involve broken bones or stitches, involve imbedded matter in the eye, or burns of a defined size and severity.

(number of incidents)	2016	2017	2018
SEMO (includes Glover)	33	21	23
Metals Division (Resource Recycling, Herculanum)	34	29	21
Corporate Headquarters	0	0	0
FPI	1	0	1
Total	68	50	45

Total Case Incident Rate (TCIR)

TCIR is the number of OSHA recordable and MSHA reportable incidents per 200,000 personnel hours worked. OSHA recordables and MSHA reportables are incidents that require lost time, restricted duty, prescription medication, involve broken bones or stitches, involve imbedded matter in the eye, or burns of a defined size and severity.

(TCIR rate)	2016	2017	2018
SEMO (includes Glover)	4.3	3.0	3.2
Metals Division (Resource Recycling, Herculanum)	9.7	11.3 ⁽⁷⁾	5.7
Corporate Headquarters	0.0	0.0	0.0
FPI	2.4	0.0	2.4
Total Company	5.5	4.2⁽⁷⁾	3.8

- (1) The OSHA General Industry Lead Standard is written in units of μg of Pb/100g of whole blood. Doe Run reports their blood lead values in μg of Pb/dL of whole blood, and all values in this report are presented as $\mu\text{g}/\text{dL}$. The conversion used is $1 \mu\text{g}/100\text{g} = 1.05 \mu\text{g}/\text{dL}$.
- (2) Glover is included in the Metals Division for blood-lead data only due to the nature of their work.
- (3) Employees at corporate headquarters are not required to be tested.
- (4) Some 2016 and 2017 data has been corrected here.
- (5) Due to an analytical testing issue at an outside lab, FPI blood-lead data is reported as of July 31. All other blood-lead data is representative of the full calendar year. FPI calculations exclude the last quarter of inaccurate test data.
- (6) Significant reductions in blood-lead levels >19 resulted from continued focus on employee hygiene and housekeeping procedures, and equipment changes at Resource Recycling and SEMO.
- (7) Adjustments have been made for consistent rounding compared to 2017 published data.

404-1 (LA9) Average Hours of Training Per Employee (Calendar Year)

(number of training hours)	2016	2017	2018
Total number of training hours	16,745 ⁽²⁾	16,146 ⁽²⁾	31,245
Total number of employees ⁽¹⁾	1,333	1,208	1,245
Average number of training hours per employee	12.56⁽²⁾	13.36⁽²⁾	25.09⁽³⁾

- (1) Total number of employees reflects total number of employees who received training during annual training periods and may not reflect year-end employee counts.
- (2) Training hours for 2016 and 2017 are a conservative estimate due to changes in the training hours recording system.
- (3) In 2018, leadership development training was conducted for all employees with direct reports, which accounts for increased hours. Additionally, an increase in new hires resulted in more new employee trainings.

Environmental

301-1 (EN1) Materials Consumed (Fiscal Year)

Units and Substances Key

Metric Ton(s): mt

Direct/Indirect Source (mt)	2016	2017	2018
Direct Materials Used	31,489	34,117	27,452
Indirect Materials Used	54,043	48,850	58,928
Total Materials Used	85,532	82,967	86,380
Renewable/Non-Renewable Source (mt)			
Renewable Materials Used	97	84	58
Non-Renewable Materials Used	85,435	82,883	86,322
Total Materials Used	85,532	82,967	86,380

301-2 (EN2) Direct Recycled Input Materials (Fiscal Year)

Units and Substances Key

Metric Ton(s): mt

Source (mt)	2016	2017	2018
Slag	13,480	12,317	3,467
Batteries (mt of Pb)	86,091	97,929	107,928
Lead-Bearing Material	36,622	44,422	44,731
Iron-Containing Material	8,812	6,643	14,028
Total Materials Used	145,005	161,311	170,154
Percentage of materials used that are recycled input materials	63%	65%	66%

302-1 (EN3) Energy Consumption (Calendar Year)

Units and Substances Key

Gigajoule(s): GJ

Direct Non-Renewable Energy Source⁽¹⁾	2016	2017	2018
Coke	529,612	416,868 ⁽²⁾	483,741
Explosives	24,486	25,773	24,836
Natural Gas	131,663	197,148 ⁽²⁾	237,801
Petroleum Fuel	265,809	270,620	280,588
Propane	486,552	507,154 ⁽²⁾	614,485
Total Direct Energy Consumption⁽¹⁾	1,438,122	1,417,563⁽²⁾	1,641,451
Indirect Non-Renewable Energy Source	2016	2017	2018
Electricity	1,434,721	1,417,864	1,447,947
Total Energy Use	2,872,843	2,835,427⁽²⁾	3,089,398

(1) Annual variations reflect changes in production requirements year to year.

(2) Some 2017 data has been corrected here.

302-3 (EN5) Energy Intensity of All Sources (Calendar Year)

Units and Substances Key

Metric Ton(s): mt

Gigajoule(s): GJ

Ore: Ore milled at mining operations

Pb: Lead produced at alloying, casting, and secondary smelting and fabricating operations

Division	Units	2016	2017	2018
Southeast Missouri Mining and Milling Division (SEMO)	GJ/mt Ore milled	0.4 ⁽¹⁾	0.3 ⁽¹⁾	0.3
Metals Division (Resource Recycling and Herculaneum)	GJ/mt Pb produced	10.4 ⁽¹⁾	6.7 ^(1,2,3)	8.5
Fabricated Products Inc. (FPI)	GJ/mt Pb produced	1.4 ⁽¹⁾	3.5 ^(1,3)	4.4

(1) 2016 and 2017 values were previously reported to two decimal places.

(2) Reduction due to changes in the battery breaker process at Resource Recycling.

(3) Some 2017 data has been corrected here.

305-1 (EN15) Total Direct Greenhouse Gas Emissions (Calendar Year)

Units and Substances Key

Metric Ton(s) of Carbon Dioxide Equivalent (mt CO₂e)

	2016	2017	2018
Scope 1 (direct emissions of Greenhouse Gases, Carbon Disclosure Project, e.g., direct combustion of fuels)	144,778	104,816 ^(1,2)	115,896 ⁽³⁾

(1) 2017 data has been corrected here.

(2) Reduction in 2017 is due to variable production requirements at Resource Recycling.

(3) Increase due to a colder winter and increased production at Resource Recycling.

305-2 (EN16) Total Indirect Greenhouse Gas Emissions (Calendar Year)

Units and Substances Key

Metric Ton(s) of Carbon Dioxide Equivalent (mt CO₂e)

	2016	2017	2018
Scope 2 (emissions from direct purchase of energy, e.g., electricity)	293,131	319,052	330,370

305-3 (EN17) Other Relevant Indirect Greenhouse Gas Emissions (Calendar Year)

Units and Substances Key

Metric Ton(s) of Carbon Dioxide Equivalent (mt CO₂e)

	2016	2017	2018
Scope 3 (indirect emissions from transportation and employees' commute, etc.)	13,197	20,057 ⁽¹⁾	16,795

(1) Increase in 2017 is due to increased miles traveled by employees on company business expenses.

305-4 (EN18) Greenhouse Gas Emission Intensity

Units and Substances Key

Metric Ton(s): mt

Carbon Dioxide Equivalent: CO₂e

Ore: Ore milled at mining operations

Pb: Lead produced at alloying, casting, and secondary smelting and fabricating operations

Division	Units	2016	2017	2018
Southeast Missouri Mining and Milling Division (SEMO)	mt CO ₂ e/mt Ore milled	0.06	0.05	0.05
Metals Division (Resource Recycling and Herculanum)	mt CO ₂ e/mt Pb produced	1.40	0.77 ^(1,2)	0.80⁽¹⁾
Fabricated Products Inc. (FPI)	mt CO ₂ e/mt Pb produced	0.09	0.15 ⁽³⁾	0.16

(1) Reduction in 2017 and 2018 is due to variable production requirements at Resource Recycling.

(2) Value has been updated from 2017 report to reflect more accurate rounding.

(3) 2017 data was previously misreported and has been corrected here.

305-7 (EN21) Significant Air Emissions (Calendar Year)

Units and Substances Key

Metric Ton(s): mt

Source (mt by type and weight)	2016	2017	2018
Ammonia (NH ₃)	0.06	0.12	0.12
Antimony (Sb)	0.00	0.00	0.00
Arsenic (As)	0.26	0.29	0.31
Cadmium (Cd)	0.17	0.19	0.20
Carbon Monoxide (CO) ⁽¹⁾	15,497.00	13,584.00	21,919.00
Copper (Cu)	0.33	0.22	0.18
Hazardous Air Pollutants (HAP)	1.08	0.94	0.89
Lead (Pb)	5.10	4.45	4.47
Nickel (Ni)	0.03	0.03	0.04
Nitrogen Oxides (NO _x) ⁽²⁾	36.00	40.00	55.00
Particulate Matter (PM)	199.00	151.00	206.00
Sulfur Dioxide (SO ₂)	2,199.00	2,374.00	2,130.00
Sulfuric Acid (H ₂ SO ₄) ⁽³⁾	2.60	1.82	0.74
Volatile Organic Compounds (VOC)	8.00	9.40	10.20
Zinc (Zn)	0.85	0.67	0.57
Total	17,950.00	16,167.00	24,328.00

(1) Annual carbon monoxide variations reflect changes in production requirements year to year.

(2) Increase in nitrogen oxides is due to additional combustion processes.

(3) Decrease in sulfuric acid from 2017 to 2018 is due to an updated stack test emission factor.

306-1 (EN22) Total Water Discharge (Calendar Year)

Units and Substances Key

ppb: parts per billion

Source (average ppb/year) ⁽¹⁾	2016	2017	2018
Lead	56	21 ^(3,4)	15 ⁽³⁾
Zinc	336	258 ^(3,4)	242 ⁽³⁾
Copper	4	3 ⁽³⁾	3 ⁽³⁾
Total water discharge (million gallons/year)	19,775⁽²⁾	18,264	19,870

- (1) All data sources represented are reported in average ppb/year to be consistent with permit reporting requirements.
- (2) 2016 total water discharge was previously misreported and has been corrected here.
- (3) The final of five SEMO water treatment plants was put into operation in August 2017. These plants helped reduce the metals contained in water discharges.
- (4) Corrections were made in 2017 calculations to represent actual reductions.

Environmental Spending

EN31 Total Fiscal Environmental Spending

	2016	2017	2018
Total Capital Spending and Operating Expense	60,525,088⁽¹⁾	48,248,765	39,422,485
Remediation Spending			
Historic Properties	1,065,582	4,544,150	6,424,264
Operating Properties	8,891,423	5,001,595 ⁽²⁾	5,057,746
Total Remediation Spending	9,957,005	9,545,745	11,482,010
Total Fiscal Environmental Spending, Including Remediation	70,482,093⁽¹⁾	57,794,509	50,904,495

- (1) 2016 capital and operating costs were updated from previous reports to include operating expenses not previously included and remove the double counting of some expenses.
- (2) Remediation spending decreased in 2017 and 2018 at Herculaneum as the remediation work progresses.

Economic

Economic Impact

201-1 (EC1) Financial Highlights (Fiscal Year)

(dollars in thousands)	2016	2017	2018
Property Taxes	\$6,818	\$6,188	\$1,962⁽¹⁾
Compensation	\$114,005	\$127,361	\$121,362
Community Investment ⁽²⁾	\$211	\$182	\$178
Environmental Spending	\$70,482 ⁽³⁾	\$57,795 ⁽⁴⁾	\$50,904
Research and Development	\$1,405	\$2,095	\$2,533
Royalties to Governments	\$7,924	\$9,236	\$9,303
Capital Spending (excluding environmental capital expenditures)	\$24,165	\$21,371	\$46,908⁽⁵⁾

(1) Lower property tax spending in 2018 is due to overpaying taxes since 2011.

(2) Includes donations, scholarships and tuition reimbursement.

(3) Environmental spending totals for 2016 were updated from previous reports to include operating expenses not previously included and remove the double counting of some expenses between divisions.

(4) Decrease in environmental spending is due to the completion of several environmental projects at Southeast Missouri Mining and Milling Division and Metals Division.

(5) Higher investment in mine development and mobile equipment was made in 2018.

Management Approaches

<https://doerun.com/sustainability/management-approaches/>

Read below to learn more about how we manage our social, environmental and economic commitments.

Social

Environmental

Economic

Social

Community Engagement

Doe Run operates with the consent of the community. We recognize the importance of their goodwill and the responsibility we have to operate safely, economically, soundly and in an environmentally sustainable manner. Our local communities expect us to be a fair and responsible community member that provides jobs at a fair rate, sources materials from local vendors where possible, supports community organizations, and includes the concerns of the community in our decision-making process.

When we developed our Sustainability Principles, it was important to us that we address being a good neighbor, specifically:

- We will respect community values, priorities and interests in our business decisions.
- We will provide enduring benefits that enhance our communities.
- We will maximize the economic benefits we provide to our stakeholders.

Each of our operations has community engagement plans that guide community outreach, communication and support. We are able to provide both immediate and lasting benefits to the community by:

- Purchasing locally wherever possible.
- Providing supplier procurement programs that help local vendors operate more sustainably.
- Hiring locally where possible, and paying higher-than-average wages.
- Paying royalties to governments and private landholders, as well as our fair share of taxes.
- Supporting educational opportunities through tours, internships, summer jobs, doctoral candidate research projects and academic scholarships.
- Providing donations to local charities that improve the quality of life for people in our communities.

We also aim to share information in a transparent and proactive manner. Although we are a privately held company, we choose to report annually on our social, economic and environmental performance in our Sustainability Report, so community members, customers, legislators and other stakeholders know how we are doing. We also regularly conduct community surveys to determine the interests, concerns and disposition toward our operations of those living nearest to our operations. In this way, we can adjust our community engagement and communications efforts to better meet the community's needs.

By sharing information openly, being an active member and supporter of the community, living in and near the communities in which we operate, and engaging in two-way dialogue we believe we can support the sustainability of the local communities, and produce and deliver our products more efficiently.

Employment

Doe Run's values – safety, integrity, collaboration, respect, stewardship and sustainability – affirm our organization's culture and commitment to sound and ethical business practices. This starts with how we treat our employees and employee candidates. Our goal is to attract and retain the best employees we can in order to help us achieve our goals, so it is important that we strive to respect and invest in our people, and follow fair labor practices.

Our approach to employment and workers follows the principles of equal employment opportunity and affirmative action in all employment policies and practices, including our recruiting, hiring, compensation, benefits, transfers, training, promotions, company-sponsored events, and other employment activities. We track and report on employment rates annually, as well as employee health and safety monthly (see [Management Approach to Health and Safety](#)) monthly to ensure we're meeting those principles.

An employee handbook outlines our business code of conduct, hiring practices, time and attendance policies, anti-harassment policies and procedures, compensation and pay practices, benefit and leave policies, and much more for employees. We provide helpful resources, such as the Your Voice 24-Hour Hotline to support all employees if they would like to report anything that might be illegal, unethical or a violation of company policy. We introduce all new employees to these materials during orientation, and regularly review them with employees when and if changes are made to policy, or if a need is identified.

We support a culture of respect, continuous improvement and safety by identifying competencies that are aligned directly to our values and have built them into our talent management practices. We assess and review talent for our critical positions companywide on an annual basis, and offer tools for learning to plan for succession and prepare our workforce for future success. We recognize and respect that every employee has a voice and opinion that matters; diversity in experience, thought and idea is encouraged.

Building a culture that respects and invests in our people is always a strategic priority, but it's increasingly important as the entire mining industry faces a growing demand for talent. Approximately 55,000 new employees are needed to meet demand and replace retiring employees over the next five to 10 years. How we attract, build and retain top talent will directly impact our long-term success as a company and an industry. That's why we aim to be viewed as an employer of choice by promoting a culture of safety and environmental compliance, teamwork and collaboration, fairness and consistency, oversight and standardization, communication, and advocacy.

Health and Safety

We depend on one another to operate safely, to protect each other, the community and the environment. Safety is our most foundational goal and our employees, their families, local communities and the government want to know how we are meeting our safety goals.

Doe Run's approach to employee health and safety includes continual training and protective standards that meet or exceed industry expectations. Training is critical to helping us keep our employees safe and is required to meet certain compliance and regulatory guidelines, as well as to cover essential work-related skills, techniques and knowledge. We ensure that our employees possess the right skills to help our business succeed, and conduct annual refreshers to address changes in guidelines, technology, processes, etc.

As a part of training, Doe Run also provides employee development opportunities, which are important to help employees perform their best, develop new skills and enable the company to thrive. We believe this approach fosters greater employee satisfaction, so that they stay with us, become great at what they do and help others become so, too.

We track our training hours for each employee, along with course titles and dates of completion. This data is collected by the training facilitator/subject matter expert, verified and entered into our training database. Supervisors are responsible for confirming that all employees receive required trainings, annual refreshers and/or continuing education, as needed. In 2018, employees participated in approximately 31,000 hours of training.

Doe Run also tracks and reports on key health and safety metrics on a monthly and annual basis to identify opportunities for improvement. We track our workforce's blood-lead levels (the trace amount of lead the body may absorb through exposure), accidents and incident rates. Monthly reports are shared all the way up through the executive level.

Our mining, milling and recycling activities have the potential for employees to be exposed to airborne lead particles. Doe Run employees are trained in proper lead handling and personal hygiene processes to reduce their exposure. Personal protective equipment, like respirators, are worn in areas of exposure, and employees who work in certain areas are required to wash thoroughly and change clothes and shoes before eating or going home each day.

Doe Run's standards for workforce exposure to lead are more stringent than government requirements, and monthly progress is measured to the microgram, one millionth of a gram. Doe Run monitors exposed workers' blood-lead levels and tracks the number of employees with a blood-lead level greater than 19 micrograms of lead per deciliter of whole blood ("µg/dL") at both its Southeast Missouri Mining and Milling Division and Metals Division. Doe Run counsels employees who cross a certain threshold to identify particular areas of exposure, and work on individualized plans to address those areas. Employees who exceed 30 µg/dL are temporarily reassigned to a job area with reduced exposure. By comparison, the adjusted OSHA standard for medical reassignment of an employee is 53 µg/dL.

Safety is a core value. We use a variety of mining and manufacturing tools to assist in identifying safety improvement opportunities, and we involve employees to develop solutions to address them. One example is our Job Safety Analysis program, which encourages employees to evaluate jobs before they begin to identify the safest tools and correct methods to proceed. Employees document that information for coworkers and future employees.

Doe Run has won the prestigious Sentinels of Safety mine safety award 28 times and has operations that have surpassed decades without a lost-time incident. We also have two award-winning mine rescue teams that undergo monthly training and compete in mine rescue competitions to keep skills sharp in case they need to aid employees during a real mine emergency. Safely returning our workers home to their families and loved ones at the end of each day is the ultimate goal of our safety and training programs.

Environmental

Emissions

One of the reasons we report on our environmental performance each year is to be transparent in our environmental impacts, and to keep our neighbors and other stakeholders informed of our efforts to minimize the impact of our operations.

Doe Run's mining, milling and recycling activities have the potential to result in releases to the air, water or land. Our releases are monitored and reported, as appropriate, to regulatory bodies, including the Missouri Department of Natural Resources and the United States Environmental Protection Agency.

We have a number of measures in place to minimize, treat or prevent releases in order to meet permitted levels. For example, water released from our property must meet limits established in facility-specific operating permits. Doe Run has eight water treatment plants at its mines in the Viburnum Trend and at Resource Recycling, Herculaneum and Glover that treat and release water. Air emissions also must meet standards. Doe Run utilizes baghouses, ventilation systems and enclosures to manage these emissions. The vast majority of our land releases are made up of tailings (the sand-like, non-mineralized portion of ore), which are stored in permitted areas of our property.

We also use an environmental management system that enables us to monitor air emissions and adjust our processes in real time to reduce our impact. To further monitor and improve in this area, we maintain ISO environmental management certifications at all of our active facilities.

Energy

When we created our Sustainability Principles, we considered how Doe Run must be a steward of not only the minerals we extract, but also the energy we use in our operations. Energy consumption is one of our largest operating costs for both the mining and metals divisions. Doe Run is one of the largest electricity consumers in Missouri because electric motors run much of our operations, including conveyors, pumps, ventilation fans, rock crushers and hoisting equipment. Total energy consumption includes electricity, fuels (furnace coke, diesel, propane, gasoline), and explosives. Most of the energy consumed is derived from fossil fuels, which produce carbon emissions. Energy usage and costs are tracked and reported monthly for each of the operations. Historically, energy consumption has increased with expansion of the operations over time and is directly proportional to production trends.

To reduce carbon and other emissions, the mining division has adopted 85% bio-diesel usage underground. We continue to explore other ways to conserve energy and use cleaner energy options for the good of the environment, society and the bottom line.

In 2016, we formed an energy team with members from both the mining and metals divisions. The team is charged with evaluating energy efficiency and conservation opportunities. So far, the team has initiated several energy efficiency projects, including LED lighting replacements, installing variable-frequency drives on vent fan motors, and installing shut-off switches on pumps that do not need to run constantly.

The energy team is looking at a number of other projects to manage our energy use to reduce our propane usage, and switching diesel trucks to run on natural gas and electricity. We also installed an electric underground hauling system to replace the use of diesel trucks aboveground at one of our sites. As mines age, it becomes even more important to be as efficient as possible. Conserving energy, reducing costs and/or looking for alternative energy sources are critical to the future of our mines and the economic value they bring our stakeholders.

Materials

One of our Sustainability Principles is to “minimize the impact of our operations on the environment.” Understanding our direct and indirect input materials, as well as the amount of materials we are able to recycle through our process, helps us measure and manage the resources we consume.

Our stakeholders care about the environment and jobs, so effectively managing natural resources and providing value to the local community by sourcing locally are two examples of why this matters to our stakeholders.

By measuring materials, we can better evaluate things, like purchasing habits, material sourcing and product options, in order to look for opportunities for improvements, such as sourcing more materials locally (which can reduce shipping impacts); choosing alternative materials where possible that may be renewable or have lower environmental impacts.

Doe Run captures this data, which is reviewed by the company’s purchasing group, which evaluates contracts, vendor selection and material options, with the assistance of on-site process owners. Together, this team is able to determine an efficient purchasing path and cost-effective material. Ultimately, measuring our direct and indirect input materials ensures that we purchase materials that deliver value to the organization, support jobs in local communities where possible, and are renewable or have as little environmental impact as is possible and practical.

Water

When we created our Sustainability Principles, we considered how Doe Run must be a steward of not only the minerals we extract, but also the energy and water we use in our operations. Water is particularly important in Southeast Missouri, where many creeks, streams and river tributaries run near our operations. These waterways provide recreation for the community, and responsible use of these resources is important to us, as well as our neighbors.

We measure our water discharge data to track our progress in returning clean water to the environment. At the Southeast Missouri Mining and Milling Division, an estimated 35 million gallons of water come in contact with our operations, either naturally flowing through our mines or used in the milling process. We pump water that comes from the mines and mills to large tailings ponds on our property, where lead, zinc and copper particles can settle out of the water. At some locations, we are able to pump mine water directly to our mills for use in the milling process first, then discharge the process water to the tailings pond.

Five water treatment plants pump water from the tailings ponds and process it using a chemical technology, similar to municipal water treatment plants to remove metals and impurities. Runoff water from storms is also treated at the plants. We monitor the water to ensure it meets permit limits, then discharge it into local streams.

Since overhauling our water management approach with these high-tech facilities, Doe Run has been able to process and discharge water more efficiently and meet more stringent water quality standards. The water treatment plants have also increased our capacity to handle high surges of water in the event of heavy storms.

A water treatment plant is located on-site at the Resource Recycling facility, where water used in the lead battery recycling process is treated to remove metal particles. This plant also treats storm water on the property. Similar plants also operate at Glover and Herculanum, the other sites that make up Doe Run's Metals Division.

At Fabricated Products, Inc. — a wholly owned subsidiary of Doe Run — we rely on two retention basins to collect rain water runoff at the lead fabrication plant in Casa Grande, Arizona. This reduces the load on the municipal storm water and sewer system.

Additionally, we keep the quality of water in mind when remediating historic mine sites. At some remediation sites, we have rerouted streams and created stormwater diversions to manage water quality. We also sometimes cap slag and chat piles, so wind and erosion cannot carry these particles into nearby water sources.

Economic

Compliance

Our activities are subject to a wide range of laws and regulations governing worker health and safety, land use, environmental protections, and many other areas. Compliance in this regulatory environment is crucial to securing our license to operate and protecting our reputation.

Our commitment to conduct business in a manner that adheres to all applicable laws and regulations is stated in our Business Code of Conduct and supported by our policies and standards.

We also participate in key voluntary compliance and reporting programs to demonstrate our commitment to transparency and good governance. Our Environmental Task Management System (ETMS) integrates our environmental tasks into a management system that allows us to track the completion of reoccurring environment tasks, such as sampling events. All our sites undergo third-party certification of our environmental management systems to the internationally accepted ISO 14001 standard.

In addition to internal efforts to verify performance, each regulatory regime in which we operate closely monitors our activities. Sites are frequently inspected by state and national government agencies that review our operational, health and safety, and environmental performance. Our mines in the U.S. are subject to regulation by the federal Mine Safety and Health Administration (MSHA). MSHA personnel conduct inspections on a regular basis.

Some of these inspections may result in alleged violations, which may result in citations and orders. These citations and orders may result in fines or penalties. We take these alleged violations seriously and work with the issuing agency to informally and formally contest the issued citations.

When we are out of compliance or when a significant event occurs, we commit to transparently disclose and mitigate any impacts.

Financial Management

Doe Run generates financial value by mining and milling lead, copper, and zinc concentrates and recovering lead metal through the recycling of nearly 13.5 million lead batteries each year.

We engage in a rigorous planning process each year in which we allocate the resources generated by the business. During that process, we try to balance our investments in a way that is most fair to all of our stakeholders by reinvesting in our business and employees, protecting the environment, improving the local economy, and providing a return to our investors.

Doe Run takes this approach in order to appropriately allocate resources to each of our priorities, balancing the changing needs of each one. This will allow us to continue serving a valuable role in the community for years to come.

- We strive to ensure that we invest sufficiently in the community, through paying taxes and royalties, donating to local causes, and paying fair wages to employees.
- It is important that we continue to reinvest in our operations to ensure our long-term sustainability.
- We are also committed to the environment we live and operate in, and invest significant resources into monitoring, mitigating and improving our impact on the environment.

Doe Run follows rigorous procedures for its internal control systems. These procedures include conscientious design of systems, with a focus on segregation of duties wherever practicable, and proper documentation and annual testing of the operations of these systems. Doe Run also undergoes external audits by an independent accounting firm, **Crowe LLP**, which adheres to **Generally Accepted Auditing Standards (GAAS)** as established by the **American Institute of Certified Public Accountants**. Our decision to take these steps is consistent with our desire to conduct business ethically and responsibly. Following this control framework also supports our efforts to maintain **International Organization for Standardization (ISO)** certifications at several operating sites.

Corporate Governance

<https://doerun.com/sustainability/corporate-governance/>

The Doe Run Resources Corporation, doing business as The Doe Run Company (Doe Run), is ultimately held by the private, New York-based **The Renco Group, Inc.**

As a global supplier of lead, copper, and zinc concentrates and lead metals and alloys, Doe Run is guided by an eight-member executive team^[1]. The team consists of the president and chief executive officer, vice president and chief operating officer, vice president – finance and chief financial officer, vice president – information technology and human resources, vice president – law and general counsel, vice president – sales and marketing, vice president – exploration, research and technical development, and vice president – environmental affairs. The executive team is 88% male and 88% Caucasian, and encompasses an age range of 49-65 years. The team includes one female and one person of Hispanic heritage. Their compensation is determined using market-based data and standard industry practices.

These individuals are responsible for setting the business strategy and organizational structure of Doe Run, as well as the company's economic, social and environmental policies, goals and performance. As a part of our annual profit planning process, the executive team sets company goals and projects, including those that further implement sustainability in the company's operations. Company projects must align to company goals and have specific metrics. Company projects are reviewed continuously. Many of the projects are reported upon in the sustainability report, which is prepared by a team of employees across all divisions, as assigned by the executive team. The president and CEO, vice president and chief operating officer, vice president – environmental affairs, and vice president – information technology and human resources, review and approve Doe Run's sustainability report.

Doe Run's board expects management to keep pace with best practices in corporate governance. To accomplish this goal, Doe Run utilizes a stringent set of corporate governance policies, procedures and practices to ensure that the business is properly directed, administered and controlled. For example:

- Doe Run follows rigorous procedures for its internal control systems. These procedures include conscientious design of systems, with a focus on segregation of duties wherever practicable, and proper documentation and annual testing of the operations of these systems. Doe Run also undergoes external audits, including testing of internal controls, by an independent accounting firm, **Crowe LLP**, which adheres to **Generally Accepted Auditing Standards (GAAS)** as established by the **American Institute of Certified Public Accountants**. Our decision to take these steps is consistent with our desire to conduct business ethically and responsibly. Following this control framework also supports our efforts to maintain **International Organization for Standardization (ISO)** certifications at several operating sites. Our Herculaneum site, Resource Recycling facility and Vancouver, Washington, Fabricated Products Inc., site are certified under ISO 9001 Quality Management program, which verifies that strong, quality procedures are in place. Doe Run's Sweetwater Mine and Mill, Fletcher Mine and Mill, Brushy Creek Mine and Mill, Buick Mine and Mill,

Casteel Mine, Mine 29, and Resource Recycling facility also hold ISO 14001 certification, which focuses on environmental management. Specifics related to these certifications are included on our website. Doe Run has written procedures and policies in place to ensure the accuracy and completeness of our financial records and the effectiveness of our internal control systems, particularly in such areas as accounting, purchasing, vendor receipts and customer transactions. In addition, the legal department reviews contracts for business risks and potential conflicts of interest.

- As a federal sub-contractor, Doe Run adheres to the requirements of the Office of Federal Contract Compliance Programs (OFCCP). In doing so, Doe Run develops annual affirmative action plans, which support the principles of equal employment opportunity and affirmative action in all of its employment policies and practices, including recruiting, hiring, compensation, benefits, transfers, training, promotions, social recreation programs, company sponsored events, and in other terms and conditions of employment.
- Doe Run strives to maintain open communication with important audiences both inside and outside the company. As described within the Reporting Process, Doe Run regularly surveys stakeholders through online or third-party surveys of community stakeholders and employees (conducted most recently online in 2017). Through our corporate office, Doe Run provides our operating sites with guidance and education about community engagement. Sites then implement programs based on the specific needs of local communities. These programs include regular community outreach, facility tours, public meetings and ongoing dialogue with local communities. You can share feedback with the company through any of these forums, or by contacting communityinfo@doerun.com.
- We also provide our employees with a mechanism by which they can anonymously share issues or concerns via a hotline system managed by an outside third party. Once an employee makes a report, the third-party firm notifies human resources and legal department leadership. Timely investigations are conducted for all reports made to the hotline, with issues of safety given highest priority. Any necessary communication between the reporter and the company is handled through the third-party system to resolve issues as discretely as possible.

Potential employees begin learning about the company's expectations, values and sustainability policy from our website and in hiring ads. In addition, the company's Standards of Business Conduct and Company Values, Vision, Mission and Business Strategy are reviewed formally during the onboarding process. Prior to joining Doe Run, employees receive the Doe Run Employee Handbook and Standards of Business Conduct to review, and have the opportunity to ask any questions. Employees are required to sign an acknowledgment that they have received and reviewed these documents. Employees receive updated versions of the Employee Handbook and Standards of Business Conduct as revisions are made, and also can access these documents online.

Our core values were redefined in 2011 by the executive team, and are reinforced daily in conversations, business processes, and internal and external communications.

We believe we can enhance the quality of life through:

- **Safety:** Protecting one another.
- **Integrity:** Demonstrating transparency and honesty in all we say and do.
- **Collaboration:** Working together with employees and external stakeholders to realize shared goals.

- **Respect:** Recognizing that every employee has a voice and opinion that matters; diversity of experience, thought and ideas is encouraged.
- **Stewardship:** Conserving, managing and making the most of the natural resources in our care.
- **Sustainability:** Balancing social, environmental and economic considerations with a relentless focus on improving our processes.

To ensure that we stay current on corporate governance and corporate responsibility trends, we maintain memberships in several industry-related trade associations. These associations support and educate members about such issues as community engagement, environmental stewardship and sustainability. Company leaders hold committee and/or board positions in many of these organizations. Doe Run employs an award-winning project management office (PMO) that utilizes a rigorous process to plan, manage and evaluate projects. The PMO has quantified improvements in areas such as project completion times and budget accuracy. By utilizing outside resources and proven programs, we help ensure we are looking at, and implementing as appropriate, best practices.

We believe that corporate governance is an evolving process. We are committed to continuous improvement in setting sustainability targets and in our reporting, so we can continue to operate responsibly and with integrity.

[1] *This reflects the executive team as of May 1, 2019.*

Reporting Process

<https://doerun.com/sustainability/reporting-process/>

Based on the Global Reporting Initiative (GRI) definition of materiality, The Doe Run Company (Doe Run) determines what information to include in its Sustainability Report based on a variety of methods, including third-party quantitative and qualitative research, one-on-one conversations, community meetings, tours, online surveys and special events. We include progress we have made on projects, processes or challenges that have significant economic, environmental and social impact (both positive and negative) on our company, our stakeholders and the industries that depend on lead-based products.

Doe Run initially adopted the GRI framework in 2009 as a response to research that indicated audiences wanted to know more about the company, its efforts to operate safely and its investments to limit its environmental impact. The executive team reviews and implements programs and processes to further implement sustainability in the company's operations. Each year, the executive team assigns individuals from the various divisions to collect data and prepare the company's sustainability report.

Several steps have helped Doe Run senior management and functional managers determine and improve materiality for our sustainability reports.

- In 2012, Doe Run conducted extensive quantitative and qualitative research within the Missouri communities in which it operates to improve how it communicates with stakeholders, including through this report. The research identified the major issues facing citizens in the community to be the local economy, job opportunities, environmental responsibility and community involvement.
- In 2014, Doe Run again conducted research within the Missouri communities surrounding its operations to determine any changes to the major issues facing the communities, and inform the reporting aspects material to stakeholders outside our organization. The research indicated that the local economy, job opportunities and environmental responsibility continued to be top concerns to community stakeholders, as well as the safety of Doe Run operations and the company's involvement in the community. In addition, the company has received unsolicited phone calls from across the U.S. from citizens expressing concerns about the closure of the last primary lead smelter in the U.S. and its potential impact on access to lead material for security and outdoor activities.
- Most recently, Doe Run conducted another round of community research in 2017. Respondents were asked to evaluate the company in the same areas identified in the 2012 and 2014 research. Once again, community members ranked jobs, wages and the economy as the most important issues facing the region. They expressed concerns about Doe Run's tax appeal in Reynolds County and a perception of declining community involvement from the company. The responses also showed an improvement in Doe Run's ability to meet its environmental obligations.

- Based on these years of insights, Doe Run prioritized which aspects and data indicators are material both inside and outside the organization, and should be the focus of the **2018 report**:
 - Community involvement at all operations
 - Employee health and safety at all operations
 - Environmental capital investment and performance, which relates to all operations
 - Workforce data for all operations
 - Direct economic impact from all operations and indirect economic impact from operations and supply chain

Identification and Selection of Stakeholders

Based on input and continued dialogue with our employees, communities, industry groups and regulatory bodies, we've determined our stakeholders consist of the following: community groups and leaders; property owners; neighboring residents; current and retired employees; local, state and federal government; business groups; nearby schools; and industry organizations.

Stakeholder Groups

Community Groups and Leaders

Key Interests and Concerns

Seek information related to local jobs, taxes and other support.

Engagement Methods

- Conducted community surveys in 2017, 2014 and 2012.
- Provide feedback mechanism via annual Sustainability Report.
- Maintain ongoing engagement through a number of community events.
- Maintain involvement in various community organizations, including Viburnum Economic Development Area Corporation, Viburnum Lions Club, Washington County Chamber of Commerce, Salem Chamber of Commerce, Sustaining Partners of Salem (The Community Resource Center), Reynolds County Rotary Club, Crawford and Reynolds County Relay for Life, Teen Challenge of St. Louis, local school district organizations and community sports teams.
- Share company updates via news releases and annual sustainability report.
- Provide free tours annually during Old Miners' Days.

Property Owners and Neighboring Residents

Key Interests and Concerns

Seek information related to the potential impact of Doe Run's operations on their land, such as environmental precautions, traffic, noise, etc. Also interested in employee safety.

Engagement Methods

- Conducted community surveys in 2017, 2014 and 2012.
- Communicate directly with nearby residents if a situation arose.
- Share company updates via news releases, local newspaper and radio interviews, and annual sustainability report.
- Provide free tours annually during Old Miners' Days.

Current and Retired Employees

Key Interests and Concerns

Seek information about business goals, operational performance, employee training, and health and safety.

Engagement Methods

- Conducted employee surveys in 2017, 2014 and 2012.
- Hold regular employee meetings with managers.
- Established cascading flow to share information with employees through managers, and to surface feedback from employees.
- Publish quarterly employee newsletter mailed to homes to share company updates.
- Hosted Retiree Pancake Breakfast in 2014 and 2016.

Local, State and Federal Government and Regulatory Agencies

Key Interests and Concerns

Both groups seek information about operational performance, specifically around environmental impact and health and safety. Local and state government is also deeply interested in the company's economic impact, including jobs and taxes.

Engagement Methods

- Hosted a legislator tour of Doe Run operations in June 2019.
- Hosted Doe Run Day at the Capitol to interact with legislators in Jefferson City, Missouri, in 2015, and again in 2017.
- Regularly invite elected and regulatory officials to tour operations.
- Participated in a survey for the federal Government Accountability Office, to help the U.S. Senate Committee on Energy and Natural Resources understand the impact of federal policy on the industry.
- Post online annual sustainability reports with detailed data on environmental, health and safety performance.
- Meet regularly to address legacy issues and ongoing operations with Missouri Department of Natural Resources, EPA Region 7, and Natural Resources Trustees.

Business Groups

Key Interests and Concerns

Seek information related to the company's economic impact in the area, including supplier partnerships.

Engagement Methods

- Maintain involvement with local business groups, including Viburnum Economic Development Area Corporation, Viburnum Lions Club, Washington County Chamber of Commerce and Salem Chamber of Commerce.
- Share company updates via news releases and the annual sustainability report.

Nearby School Districts and Colleges

Key Interests and Concerns

Seek information related to funding that benefits schools. Also seek information to inform and educate students about mining and minerals, and training for students who want to enter the mining profession.

Engagement Methods

- Maintain ongoing partnerships with local colleges, including the Missouri University of Science and Technology and Mineral Area College, including donations toward key programs.
- Provide financial support for STEM-related education in local schools, including Valley R-VI School District's Project Lead The Way and the nonprofit Kaleidoscope Discovery Center in Rolla.
- Offer minerals education programs at local school districts.
- Offer internships and job training.
- Engage in informal conversations with teachers and administrators through involvement in mineral education workshops, backpack donation programs, Career Days and other partnerships with schools.
- Share company updates via news releases and the annual sustainability report.

Industry Organizations

Key Interests and Concerns

Seek information and best practices related to economic, environmental and social performance.

Engagement Methods

- Hold board or executive committee positions on:
 - International Lead Association (ILA); Battery Council International (BCI); Consortium for Battery Innovation; Society for Mining, Metallurgy & Exploration (SME).
- Assist industry organizations with initiatives to further the industry.

Open communication with our internal and external stakeholders helps us share achievements and challenges. It also helps Doe Run understand what actions and information our stakeholders need from us. We strive to maintain open communication with stakeholders both inside and outside the company. Our sustainability reports and our online survey are two channels for this communication.

To share feedback with Doe Run, contact communityinfo@doerun.com, and please consider answering a few questions via our [online survey](#).

GRI Index

<https://doerun.com/sustainability/gri-index/>

This report contains Standard Disclosures from the GRI Sustainability Reporting Guidelines. A list of the reported Standard Disclosures is listed below. All information is fully disclosed, unless otherwise indicated.

Strategy and Analysis

102-14 (G4-1)	Statement from the most senior decision-maker of the organization	Letter from the CEO
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Organizational Profile

102-1 (G4-3)	Name of the organization	The Doe Run Resources Corporation/DBA The Doe Run Company
102-2 (G4-4)	Primary brands, products, and services	What We Do
102-3 (G4-5)	Location of the organization's headquarters	St. Louis, Missouri, United States
102-4 (G4-6)	Countries where the organization operates	United States (Missouri, Arizona and Washington)
102-5 (G4-7)	Nature of ownership and legal form	The Doe Run Resources Corporation is a corporation, which is an indirect subsidiary of The Renco Group, Inc.
102-6 (G4-8)	Markets served	Primary customers served include battery manufacturers in the U.S.; concentrates are sold globally. What We Do
102-7 (G4-9)	Scale of the reporting organization	What We Do Financial Highlights As a private company, net sales, net revenue and total capitalization is proprietary information and viewed as business confidential.
102-8 (G4-10)	Total workforce by employment type, employment contract, and region, broken down by gender	Workforce Summary
102-41 (G4-11)	Percentage of total employees covered by collective bargaining agreements	Only 0.16% of employees are covered under collective bargaining agreements.

102-9 (G4-12)	Organization's supply chain	Doe Run partners with its local vendors to create a more sustainable supply chain and support local economic vitality where possible. Its supplier practices guided more than \$181 million in spending to Missouri-based suppliers in 2018, representing 43% of Doe Run's overall supplier spending.
102-10 (G4-13)	Significant changes during the reporting period	Letter from the CEO
102-12 (G4-15)	Externally developed economic, environmental and social charters, principles, or other initiatives to which the organization subscribes or which it endorses	The Doe Run Company, through its membership with the International Lead Association, subscribes to the principles of the Shared Lead Action 21 Program . We aim for the safe production and use of lead now and in the future while safeguarding human health and limiting operational impact on the natural environment. In addition, many of Doe Run's operations have achieved and maintain ISO certifications to minimize our environmental impact.
102-13 (G4-16)	Memberships of associations or organizations	The Doe Run Company participates on the boards and/or committee activities for a variety of industry organizations, including: International Lead Association Battery Council International Consortium of Battery Innovation Society of Mining, Metallurgy and Exploration

Identified Material Aspects and Boundaries

102-45 (G4-17)	Entities included in the organization's consolidated financial statements or equivalent documents	All Doe Run entities have been reported. What We Do
102-46 (G4-18)	Process for defining report content	Reporting Process
102-47 (G4-19)	Material aspects identified for defining report content	Reporting Process
103-1 (G4-20)	Aspect boundaries inside the organization	All Doe Run entities have been reported. All sizeable economic, environmental and social impacts are included either in the stories or the data.
103-1 (G4-21)	Aspect boundaries outside the organization	Reporting Process

102-48 (G4-22)	Restatements of information provided in previous reports, and the reasons for such	Environmental Spending
102-49 (G4-23)	Report significant changes from previous reporting periods in the Scope and Aspect Boundaries	None

Stakeholder Engagement

102-40 (G4-24)	List of stakeholder groups engaged by the organization	Reporting Process
102-42 (G4-25)	Basis for identification and selection of stakeholders with whom to engage	Reporting Process
102-43 (G4-26)	Approach to stakeholder engagement	Reporting Process
102-44 (G4-27)	Key topics and concerns that have been raised through stakeholder engagement	Reporting Process

Report Profile

102-50 (G4-28)	Reporting period	2018 Calendar (Fiscal year reporting is noted where appropriate.)
102-51 (G4-29)	Date of most recent previous report	Published in September 2018
102-52 (G4-30)	Reporting cycle	Annual
102-53 (G4-31)	Contact point	corporateinfo@doerun.com
102-54 102-55 (G4-32)	In Accordance with Guidelines and GRI Content Index	This report contains Standard Disclosures from the GRI Sustainability Reporting Guidelines. The GRI content index is outlined on this page.

Governance

102-18 (G4-34)	Governance structure of the organization	Corporate Governance
102-19 (G4-35)	Process for delegating authority to address economic, environmental and social topics	Corporate Governance
102-20 (G4-36)	Position responsible for economic, environmental and social topics	Corporate Governance
102-22 (G4-38)	Composition of the company's highest governing body	Corporate Governance (Partially Disclosed)

102-23 (G4-39)	Indicate whether the Chair of the highest governance body is also an executive officer	No
102-26 (G4-42)	Report the highest governance body's and executives' roles in developing, approving and updating the organization's purpose, mission, strategies, policies and goals related to sustainability	Corporate Governance
102-32 (G4-48)	Highest position that formally reviews and approves the sustainability report	President and CEO

Ethics and Integrity

102-16 (G4-56)	Organization's values, principles, standards and norms of behavior	Core Values
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Economic

201-1 (G4-EC1)	Direct economic value generated and distributed	Financial Highlights (Partially Disclosed)
203-1 (G4-EC7)	Development and impact of infrastructure investments and services supported	Community Engagement Missouri's Rich Mining History
204-1 (G4-EC9)	Proportion of spending on local suppliers at significant locations of operation	In 2018, Doe Run supported Missouri businesses by spending more than \$181 million with nearly 700 Missouri vendors. This accounts for 43% of total company spending.

Environmental

301-1 (G4-EN1)	Materials used by weight or volume	Environmental Performance
301-2 (G4-EN2)	Percentage of materials used that are recycled input materials	Environmental Performance
302-1 (G4-EN3)	Energy consumption within the organization	Environmental Performance
302-3 (G4-EN5)	Energy intensity	Environmental Performance
305-1 (G4-EN15)	Direct greenhouse gas (GHG) emissions (Scope 1)	Environmental Performance
305-2 (G4-EN16)	Energy indirect greenhouse gas (GHG) emissions (Scope 2)	Environmental Performance
305-3 (G4-EN17)	Other indirect greenhouse gas (GHG) emissions (Scope 3)	Environmental Performance

305-4 (G4-EN18)	Greenhouse gas (GHG) emissions intensity	Environmental Performance
305-7 (G4-EN21)	NOX, SOX, and other significant air emissions	Environmental Performance
306-1 (G4-EN22)	Total water discharge by quality and destination	Environmental Performance
307-1 (G4-EN29)	Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with environmental laws and regulations	Doe Run paid no (\$0) fines for noncompliance with environmental laws and regulations in 2018.

Labor Practices and Decent Work

102-8 (G4-LA1)	Total number and rates of new employee hires and employee turnover by age group, gender and region	Workforce Summary (Partially Disclosed)
403-1 (G4-LA6)	Type and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities by region and by gender	Health and Safety Performance (Partially Disclosed)
404-1 (G4-LA9)	Average hours of training per year per employee by gender and employee category	Workforce Training (Partially Disclosed)

Society

413-1 (G4-SO1)	Local community engagement, impact assessments, and development programs	All operations implement a localized community engagement plan. Community Engagement
419-1 (G4-SO8)	Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with laws and regulations	In 2018, Doe Run paid approximately \$118,499 in fines and non-monetary sanctions related to laws and regulations.

Product Responsibility

419-1 (G4-PR9)	Monetary value of significant fines for non-compliance with laws and regulations concerning the provision and use of products and services	Doe Run paid no (\$0) significant fines for noncompliance concerning provision and use of products and services in 2018.
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