



2016

# Sustainability Report

# 2016 Doe Run Sustainability Report

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## Business Highlights

**250,000**

Southeast Missouri Mining and Milling Division produces approximately 250,000 tons of lead concentrates annually.

**160,000**

Resource Recycling has the capacity to recycle and recover nearly 160,000 tons of refined lead and lead alloys from more than 13.5 million recycled lead-acid batteries annually.

**30,000**

Fabricated Products Inc. manufactures 30,000 tons of lead products annually.

## Facts About Lead

### Battery Recycling

More than 99 percent of lead batteries in the United States are recycled, compared to aluminum cans at 55 percent. <sup>1</sup>

### Automobiles

One billion vehicles worldwide rely on lead-based batteries to start their engines and power their electronics. <sup>2</sup>

### Renewable Energy

Lead-based batteries store renewable energy sourced from wind turbines and solar panels before going into the electric grid.

1. U.S. Environmental Protection Agency

2. International Lead Association

# Message from the CEO

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 [sustainability2016.doerun.com/message-from-the-ceo/](https://sustainability2016.doerun.com/message-from-the-ceo/)

For much of 2016, Doe Run continued to face challenges from depressed metal prices, regulatory capital spending requirements and other regulatory uncertainty. In order to adjust to these conditions, we had to make a number of tough choices. Those included the difficult decisions to curtail production and to reduce our workforce at several locations early in the year.

Despite this period of uncertainty, Doe Run continued progress on process and equipment improvements, as well as a program of cost reductions, so that we could be poised to capitalize on a lead price rebound. Fortunately, our efforts paid off and lead prices began to improve toward the end of 2016.

## Adapting Now to Prepare for the Future

As we prioritized projects for 2016, we focused on those that met our commitments to workforce safety, environmental standards and customer needs, as well as projects that would prepare our company for the economic opportunities of a pricing rebound.

In 2016, Doe Run completed our multi-million dollar equipment update at the Resource Recycling facility. These improvements included:

- Better workforce safety.
- Enhanced productivity and processing capability.
- Stronger competitiveness for the future.

Read more on how we delivered on this commitment [here](#).

Innovative upgrades also occurred at Brushy Creek Mill, where adjustments to our milling process improved mineral recovery and product consistency, and provided a new method to sustainably re-use our water resources. [Read more](#) on our updated water management.

We continue to make progress on converting the former smelter site in Herculaneum for new use. In 2016, Doe Run sold 18 acres of previously leased riverfront property to Riverview Commerce Park LLC. This property sale represents a long-term commitment to Herculaneum for the Mississippi River shipping port, which is changing the economic future for the community. [Read more](#) about repurposing efforts at the former smelter site.

## Continuous Improvement in the Face of Challenges

Market prices are just one of the challenges facing the mining and metal production industries. Our current and long-term success depends on our ability to adapt to a constantly changing regulatory environment, and maintaining a skilled workforce.

As we face these challenges, we're driven by our commitment to balance our social, environmental and economic responsibilities set forth in our [Sustainability Principles](#). We continually strive to be good stewards of the environment and maintain the health and safety of our employees and the communities in which we operate.

During periods of low lead prices, the financial costs of the changing regulatory environment became increasingly challenging. According to a [report for the National Association of Manufacturers](#), companies in the manufacturing sector spend on average \$13,750 per employee each year just to meet federal regulations. During the last five years, Doe Run incurred more than \$343 million in environmental expenses – or roughly \$57,000 per employee. In

2016 alone, these expenses included \$71 million on efforts to limit the impact of our operations and improve energy and water use. As an example, we opened two \$12 million water treatment plants at Sweetwater Mine and in Viburnum as part of updating our [water management approach](#) at the Southeast Missouri Mining & Milling Division (SEMO).

Our success as a company and an industry depends on protecting the health and safety of our employees, contractors and communities. In 2015, International Lead Association (ILA) members established the goal of reducing employee blood-lead levels to below 30 µg/dL. Our goal is to reduce the number of employees at each location who surpass 19 µg/dL by proactively monitoring employees' blood-lead levels, which we accomplished at three out of four locations in 2016. In total, the average blood-lead level companywide declined to 10.2 µg/dL. Both the ILA guidelines and Doe Run's protocols establish lower acceptable blood-lead levels than are required by law. [View more](#) about employee health and safety.

To sustain our vital industry in Southeast Missouri, we're focused on attracting talented workers. By 2019, the mining industry needs 78,000 workers to replace retirees, according to the Energy Information Administration (EIA). During that same time, the industry is expected to grow by about 50,000 workers. Our industry will need to fill 128,000 positions by 2019. Our efforts to address this challenge include our partnerships and donations to Missouri University of Science & Technology, Mineral Area College and other schools with mining-related programs, as well as scholarships and internships to educate the next generation of our workforce. [Read more](#) about our partnerships to build a sustainable workforce.

## **Opportunities for Metals in the Future Economy**

We're excited about the future for the metals we mine. Around the world, lead-based batteries power vehicles, store renewable wind and solar energy, and provide backup power for critical operations at hospitals and financial centers. Market analysts predict demand for lead-based batteries will grow as a result of expanding economies across the globe, growth in hybrid electric vehicles and renewable energy storage demand expands around the globe.

Doe Run is doing its part to support the development of advanced lead batteries to meet these applications as a member of the [Advanced Lead Acid Battery Consortium](#) and other industry organizations. Through these industry coalitions, we're supporting research and development of advanced uses for our lead that will drive demand for decades to come. New lead-based battery technologies will help the lead industry continue to thrive in Missouri. [Read more](#) about lead's economic rebound.

Our future isn't focused on lead alone. Zinc and copper, two other metals contained in ore found in our Southeast Missouri mines, are vital to everyday life. Zinc-based products are used for construction and the automotive industry and demand for this versatile metal grows as developing nations expand their infrastructure. In addition, zinc-based batteries have been used for many decades in toys, electronics and even aircraft and space applications. Zinc also is vital for human and plant health. [Read more](#) about zinc. Doe Run's third mineral product, copper, is also critical to modern society and is used extensively in construction, manufacturing, electrical and the energy industries to name a few.



**Share Your Feedback on Our Report**

We understand that we operate with the consent of stakeholders like you. Your views are important to us, and we ask that you consider answering a few questions on our [online survey](#) or you may email me.

As I prepare this report overview, I have the advantage of hindsight. The steps we took in 2016, combined with the dedication of our employees, and the partnerships we have forged with customers and vendors, have put Doe Run in a solid position to capitalize on the improved lead metal prices, a growing economy and a bright future. Thank you for your interest in our business. Please consider sharing your opinions with us in a brief [online survey](#).

Sincerely,

Jerry L. Pyatt

President and Chief Executive Officer  
[corporateinfo@doerun.com](mailto:corporateinfo@doerun.com)



# Organizational Profile

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[sustainability2016.doerun.com/introduction/organizational-profile/](https://sustainability2016.doerun.com/introduction/organizational-profile/)

**The Doe Run Company manages the various components of the lead lifecycle, and also provides lead metals, alloys and lead concentrates to companies globally.**

Based in St. Louis, Missouri, The Doe Run Company (Doe Run) is a privately held natural resources company and a global provider of lead, copper and zinc concentrates and lead metals and alloys. Dedicated to environmentally responsible mining operations and metal production, Doe Run operates one of the world's largest single-site lead recycling centers, located in Boss, Missouri. Doe Run and its subsidiaries deliver products and services necessary to provide power, protection and convenience. Doe Run has operations in Missouri, Washington and Arizona.

## Our Business Divisions

### Southeast Missouri Mining and Milling Division

The lifecycle of lead starts with exploration, which has helped to identify and locate the six underground mines of the Southeast Missouri Mining and Milling Division (SEMO). Here, ore containing lead (galena), zinc (sphalerite) and copper (chalcopyrite) is located, blasted, hauled, crushed and hoisted to the surface, then concentrated at Doe Run's four mills. In southeastern Missouri's Viburnum Trend, mining and milling has taken place for more than 50 years and produces approximately 225,000 tons of lead concentrates annually.



Doe Run's SEMO Division also includes the Glover facility as of late 2013. A portion of the site, which ceased operations as a primary lead smelter in 2003, functions as a warehouse and transloading facility.

Steve Batts, Vice President – SEMO Operations

[semoinfo@doerun.com](mailto:semoinfo@doerun.com)

## Metals Division

Doe Run's Resource Recycling facility has served metals customers and the battery manufacturing industry as one of the world's largest single-site lead recycling centers since 1991. Resource Recycling has the capacity to recycle and recover nearly 175,000 tons of refined lead and lead alloys from more than 13.5 million recycled lead-acid batteries annually. Other recycled materials include ammunition, lead-bearing glass and lead-based paint chips. Recovered lead is used to produce secondary lead and lead alloys for battery manufactures and other customers.



In late 2013, Doe Run closed its Herculaneum primary smelting operations. The company continues to operate its refinery, strip mill, and alloying and casting operations at the Herculaneum site to produce unique lead alloy products. With the closure of the smelter, Doe Run's Primary Smelting Division was combined with its Resource Recycling Division to better serve customers as the Metals Division.

Anthony Staley, General Manager (hired 2017)  
[rrdinfo@doerun.com](mailto:rrdinfo@doerun.com)

## Fabricated Products Inc.

Fabricated Products Inc. (FPI) is a wholly owned Doe Run subsidiary. FPI's Vancouver, Washington, location primarily produces lead oxide for the manufacturing of lead-acid batteries. Lead metal fabrication takes place at the Casa Grande, Arizona, location. The facility produces sheet lead for roofing; lead shielding to block sound waves, X-rays and nuclear radiation; storage containers for radioactive waste; lead anodes for copper and zinc electrowinning; bullet materials; and specialty extruded shapes. Annually, FPI manufactures 30,000 tons of lead products.



Dave Olkkonen, General Manager  
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## Map of Operations





# Partners for a Sustainable Workforce

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Founded in 1870 as the Missouri School of Mines and Metallurgy, Missouri University of Science and Technology (Missouri S&T) continues to be instrumental in preparing students for careers in mining, geology, metallurgy and other disciplines critical to the success of Doe Run. Today, more than ever, Doe Run and Missouri S&T recognize the mutual benefits of a globally recognized lead mine and world-renowned university in each other's backyards.

Employment in occupations related to STEM (science, technology, engineering and mathematics), including mining and manufacturing, is projected to grow to more than 9 million between 2012 and 2022, faster than most other occupations. The manufacturing industry is facing the possibility of more than 2 million jobs going unfilled over the next decade due to a skills gap, according to the National Association of Manufacturers. Mining also will face shortages.

"The U.S. mining industry estimates 50,000 new employees will be needed to meet a shortage of skilled mine laborers and professionals as a result of retiring employees over the next several years," said Mark Coomes, Doe Run vice president – human resources and community relations. "Missouri S&T has been a tremendous asset to Doe Run. They provide us with the exceptional talent we need today and for the future."

Doe Run employs nearly 50 graduates of Missouri S&T (formerly the University of Missouri-Rolla). Today, many of those graduates are managers and leaders for Doe Run.

"We have a mutually beneficial relationship," said Coomes. "We help provide the real-world application of education to students through collaborative field trips, meaningful internships, equipment donations and sponsorship of educational programs, like explosives camp. Missouri S&T challenges and educates the future workforce to prepare them for careers in 98 degree programs, including mining engineering and metallurgical engineering, which is important to Doe Run as an employer."

## Forging a Partnership

In 2016, Doe Run strengthened its relationship with Missouri S&T. Doe Run established an internal team to help manage and promote opportunities for interaction between the company and university. This cross-functional team represents mining, exploration, environmental, human resources, customer relations and communications<sup>1</sup>. The team works closely with John Eash, Missouri S&T's executive director of corporate relationships.

"We met John Eash in late 2015," said Tammy Stankey, Doe Run senior communications liaison. "With his help, we became more intentional about how we could help the university educate students in fields that matter to us. There are obvious ways for us to help them, including providing internships, scholarships and tours of the company's operations, but we also identified opportunities where the university can help Doe Run with research projects and innovative problem solving."

## New Opportunities for Students

In 2016, one research project focused on using soil-enhancing additives to encourage plant growth at mine tailings sites. Mariam Al-Lami, a doctoral student in civil and environmental engineering at Missouri S&T, earned recognition from the American Society of Mining and Reclamation (ASMR) for her research, which explored revegetating tailings impoundments as a part of the remediation of mine sites.

Al-Lami collaborated on the research with Missouri S&T's Joel Burken, Curators' Distinguished Professor and chair of the civil, architectural and environmental engineering department. Doe Run supported the research with \$50,000 in funding over a three-year period.

Research is just one way Doe Run and Missouri S&T work together. “Our goal is to identify and pursue opportunities for the university and corporate partners to work together toward advancing knowledge and problem solving, and becoming a trusted resource to help businesses grow and thrive,” said Eash. “We want to connect industry needs with university assets, including on-site and remote education, students, faculty, and research facilities.”



#### **University EcoVillage Employs Lead Batteries**

Missouri S&T's solar-powered EcoVillage microgrid will use lead batteries to power student-designed and built homes. The project is a collaboration between the university's Microgrid Industrial Consortium and the Advanced Lead Acid Battery Consortium, of which Doe Run is a member.

The relationship has blossomed to include a partnership with the Advanced Lead Acid Battery Consortium. The trade association will work alongside Doe Run and others as part of the university's Microgrid Industrial Consortium. The Consortium and its members promote a more sustainable energy future through research projects, including a campus-based, solar-powered EcoVillage microgrid that will use lead batteries to power three student-designed and built homes on the university's campus. The EcoVillage is designed to accommodate a total of six solar houses, providing the opportunity to grow the microgrid and the associated research partnerships.

Doe Run also provides funding and resources to support students pursuing degrees in mining and STEM fields:

- Over the past 10 years, Doe Run has provided \$84,000 in scholarships for Missouri S&T students.
- With Doe Run's help, Missouri S&T built a mine education building that opened in 2016. Located adjacent to its experimental mine near campus, the building provides mine engineering students with practical experience.
- The company also donates equipment, such as an XRF Spectrometer and other analysis tools, which allows students to practice technical skills.

(1) The team is led by Tammy Stankey (senior communications liaison), and includes Mark Coomes (vice president – human resources and community relations), Mark Yingling (vice president – environmental, health and safety), Ross Conner (vice president – exploration), Lou Magdits (director of raw materials), Tom Yanske (technical services manager), and Missouri S&T alums Genevieve Sutton (environmental, health and safety technical supervisor) and Chris Neaville (asset development director).

## Hands-On Training for the Future Workforce

In addition to Missouri S&T, Doe Run partners with several universities across the country to offer a rigorous, hands-on internship program that recruits and trains future mining professionals. Taylor Fels and Kathleen Tew are two such individuals.

### Taylor Fels, Environmental Engineer

Although he was raised in Rolla, Missouri, just 60 miles from Doe Run's Southeast Missouri Mining and Milling Division, **Taylor Fels** didn't know much about the industry until he took a tour of Brushy Creek Mine.

He was a mechanical engineering major at Missouri S&T in 2011, but discovered environmental and geological engineering would give him the opportunity to do more hands-on work outdoors in the field.

"You can only learn so much from a text book," said Fels. "My internship at Doe Run helped me realize what I wanted to do for a living."



Taylor Fels, Doe Run Environmental Engineer

A Missouri S&T grad, Fels completed several internships with Doe Run before joining the company full time to support environmental remediation projects, including capping a slag pile at Glover, a former primary smelter in Missouri.

Fels first interned with the company in 2013. He was impressed by the trust the company placed in him to do the work. "They trusted me to make the right decisions and gave me the chance to do so," he said.

The next summer, Fels moved to Minnesota to intern for a consulting firm. "About one month into that job, I realized I liked Doe Run's style better," shared Fels. "I left the consulting firm mid-summer and came back to intern here, and I never left."

During the Doe Run internship, Fels managed the design and construction oversight of two storm water retention basins. He joined other interns to present the large and important project to the company's executive team.

"The presentation gives you the chance to see how involved everyone is in the internship program and how interest-ed they are in what you're doing and what you're learning," Fels said. "It also underscores how much the company values the contributions of the interns."

Fels continued to work nearly full time as an intern and an environmental technician until he graduated from Missouri S&T with a bachelor's degree in geological engineering in May 2016. Today, Fels works on several remediation projects key to helping Doe Run meet its vision as stewards of the mineral resources in its care.

"It's one of the biggest things I realized as an intern – how big of a role taking care of the environment plays in the mining industry. Remediation is a large component of mining. We work very hard to be good stewards and protect the environment," Fels said.

## Kathleen Tew, Mine Planner

**Kathleen Tew** literally grew up in mines, tagging along with her father at work all over the country. In fact, her ability to drive a haul truck impressed her Doe Run co-workers early on in her internship.

“I rode in haul trucks as a kid and spent time in underground salt mines in Ohio and New York,” said Tew. “By the time I completed college, I’d also experienced a surface coal mine, a surface garnet mine and a cement plant. The more I worked on the surface, the more I realized I preferred the complexity of being underground.”

When she was a freshman at the South Dakota School of Mines and Technology, Tew decided to double major in mining engineering and management, and geological engineering. Tew accepted a summer internship at Doe Run’s Buick Mine in 2013.



**Kathleen Tew, Mine Planner**

A recent mine and geological engineering graduate, Tew lives her passion for underground mining every day as she analyzes ore bodies and develops plans for addressing mine conditions.

“Doe Run was the most comprehensive internship I did in terms of experience,” she said. “They wanted me to really understand the mining process and everything that goes into it – from extraction to the equipment to how they use data in planning. You’re given a chance to do real work and make an impact.”

Tew says that approach helped her understand the importance of good communication between the underground production crews and the engineering professionals. “I gained a better understanding of what I needed to do to make sure what I was producing in my role would be applicable to their work underground,” said Tew. “I knew one month into the job that this was the kind of company where I wanted to work. Everyone seemed to enjoy their jobs and they were open and willing to teach me.”

Today, Tew works with the mine captain and foreman on audits, analyzing ore bodies and conducting production planning. “The best part of my job is also the most challenging part of my job,” she said. “The conditions of the mine are always changing and we have to constantly think of new solutions to problems, like the presence of water or equipment breakdowns. It’s a very interesting place to be.”

# Recognitions and Achievements

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Continuous improvement is a priority at Doe Run, and awards and certifications are measures of the company's progress. In 2016, Doe Run received recognition on several fronts for its commitment to safety, environmental and product quality programs.

## Mine Rescue Hall of Fame

After more than three decades of commitment to his coworkers' safety, Doe Run celebrated the distinguished career of one of their own. In July, the Mine Safety and Health Administration named Denny Dickerson, a recent Doe Run retiree and long-time member of Doe Run's Maroon Mine Rescue Team, to the [National Metal/Nonmetal Mine Rescue Hall of Fame](#).

"We are thrilled Denny received national recognition for his outstanding contributions to Doe Run's mine rescue programs," said Steve Setzer, captain of Doe Run's Maroon Team. "As one of the longest-tenured team members, Denny helped prepare our mine rescuers to perform their roles as safely as possible. We're all better because of the level of expertise and commitment to safety that Denny provided."

Dickerson retired from Doe Run in early 2016. His career spanned more than four decades in Missouri's mining industry and 33 years in mine rescue.

"When I first began working in the mining industry, I didn't know about mine rescue," said Dickerson. "While at West Fork Mine in 1985, we started a mine rescue team to make sure we had the skills needed to help our fellow employees in the event of an emergency underground. I volunteered that year and stayed on the team until my retirement."

Dickerson helped Doe Run's Maroon Team earn the National Championship title at the Mine Safety and Health Administration National Metal/Nonmetal Mine Rescue Contest in both [2010](#) and [2014](#). His decades of preparation and expertise were tested in 2010 when he helped with the successful evacuation of three miners trapped by a small truck fire in Mine 29.

"Safety procedures are essential in the mines," said Dickerson, who credits fellow team members and underground employees for sharing their safety knowledge with him. "I've had a chance to work with a lot of good people, to teach them and learn from them all."

Doe Run's mine rescue teams undergo eight hours of rigorous monthly training and enter regional and national competitions during the year to keep their skills sharp. Even in retirement, Dickerson will help train Doe Run's teams. He's been asked to develop hypothetical mine rescue situations for practice. He wants to continue sharing the knowledge he gained from his colleagues with the next generation of mine rescue teams, so they can continue to keep their fellow miners safe.

Dickerson also was named to the Missouri Mine Rescue Hall of Fame in 2015, thanks to a nomination from a member of the Mississippi Lime team, which the Maroon Team regularly faces in competitions.

Throughout 2016, Doe Run's mine rescue teams continued their tradition of excellence. The company's Maroon and Gray Mine Rescue Teams participated in the National Metal/Nonmetal Mine Rescue Contest in Reno, Nevada, where Garry Moore and Denny Keene of the Gray Team won the National Championship in the team technician category.

At [Missouri University of Science and Technology's Annual Mine Rescue Competition](#) in October, the Maroon Team



won first place in the field competition – the highest honor for the event. The Maroon Team also won best in association and second place in the first aid competition. The Gray Team earned fourth place in the field competition.

See more of Doe Run's [mine rescue team honors](#).

## Marking Safety Milestones

Doe Run employees participate in refresher safety training every year. This commitment to safety helped the company reach milestones at two facilities in 2016.

- In November, [Brushy Creek Mill surpassed 10 years](#) with no lost-time accidents. The 23 employees average more than 10 years of experience and meet daily to share experiences and advice as to how to do their job in a safe way.
- Fabricated Products Incorporated (FPI) earned its 17th Perfect Safety Award from the National Safety Council. The Casa Grande, Arizona, facility, a subsidiary of Doe Run specializing in metal fabrication, has earned the recognition every year since 2000. Last year, it surpassed 1.6 million hours with no lost-time accidents.

## Managing Environmental Impact

Doe Run is committed to effectively managing its environmental impact by pursuing International Organization for Standardization (ISO) certification at many of its facilities. ISO's annual third-party audits help each site make the best use of its environmental management system and provide guidance for reaching environmental goals.

In 2016, [SRI Quality System Registrar](#) recognized Resource Recycling with the [President's Award for Commitment](#) for continuously maintaining ISO certification for the last 20 years. Resource Recycling holds ISO 9001:2008 (product quality) and ISO 14001:2004 (environmental management systems) certifications.

Three of the company's mines and mills – Sweetwater, Brushy Creek and Fletcher – also maintain ISO 14001:2004 certifications. In 2017, Buick Mine and Mill, Casteel Mine, and Mine 29 plan to pursue that certification as well. The Herculaneum facility and FPI's Vancouver, Washington, site maintain ISO 9001:2008 certification.



**Brushy Creek Mill Reaches 10-Year Milestone**

Brushy Creek Mill's 23 employees worked more than 10 years with no lost-time accidents. The mill process includes breaking down rock ore to separate out lead, zinc and copper minerals.



**Resource Recycling Facility Recognized**

One of the largest single-site lead recycling facilities in the world, Resource Recycling earned recognitions for its commitment to customer service in 2016.

## Building Relationships with Customers and the Community

Doe Run's commitment to maintain strong relationships with its stakeholders, particularly customers and the community, earned the company several recognitions:

- Winchester Ammunition chose Resource Recycling from 22 companies as its top metals [supplier of the year](#). The recognition was based on Doe Run's high scores in product quality, on-time delivery, pricing and service.
- Alex Sellers, a safety analyst at Resource Recycling, was honored with the [Missouri Community Betterment Adult Leadership Award](#) from [Missouri Community Betterment](#) for his efforts to improve the community through The Salem Initiative. Salem is one of the largest towns near Doe Run's mining and recycling operations, and serves as home to many Doe Run employees.
- Doe Run received an APEX Award for Publication Excellence from The Business Communications Report for its [2015 Sustainability Report website](#), which updates its community and stakeholders about how the company operates sustainably to balance social, economic and environmental responsibilities. The award is based on excellence in graphic design, editorial content and overall communications effectiveness. This is Doe Run's fifth APEX award for its annual sustainability report.

# Health and Safety Performance

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## LA6: (403-1) 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").<sup>(1)</sup> 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)	2014	2015	2016
Southeast Missouri Mining and Milling Division (SEMO), including remediation and demonstration plant	9.78	9.67	<b>8.28</b>
Metals Division (Resource Recycling, Herculaneum, Glover) <sup>(2)</sup>	15.20	15.01	<b>14.83</b>
Corporate Headquarters <sup>(3)</sup>	N/A	N/A	<b>N/A</b>
Fabricated Products Inc. (FPI)	7.74	7.40	<b>7.80</b>
<b>Average</b>	<b>11.49</b>	<b>11.02</b>	<b>10.20</b>

### 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's standard for medical reassignment of an employee is 53 µg/dL.<sup>(1)</sup> Doe Run sets its maximum limit at 30 µg/dL.

(# of employees with blood-lead levels >19 ug/dL)	2014	2015	2016
SEMO	74	38	<b>23</b>
Metals Division (Resource Recycling, Herculaneum, Glover) <sup>(2)</sup>	148	148	<b>134</b>
Corporate Headquarters <sup>(3)</sup>	N/A	N/A	<b>N/A</b>
FPI	1	2	<b>2</b>
<b>Total</b>	<b>223</b>	<b>188</b>	<b>159</b>

### 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.

(number of employees)	2014	2015	2016
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SEMO (includes Glover)	2	3	7
Metals Division (Resource Recycling, Herculaneum)	4	7	6
Corporate Headquarters	0	0	0
FPI	0	0	0
<b>Total number of work-related fatalities, companywide</b>	<b>0</b>	<b>1</b>	<b>0</b>
<b>Total</b>	<b>6</b>	<b>11</b>	<b>13</b>

## Total OSHA Recordables and MSHA Reportables

Total OSHA recordables and Mine Safety and Health Administration (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)	2014	2015	2016
SEMO (includes Glover)	23	33	33
Metals Division (Resource Recycling, Herculaneum)	35	44	34
Corporate Headquarters	0	0	0
FPI	1	0	1
<b>Total</b>	<b>59</b>	<b>77</b>	<b>68</b>

## Total Case Incident Rate (TCIR)

TCIR is the number of OSHA recordable and MSHA reportable incidents per 200,000 personnel hours worked. OSHA recordables 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)	2014	2015	2016
SEMO (includes Glover)	2.6	3.6	4.3
Metals Division (Resource Recycling, Herculaneum)	9.3	12.2	9.7
Corporate Headquarters	0	0	0
FPI	2.3	0	2.4
<b>Total Company</b>	<b>3.9</b>	<b>5.6</b>	<b>5.5</b>

(1) The OSHA General Industry Lead Standard is written in units of  $\mu\text{g}$  of Pb/100 g of whole blood. Doe Run reports their blood lead values in  $\mu\text{g}$  of Pb/ dL of whole blood, and all values in this report are presented as  $\mu\text{g}/\text{dL}$ . The conversion used is  $1 \mu\text{g}/100\text{g} = 1.05 \text{ug}/\text{dL}$ .

- (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.



# Workforce Summary

[sustainability2016.doerun.com/workforce-summary/](http://sustainability2016.doerun.com/workforce-summary/)

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

(number of employees) <sup>(1)</sup>	2014	2015	2016
Southeast Missouri Mining and Milling Division (SEMO)	883	800 <sup>(2)</sup>	<b>700<sup>(2)</sup></b>
Metals Division (Resource Recycling, Herculaneum)	355	312 <sup>(2)</sup>	<b>313</b>
Corporate Headquarters	143	124 <sup>(2)</sup>	<b>130</b>
Fabricated Products Inc. (FPI)	42	42	<b>41</b>
<b>Total Number of Employees<sup>(1)</sup></b>	<b>1,423</b>	<b>1,278<sup>(2)</sup></b>	<b>1,184<sup>(2)</sup></b>

## 2016 Male and Female Employees by Division (Calendar Year)

(number of employees)	2014		2015		2016	
	Male	Female	Male	Female	Male	Female
SEMO	812	71	733 <sup>(2)</sup>	67 <sup>(2)</sup>	<b>652<sup>(2)</sup></b>	<b>48<sup>(2)</sup></b>
Metals Division	331	24	293 <sup>(2)</sup>	19 <sup>(2)</sup>	<b>296<sup>(2)</sup></b>	<b>17<sup>(2)</sup></b>
Corporate Headquarters	86	57	74 <sup>(2)</sup>	50 <sup>(2)</sup>	<b>76<sup>(2)</sup></b>	<b>54<sup>(2)</sup></b>
FPI	36	6	36	6	<b>35</b>	<b>6</b>
<b>Total Number of Employees</b>	<b>1,265</b>	<b>158</b>	<b>1,136<sup>(2)</sup></b>	<b>142<sup>(2)</sup></b>	<b>1,059<sup>(2)</sup></b>	<b>125<sup>(2)</sup></b>

## Number of Employees by Employment Type (Calendar Year)

(number of positions)	2014	2015	2016
Permanent Hourly Positions	969	898	<b>846</b>
Permanent Salary Positions	427	375	<b>331</b>
Temporary Positions	20	1	<b>3</b>
Contracted Positions	7	4	<b>4</b>
<b>Total Number of Employees</b>	<b>1,423</b>	<b>1,278<sup>(2)</sup></b>	<b>1,184<sup>(2)</sup></b>

## 2016 Male and Female Employees by Employment Type (Calendar Year)

(number of positions)	2014		2015		2016	
	Male	Female	Male	Female	Male	Female
Permanent Hourly Positions	944	25	874	24	822	24
Permanent Salary Positions	296	131	257	118	232	99
Temporary Positions	18	2	1	0	1	2
Contracted Positions	7	0	4	0	4	0
<b>Total Number of Employees</b>	<b>1,265</b>	<b>158</b>	<b>1,136<sup>(2)</sup></b>	<b>142<sup>(2)</sup></b>	<b>1,059<sup>(2)</sup></b>	<b>125<sup>(2)</sup></b>

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

(2) Lower counts reflect workforce reductions in 2015 and 2016, retirements, and open positions.

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

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

	2014		2015		2016	
	Number	Rate	Number	Rate	Number	Rate
Male	91	89.2%	22 <sup>(3)</sup>	91.7%	85 <sup>(4)</sup>	96.6%
Female	11	10.8%	2 <sup>(3)</sup>	8.3%	3 <sup>(4)</sup>	3.4%
<b>Total Number of Employees</b>	<b>102</b>		<b>24<sup>(3)</sup></b>		<b>88<sup>(4)</sup></b>	

(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 total number of hires in the reported calendar year by the total number of employees as of December 31.

(3) Reduced hiring in 2015 reflects the company's adjustment to market conditions.

(4) New hires primarily replaced those who retired or left voluntarily.

## Employees Leaving by Gender (Calendar Year)

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

	2014		2015		2016	
	Number	Rate	Number	Rate	Number	Rate
Male	102	91.1%	138 <sup>(3)</sup>	91.4%	132 <sup>(3)</sup>	86.8%
Female	10	8.9%	13 <sup>(3)</sup>	8.6%	20 <sup>(3)</sup>	13.1%

<b>Total Number of Employees</b>	<b>112</b>	<b>151<sup>(3)</sup></b>	<b>152<sup>(3)</sup></b>
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(1) Employee counts for LA1 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 total number of terminations in the reported calendar year broken down by gender.

(3) Higher departure counts reflect a workforce reduction and retirements.

## New Employee Hires by Age Group (Calendar Year)

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

	2014		2015		2016	
	Number	Rate	Number	Rate	Number	Rate
30 or younger	48	47.1%	14 <sup>(3)</sup>	58.3%	<b>47<sup>(4)</sup></b>	<b>53.4%</b>
31 to 40	27	26.5%	3 <sup>(3)</sup>	12.5%	<b>16<sup>(4)</sup></b>	<b>18.2%</b>
41 to 50	16	15.7%	4 <sup>(3)</sup>	16.7%	<b>18<sup>(4)</sup></b>	<b>20.5%</b>
51 and above	11	10.8%	3 <sup>(3)</sup>	12.5%	<b>7<sup>(4)</sup></b>	<b>8.0%</b>
<b>Total Number of Employees</b>	<b>102</b>		<b>24<sup>(3)</sup></b>		<b>88<sup>(4)</sup></b>	

(1) Employee counts for LA1 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 total number of hires in the reported calendar year by the total number of employees as of December 31.

(3) Reduced hiring in 2015 reflects the company's adjustment to market conditions.

(4) New hires primarily replaced those that retired or left voluntarily.

## Employees Leaving by Age Group (Calendar Year)

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

	2014		2015		2016	
	Number	Rate	Number	Rate	Number	Rate
30 or younger	20	17.9%	14	9.3%	<b>20</b>	<b>13.1%</b>
31 to 40	22	19.6%	30	19.9%	<b>27</b>	<b>17.6%</b>
41 to 50	25	22.3%	31	20.5%	<b>29</b>	<b>19.0%</b>
51 and above	45	40.2% <sup>(3)</sup>	76	50.3% <sup>(3)</sup>	<b>76</b>	<b>50.0%<sup>(3)</sup></b>
<b>Total Number of Employees</b>	<b>112</b>		<b>151</b>		<b>152</b>	

(1) Employee counts for LA1 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 total number of terminations in the reported calendar year by the total number of employees as of December 31.

(3) In 2014, 28% of this category were retirements. In 2015, 54% were retirements and in 2016 54.5% represented retirements.

*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 percent, but are accurate.*

# Workforce Training

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 [sustainability2016.doerun.com/workforce-training/](https://sustainability2016.doerun.com/workforce-training/)

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

<b>(number of training hours)</b>	<b>2015</b>	<b>2016</b>
Total number of training hours	22,237	<b>16,745<sup>(2)</sup></b>
Total number of employees	1,364 <sup>(1)</sup>	<b>1,333</b>
<b>Average number of training hours per employee</b>	<b>16.30</b>	<b>12.56<sup>(2)</sup></b>

(1) Total number of employees reflect total number of employees who received training during annual training periods and may not reflect year-end employee counts.

(2) 2016 training hours are a conservative estimate due to changes in the training hours recording system.



# Battery Recycling: Delivering on Commitments

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 [sustainability2016.doerun.com/battery-recycling-delivering-commitments/](https://sustainability2016.doerun.com/battery-recycling-delivering-commitments/)

Each day, more than 250 million vehicles hit U.S. roads thanks to the power of lead batteries. Drivers might not realize many of their journeys began in the Viburnum Trend with lead and zinc mined by Doe Run. And when millions of those lead batteries reach the end of their life, they return to Missouri to be recycled at Doe Run's Resource Recycling facility, one of the largest single-site lead recycling facilities in the world.

Lead batteries are the most recycled product in the U.S. – more than 99 percent are returned for recycling. As global lead battery demand is expected to grow 3.4 percent each year through 2021, continuous improvement at Resource Recycling is important to meet environmental requirements and customer needs.

In 2016, Doe Run continued a multiyear, multi-million dollar investment to update the plant's Breaking, Separation and Neutralization (BSN) system. The project improves safety and environmental performance while helping keep the facility competitive. The project improved processing capability and reduced operating and maintenance costs.

Before 1991, Resource Recycling was a primary lead smelter – turning lead ore into raw materials used for production. Doe Run converted the smelter into a battery recycling facility to meet both the growing demand for lead and public demand for sustainable products. Doe Run has continued to invest in upgrades, like the BSN system, so Resource Recycling can keep pace with evolving technology.

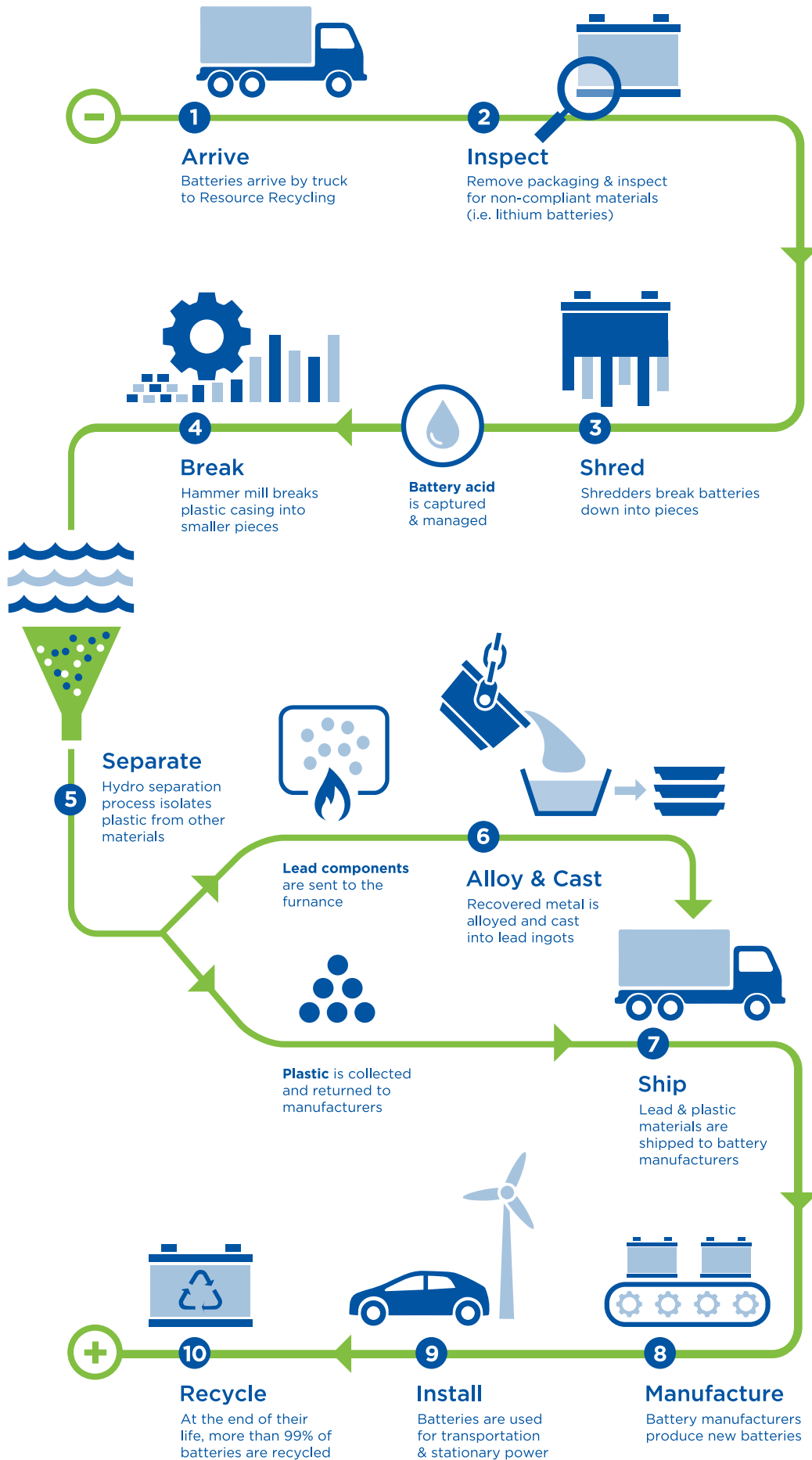
“We began this modernization process in 2013, including construction of a new baghouse using a negative-pressure ventilation system to minimize the potential of emissions,” said Bruce Chamberlain, operations manager of Doe Run's Metals Division\*. “In November 2016, the new BSN system became operational, helping us improve our processes, as well as the needs of our customers and the community.”

Resource Recycling recovers more than just lead for its battery customers. The polypropylene plastic casing also can be recycled into new battery cases. The new BSN system produces quality recycled plastic by creating fewer opportunities for cross contamination between the polypropylene and other materials, recovering at least 98 percent of all polypropylene for reuse.

Doe Run partnered with Engitec, an Italian company and world leader in building metal recycling facilities. Local contractors at Lee Mechanical in Park Hills, Missouri, and Schneider Electric in St. Louis were responsible for installing the new BSN equipment.

## Our Battery Recycling Process

More than 99 percent of lead batteries are recycled in the U.S., which keeps [2.4 million tons of batteries out of landfills](#). See diagram below of how Doe Run employees recycle the lead and other materials from used automobile batteries, giving those components new life.



## **Designed for Safety**

To power a vehicle or store energy from solar panels, lead batteries need to be compact, but powerful. A chemical reaction in the battery occurs whenever it generates or stores electricity. That's why safety is an important factor in improvements to Resource Recycling operations. During the recycling process, workers could be exposed to the elements that cause the chemical reaction, like battery acid, which is collected and neutralized in the BSN by adding hydrated lime.

"The safety of our employees was key in the new BSN design, which uses automation and electronic controls to reduce exposure to materials from the batteries," said Rick White, BSN manager of Doe Run's Metals Division. "The new BSN protects employees and improves equipment reliability."

The system design also includes shields that limit potential spillage of plastic and lead-bearing materials being shredded. These improvements are already contributing to reduced blood-lead levels (the trace amount of lead the body may absorb through exposure) in Resource Recycling employees in 2017.

## **Designed for the Future**

Other design features of the new BSN system prepare Resource Recycling for changes in the battery industry. The updates mean Doe Run can now recycle increasingly popular absorbed glass mat (AGM) batteries. The industry expects demand to increase for these lighter, long-lasting lead-based batteries over the next decade, particularly for vehicles and storage of renewable energy.

As innovation drives changes in lead battery technologies, Doe Run continues to invest in plant improvements.

"Lead-based batteries start 1 billion cars worldwide and store energy from the growing wind and solar industries. Doe Run plays a critical role in powering our global economy," said Chamberlain.

## **Lead Recycling Fast Facts**

Lead batteries are the most recycled and sustainable consumer product in the U.S.

- Lead batteries are recycled at a rate of 99 percent, compared to just 67 percent of paper, 55 percent of aluminum and 34 percent of glass, according to the Environmental Protection Agency (EPA).
- By comparison, only a few companies can recycle lithium-ion batteries, and less than 1 percent of lithium is recycled.
- Approximately 90 percent of the lead Doe Run mines goes into lead-based batteries.
- Since it opened in 1994, Doe Run's Resource Recycling facility has recycled approximately 324 million batteries, enough to circle the globe.
- Each year, Doe Run recycles enough batteries to cover about 137 football fields, keeping used batteries out of landfills.

# Rethinking Water Management

[sustainability2016.doerun.com/rethinking-water-management/](https://sustainability2016.doerun.com/rethinking-water-management/)

Brushy Creek Mill employees faced a challenge when the quality of its lead and zinc concentrates unexpectedly declined. An investigation discovered that poor process water quality was to blame. Thanks to collaboration within the team, and with water partner Neo Solutions, Doe Run discovered a sustainable solution located 1,200-feet underneath the mill.

Brushy Creek Mill processes approximately 50,000 tons of lead concentrates each year. The lead ore also contains smaller amounts of zinc and copper. Processing these other elements helps Doe Run diversify its revenue streams and fulfill its sustainability commitments, getting the most from all the natural resources in its mining operations.

However, a decline in concentrate quality was caused by the process water being used in flotation, which separates lead, zinc and copper minerals from the mined rock. As good stewards of the estimated 38 million gallons of water that flow into Doe Run's six mines and other facilities, Brushy Creek Mill was using water pumped from the mine and held in its tailings ponds for the flotation process to separate the minerals.

"Over time, the use and reuse of the process water made the quality too poor to filter lead concentrates effectively," said Brian Mangogna, mill manager at the Southeast Missouri Mining & Milling Division (SEMO). "The lead concentrates contained too much moisture, so they had to dry longer before being shipped. It affected our business, our transportation partners and our customers."



**Managing Water Underground and Above**

Brian Mangogna, SEMO mill manager, also oversees water management projects at the site, such as this diversion path for stormwater.

## A Solution Right Under Their Feet

Doe Run and Neo Solutions, a water management partner, evaluated a number of solutions that would both improve the quality of lead and zinc concentrates and maintain the company's stewardship of the water at its property. Instead of reusing process water after it reaches the tailings ponds, they developed a system that enables them to tap the high quality, naturally occurring mine water directly from Brushy Creek Mine below.

An adjustment in the piping now allows the mine water to enter directly into the mill. Not only was the quality better

suited for the flotation process, the year-round 65-degree water temperature has provided unexpected benefits.

“We know temperature plays a role in the quality of outputs for our mill,” said Mangogna. “But the switch to using mine water improved zinc recovery and mill efficiency more than anticipated, especially during the winter months when the outdoor tailings pond is very cold.”

Today, a cross-functional team at the mill stays in communication to make the process work. They monitor water within the mines, in the tailings pond and in the mill process and make adjustments as needed. For example, during heavy rainfall, the mill may need to draw more water from the tailings pond than the mine to help balance the increased volume caused by the rain.

“We often celebrate when we make substantial leaps by building new technologies, but simple changes and improvements can create significant positive change,” said Mark Yingling – vice president, environment, health and safety. “With the new mine water process, in combination with the capabilities of the water treatment plant added to that site in 2014, Brushy Creek Mill serves as an example of how we can optimize our infrastructure to be a better steward of our natural resources and environmental responsibilities.”

The team from Brushy Creek Mill has shared its knowledge about managing water systems for sustainable reuse of water resources with Doe Run’s other locations. In 2017, Fletcher Mine and Mill began similar work to pump underground water for use at the mill.

## **Additional Water Management Efforts**

In 2017, Doe Run will complete a \$75 million overhaul of its water management program at SEMO. The five-year program to upgrade and advance the company’s water management adds high-tech water treatment plants that use a chemical process to treat mine and mill water to meet permit limits. Two water treatment plants, costing \$28.6 million, opened in 2016 at Sweetwater Mine and in Viburnum. A final plant at West Fork Mine is scheduled to be completed in the summer of 2017.

The new plants improve flexibility and treatment options at the facilities. The plants can treat up to 10,000 gallons of water per minute, 5,500 gallons more than the first plant, which was constructed at Brushy Creek Mine. The final plant at West Fork Mine will be able to process up to 18,000 gallons per minute.

“We’ve learned that we needed more flexibility in our water capacity given the types of weather we encounter in Missouri, and made the necessary adjustments,” said Samantha Anderson, senior environmental scientist at SEMO.

The four completed water treatment plants processed more than 5 billion gallons of water in 2016.



# Remediation for Revitalization

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 [sustainability2016.doerun.com/remediation-for-revitalization/](https://sustainability2016.doerun.com/remediation-for-revitalization/)

When the industrial revolution transformed the American economy, communities blossomed around new jobs and emerging industries. Major employers, like the lead smelter in Herculaneum, Missouri, drove economic growth and prosperity in these company towns. Nearly 100 years later, those company towns now face a common challenge. How do you drive economic growth after business changes and environmental regulations have altered the landscape, closing 70,000 U.S. factories, and eliminated more than 5 million manufacturing jobs since 2000?

Doe Run and the city of Herculaneum are determined to overcome those hurdles and use the former smelter site as a catalyst for renewed economic vitality in the community.

“We have a unified vision among the city of Herculaneum, our residents and Doe Run to work together to improve the city by creating new jobs, growing our tax base and providing quality of life for our community,” said Jim Kasten, city administrator for Herculaneum. “Today, Doe Run owns some of the biggest pieces of property in the city, and our hope is that these areas can be repurposed and transformed for industrial business opportunities over the next 10 years.”

From a state-of-the-art port on the Mississippi River to an all-abilities playground in Herculaneum, Doe Run remediation work embraces a responsibility to bring new opportunities to the sites and communities once occupied by its mining and metal operations.

## Preparing for Future Economy

Doe Run and its predecessor, St. Joseph Lead Company, were a big contributor to building and expanding the river, rail and road infrastructure that spurred development in the town of Herculaneum. Thanks to investments in remediation at the lead smelter and updates to the on-site infrastructure, Doe Run helped to bring new industry to the area through the Riverview Commerce Park LLC (RCP) shipping port.

In 2016, Doe Run sold 18 acres of previously leased riverfront property to RCP, securing a long-term commitment to Herculaneum. RCP also increased shipping capacity in Herculaneum by opening a second loading dock.

“We are pleased that our work to repurpose the property helped draw new opportunities to the area,” said Chris Neaville, Doe Run’s asset development director. “As we continue the cleanup process at the smelter, we hope to identify additional ways the land can benefit local businesses and the Herculaneum community.”

Doe Run remediation efforts continue at the former smelter property and surrounding area. In 2016, crews removed 5,000 tons of lead-bearing materials from the plant for recycling. Other work at the site included moving slag (a glassy, sand-like material leftover from smelting) situated on the north end of the property to a new slag storage area at the south end, and the next step will be to cap it with soil. All remediation work is done under guidance from the Environmental Protection Agency.

As part of its remediation commitments, Doe Run continues work on the land, houses and public buildings located immediately next to the smelter property. Several houses and other buildings already have been removed, including Assumption Catholic Church, so the company can prepare those properties for reuse.



#### Part of the Community

Dennis Mitchell, supervisor at Doe Run's Herculaneum smelter, visits with his grown daughter and granddaughters at Kade's Playground, an all-abilities playground in Herculaneum.

## Bringing Value to the Community

When Dennis Mitchell began his job at the Herculaneum smelter fresh out of high school he never imagined that 43 years later he'd prepare nearby property for a playground that he now visits with his own grandchildren.

Mitchell spent his entire career with Doe Run and called Herculaneum home for most of that time. For 12 years, Mitchell served as general maintenance supervisor at the smelter. Today, Mitchell oversees Doe Run remediation at the site. This includes soil remediation and landscaping of land once owned by Doe Run to create Kade's Playground, an all-inclusive playground that is accessible to children of all ages and abilities.

"For people who have spent their lives in Herculaneum, Doe Run has always been the cog in the wheel that kept this city viable," Mitchell said. "Even a small contribution to support a playground helps make Herculaneum an attractive community that can sustain families for years to come."

Mitchell and his wife raised their daughter in Herculaneum. Now, when she visits with Mitchell's two granddaughters, they go to Kade's Playground together.

The playground opened in 2015 and is named in memory of Kade Bauman, a local child who used a wheelchair and wanted to bring an inclusive playground to Jefferson County. Kade's Playground was designed so that children of all abilities can play together. All structures include ramps so wheelchairs can access them. The playground also has high-back swings, a spongy playing surface and musical instruments.

"Doe Run helped build this town. As a good neighbor, we are doing everything we can to maintain Herculaneum as a place where people want to live and raise their families," Mitchell said.



#### **Glover Remediation**

Doe Run continued remediation at the former smelter, including removing lead material from the blast furnace building and capping the slag storage area with soil and native grass.

### **Additional Remediation Projects**

As the last remaining lead mining company in the area, Doe Run manages remediation of several historic mine sites that once belonged to its predecessor companies.

Doe Run continues remediation at the former smelter in Glover, Missouri. Glover currently serves as a facility for storing and shipping Doe Run's ore concentrates, but could one day have the potential to serve as an industrial park. In 2016, crews removed lead material and equipment from the Glover blast furnace building and baghouse. Crews also capped the slag pile and planted grass to cover it.

"Our hope is that the Glover facility – when it's decommissioned and ready for repurposing – will be a good site for other employers," said Neaville. "The area has railroad access and is remote, with about 4,000 acres of buffer land. We think it offers many benefits that would be attractive to several industries."

Doe Run also oversees remediation at the Block P mine site in Montana. Block P was owned by Doe Run's predecessor, St. Joseph Lead Company. In 2017, the company will reroute a stream near the mine. Doe Run crews also are working to cover chat piles to minimize contact with mine waste in Treece, Kansas. The chat piles were left by Kansas Exploration, a St. Joseph Lead Company subsidiary.

# Environmental Spending

[sustainability2016.doerun.com/environmental-spending/](https://sustainability2016.doerun.com/environmental-spending/)

## EN31: Total Fiscal Environmental Spending

	2014	2015	2016
<b>Total Capital Spending and Operating Expense</b>	<b>63,420,053</b>	50,189,445	<b>61,118,393</b>
Remediation Spending			
Historic Properties	5,533,608	4,299,618	<b>1,065,582<sup>(1)</sup></b>
Operating Properties	4,901,332	8,690,056	<b>8,891,423</b>
<b>Total Remediation Spending</b>	<b>10,434,939</b>	<b>12,989,674</b>	<b>9,957,005</b>
<b>Total Fiscal Environmental Spending, Including Remediation</b>	<b>73,854,992</b>	<b>63,179,119</b>	<b>71,075,398</b>

(1) Remediation spending decreased in 2016 following the completion of major projects on historic properties in Jasper County in 2015.

# Environmental Performance

[sustainability2016.doerun.com/environmental-performance/](https://sustainability2016.doerun.com/environmental-performance/)

## Indicator Key

Numbers within each green bar represent the quantifiable GRI indicators included in our Level C report. See the full [GRI Index](#) for details.

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

### Units and Substances Key

Metric Ton(s): mt

### Direct/Indirect

Source (mt)	2014	2015	2016
Direct Materials Used	57,120(1)	43,084(1)	<b>31,489</b>
Indirect Materials Used	60,394(1)	43,711(1)	<b>54,043</b>
<b>Total Materials Used</b>	<b>117,514</b>	<b>86,795</b>	<b>85,532</b>

### Renewable/Non-Renewable

Source (mt)	2014	2015	2016
Renewable Materials Used	115	101	<b>97</b>
Non-Renewable Materials Used	117,399(1)	86,528(1)	<b>85,435</b>
<b>Total Materials Used</b>	<b>117,514</b>	<b>86,795</b>	<b>85,532</b>

(1) Overall reductions in the 2014 and 2015 totals reflect reduced production due to the closure of the Herculaneum smelter.

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

### Units and Substances Key

Metric Ton(s): mt

Source (mt)	2014	2015	2016
Slag	14,036	20,600	<b>13,480</b>
Batteries (mt of Pb)	82,860	97,582	<b>86,091</b>
Lead-Bearing Material	33,621	37,582	<b>36,622</b>

Iron-Containing Material	15,142	13,906	<b>8,812</b>
<b>Total</b>	<b>145,659<sup>(1)</sup></b>	<b>169,670<sup>(1)</sup></b>	<b>145,005<sup>(1)</sup></b>
<b>Percentage of materials used that are recycled input materials</b>	<b>55%</b>	<b>66%</b>	<b>63%</b>

(1) Overall fluctuation in materials recycled reflects the availability of materials.

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

### Direct Non-Renewable Energy Source

#### Units and Substances Key

Gigajoule(s): GJ

Source (GJ)	2014	2015	2016
Coke	509,071 <sup>(1)</sup>	472,232	<b>529,612</b>
Explosives	29,289	28,275	<b>24,486</b>
Natural Gas	218,910 <sup>(1)</sup>	151,726	<b>131,663</b>
Petroleum Fuel	321,992	277,685 <sup>(2)</sup>	<b>265,809</b>
Propane	587,933	532,992	<b>486,552</b>
<b>Total Direct Energy Consumption</b>	<b>1,667,196<sup>(1)</sup></b>	<b>1,462,910<sup>(2)</sup></b>	<b>1,438,122</b>

### Indirect Non-Renewable Energy Source

Source (GJ)	2014	2015	2016
Electricity	1,489,964	1,490,784	<b>1,434,721</b>
<b>Total Energy Use</b>	<b>3,157,160</b>	<b>2,953,694</b>	<b>2,872,843</b>

(1) Reductions following 2014 are due to the closure of the Herculaneum smelter.

(2) Decrease reflects increased fuel efficiency and decreased production at Southeast Missouri Mining and Milling Division.

## EN5 (302-3) 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	2014	2015	2016
Southeast Missouri Mining and Milling Division (SEMO)	GJ/mt Ore milled	0.29	0.28	0.35
Metals Division (Resource Recycling, Herculanium)	GJ/mt Pb produced	9.2	9.0	10.4
Fabricated Products Inc. (FPI)	GJ/mt Pb produced	1.2	1.2	1.4

### EN15 (305-1 [scope 1]) Total Direct Greenhouse Gas Emissions (Calendar Year)

#### Units and Substances

Metric Ton(s) of Carbon Dioxide Equivalent (mt CO<sub>2</sub>e)

	2014	2015	2016
Scope 1 (direct emissions of Greenhouse Gases, Carbon Disclosure Project, e.g., direct combustion of fuels)	159,400	154,411	144,778 <sup>(1)</sup>

(1) Overall reduction in 2016 is due to reduced fuel needs due to curtailed production and a warmer winter than usual.

### EN16 (305-2 [scope 2]) Total Indirect Greenhouse Gas Emissions (Calendar Year)

#### Units and Substances

Metric Ton(s) of Carbon Dioxide Equivalent (mt CO<sub>2</sub>e)

	2014	2015	2016
Scope 2 (emissions from direct purchase of energy, e.g., electricity)	304,700	289,612 <sup>(1)</sup>	293,131

(1) Overall reduction in 2015 is due to lower production rates in Herculanium.

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

#### Units and Substances

Metric Ton(s) of Carbon Dioxide Equivalent (mt CO<sub>2</sub>e)

	2014	2015	2016
Scope 3 (indirect emissions from transportation and employees' commute, etc.)	13,500	11,275 <sup>(1)</sup>	13,197

(1) Reduction in 2015 is primarily related to reduced travel budgets in that calendar year.

### EN18 (305-4) Greenhouse Gas Emission Intensity

#### Units and Substances Key

Carbon Dioxide Equivalent: CO<sub>2</sub>e

Ore: Ore milled at mining operations

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

Division	Units	2014	2015	2016
Southeast Missouri Mining and Milling Division (SEMO)	mt CO <sub>2</sub> e/mt Ore milled	0.05	0.05	<b>0.06</b>
Metals Division (Resource Recycling, Herculaneum)	mt CO <sub>2</sub> e/mt Pb produced	1.2	1.1	<b>1.4</b>
Fabricated Products Inc. (FPI)	mt CO <sub>2</sub> e/mt Pb produced	0.08	0.08	<b>0.09</b>

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

### Units and Substances Key

Metric Ton(s): mt

Source (mt by type and weight)	2014	2015	2016
Ammonia (NH <sub>3</sub> )	0.11	0.06	<b>0.06</b>
Antimony (Sb)	0.01	0.00	<b>0.00</b>
Arsenic (As)	0.26	0.25	<b>0.26</b>
Cadmium (Cd)	0.19	0.18	<b>0.17</b>
Carbon Monoxide (CO)	10,181	11,406(1)	<b>15,497(2)</b>
Copper (Cu)	0.39	0.42	<b>0.33</b>
Hazardous Air Pollutants (HAP)	0.79	0.65	<b>1.08</b>
Lead (Pb)	8.6	5.7	<b>5.1</b>
Nickel (Ni)	0.04	0.03	<b>0.03</b>
Nitrogen Oxides (NO <sub>x</sub> )	136	43(3)	<b>36(3)</b>
Particulate Matter (PM)	188	178	<b>199</b>
Sulfur Dioxide (SO <sub>2</sub> )	1,649	2,539(1)	<b>2,199</b>
Sulfuric Acid (H <sub>2</sub> SO <sub>4</sub> )	2.5	2.4	<b>2.6</b>
Volatile Organic Compounds (VOC)	9.4	9.4	<b>8.0</b>
Zinc (Zn)	1.1	1.2	<b>0.85</b>
<b>Total</b>	<b>12,178</b>	<b>14,187</b>	<b>17,950</b>

(1) An updated emissions factor was used to calculate carbon monoxide and sulfur dioxide emissions in 2015.

(2) Increase reflects a change in production requirements, which can vary year to year.

(3) A change in test methodology in 2015 resulted in an updated NO<sub>x</sub> emission factor.

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

### Units and Substances Key

ppb: parts per billion

<b>Source (average ppb/year) <sup>(1)</sup></b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
Lead	124	132	<b>56</b>
Zinc	444	431	<b>336</b>
Copper	6	6	<b>4</b>
<b>Total water discharge (million gallons/year)</b>	<b>14,349</b>	<b>19,333</b>	<b>19,837</b>

(1) All data sources represented are reported in average ppb/year to be consistent with permit reporting requirements.

# Lead's Late Rebound

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 [sustainability2016.doerun.com/leads-late-rebound/](https://sustainability2016.doerun.com/leads-late-rebound/)

Lead-based batteries start nearly 1 billion vehicles every day. They also provide energy storage for mobile communications, data centers and emergency equipment, and help to move commercial products in warehouses across our country. Lead batteries are truly foundational to the energy needs of modern society. At the end of their life, lead batteries are the single most recycled consumer product, their lead metal and plastic cases recovered, recycled and reused for new batteries. Given the value of lead in modern society, tracking the changes to the global market is a daily function of Doe Run.

2016 was a fickle year for lead with the lead metal prices dipping to \$0.73 per pound in January before making a late comeback toward the end of the year. The long-awaited lead rebound meant mining companies like Doe Run that had taken measures over the past two to three years to weather low lead prices could breathe a sigh of relief.

## Looking Back

Lower lead metal prices seen particularly in 2015 and 2016 were driven by a cooling-off period in global economic growth brought on by loan defaults in Portugal, Spain and Greece, and a softening of the Chinese economy.

During the last decade, China's double-digit economic growth spurred the global economy and the lead market. But in 2015 and 2016, China's growth moderated to a more sustainable rate of 5 to 6 percent annual growth. As a result, we entered a period of oversupply in the global lead market.

"As a global business, the economies around the world impact our company," said Steve Batts, vice president – Southeast Missouri Operations. "We adjusted our output to adapt to the market and enable us to operate sustainably."

Doe Run was not the only company that adjusted its mine output. Several other large mines also curtailed production, including mines in Ireland and Australia. Globally, newly mined lead output declined 2.8 percent year-on-year and refined production (primary and secondary) increased by 2.7 percent.

Newly mined lead supplies about 45 percent of the global demand for lead. The remaining nearly 55 percent of refined lead is supplied from lead recycling. In 2014 and 2015, there was tightness in the scrap lead metal market, which supplies North American battery recyclers (secondary smelters). For battery recyclers like Doe Run, this meant increased costs for scrap lead and narrower margins. The closure of a secondary smelter in California in 2016 did not completely ease the tightness since the market is further complicated by exports of lead battery scrap.

## Lead Demand on the Rise



#### **Sustainable Energy Growth**

The use of lead batteries in wind and solar energy storage, the expansion of cellular networks in developing countries, and hybrid electric vehicles represents growing demand for this versatile and recyclable metal.

Future demand for lead will be driven by growing demand for mobility in developing countries, greater electrification of vehicles and the rapid expansion of renewable energy storage around the globe. These technological changes – powered by lead batteries – have analysts forecasting global demand to grow by 2 percent year-over-year. After years of depressed prices because of an oversupply of lead, companies like Doe Run should benefit from increased demand, and analysts expect demand to outpace supply of newly mined lead ore by 2023. Anticipated new mine projects will be required to meet the demand.

Today, global lead demand remains driven largely by China. In 2016, vehicle production in China increased 14.5 percent year-over-year for a record production of 28 million vehicles. China also continues to expand its mobile network, adding on nearly 2 million new transmission stations in 2016. Each cellular base station uses more than a metric tonne of lead in standby batteries, which provide emergency power.

In the U.S., Ford Motor company's 2016 decision to forego plans for an automotive assembly plant in Mexico and instead expand one of its Michigan plants, bodes well for Doe Run and the battery manufacturers we supply. Separately, the country's largest battery producer, Johnson Controls Inc., also announced it will invest \$245 million in new battery production in the U.S. and Mexico between 2016 and 2020.

### **A Promising Future**

Lead is the most recycled metal on the planet. In fact, more than 99 percent of lead batteries are recycled in North America and Europe primarily as a result of the closed-loop supply chain and the intrinsic value that spent lead batteries retain. Their lead can be recycled and returned to its main purpose infinitely. The plastic casings are also recycled and reused as are nearly all materials used to build this highly efficient and affordable energy storage device.

But not everyone agrees that the battery of the past will meet the needs of the future. Other battery chemistries using often more expensive metals (such as lithium, cobalt and rare earth minerals) are competing to be the preferred energy storage for electric vehicles, home emergency power, and other motive and stationary uses. In most cases, these other battery chemistries cannot be economically recycled when they are no longer suitable for their original use. For example, less than 1 percent of lithium is recycled. This creates a glut of spent or partially

spent batteries (primarily lithium batteries) that are being stored in warehouses or refitted for other, temporary uses.

Conversely, affordable lead batteries are produced, recycled and manufactured over and over again. The industry is working to advance the understanding of this quiet workhorse and help establish industry standards for battery manufacturing and recycling, so that society can use and reuse its natural resources in the most economical fashion possible. Learn more about how batteries are made and recycled [here](#).

## Next-Generation Lead Batteries

Lead's high density, durability in punishing climates and untapped energy potential are some of the reasons researchers are exploring next-generation lead-based batteries. Some of this research is taking place here in Missouri at Missouri University of Science and Technology (Missouri S&T) in Rolla.

"Missouri S&T is exploring the future of energy storage, electric grid stability and the application of renewable energy for a more sustainable energy future," said Angie Rolufs, Director of the Center for Sustainability, Missouri S&T. "Doe Run participates in and supports this research through its membership on Missouri S&T's [Microgrid Consortium](#) and its research projects, including the design, management and measurement of the efficacy of lead-based battery energy storage and deployment in a small, multi-use campus community."

Around the world, the Advanced Lead Acid Battery Consortium (ALABC), of which Doe Run is a member, is researching methods to improve lead battery performance and lifespan for micro-hybrid vehicles and renewable energy storage. For example, recent ALABC vehicle demonstrations with Ford, Hyundai and Kia have shown that 48-volt lead batteries in micro-hybrid applications can result in fuel savings and carbon dioxide reductions of up to 16 percent. Advanced lead batteries are helping car manufacturers meet increasingly stringent standards for fuel consumption and emissions around the world.

The ALABC and its partners plan more than \$4 million in research projects with universities, national laboratories and members from across the globe during its current program period.

"While the outlook for lead in the long term remains strong, fluctuations in metals pricing caused by social, political and economic influences are apt to continue to keep things interesting," said Jose Hansen, vice president sales and marketing at Doe Run.

Doe Run's business also is impacted by the global market for other metals found in its mines. Read more about the market performance and everyday uses of zinc [here](#).

# Zinc in the Spotlight

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 [sustainability2016.doerun.com/zinc-in-the-spotlight/](https://sustainability2016.doerun.com/zinc-in-the-spotlight/)

Of the three major metals contained in the ore that Doe Run mines – lead, copper and zinc – in 2016, zinc stole the show reaching pricing levels not seen since early 2010. Because zinc is widely used in galvanized steel for construction and the automotive industries, this mineral is playing an important role in everyday life, contributing to its high market demand. The year of zinc started with prices in the mid-60 cents per pound range for most of January. But by mid-July, the price reached \$1.00 per pound and continued to climb throughout the year reaching its peak at \$1.32 per pound in late November.

U.S. zinc use has grown due to a strong performance in the automotive sector. The extended period of strong demand with diminished resources has created a dramatic decline in zinc concentrate reserves to meet global needs. Global inventories of zinc concentrates have fallen from more than 1.1 million metric tonnes in 2014 to 0.2 million metric tonnes at the end of 2016.

“Global demand significantly outpaced supply in three of four quarters of 2016. The limited supply was the result of mine closures, as well as a smelter closing in China, as the country continues to address environmental impacts and government corruption,” said John Likarish, manager of marketing at Doe Run. “As with most commodities, demand from China drove the market with analysts reporting that zinc imports to China were up 8 percent year on year.”

Major zinc mine closures in 2016 in Australia and Ireland followed the downsizing of mine operations at Peru, Australia and Kazakhstan in late 2015. In total, zinc contained in concentrates declined by 850,000 metric tonnes in 2016.

“For the next few years, we can expect to see less zinc metal availability and further increases in zinc prices and regional premiums,” Likarish added.

## Zinc: Essential for Life

As one of the most versatile minerals, zinc plays an important role in infrastructure, like bridges, buildings and transportation, but also is essential to life as an important micro-nutrient for productive crops and essential dietary mineral requirements in both humans and animals.

More than 65 percent of zinc sold is used to galvanize steel used in the construction, automotive and machinery industries to prevent corrosion, providing longer life to steel and the structures that depend on it.

As lawmakers look at updating aging infrastructure across the U.S., domestic zinc producers could play an important role. Americans overwhelmingly support using domestically sourced minerals for infrastructure projects, according to a poll from Morning Consult. Roughly 83 percent of zinc from galvanized steel is recycled, returning this valuable metal to its varied uses.

Zinc is an important mineral for both plant and human health. A lack of zinc in soil prevents plants from reaching their full root and foliage potential, decreasing the amount of food it can produce. These deficiencies in the soil also correlate to insufficient zinc in humans and negative health impacts. For example, zinc has been promoted to boost the immune system, helping people fight colds and ear infections, and can be used to help treat malaria, skin conditions, asthma, diabetes, ADHD and other conditions.

Adequate levels of zinc reduce childhood illnesses, enhance physical growth and decrease mortality in developing nations. That’s why the International Zinc Association and its members partnered with UNICEF to combat global zinc deficiencies through the nonprofit [Zinc Saves Kids](#) initiative. Each year, 1.5 million children die from diarrhea.



Adequate zinc can reduce the severity and occurrence of this acute disease in developing countries.

Programs to improve childhood health through adequate zinc consumption show tremendous progress in countries, including Peru, Mexico and DRC (Democratic Republic of the Congo). Health centers in Peru report a 25 percent reduction in diarrhea episodes and a 40 percent reduction in the duration and severity of diarrhea cases as a result of providing zinc supplements to children.

2 Bil

People worldwide have inadequate zinc in their diet

800,000

People at risk of dying each year from zinc deficiency

450,000

Children at risk of dying every year due to zinc deficiency

5 Mil

Children who die each year from diarrhea, a condition that can be easily addressed with zinc supplements

# Financial Highlights

[sustainability2016.doerun.com/financial-highlights/](https://sustainability2016.doerun.com/financial-highlights/)

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

(dollars in thousands)	2014	2015	2016
Property Taxes	\$7,368	\$6,727	<b>\$6,818</b>
Compensation	\$144,202	\$131,424	<b>\$114,005</b>
Community Investment(1)	\$157	\$197	<b>\$211</b>
Environmental Spending	\$73,855	\$63,179	<b>\$71,075</b>
Research and Development	\$1,803	\$1,564	<b>\$1,405</b>
Royalties to Governments	\$10,565	\$10,108	<b>\$7,924</b>
Capital Spending (excluding environmental capital expenditures)	\$24,089	\$12,350	<b>\$24,165</b>

(1) Includes donations, scholarships and tuition reimbursement.

# Corporate Governance

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 [sustainability2016.doerun.com /governance/corporate-governance/](https://sustainability2016.doerun.com/governance/corporate-governance/)

The Doe Run Resources Corporation, doing business as The Doe Run Company (Doe Run), is privately held by the New York-based [Renco Group Inc.](#)

As a global supplier of lead, copper, and zinc concentrates and lead metals and alloys, Doe Run is guided by a nine-member executive team. The team consists of the president and chief executive officer; vice president – finance and chief financial officer; vice president – information technology; vice president – law; vice president – sales and marketing; vice president – human resources and community relations; vice president – exploration; vice president – environmental, health and safety; and vice president of SEMO operations. The executive team is 88 percent male and 88 percent Caucasian, and encompasses an age range of 46 – 68 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 with input from a Sustainability Governance Committee led by the vice president – environmental, health and safety. In this role, the vice president – environmental, health and safety, along with the president and chief executive officer and the vice president – human resources and community relations, review and approve Doe Run's annual sustainability report. The Sustainability Governance Committee designates a team of employees to compile data and content for the annual 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:

- As a privately held company, Doe Run is not legally bound to meet the requirements of the [Sarbanes-Oxley Act](#). This act was passed by Congress in 2002 to help restore confidence in publicly traded companies after several major corporate and accounting scandals. However, Doe Run has chosen to adopt certain Sarbanes-Oxley requirements that can be applied to privately held companies. These include good documentation procedures, rigorous internal accounting controls based on a proper segregation of duties, and strong internal audits and reviews. We also undergo annual external audits by the accounting firm of [Crowe Horwath 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 9000 programs, which verify that strong, quality procedures are in place. Doe Run's Sweetwater Mine and Mill, Fletcher Mine and Mill, Brushy Creek Mine and Mill, 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 subcontractor, Doe Run adheres to the requirements of the Office of Federal Contracts Compliance Program (OFCCP). In doing so, Doe Run develops an annual affirmative action plan, which supports 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 third-party surveys of community stakeholders and employees (conducted most recently in 2014 with plans for a 2017 survey). 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](mailto: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 sends an email to the vice president – human resources and community relations and the vice president – law. 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 firm to maintain confidentiality.

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. Employees also are required to sign an acknowledgment that they have received and understand the Doe Run Employee Handbook and Standards of Business Conduct.

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 for, 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.

# Reporting Process

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 [sustainability2016.doerun.com/governance/report-parameters/](https://sustainability2016.doerun.com/governance/report-parameters/)

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, 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 minimize its environmental impact. A Sustainability Governance Committee, established in 2012, is charged with implementing programs and processes to further integrate sustainability into Doe Run's operations, including the indicators and processes reported in the sustainability report. The committee chair also approves the material topics, content and indicators chosen for the reports.

Several steps have helped Doe Run's 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 continue 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 non-solicited phone calls from citizens across the U.S. 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.
- The Sustainability Governance Committee and Doe Run's general managers also identified the main challenges, accomplishments and progress within the company, including a reduction in workforce, progress on environmental projects, workforce safety and the global market's impact on business decisions.
- Doe Run then prioritized which [GRI aspects and data indicators](#) were material both inside and outside the organization to focus on in the report:
  - Environmental capital investment and performance, which relates to all operations
  - Workforce data for all operations
  - Direct and indirect economic impact
  - Community involvement
  - Employee health and safety at all operations

## 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; regulatory agencies; and [industry organizations](#).

## **Stakeholder Group**

### **Community groups and leaders**

#### **Key Interests and Concerns**

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

#### **Engagement Methods**

- Conducted community surveys in 2014 and 2012; 2017 survey was completed in May 2017.
- 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, Dent and Reynolds County Relay for Life, local school district organizations, and community sports teams.
- Share company updates via news releases and annual sustainability report.

### **Property owners and neighboring residents**

#### **Key Interests and Concerns**

Seek information related to the 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 2014 and 2012; 2017 survey is currently underway.
- Communicate directly with nearby residents if a situation arose.
- Share company updates via news releases and local newspaper and radio interviews, and annual sustainability report.

### **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 communications survey in 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.
- Provide free tours annually on Old Miners' Days.
- Hosted Retiree Pancake Breakfast in 2014 and 2016.

## Local, state and federal government

### Key Interests and Concerns

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

### Engagement Methods

- Hosted Doe Run Day at the Capitol to interact with legislators in Jefferson City, Missouri, in 2015, and again in March 2017.
- Sit on Lead Industry Task Force in Missouri to help inform legislators about the lead mining industry.
- Regularly invite local and state legislators 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.

## 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, including local taxes and donations that benefit schools. Also seek information to expose students to mining and minerals, and training for students who want to enter the mining profession.

### Engagement Methods

- Maintain ongoing partnerships with local colleges, such as the Missouri University of Science and Technology and Mineral Area College, including donations toward key programs.
- 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.

## Regulatory agencies

### Key Interests and Concerns

Seek information related to company's performance against environmental and health and safety regulations.

### Engagement Methods

- Submit annual reports with detailed data on environmental, health and safety performance.
- Meet regularly to discuss current performance and the state of the business, and to address legacy issues with Missouri Department of Natural Resources, Region 7 EPA and Natural Resources Trustees.

## 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:
  - ILA; ABR; BCI; ALABC; Mining Industry Council; SME
- Assist industry organizations with initiatives to further the industry.

Open communications 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](mailto:communityinfo@doerun.com), and please consider answering a few questions via our [online survey](#).

# GRI Index

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 [sustainability2016.doerun.com/governance/gri-index/](https://sustainability2016.doerun.com/governance/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

G4-1

### Statement from the most senior decision-maker of the organization

[Message from the CEO](#)

## Organizational Profile

G4-3

### Name of the organization

The Doe Run Resources Corporation/DBA The Doe Run Company

G4-4

### Primary brands, products, and services

[Organizational Profile](#)

G4-5

### Location of the organization's headquarters

St. Louis, Missouri, United States

G4-6

### Countries where the organization operates

United States (Missouri, Arizona and Washington)

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.

G4-8

### Markets served

Primary customers served include battery manufacturers in the U.S.; concentrates are sold globally.

[Organizational Profile](#)

G4-9

## **Scale of the reporting organization**

[Organizational Profile](#)

[Financial Highlights](#)

As a private company, net sales, net revenue and total capitalization is proprietary information and viewed as business confidential.

G4-10

## **Total workforce by employment type, employment contract, and region, broken down by gender**

[Workforce Summary](#)

G4-11

## **Percentage of total employees covered by collective bargaining agreements**

Only 0.17% of employees are covered under collective bargaining agreements.

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 \$140 million in spending to Missouri-based suppliers in 2016, representing 42 percent of Doe Run's overall supplier spending.

G4-13

## **Significant changes during the reporting period**

[Letter from the CEO](#)

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 to ensure the safe production and use of lead now and in the future while safeguarding human health and minimizing 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.

G4-16

## **Memberships of associations or organizations**

## **Identified Material Aspects and Boundaries**

G4-17

## **Entities included in the organization's consolidated financial statements or equivalent documents**

All Doe Run entities have been reported.

[Organizational Profile](#)

G4-18

**Process for defining report content**

[Reporting Process](#)

G4-19

**Material aspects identified for defining report content**

[Reporting Process](#)

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.

G4-21

**Aspect boundaries outside the organization**

[Reporting Process](#)

G4-22

**Restatements of information provided in previous reports, and the reasons for such**

[Environmental Spending](#)

G4-23

**Report significant changes from previous reporting periods in the Scope and Aspect Boundaries**

None

**Stakeholder Engagement**

G4-24

**List of stakeholder groups engaged by the organization**

[Reporting Process](#)

G4-25

**Basis for identification and selection of stakeholders with whom to engage**

[Reporting Process](#)

G4-26

## **Approach to stakeholder engagement**

[Reporting Process](#)

G4-27

## **Key topics and concerns that have been raised through stakeholder engagement**

[Reporting Process](#)

## **Report Profile**

G4-28

### **Reporting period**

2016 Calendar (Fiscal year reporting is noted where appropriate.)

G4-29

### **Date of most recent previous report**

Published in August 2016

G4-30

### **Reporting cycle**

Annual

G4-31

### **Contact point**

[corporateinfo@doerun.com](mailto:corporateinfo@doerun.com)

G4-32

## **In Accordance with Guidelines**

This report contains Standard Disclosures from the GRI Sustainability Reporting Guidelines.

## **Governance**

G4-34

### **Governance structure of the organization**

[Corporate Governance](#)

G4-35

### **Process for delegating authority to address economic, environmental and social topics**

[Corporate Governance](#)

G4-36

**Position responsible for economic, environmental and social topics**

[Corporate Governance](#)

G4-38

**Composition of the company's highest governing body**

[Corporate Governance \(partially disclosed\)](#)

G4-39

**Indicate whether the Chair of the highest governance body is also an executive officer**

No

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](#)

G4-48

**Highest position that formally reviews and approves the sustainability report**

President and CEO

## **Ethics and Integrity**

G4-56

**Organization's values, principles, standards and norms of behavior**

[Core Values](#)

## **Specific Standard Disclosures**

### **Economic**

G4-EC1

**Direct economic value generated and distributed**

[Financial Highlights \(Partially Disclosed\)](#)

G4-EC7

**Development and impact of infrastructure investments and services supported**

[Remediation for Revitalization](#)



G4-EC9

**Proportion of spending on local suppliers at significant locations of operation**

In 2016, Doe Run supported Missouri businesses by spending more than \$140 million with 632 Missouri vendors. This accounts for 42 percent of total company spending.

**Environmental**

G4-EN1

**Materials used by weight or volume**

[Environmental Performance](#)

G4-EN2

**Percentage of materials used that are recycled input materials**

[Environmental Performance](#)

G4-EN3

**Energy consumption within the organization**

[Environmental Performance](#)

G4-EN4

**Energy consumption outside of the organization**

[Environmental Performance](#)

G4-EN5

**Energy intensity**

[Environmental Performance](#)

G4-EN15

**Direct greenhouse gas (GHG) emissions (Scope 1)**

[Environmental Performance](#)

G4-EN16

**Energy indirect greenhouse gas (GHG) emissions (Scope 2)**

[Environmental Performance](#)

G4-EN17

**Other indirect greenhouse gas (GHG) emissions (Scope 3)**

[Environmental Performance](#)

G4-EN18

**Greenhouse gas (GHG) emissions intensity**

[Environmental Performance](#)

G4-EN21

**NO<sub>x</sub>, SO<sub>x</sub>, and other significant air emissions**

[Environmental Performance](#)

G4-EN22

**Total water discharge by quality and destination**

[Environmental Performance](#)

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 \$16,380 in fines for noncompliance with environmental laws and regulations in 2016.

G4-EN31

**Total environmental protection expenditures and investments by type**

[Environmental Spending](#)

**Labor Practices and Decent Work**

G4-LA1

**Total number and rates of new employee hires and employee turnover by age group, gender and region**

[Workforce Summary \(Partially Disclosed\)](#)

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 \(Partially Disclosed\)](#)

G4-LA9

**Average hours of training per year per employee by gender and employee category**

[Workforce Training \(Partially Disclosed\)](#)

**Society**

G4-SO1

**Local community engagement, impact assessments, and development programs**

All operations implement a localized community engagement plan.

G4-SO8

**Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with laws and regulations**

In 2016, Doe Run paid approximately \$107,509 in fines and non-monetary sanctions related to laws and regulations.

**Product Responsibility**

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 2016.