U.S. SILICA HOLDINGS, INC.
Form 10-K
February 21, 2018
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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

þ ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the Fiscal Year Ended December 31, 2017
OR
¨ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
Commission file number 1-35416
U.S. Silica Holdings, Inc.
(Exact name of registrant as specified in its charter)

Delaware	26-3718801
(State or other jurisdiction of Incorporation or Organization)	(I.R.S. Employer Identification No.)

8490 Progress Drive, Suite 300
Frederick, Maryland 21701
(Address of Principal Executive Offices) (Zip Code)
(301) 682-0600
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Securities Act:

Title of each class:	Name of each exchange on which registered:
Common Stock, par value $0.01 per share	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Securities Act: None

Indicate by a check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes þ No ¨

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15 (d) of the Act. Yes ¨ No þ

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes þ No ¨

Indicate by check mark whether the registrant has submitted electronically and posted on its website, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes þ No ¨

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of the registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. þ

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer þ Accelerated filer ¨
Non-accelerated filer ¨ Smaller reporting company ¨

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ¨

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes ¨ No þ

The aggregate market value of the outstanding common stock held by non-affiliates of the registrant as of June 30, 2017, the last business day of the registrant's most recently completed second fiscal quarter, was $2,870,547,820 based on the closing price of $35.49 per share, as reported on the New York Stock Exchange.

As of February 16, 2018, 80,539,945 shares of the common stock of the registrant were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Part III of Form 10-K Certain sections of the Proxy Statement for the 2018 Annual Meeting of Shareholders for U.S. Silica Holdings, Inc.

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Forward-Looking Statements

This Annual Report on Form 10-K contains forward-looking statements that are subject to risks and uncertainties. All statements other than statements of historical fact included in this Annual Report on Form 10-K are forward-looking statements. Forward-looking statements give our current expectations and projections relating to our financial condition, results of operations, plans, objectives, future performance and business. You can identify forward-looking statements by the fact that they do not relate strictly to historical or current facts. These statements may include words such as “anticipate,” “estimate,” “expect,” “project,” “plan,” “intend,” “believe,” “may,” “will,” “should,” “can have,” “likely” and terms of similar meaning in connection with any discussion of the timing or nature of future operating or financial performance or other events. For example, all statements we make relating to our estimated and projected costs, expenditures, cash flows, growth rates and financial results, our plans and objectives for future operations, growth or initiatives, strategies or the expected outcome or impact of pending or threatened litigation are forward-looking statements. All forward-looking statements are subject to risks and uncertainties that may cause actual results to differ materially from those that we expected, including:

- fluctuations in demand for commercial silica;
- the cyclical nature of our customers’ businesses;
- operating risks that are beyond our control, such as changes in the price and availability of transportation, natural gas or electricity; unusual or unexpected geological formations or pressures; cave-ins, pit wall failures or rock falls; or unanticipated ground, grade or water conditions;
- our dependence on five of our plants for a significant portion of our sales;
- the level of activity in the natural gas and oil industries;
- decreased demand for frac sand or the development of either effective alternative proppants or new processes to replace hydraulic fracturing;
- federal, state and local legislative and regulatory initiatives relating to hydraulic fracturing and the potential for related regulatory action or litigation affecting our customers’ operations;
- our rights and ability to mine our properties and our renewal or receipt of the required permits and approvals from governmental authorities and other third parties;
- our ability to implement our capacity expansion plans within our current timetable and budget and our ability to secure demand for our increased production capacity, and the actual operating costs once we have completed the capacity expansion;
- our ability to succeed in competitive markets;
- loss of, or reduction in, business from our largest customers;
- increasing costs or a lack of dependability or availability of transportation services and transload network access or infrastructure;
- extensive regulation of trucking services;
- our ability to recruit and retain truckload drivers;
- increases in the prices of, or interruptions in the supply of, natural gas and electricity, or any other energy sources;
- increases in the price of diesel fuel;
- diminished access to water;
- our ability to successfully complete acquisitions or integrate acquired businesses;
- our ability to make capital expenditures to maintain, develop and increase our asset base and our ability to obtain needed capital or financing on satisfactory terms;
- our substantial indebtedness and pension obligations;
- restrictions imposed by our indebtedness on our current and future operations;
- contractual obligations that require us to deliver minimum amounts of frac sand or purchase minimum amounts of services;
- the accuracy of our estimates of mineral reserves and resource deposits;

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- a shortage of skilled labor and rising costs in the mining industry;
- our ability to attract and retain key personnel;
- our ability to maintain satisfactory labor relations;
- our reliance on patents, trade secrets and contractual restrictions to protect our proprietary rights;
- our significant unfunded pension obligations and post-retirement health care liabilities;
- our ability to maintain effective quality control systems at our mining, processing and production facilities;
- seasonal and severe weather conditions;
- fluctuations in our sales and results of operations due to seasonality and other factors;
- interruptions or failures in our information technology systems;
- the impact of a terrorist attack or armed conflict;
- extensive and evolving environmental, mining, health and safety, licensing, reclamation and other regulation (and changes in their enforcement or interpretation);
- silica-related health issues and corresponding litigation;
- our ability to acquire, maintain or renew financial assurances related to the reclamation and restoration of mining property; and
- other factors included and disclosed in Part I, Item 1A, “Risk Factors” and elsewhere in this Annual Report on Form 10-K.

We derive many of our forward-looking statements from our operating budgets and forecasts, which are based on many detailed assumptions. While we believe that our assumptions are reasonable, we caution that it is very difficult to predict the impact of known factors, and it is impossible for us to anticipate all factors that could affect our actual results. Important factors that could cause actual results to differ materially from our expectations, or cautionary statements, are disclosed under Item 1A, “Risk Factors” and Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in this Annual Report on Form 10-K. All written and oral forward-looking statements attributable to us, or persons acting on our behalf, are expressly qualified in their entirety by these cautionary statements as well as other cautionary statements that are made from time to time in our other filings with the Securities and Exchange Commission (the “SEC”) and public communications. You should evaluate all forward-looking statements made in this Annual Report on Form 10-K in the context of these risks and uncertainties. We caution you that the important factors referenced above may not contain all of the factors that are important to you. In addition, we cannot assure you that we will realize the results or developments we expect or anticipate or, even if substantially realized, that they will result in the consequences or affect us or our operations in the way we expect. The forward-looking statements included in this Annual Report on Form 10-K are made only as of the date hereof. We undertake no obligation to update or revise any forward-looking statement as a result of new information, future events or otherwise, except as otherwise required by law.

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PART I.

ITEM 1. BUSINESS

Unless we state otherwise or the context otherwise requires, the terms “we,” “us,” “our,” “U.S. Silica,” “the Company,” “our business,” “our company” refer to U.S. Silica Holdings, Inc. and its consolidated subsidiaries as a combined entity. Adjusted EBITDA as used herein is a non-GAAP measure. For a detailed description of Adjusted EBITDA and a reconciliation to the most comparable GAAP measure, please see the discussion under “Management’s Discussion and Analysis of Financial Condition and Results of Operations – How We Evaluate Our Business – Adjusted EBITDA.”

Our Company

Business Overview

We are one of the largest domestic producers of commercial silica, a specialized mineral that is a critical input into a variety of attractive end markets. During our 118-year history, we have developed core competencies in mining, processing, logistics and materials science that enable us to produce and cost-effectively deliver over 239 products to customers across these markets. As of December 31, 2017, we operate 19 production facilities across the United States and control 765 million tons of reserves of commercial silica, which can be processed to make 323 million tons of finished products that meet American Petroleum Institute ("API") frac sand specifications.

On August 16, 2016, we completed the acquisition of New Birmingham, Inc. ("NBI"), a regional sand producer located near Tyler, Texas. On August 22, 2016, we completed the acquisition of Sandbox Enterprises, LLC ("Sandbox" or the “Sandbox Acquisition”) as a “last mile” logistics solution for frac sand in the oil and gas industry. On April 1, 2017, we completed the acquisition of White Armor, a product line of cool roof granules used in industrial roofing applications. On August 16, 2017, we completed the acquisition of Mississippi Sand, LLC ("MS Sand"). MS Sand is a frac sand mining and logistics company based in St. Louis, Missouri.

For more information regarding these acquisitions, see Note D - Business Combinations to our Financial Statements in Part II, Item 8 to this Annual Report on Form 10-K.

Our operations are organized into two segments based on end markets served: (1) Oil & Gas Proppants and (2) Industrial & Specialty Products. In our largest end market, oil and gas proppants, our frac sand is used to stimulate and maintain the flow of hydrocarbons in oil and natural gas wells. We produce a wide range of frac sand sizes and are capable of efficient delivery of large quantities of API grade frac sand to most of the major U.S. shale basins via our logistics network. Our silica is also used as an economically irreplaceable raw material in a wide range of industrial applications, including glassmaking and chemical manufacturing. Additionally, in recent years a number of attractive new end markets have developed for our high-margin, performance silica products, including high-performance glass, specialty coatings, polymer additives and geothermal energy systems. Our segments are complementary because our ability to sell to a wide range of customers across end markets allows us to maximize recovery rates in our mining operations, optimize our asset utilization and reduce the cyclicality of our earnings.

Corporate History

U.S. Silica Holdings, Inc. was incorporated under the laws of the State of Delaware on November 14, 2008. U.S. Silica Company, which has been a domestic producer of commercial silica for 118 years, became a wholly-owned subsidiary of the Company on November 25, 2008. On January 31, 2012, we completed our initial public offering of our common stock.

Our Strengths

We attribute our success to the following strengths:

- Large-scale producer with a diverse and high-quality reserve base. Our 19 geographically dispersed production facilities control 765 million tons of reserves, including API size frac sand and large quantities of silica with distinct characteristics, giving us the ability to sell over 239 products to customers in both our Oil & Gas Proppants segment and Industrial & Specialty Products segment. Our large-scale production, logistics capabilities and long reserve life make us a preferred commercial silica supplier to our customers. Our consistent, reliable supply of large quantities of silica gives our customers the security to customize their production processes around our commercial silica. Furthermore, our large scale provides us earnings diversification and a larger addressable market.
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Geographically advantaged footprint with intrinsic transportation advantages. The strategic location of our facilities and our logistics capabilities enable us to enjoy high customer retention and a larger addressable market.

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In our Oil & Gas Proppants segment, our network of frac sand production facilities with access to Class I rail either onsite or by truck and the strategic locations of our transloads serve to create an addressable market that includes every major U.S. shale basin. We believe we are one of the few frac sand producers capable of cost-effectively delivering API grade frac sand to most of the major U.S. shale basins by on-site rail.

- On August 16, 2017, we completed the acquisition of MS Sand, a frac sand mining and logistics company based in St. Louis, Missouri.
- In July 2017, we purchased a new Greenfield site near Lamesa, Texas, which depending on market conditions, could become operational as early as the second quarter of 2018 and add approximately 2.6 million tons of annual frac sand capacity.
- In May 2017, we purchased a new Greenfield site in Crane County, Texas, which depending on market conditions, could become operational as early as the first quarter of 2018 and add approximately 4 million tons of annual frac sand capacity.
- On August 16, 2016, we acquired NBI, the ultimate parent company of NBR Sand, LLC, a regional sand producer located near Tyler, Texas. This facility allows customers to ship regional sand directly to the wellheads in the Texas and Louisiana basins by truck, which provides us with a delivered cost advantage.
- On August 22, 2016, we completed the acquisition of Sandbox, a provider of logistics solutions and technology for the transportation of proppant used in hydraulic fracturing in the oil and gas industry. Sandbox provides “last mile” logistics to oil and gas companies. Sandbox has operations in Texas (Midland/Odessa, Kenedy, Dallas/Fort Worth, Tyler); Morgantown, West Virginia; western North Dakota; northeast of Denver, Colorado; Oklahoma City, Oklahoma; Cambridge, Ohio and Mansfield, Pennsylvania, where its major customers are located, which allowed us to expand our frac sand offering directly to customers' wellhead locations.

Additionally, due to the high weight-to-value ratio of many silica products in our Industrial & Specialty Products segment, the proximity of our facilities to our customers’ facilities often results in us being their sole supplier. This advantage has enabled us to enjoy strong customer retention in this segment, with our top five Industrial & Specialty Products segment customers purchasing from us for an average of over 50 years.

- Low-cost operating structure. We focus on building and operating facilities with low delivered cost that will allow us to be successful through market cycles. We believe the combination of the following factors contributes to our low-cost structure and our high margins:
  - our ownership of the vast majority of our reserves, resulting in mineral royalty expense that was less than 0.1% of our sales in 2017;
  - the close proximity of our mines to their respective processing plants, which allows for a cost-efficient and highly automated production process;
  - our processing expertise, which enables us to create over 239 products with unique characteristics while minimizing waste;
  - our integrated logistics management expertise and geographically advantaged facility network, which enables us to reliably ship products by the most cost-effective method available, whether by truck, rail or barge, to meet the needs of our customers, whether at in-basin transload locations or directly at wellhead locations via our Sandbox operations;
  - our large customer base across numerous end markets, which allows us to maximize our mining recovery rate and asset utilization; and
  - our large overall and plant-level operating scale.
- Strong reputation with our customers and the communities in which we operate. We believe that we have built a strong reputation during our 118-year operating history. Our customers know us for our dependability and our high-quality, innovative products, as we have a long track record of timely delivery of our products according to customer specifications. We also have an extensive network of technical resources, including materials science and petroleum engineering expertise, which enables us to collaborate with our customers to develop new products and improve the performance of their existing applications. We are also well known in the communities in which we operate as a preferred employer and a responsible corporate citizen, which generally serves us well in hiring new employees and securing difficult to obtain permits for expansions and new facilities.
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Experienced management team. The members of our senior management team bring significant experience to the dynamic environment in which we operate. Their expertise covers a range of disciplines, including industry-specific

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operating and technical knowledge as well as experience managing high-growth businesses. We believe we have assembled a flexible, creative and responsive team that can quickly adapt to the rapidly evolving unconventional oil and natural gas drilling landscape.

Our Business Strategy

The key drivers of our growth strategy include:

- Expand our Oil & Gas Proppants production capacity and product portfolio. We continue to consider and execute several initiatives to increase our frac sand production capacity and augment our proppant product portfolio. We are evaluating Greenfield opportunities and are expanding production capacities and maximizing production efficiencies of our existing facilities.
- Increase our presence and product offering in industrial and specialty products end markets. Our research and business development teams work in tandem with our customers to develop new products, which we expect will either increase our presence and market share in certain industrial and specialty products end markets or allow us to enter new markets. We manage a robust pipeline of new products in various stages of development. Some of these products have already come to market, resulting in a positive impact on our financial results. We continue to work toward offering more value-driven industrial and specialty products that will enhance the profitability of the business. For instance, on April 1, 2017, we completed the White Armor acquisition, a product line of cool roof granules used in industrial roofing applications.
- Optimize product mix and further develop value-added capabilities to maximize margins. We continue to actively manage our product mix at each of our plants to ensure we maximize our profit margins. This requires us to use our proprietary expertise in balancing key variables, such as mine geology, processing capacities, transportation availability, customer requirements and pricing. We expect to continue investing in ways to increase the value we provide to our customers by expanding our product offerings, improving our supply chain management, upgrading our information technology, and creating a world class customer service model.
- Expand our supply chain network and leverage our logistics capabilities to meet our customers' needs in each strategic oil and gas basin. We continue to expand our logistics network to ensure product is available to meet the in-basin needs of our customers. This approach allows us to provide strong customer service and puts us in a position to take advantage of opportunistic spot market sales. Our plant sites are strategically located to provide access to key Class I railroads, which enables us to cost effectively send product to each of the strategic basins in North America. We can ship product by truck, barge and rail with an ability to connect to short-line railroads as necessary to meet our customers' evolving in-basin product needs. We believe that our supply chain network and logistics capabilities are a competitive advantage that enables us to provide superior service for our customers. We expect to continue to make strategic investments and develop partnerships with transload operators and transportation providers that will enhance our portfolio of supply chain services that we can provide to customers. As of December 31, 2017, we have storage capacity at 56 transloads located near all of the major shale basins in the United States. Our acquisition of Sandbox extends our delivery capability directly to our customers' wellhead locations, which increases efficiency and provides a lower cost logistics solution for our customers. Sandbox has operations in Texas (Midland/Odessa, Kenedy, Dallas/Fort Worth, Tyler); Morgantown, West Virginia; western North Dakota; northeast of Denver, Colorado; Oklahoma City, Oklahoma; Cambridge, Ohio and Mansfield, Pennsylvania, where its major customers are located.
- Evaluate both Greenfield and Brownfield expansion opportunities and other acquisitions. We expect to continue leveraging our reputation, processing capabilities and infrastructure to increase production, as well as explore other opportunities to expand our reserve base.

We may accomplish this by developing Greenfield projects, where we can capitalize on our technical knowledge of geology, mining and processing and our strong reputation within local communities. For instance, in May 2017, we purchased a new Greenfield site in Crane County, Texas, which depending on market conditions, could become operational as early as the first quarter of 2018 and add approximately 4 million tons of annual frac sand capacity. Additionally, in July 2017, we purchased a new Greenfield site near Lamesa, Texas, which depending on market conditions, could become operational as early as the second quarter of 2018 and add approximately 2.6 million tons of annual frac sand capacity.

We are continuing to actively pursue acquisitions to grow by taking advantage of our asset footprint, our management's experience with high-growth businesses, and our strong customer relationships. Our primary objective is to acquire assets with differing levels of frac sand qualities that are complementary to our Oil & Gas Proppants segment, with a focus on mining, processing and logistics to further enhance our

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market presence. We prioritize acquisitions that provide opportunities to realize synergies (and, in some cases, the acquisition may be immediately accretive assuming synergies), including entering new geographic and frac sand product markets, acquiring attractive customer contracts and improving operations. On August 16, 2016, we completed our acquisition of NBI, the ultimate parent company of NBR Sand, LLC, a regional sand producer located near Tyler, Texas. On August 22, 2016, we completed the acquisition of Sandbox, a provider of logistics solutions and technology for the transportation of proppant used in hydraulic fracturing in the oil and gas industry. On August 16, 2017, we completed our acquisition of MS Sand, a frac sand mining and logistics company based in St. Louis, Missouri. We are in active discussions to acquire additional assets fitting this strategy, which, if completed, could be "significant" under Regulation S-X and could require additional sources of financing. There can be no assurance that we will reach a definitive agreement and complete any of these potential transactions. See the risk factors disclosed in Item 1A of Part I of this Annual Report on Form 10-K, including the risk factor entitled, "If we cannot successfully complete acquisitions or integrate acquired businesses, our growth may be limited and our financial condition may be adversely affected."

- Maintain financial strength and flexibility. We intend to maintain financial strength and flexibility to enable us to better manage through industry downturns and pursue acquisitions and new growth opportunities as they arise. In March 2016, we completed a public offering of 10,000,000 shares of our common stock for total cash net proceeds of $186.2 million. In November 2016, we executed another offering of 10,350,000 shares of common stock raising net cash proceeds of $467.0 million. As of December 31, 2017, we had $384.6 million of cash on hand and $45.5 million of availability under our revolving credit facility (the "Revolver").

Our Products

In order to serve a broad range of end markets, we produce and sell a variety of commercial silica products, including whole grain and ground products, as well as other industrial mineral products that we believe complement our commercial silica products.

Whole Grain Silica Products—We sell whole grain commercial silica products in a range of shapes, sizes and purity levels. We sell whole grain silica that has a round shape and high crush strength to be used as frac sand in connection with oil and natural gas recovery, and we have the capability to produce resin coated sand.

We also sell whole grain silica products in a range of size distributions, grain shapes and chemical purity levels to our customers involved in the manufacturing of glass products, including a low-iron whole grain product sold to manufacturers of architectural and solar glass applications. In addition, we sell several grades of whole grain round silica to the foundry industry and provide whole grain commercial silica to the building products industry. Sales of whole grain commercial silica products and coated proppants accounted for approximately 91%, 86%, and 88% of our total sales revenue for 2017, 2016 and 2015, respectively.

Ground Silica Products—Our ground commercial silica products are inherently inert, white and bright, with high purity. We market our ground silica in sizes ranging from 40 to 250 microns for use in plastics, rubber, polishes, cleansers, paints, glazes, textile fiberglass and precision castings. We also produce and market fine ground silica in sizes ranging from 5 to 40 microns for use in premium paints, specialty coatings, sealants, silicone rubber and epoxies. We believe we are currently the only commercial silica producer in the United States that manufactures a 5-micron product. Sales of ground silica products accounted for approximately 7%, 12%, and 9% of our total sales revenue for 2017, 2016 and 2015 respectively.

Industrial Mineral Products—We also produce and sell certain other industrial mineral products, such as aplite and magnesium silicate. Aplite is a mineral used to produce container glass and insulation fiberglass and is a source of alumina that has a low melting point and a low tendency to form defects in glass. We also produce and sell a highly selective adsorbent made from a mixture of silica and magnesium, used extensively in preparative and analytical chromatography. Sales of our other industrial mineral products accounted for approximately 2%, 2%, and 3% of our total sales revenue for 2017, 2016 and 2015, respectively.

Our Industry

The commercial silica industry consists of businesses that are involved in the mining, processing and distribution of commercial silica. Commercial silica, also referred to as "silica," "industrial sand and gravel," "sand," "silica sand" and "quartz sand," is a term applied to sands and gravels containing a high percentage of silica (silicon dioxide, SiO_2) in the form

of quartz. Commercial silica deposits occur throughout the United States, but mines and processing facilities are typically located near end markets and in areas with access to transportation infrastructure. Other factors affecting the feasibility of commercial silica production include deposit composition, product quality specifications, land-use and environmental regulation, including

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permitting requirements, access to electricity, natural gas and water and a producer's expertise and know-how. New entrants face serious hurdles to establish their operations, including:

- the difficulty of finding silica reserves suitable for use as frac sand, which, according to the API, must meet stringent technical specifications, including, among others, sphericity, grain size, crush resistance, acid solubility, purity and turbidity;
- the difficulty of securing contiguous reserves of silica large enough to justify the capital investment required to develop a mine, processing plant, product storage and rail track;
- a lack of industry-specific geological, exploration, development and mining knowledge and experience needed to enable the identification, acquisition and development of high-quality reserves;
- the difficulty of identifying reserves with the above characteristics that either are located in close proximity to oil and natural gas reservoirs or have the rail access needed for low-cost transportation to major shale basins;
- the difficulty of securing mining, production, water, air, refuse and other federal, state and local operating permits from the proper authorities, a process that can require up to three years; and
- the difficulty of assembling a large, diverse portfolio of customers to optimize operations.

Extraction Processes

Commercial silica deposits are formed from a variety of sedimentary processes and have distinct characteristics that range from hard sandstone rock to loose, unconsolidated dune sands. While the specific extraction method utilized depends primarily on the deposit composition, most silica is mined using conventional open-pit bench extraction methods and begins after clearing the deposit of any overlaying soil and organic matter. The silica deposit composition and chemical purity also dictate the processing methods and equipment utilized. For example, broken rock from a sandstone deposit may require one, two or three stages of crushing to liberate the silica grains required for most markets. Unconsolidated deposits may require little or no crushing, as silica grains are not tightly cemented together.

We conduct only surface mining operations and do not operate any underground mines, although we do lease underground reserves at our Festus, MO, operation, which are being mined underground by a contractor. Mining methods at our facilities include conventional hard rock mining, hydraulic mining, surface or open-pit mining of loosely consolidated silica deposits and dredge mining. Hard rock mining involves drilling and blasting in order to break up sandstone into sizes suitable for transport to the processing facility by truck, slurry or conveyor. Hydraulic mining involves spraying high-pressure water to break up loosely consolidated sandstone at the mine face. Surface or open-pit mining involves using earthmoving equipment, such as bucket loaders, to gather silica deposits for processing. Lastly, dredging involves gathering silica deposits from mining ponds and transporting them by slurry pipelines for processing. We may also use slurry pipelines in our hydraulic and open-pit mining efforts to expedite processing. Silica mining and processing typically has less of an environmental impact than the mining and processing of other minerals, in part because it uses fewer chemicals. Our processing plants are equipped to receive the mined sand, wash away impurities, eliminate oversized or undersized particles and remove moisture through a multi-stage drying process. Our 19 production facilities are located primarily in the eastern half of the United States, with operations in Alabama, Illinois, Louisiana, Michigan, Missouri, New Jersey, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, West Virginia and Wisconsin. Each of our facilities operates year-round, typically in shift schedules designed to optimize facility utilization in accordance with market demand. Our facilities receive regular preventative maintenance, and we make additional capital investments in our facilities as required to support customer volumes and internal performance goals. For more information related to our production facilities, see Item 2, "Properties".

We believe we have a broad and high quality mineral reserves base due to our strategically located mines and facilities. At December 31, 2017, we estimate that we had approximately 765 million tons of proven and probable mineral reserves. The quantity and nature of the mineral reserves at each of our properties are estimated by our mining engineers. Our mining engineers update our reserve estimates annually, making necessary adjustments for reserve usage at each location during the year and additions or reductions due to property acquisitions and dispositions, quality adjustments and mine plan updates. Before acquiring new reserves, we perform surveying, drill core analysis and other tests to confirm the quantity and quality of the acquired reserves. In some instances, we acquire the mineral

rights to reserves without actually taking ownership of the properties. For more information related to our production facilities, deposits and reserves, see Item 2, “Properties”.

Production Processes

After extracting the ore, the silica is washed with water to remove fine impurities such as clay and organic particles. In some deposits, these fine contaminants or impurities are tightly bonded to the surface of the silica grain and require attrition scrubbing to be removed. Other deposits require the use of flotation to collect and separate contaminants from the silica. When

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these contaminants are weakly magnetic, special high intensity magnets may be utilized in the process to improve the purity of the final commercial silica product. After the silica has been washed, most output is dried prior to sale.

The next step in the production process involves the classification of commercial silica products according to their chemical purity, particle shape and particle size distribution. Generally, commercial silica is produced and sold in either whole grain form or ground form. Whole grain silica generally ranges from 12 to 140 mesh. Mesh refers to the number of openings per linear inch on a sizing screen. Whole grain silica products are sold in a range of shapes, sizes and purity levels to be used in a variety of industrial applications, such as oil and natural gas hydraulic fracturing proppants, glass, foundry, building products, filtration and recreation. Some whole grain silica is further processed to ground silica of much smaller particle sizes, ranging from 5 to 250 microns. A micron is one-millionth of a meter.

Quality Control

We maintain a standard of excellence through our mining and processing facilities some of which include ISO 9001-registered quality systems. We use automated process control systems that efficiently manage the majority of the mining and processing functions, and we monitor the quality and consistency of our products by conducting hourly tests throughout the production process to detect variances. All of our major facilities operate a testing laboratory to evaluate and ensure the quality of our products and services. We also provide customers with documentation verifying that all products shipped meet customer specifications. These quality assurance functions ensure that we deliver quality products to our customers and maintain customer trust and loyalty.

In addition, we have certain company-wide quality control mechanisms. We maintain a company-wide quality assurance database that facilitates easy access and analysis of product and process data from all plants. We also have fully staffed and equipped corporate laboratories that provide critical technical expertise, analytical testing resources and application development to promote product value and cost savings. The labs consist of different departments: a foundry lab, a paint and coatings lab, an analytical lab, a minerals-processing lab and an oil and gas lab. The foundry lab is fully equipped for analyzing foundry silica based on grain size distribution, acidity, acid demand value and turbidity, which is a measure of silica cleanliness. The paint and coatings lab provides formulation, application, and testing of paints, coatings and grouts for end use in fillers and extenders as well as building products. The analytical lab performs various analyses on products for quality control assessment. The minerals processing lab models plant production processes to test variations in deposits and improve our ability to meet customer requirements. The oil and gas lab performs testing and provides in-depth analysis of all types of hydraulic fracturing proppants to verify products meet specifications, such as API size and crush strength specifications. Additionally, this lab is responsible for the development of new resin coated products and the technical oversight of our Rochelle, Illinois facility.

Distribution

We ship our commercial silica products direct to our customers by truck, rail or barge and through our network of in-basin transloads. Recent trends in the oil and gas market and the expansion of our logistics footprint have resulted in more of our product volumes being transported by high-efficiency unit trains over the past two years. During 2017, we shipped 349 unit trains to both our transload sites and our customers. Our recent acquisition of Sandbox extends our delivery capability directly to our customers' wellhead locations. Sandbox provides “last mile” logistics to companies in the oil and gas industry, which increases efficiency and provides a lower cost logistics solution for our customers. Sandbox has operations in Texas (Midland/Odessa, Kenedy, Dallas/Fort Worth, Tyler); Morgantown, West Virginia; western North Dakota; northeast of Denver, Colorado; Oklahoma City, Oklahoma; Cambridge, Ohio and Mansfield, Pennsylvania, where its major customers are located.

For bulk commercial silica, transportation cost represents a significant portion of the overall product cost. Generally, we utilize trucks for shipments of 200 miles or less from our plant sites and to distribute our bagged products. Given the weight-to-value ratio of most of our products, the majority of our shipments outside this 200-mile radius are by rail. As a result, facility location is one of the most important considerations for producers and customers. Generally, our plant sites are strategically located to provide access to all Class I railroads or in strategic shale basins, which enables us to cost effectively send product to points of end use in North America.

We are continuously looking to increase the number of available transload points to which we have access. This approach allows us to provide strong customer service and puts us in a position to take advantage of opportunistic spot market sales. As of December 31, 2017, we have 56 transload facilities strategically located in or near all major shale

basins in the United States. For more information related to our transload facilities, see Item 2, “Properties”.

Both we and our customers lease a significant number of railcars for shipping purposes, as well as to facilitate the short-term storage of our products, particularly our frac sand products. As of December 31, 2017, we leased a fleet of 7,111 railcars, of which no empty cars were in storage.

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In addition to bulk shipments, commercial silica products can be packaged and shipped in 50 to 100 pound bags or bulk super sacks. Bag shipments are usually made to smaller customers with batch operations, warehouse distributor locations or for ocean container shipments made overseas. The products that are shipped in bags are often higher value products, such as ground and fine.

Primary End Markets

The special properties of commercial silica-chemistry, purity, grain size, color, inertness, hardness and resistance to high temperatures-make it critical to a variety of industries. Commercial silica is a key input in the well completion process, specifically, in the hydraulic fracturing techniques used in unconventional oil and natural gas wells. In the industrial and specialty products end markets, stringent quality requirements must be met when commercial silica is used as an ingredient to produce thousands of everyday products, including glass, building and foundry products and metal castings, as well as certain specialty applications such high-performance glass, specialty coatings, polymer additives and geothermal energy systems. Due to the unique properties of commercial silica, it is an economically irreplaceable raw material in a wide range of industrial applications. Our major end markets include:

Oil and Gas Proppants

Commercial silica is used as a proppant for oil and natural gas recovery in conventional and unconventional resource plays. Unconventional oil and natural gas production requires hydraulic fracturing and other well stimulation techniques to recover oil or natural gas that is trapped in the source rock and typically involves horizontal drilling. Frac sand is pumped down oil and natural gas wells at high pressures to prop open rock fissures in order to increase the flow rate of hydrocarbons from the wells. Proppants are also used in the "refracturing" process where older wells are restimulated using newer technologies and additional frac sand as a viable and lower-cost alternative to drilling new wells. The frac sand market experienced substantial growth from 2008 until 2014, driven by the growth in the use of hydraulic fracturing. From 2015 and through most of 2016, the frac sand market was negatively impacted due to reduced oil and gas drilling and completion activity in North America. Oil and gas drilling activity increased throughout 2017, leading to more completion activity. Leading indicators for completion activity suggest stabilization or even an increase in the near future.

Glass

Commercial silica is a critical input into and accounts for 55% to 75% of the raw materials in glass production. The glassmaking markets served by commercial silica producers include containers, flat glass, specialty glass and fiberglass. Demand typically varies within each of these end markets.

The container glass, flat glass and fiberglass end markets are generally mature end markets. Demand for container glass has historically grown in line with population growth, and we expect similar growth in the future. Flat glass and fiberglass tend to be correlated with construction and automotive production activity. While construction activity has improved during the past few years, automotive production activity has experienced recent declines. To the extent construction and domestic automotive production activity grow in the coming years, we expect that demand in these end markets will continue to increase. Some of the anticipated growth in the glass markets may be offset through the use of recycled glass.

Building Products

Commercial silica is used in the manufacturing of building products for commercial and residential construction. Whole grain commercial silica products are used in flooring compounds, mortars and grouts, specialty cements, stucco and roofing shingles. Ground commercial silica products are used by building products manufacturers in the manufacturing of certain fiberglass products and additionally as functional extenders and to add durability and weathering properties to cementious compounds. In addition, geothermal wells are an alternative energy source that requires specialized ground silica products in their well casings for effectiveness. The market for commercial silica used to manufacture building products is driven primarily by the demand in the construction markets. The historical trend for this market has been one of growth, especially in demand for cementious compounds for new construction, renovation and repair. We have seen an increase in permits and housing starts since 2012, and those gains continued in 2017. To the extent the housing market growth continues in the coming years, we expect that demand in this end market will increase.

Foundry

Commercial silica products are used in the production of molds for metal castings and in metal casting products. In addition, commercial whole grain silica is sold to coaters of foundry silica, or coated internally, who then sell their product to foundries for cores and shell casting processes. The demand for foundry silica primarily depends on the rate of automobile and light truck production, construction and production of heavy equipment like rail cars. Over the past decade, there has been some movement of foundry supply chains to Mexico and other offshore production areas. We have experienced increases in

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foundry demand since 2011. During 2017, several of the foundry markets continued to see growth. To the extent production levels continue to strengthen in the coming years, we expect that demand in this end market will increase.

Chemicals

Both whole grain and ground silica products are used in the manufacturing of silicon-based chemicals, such as sodium silicate, that are used in a variety of applications, including food processing, detergent products, paper textile, specialty foundry applications and as inputs for some precipitated silicas. This end market is driven by the development of new products by the chemicals manufacturers, including specialty coatings and polymer additives as well as the growth of “green” tires. We expect this end market to grow as these manufacturers continue their product and applications development.

Fillers and Extenders

Commercial silica products are sold to producers of paints and coating products for use as fillers and extenders in architectural, industrial and traffic paints and are sold to producers of rubber and plastic for use in the production of epoxy molding compounds and silicone rubber. The commercial silica products used in this end market are most often ground silica, including finer ground classifications. The market for fillers and extenders is driven by demand in the construction and automotive production industries as well as by demand for materials in the housing remodeling industry. We have experienced increases in demand in these sectors since 2011. To the extent these industries continue to grow in the coming years, we expect demand to increase.

Our Customers

We sell our products to a variety of end markets. Our customers in the oil and gas proppants end market include major oilfield services companies and exploration and production companies that are engaged in hydraulic fracturing. Sales to the oil and gas proppants end market comprised approximately 82%, 65%, and 67% of our total sales revenue in 2017, 2016 and 2015, respectively.

Our primary markets have historically been core industrial end markets with customers engaged in the production of glass, building products, foundry products, chemicals and fillers and extenders. Our diverse customer base drives high recovery rates across our production. We also benefit from strong and long-standing relationships with our customers in each of the industrial and specialty products end markets we serve. Sales to our industrial and specialty products end markets comprised approximately 18%, 35%, and 33% of our total sales revenue in 2017, 2016 and 2015, respectively.

Sales to our two largest customers, which are Oil & Gas Proppants customers, accounted for 15% and 12% of our total sales during the year ended December 31, 2017. No other customers accounted for 10% or more of our total sales.

Competition

Both of our reporting segments operate in highly competitive markets that are characterized by a small number of large, national producers and a larger number of small, regional or local producers. According to a January 2018 publication by the United States Geological Survey (“USGS”), in 2017, there were 200 producers of commercial silica with a combined 340 active operations in 35 states within the United States. Competition in the industry across both of our reporting segments is based on price, consistency and quality of product, site location, distribution capability, customer service, reliability of supply, breadth of product offering and technical support. As transportation costs are a significant portion of the total cost to customers of commercial silica, in many instances transportation costs can represent more than 50% of delivered cost, the commercial silica market is typically local, and competition from beyond the local area is limited. Notable exceptions to this are the frac sand and fillers and extenders markets, where certain product characteristics are not available in all deposits and not all plants have the requisite processing capabilities, necessitating that some products be shipped for extended distances. Because the markets for our products are typically local, we also compete with smaller, regional or local producers. For more information regarding competition, see “Risk Factors—Risks Related to Our Business—Our future performance will depend on our ability to succeed in competitive markets, and on our ability to appropriately react to potential fluctuations in demand for and supply of our products.”

Seasonality

Our business is affected to some extent by seasonal fluctuations in weather that impact our production levels and our customers' business needs. For example, during the second and third quarters we sell more commercial silica to our customers in the building products and recreation end markets due to increased construction activity resulting from more favorable weather. First and fourth quarters can experience lower sales, and sometimes production levels, largely from adverse weather hampering logistical capabilities and general decreased customer activity levels.

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Intellectual Property

Other than operating licenses for our mining and processing facilities, there are no third-party patents, licenses or franchises material to our business. Our intellectual property primarily consists of trade secrets, know-how and trademarks, including our name US SILICA® and products with trademarked names such as OTTAWA WHITE®, MIN-U-SIL®, MYSTIC WHITE II®, Q-ROK®, SIL-CO-SIL®, PREMIUM HICKORY®, US SILICA WHITE®, InnoProp® and SANDBOX® among others. We own patents and have patent applications pending related to Sandbox, our "last mile" logistics solution. All of the issued patents have an expiration date after August 20, 2027 with a majority of issued patents expiring after December 21, 2031. With respect to our other products, we principally rely on trade secrets, rather than patents, to protect our proprietary processes, methods, documentation and other technologies, as well as certain other business information. Although we do seek patents from time to time, patent protection requires a costly and uncertain federal registration process that would place our confidential information in the public domain. As a result, we typically utilize trade secrets to protect the formulations and processes we use to manufacture our products and to safeguard our proprietary formulations and methods. We believe we can effectively protect our trade secrets indefinitely through the use of confidentiality agreements and other security measures.

Condition of Physical Assets and Insurance

Our business is capital intensive and requires ongoing capital investment for the replacement, modernization and/or expansion of equipment and facilities. For more information, see Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations - Liquidity and Capital Resources.”

We maintain insurance policies against property loss and business interruption and insure against risks that are typical in the operation of our business, in amounts that we believe to be reasonable. Such insurance, however, contains exclusions and limitations on coverage, particularly with respect to environmental liability and political risk. There can be no assurance that claims would be paid under such insurance policies in connection with a particular event. See Item 1A, “Risk Factors”.

Commercial Team

Our commercial team consists of approximately 92 individuals responsible for all aspects of our sales process, including pricing, marketing, transportation and logistics, product development and general customer service. This necessitates a highly organized staff and extensive coordination between departments. For example, product development requires the collaboration of our market development team, sales team, our production facilities and our corporate laboratories. Our sales team interacts directly with our customers in determining their needs, our production facilities fulfill the orders and our corporate laboratories are responsible for ensuring that our products meet those needs.

Our commercial team can be divided into five units:

- Sales—Our sales team is organized by both region and end market. We have an experienced group of dedicated sales team members for the oil and gas proppants and the industrial and specialty end markets. Our oil and gas proppants team is led out of our Houston office and is regionally positioned in the oil and gas markets across the U.S. This staff consists of experienced experts in the use of frac proppants in the oil and gas industry. Our industrial and specialty products sales team is strategically located near our major customers. As we make decisions to enter or expand our presence in certain end markets or regions, we will continue to add dedicated team members to support that growth.
- Marketing—Our marketing team coordinates all of our new and existing customer outreach efforts and identifies emerging market trends and new product opportunities. This includes producing exhibits for trade shows and exhibitions, manufacturing product overview materials, participating in regional industry meetings and other trade associations and managing our advertising efforts in trade journals.
- Transportation and Logistics—Our transportation and logistics team manages domestic and international shipments by directing inbound and outbound rail, barge and truck traffic, supervising equipment maintenance, coordinating with rail carriers to ensure equipment availability, ensuring compliance with shipping regulations and strategically planning for future growth. With our Sandbox acquisition we can deliver frac sand directly to wellheads.
- Technical—Our technical team is anchored by our Industrial & Specialty Products laboratory in Berkeley Springs, West Virginia and our Oil & Gas laboratory in Houston, Texas. At these facilities, we perform a variety of analyses

including:

- analytical chemistry by X-Ray Fluorescence (“XRF”) and Inductively Coupled Plasma (“ICP”) spectroscopy;

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- particle characterization by sieve, SediGraph, Brunauer, Emmett and Teller ("BET") surface area and microscopy;
- ore evaluation by mineral processing, flotation and magnetic separation;
- API frac sand evaluation, including crush resistance; and
- American Foundry Society ("AFS") green sand evaluation by various foundry sand tests.

Many other product analyses are performed locally at our 19 production facilities to support new product development, plant operations and customer quality requirements.

We also have a variety of other technical competencies including process engineering, equipment design, facility construction, maintenance excellence, environmental engineering, geology and mine planning and development. Effective integration of these capabilities has been a critical component of our business success and has allowed us to establish and maintain an extensive, high-quality silica sand reserve base, maximize the value of our reserves by producing and selling a wide range of high-quality products, optimize processing costs to provide strong value to customers and prioritize operating in a safe and environmentally sustainable manner.

- Customer Service—Our customer service team is dedicated to creating an exceptional customer experience and making it easy to do business with our company. The organization aims to accomplish this by consistently exceeding our customers' expectations, continually improving our performance, offering efficient and timely responses to customer needs, being available to our customers 24/7 and providing customers with personal points of contact on whom they can rely.

Employees

As of December 31, 2017, we employed a workforce of 2,202 employees, the majority of whom are hourly wage plant workers living in the areas surrounding our mining facilities. The majority of our hourly employees are represented by labor unions that include the Teamsters Union; United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union; Laborers International Union of North America; Glass, Molders, Pottery, Plastics and Allied Workers International Union; and International Union of Operating Engineers A.F.L. - C.I.O. We believe that we maintain good relations with our workers and their respective unions and have not experienced any material strikes or work stoppages since 1987.

Our employees average approximately 8 years of tenure with us, and we have an annual employee turnover rate of 12%, excluding the impact of reductions in workforce as part of the restructuring actions. We believe our stable workforce has directly contributed to improved process efficiencies and safety, which in turn help drive cost reductions. We believe our labor rates compare favorably to other mining and manufacturing facilities in the same geographic areas. We maintain workers' compensation coverage in amounts required by law and have no material claims pending. We also offer all full-time employees a competitive package of employee benefits, which includes medical, dental, life and disability coverage.

Regulation and Legislation

Mining and Workplace Safety

Federal Regulation

The U.S. Mine Safety and Health Administration ("MSHA") is the primary regulatory organization governing the commercial silica industry. Accordingly, MSHA regulates quarries, surface mines, underground mines and the industrial mineral processing facilities associated with quarries and mines. The mission of MSHA is to administer the provisions of the Federal Mine Safety and Health Act of 1977 and to enforce compliance with mandatory safety and health standards. MSHA works closely with the Industrial Minerals Association, a trade association in which we have a significant leadership role, in pursuing this mission. As part of MSHA's oversight, representatives perform at least two unannounced inspections annually for each above-ground facility. For additional information regarding mining and workplace safety, including MSHA safety and health violations and assessments in 2017, see Item 4, "Mine Safety Disclosures".

We also are subject to the requirements of the U.S. Occupational Safety and Health Act ("OSHA") and comparable state statutes that regulate the protection of the health and safety of workers. In addition, the OSHA Hazard Communication Standard requires that information be maintained about hazardous materials used or produced in operations and that this information be provided to employees, state and local government authorities and the public. OSHA regulates the customers and users of commercial silica and provides detailed regulations requiring employers to protect employees

from overexposure to silica bearing dust through the enforcement of permissible exposure limits and the OSHA Hazard Communication Standard.

Internal Controls

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We adhere to a strict occupational health program aimed at controlling exposure to silica bearing dust, which includes dust sampling, a respiratory protection program, medical surveillance, training and other components. Our safety program is designed to ensure compliance with the standards of our Occupational Health and Safety Manual and MSHA regulations. For both health and safety issues, extensive training is provided to employees. We have safety committees at our plants made up of salaried and hourly employees. We perform annual internal health and safety audits and conduct annual crisis management drills to test our plants' abilities to respond to various situations. Health and safety programs are administered by our corporate health and safety department with the assistance of plant Environmental, Health and Safety Coordinators.

Motor Carrier Regulation

Our trucking services are regulated by the U.S. Department of Transportation ("DOT"), the Federal Motor Carrier Safety Administration ("FMCSA") and by various state agencies. These regulatory authorities have broad powers, generally governing matters such as authority to engage in motor carrier operations, as well as motor carrier registration, driver hours of service, safety and fitness of transportation equipment and drivers, transportation of hazardous materials and periodic financial reporting. In addition, each driver is required to have a commercial driver's license and may be subject to mandatory drug and alcohol testing. We may be audited periodically by these regulatory authorities to ensure that we are in compliance with various safety, hours-of-service, and other rules and regulations.

The transportation industry is subject to possible other regulatory and legislative changes (such as the possibility of more stringent environmental, climate change, security and/or occupational safety and health regulations, limits on vehicle weight and size and a mandate to implement electronic logging devices) that may affect the economics of our trucking services by requiring changes in operating practices or by changing the demand for motor carrier services or the cost of providing truckload or other transportation or logistics services.

Environmental Matters

We and the commercial silica industry are subject to extensive governmental regulation on, among other things, matters such as permitting and licensing requirements, plant and wildlife protection, hazardous materials, air and water emissions and environmental contamination and reclamation. A variety of state, local and federal agencies enforce this regulation.

Federal Regulation

At the federal level, we may be required to obtain permits under Section 404 of the Clean Water Act from the U.S. Army Corps of Engineers for the discharge of dredged or fill material into waters of the United States, including wetlands and streams, in connection with our operations. We also may be required to obtain permits under Section 402 of the Clean Water Act from the U.S. Environmental Protection Agency ("EPA") (or the relevant state environmental agency in states where the permit program has been delegated to the state) for discharges of pollutants into waters of the United States, including discharges of wastewater or storm water runoff associated with construction activities. Failure to obtain these required permits or to comply with their terms could subject us to administrative, civil and criminal penalties as well as injunctive relief.

The U.S. Clean Air Act and comparable state laws regulate emissions of various air pollutants through air emissions permitting programs and the imposition of other requirements. These regulatory programs may require us to install expensive emissions abatement equipment, modify our operational practices and obtain permits for our existing operations, and before commencing construction on a new or modified source of air emissions, such laws may require us to reduce emissions at existing facilities. As a result, we may be required to incur increased capital and operating costs because of these regulations. We could be subject to administrative, civil and criminal penalties as well as injunctive relief for noncompliance with air permits or other requirements of the U.S. Clean Air Act and comparable state laws and regulations.

As part of our operations, we utilize or store petroleum products and other substances such as diesel fuel, lubricating oils and hydraulic fluid. We are subject to applicable requirements regarding the storage, use, transportation and disposal of these substances, including the relevant Spill Prevention, Control and Countermeasure requirements that the EPA imposes on us. Spills or releases may occur in the course of our operations, and we could incur substantial costs and liabilities as a result of such spills or releases, including those relating to claims for damage or injury to

property and persons.

Additionally, some of our operations are located on properties that historically have been used in ways that resulted in the release of contaminants, including hazardous substances, into the environment, and we could be held liable for the remediation of such historical contamination. The Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), also known as the Superfund law, and comparable state laws impose joint and several liability, without regard to fault or legality of conduct, on classes of persons who are considered to be responsible for the release of hazardous substances into the environment. These persons include the owner or operator of the site where the release occurred and anyone who disposed or arranged for the disposal of a hazardous substance released at the site. Under CERCLA, such persons may be subject to

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liability for the costs of cleaning up the hazardous substances, for damages to natural resources, and for the costs of certain health studies. In addition, it is not uncommon for neighboring landowners and other third parties to file claims for personal injury and property damage allegedly caused by the hazardous substances released into the environment. In addition, the Resource Conservation and Recovery Act ("RCRA") and comparable state statutes regulate the generation, transportation, treatment, storage, disposal and cleanup of hazardous and non-hazardous wastes. Under the auspices of the EPA, the individual states administer some or all of the provisions of RCRA, sometimes in conjunction with their own, more stringent requirements. In the course of our operations, we generate industrial solid wastes that may be regulated as hazardous wastes.

Our operations may also be subject to broad environmental review under the National Environmental Policy Act ("NEPA"). NEPA requires federal agencies to evaluate the environmental impact of all "major federal actions" significantly affecting the quality of the human environment. The granting of a federal permit for a major development project, such as a mining operation, may be considered a "major federal action" that requires review under NEPA. Therefore, our projects may require review and evaluation under NEPA. As part of this evaluation, the federal agency considers a broad array of environmental impacts, including, among other things, impacts on air quality, water quality, wildlife (including threatened and endangered species), historical and archaeological resources, geology, socioeconomics and aesthetics. NEPA also requires the consideration of alternatives to the project. The NEPA review process, especially the preparation of a full environmental impact statement, can be time consuming and expensive. The purpose of the NEPA review process is to inform federal agencies' decision-making on whether federal approval should be granted for a project and to provide the public with an opportunity to comment on the environmental impacts of a proposed project. While NEPA requires only that an environmental evaluation be conducted and does not mandate a result, a federal agency could decide to deny a permit, or impose certain conditions on its approval, based on its environmental review under NEPA, or a third party may challenge the adequacy of a NEPA review.

Federal agencies granting permits for our operations also must consider impacts to endangered and threatened species and their habitat under the Endangered Species Act. We also must comply with and are subject to liability under the Endangered Species Act, which prohibits and imposes stringent penalties for the harming of endangered or threatened species and their habitat. Federal agencies also must consider a project's impacts on historic or archaeological resources under the National Historic Preservation Act, and we may be required to conduct archaeological surveys of project sites and to avoid or preserve historical areas or artifacts.

State and Local Regulation

Because our operations are located in numerous states, we are also subject to a variety of different state and local environmental review and permitting requirements. Some states in which our projects are located or are being developed have state laws similar to NEPA; thus our development of new sites or the expansion of existing sites may be subject to comprehensive state environmental reviews even if they are not subject to NEPA. In some cases, the state environmental review may be more stringent than the federal review. Our operations may require state law based permits in addition to federal permits, requiring state agencies to consider a range of issues, many the same as federal agencies, including, among other things, a project's impact on wildlife and their habitats, historic and archaeological sites, aesthetics, agricultural operations and scenic areas. Some states also have specific permitting and review processes for commercial silica mining operations, and states may impose different or additional monitoring or mitigation requirements than federal agencies. The development of new sites and our existing operations also are subject to a variety of local environmental and regulatory requirements, including land use, zoning, building and transportation requirements.

As demand for frac sand in the oil and natural gas industry has driven a significant increase in current and expected future production of commercial silica, some local communities have expressed concern regarding silica sand mining operations. These concerns have generally included exposure to ambient silica sand dust, truck traffic, water usage and blasting. In response, certain state and local communities have developed or are in the process of developing regulations or zoning restrictions intended to minimize dust from getting airborne, control the flow of truck traffic, significantly curtail the amount of practicable area for mining activities, provide compensation to local residents for potential impacts of mining activities and, in some cases, ban issuance of new permits for mining activities. To date, we have not experienced any material impact or disruption to our existing mining operations or planned capacity

expansions as a result of these types of concerns.

We have a long history of positive engagement with the communities that surround our existing mining operations. We have an annual employee turnover rate of 12%, excluding the impact of reductions in workforce as part of the restructuring actions, and have had no significant strikes in more than 30 years, evidence of the strong relationship we have with our employees. We believe this strong relationship helps foster good relations with the communities in which we operate. Although additional regulatory requirements could negatively impact our business, financial condition and results of operations, we believe our existing operations are less likely to be negatively impacted by virtue of our good community relations.

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Planned expansion of our mining and production capacity in new communities could be more significantly impacted by increased regulatory activity. Difficulty or delays in obtaining or inability to obtain new mining permits or increased costs of compliance with future state and local regulatory requirements could have a material negative impact on our ability to grow our business. In an effort to minimize these risks, we continue to be engaged with local communities in order to grow and maintain strong relationships with residents and regulators.

Costs of Compliance

We may incur significant costs and liabilities as a result of environmental, health and safety requirements applicable to our activities. Failure to comply with environmental laws and regulations may result in the assessment of administrative, civil and criminal penalties, imposition of investigatory, cleanup and site restoration costs and liens, the denial or revocation of permits or other authorizations and the issuance of injunctions to limit or cease operations. Compliance with these laws and regulations may also increase the cost of the development, construction and operation of our projects and may prevent or delay the commencement or continuance of a given project. In addition, claims for damages to persons or property may result from environmental and other impacts of our activities.

The process for performing environmental impact studies and reviews for federal, state and local permits for our operations involves a significant investment of time and monetary resources. We cannot control the permit approval process. We cannot predict whether all permits required for a given project will be granted or whether such permits will be the subject of significant opposition. The denial of a permit essential to a project or the imposition of conditions with which it is not practicable or feasible to comply could impair or prevent our ability to develop a project. Significant opposition and delay in the environmental review and permitting process also could impair or delay our ability to develop a project. Additionally, the passage of more stringent environmental laws could impair our ability to develop new operations and have an adverse effect on our financial condition and results of operations.

Availability of Reports; Website Access; Other Information

Our Internet address is http://www.ussilica.com. Through “Investors” — “SEC Filings” on our home page, we make available free of charge our Annual Report on Form 10-K, our quarterly reports on Form 10-Q, our proxy statements, our current reports on Form 8-K, SEC Forms 3, 4 and 5 and any amendments to those reports filed or furnished pursuant to Sections 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. Our reports filed with the SEC are also made available to read and copy at the SEC’s Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549. Information about the Public Reference Room may be obtained by contacting the SEC at 1-800-SEC-0330. Reports filed with the SEC are also made available on its website at www.sec.gov.

Copies of our Corporate Governance Guidelines, our Audit Committee Charter, Compensation Committee Charter, and Nominating and Governance Committee Charter, the Code of Conduct for our Board and Code of Conduct and Ethics for our employees (including our chief executive officer, chief financial officer and corporate controller) can also be found on our website. We will disclose any amendments or waivers to our Code of Conduct and Ethics applicable to the chief executive officer, chief financial officer and corporate controller in the “Investors” section of our website. Stockholders may also request a free copy of these documents from: U.S. Silica Holdings, Inc., attn.: Investor Relations, 8490 Progress Drive, Suite 300, Frederick, Maryland 21701 or view them on our website at IR@ussilica.com.

Executive Officers of the Registrant

John P. Blanchard, age 44, has served as our Senior Vice President and President, Industrial & Specialty Products since July 2016, having served as Vice President and General Manager, Industrial & Specialty Products from September 2011 until July 2016. Mr. Blanchard possesses over 20 years’ experience in a variety of industries, including nonwovens, composites, building materials and pharmaceuticals. Prior to joining us, Mr. Blanchard held various positions of increasing responsibility with Johns Manville from 2005 to September 2011, including Global Business Director from December 2010 to September 2011 and Global Business Manager from February 2008 to December 2010. Mr. Blanchard earned a B.S. in Chemical Engineering from Michigan Technological University and an M.B.A. from the University of Michigan.

Bradford B. Casper, age 43, has served as an Executive Vice President since July 2016 and as our Chief Commercial Officer since May 2015. He served as our Vice President of Strategic Planning from May 2011 until his promotion to Chief Commercial Officer in May 2015. Before joining us, Mr. Casper was at Bain & Company, Inc., where he held various positions from 2002 to May 2011 in the United States, Australia and Hong Kong, most recently serving as a Principal from July 2010 to May 2011. Mr. Casper earned a B.S. in Accounting from the University of Illinois at Urbana-Champaign and an M.B.A. from the Wharton School at the University of Pennsylvania.

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Christine C. Marshall, age 56, has served as our Senior Vice President, Chief Legal Officer and Corporate Secretary since July 2016. Ms. Marshall joined us as our General Counsel and Corporate Secretary in November 2012. Prior to joining us, Ms. Marshall served as Vice President and General Counsel of the Security Technologies Sector of Ingersoll Rand Company from September 2010 to January 2012. From 2005 to 2010, Ms. Marshall held various positions of increasing responsibility with Tyco International, including General Counsel of Tyco Flow Control Americas from January 2008 to May 2010. Ms. Marshall earned a B.A. degree from Harvard University and a J.D. degree from Georgetown University School of Law.

Donald A. Merril, age 53, has served as an Executive Vice President since July 2016 and as our Chief Financial Officer since January 2013. He had previously served as our Vice President of Finance from October 2012 until his appointment as Chief Financial Officer. Previously, Mr. Merril had served as Senior Vice President and Chief Financial Officer of Myers Industries Inc. from January 2006 through August 2012. Prior to serving at Myers Industries, Mr. Merril held the role of Vice President and Chief Financial Officer, Rubbermaid Home Products Division at Newell Rubbermaid Inc. from 2003 through 2005. Mr. Merril has a B.S. in Accounting from Miami University.

David D. Murry, age 56, has served as a Senior Vice President since July 2016 and as our Chief Human Resources Officer since October 2011. He served as our Vice President of Talent Management from October 2011 until July 2016. Prior to joining us, Mr. Murry was the Director of Human Resources and Talent Management for Arkema, a diversified chemicals company, from October 2005 to October 2011. He has held positions of increasing leadership with Armstrong, Dell, and Alcoa. Mr. Murry earned a B.S. in Mining Engineering from Texas A&M University and a Master’s of Science in Management from Antioch University.

Bryan A. Shinn, age 56, has served as our President since March 2011 and as our Chief Executive Officer and a member of the Board since January 2012. Prior to assuming this position, Mr. Shinn was our Senior Vice President of Sales and Marketing from October 2009 to February 2011. Before joining us, Mr. Shinn was employed by the E. I. du Pont de Nemours and Company from 1983 to September 2009, where he held a variety of key leadership roles in operations, sales, marketing and business management, including Global Business Director and Global Sales Director. Mr. Shinn earned a B.S. in Mechanical Engineering from the University of Delaware.

Billy Ray Smith, age 47, has served as a Senior Vice President and President, Oil & Gas since January 2018, having served as Vice President of Oil & Gas since joining us in March 2017. Before joining us, Mr. Smith had held various positions of increasing responsibility with Halliburton Company, a global energy services company, since 1995 including as North America Technology Director from October 2015 to March 2017, Director of North America Operations from September 2014 to October 2015, Global Technical Sales and Marketing Manager from April 2014 to September 2014 and Senior Business Development Manager of Halliburton Australia from May 2012 to April 2014. Mr. Smith earned his B.S. in Petroleum Engineering from Texas Tech University.

Michael L. Winkler, age 53, has served as an Executive Vice President since July 2016 and as our Chief Operating Officer since December 2013. He served as a Vice President from June 2011 until July 2016 and as our Vice President of Operations from June 2011 until December 2013. Before joining us, Mr. Winkler was Vice President of Operations for Campbell Soup Company from August 2007 to June 2011 and held various positions with Mars Inc. from 1996 to August 2007, including Plant Manager-Columbus Plant and Director of Industrial Engineering. Mr. Winkler earned a B.S. in Industrial Engineering from the University of Wisconsin-Platteville and an M.B.A. from the University of North Texas.

ITEM 1A. RISK FACTORS

Our operations and financial results are subject to various risks and uncertainties, including those described below and elsewhere in this Annual Report on Form 10-K. You should carefully consider the risk factors set forth below as well

as the other information contained in this Annual Report on Form 10-K in connection with evaluating us. Additional risks and uncertainties not currently known to us or that we currently deem to be immaterial may also materially and adversely affect our business, results of operations or financial condition. Certain statements in "Risk Factors" are forward-looking statements.

Risks Related to Our Business

The demand for commercial silica fluctuates, which could adversely affect our results of operations.

Demand in the end markets served by our customers is influenced by many factors, including the following:

- demand for oil, natural gas and petroleum products;
- fluctuations in energy, fuel, oil and natural gas prices and the availability of such fuels;

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- the use of alternative proppants, such as ceramic proppants, in the hydraulic fracturing process;
- global and regional economic, political and military events and conditions;
- changes in residential and commercial construction demands, driven in part by fluctuating interest rates and demographic shifts;
- demand for automobiles and other vehicles;
- the substitution of plastic or other materials for glass;
- the use of recycled glass in glass production;
- competition from offshore producers of glass products;
- changes in demand for our products due to technological innovations, including the development and use of new processes for oil and gas production that do not require proppants;
- changes in laws and regulations (or the interpretation thereof) related to the mining and hydraulic fracturing industries, silica dust exposure or the environment;
- prices, availability and other factors relating to our products; and

- increases in costs of labor and labor strikes.

We cannot predict or control the factors that affect demand for our products. Negative developments in the above factors, among others, could cause the demand for commercial silica or other minerals to decline, which could adversely affect our business, financial condition, results of operations, cash flows and prospects.

Our operations are subject to the cyclical nature of our customers' businesses, and we may not be able to mitigate that risk.

The substantial majority of our customers are engaged in industries that have historically been cyclical, such as glassmaking, building products, foundry and oil and natural gas recovery. During periods of economic slowdown, our customers often reduce their production and also reduce capital expenditures and defer or cancel pending projects. Such developments occur even among customers that are not experiencing financial difficulties.

Demand in many of the end markets for commercial silica is driven by the construction and automotive industries. For example, the flat glass market depends on the automotive and commercial and residential construction and remodeling markets. The market for commercial silica used to manufacture building products is driven primarily by demand in the construction markets. The demand for foundry silica depends on the rate of automobile, light truck and heavy equipment production as well as construction. The demand for frac sand is driven by demand for oil and natural gas. When oil and natural gas prices decrease, as they did throughout 2015 and into 2016, exploration and production companies may reduce their exploration, development, production and well completion activities. The reduced level of such activities could result in a corresponding decline in the demand for frac sand and an oversupply of frac sand. In periods where sources of supply of frac sand exceed market demand, market prices for frac sand may decline and our results of operations and cash flows may decline or be volatile or otherwise adversely affected. In addition, given that silica transportation represents one of our customers' largest costs, if, in response to economic pressures, our customers choose to move their production offshore, the increased logistics costs could reduce demand for our products. Continued weakness in the industries we serve has had, and may in the future have, an adverse effect on sales of our products and our results of operations. A continued or renewed economic downturn in one or more of the industries or geographic regions that we serve, or in the worldwide economy, could cause actual results of operations to differ materially from historical and expected results.

Our operations are subject to operating risks that are often beyond our control and could adversely affect production levels and costs, and such risks may not be covered by insurance.

Our mining, processing and production facilities are subject to risks normally encountered in the commercial silica industry. These risks include:

- changes in the price and availability of transportation and transload network access;
- changes in the price and availability of natural gas or electricity;
- unusual or unexpected geological formations or pressures;
- pit wall failures, underground roof falls or surface rock falls;
- unanticipated ground, grade or water conditions;

- inclement or hazardous weather conditions, including flooding, and the physical impacts of climate change;

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- environmental hazards;
- industrial accidents;
- physical plant security breaches;
- changes in laws and regulations (or the interpretation thereof) related to the mining and hydraulic fracturing industries, silica dust exposure or the environment;
- nonperformance of contractual obligations;
- inability to acquire or maintain necessary permits or mining or water rights;
- restrictions on blasting operations;
- inability to obtain necessary production equipment or replacement parts;
- reduction in the amount of water available for silica production;
- technical difficulties or key equipment failures;
- labor disputes;
- cybersecurity breaches;
- late delivery of supplies;
- fires, explosions or other accidents; and
- facility shutdowns in response to environmental regulatory actions.

Any of these risks could result in damage to, or destruction of, our mining properties or production facilities, personal injury, environmental damage, delays in mining or processing, losses or possible legal liability. Any prolonged downtime or shutdowns at our mining properties or production facilities could have a material adverse effect on us. Not all of these risks are reasonably insurable, and our insurance coverage contains limits, deductibles, exclusions and endorsements. Our insurance coverage may not be sufficient to meet our needs in the event of loss and any such loss may have a material adverse effect on us.

A significant portion of our sales is generated at five of our plants. Any adverse developments at any of those plants or in the end markets those plants serve could have a material adverse effect on our financial condition and results of operations.

A significant portion of our sales are generated at our plants located in Ottawa, Illinois; Mill Creek, Oklahoma; Utica, Illinois; Sparta, Wisconsin; and Tyler, Texas. These plants represented a combined 51%, 51%, and 62% of our total revenue in 2017, 2016 and 2015, respectively. Any adverse development at these plants or in the end markets these plants serve, including adverse developments due to catastrophic events or weather, decreased demand for commercial silica products, a decrease in the availability of transportation services or adverse developments affecting our customers, could have a material adverse effect on our financial condition and results of operations.

Our business and financial performance depend on the level of activity in the oil and natural gas industries.

Our operations that produce frac sand are materially dependent on the levels of activity in natural gas and oil exploration, development and production. More specifically, the demand for the frac sand we produce is closely related to the number of natural gas and oil wells completed in geological formations where sand-based proppants are used in fracture treatments. These activity levels are affected by both short- and long-term trends in natural gas and oil prices. In recent years, natural gas and oil prices and, therefore, the level of exploration, development and production activity, have experienced significant fluctuations. Worldwide economic, political and military events, including war, terrorist activity, events in the Middle East and initiatives by the Organization of the Petroleum Exporting Countries (“OPEC”), have contributed, and are likely to continue to contribute, to price volatility. Additionally, warmer than normal winters in North America and other weather patterns may adversely impact the short-term demand for natural gas and, therefore, demand for our products. Reduction in demand for natural gas to generate electricity could also adversely impact the demand for frac sand. A prolonged reduction in natural gas and oil prices would generally depress the level of natural gas and oil exploration, development, production and well completion activity and result in a corresponding decline in the demand for the frac sand we produce. Such a decline could result in us selling fewer tons of frac sand at lower prices or selling lower priced products, which would have a material adverse effect on our results of operations and financial condition. When demand for frac sand increases, there may not be a corresponding increase in the prices for our products or our customers may not switch back to higher priced products, which could

have a material adverse effect on our results of operations and financial condition. In addition, any future decreases in the rate at which oil and natural gas reserves are discovered or developed, whether due to increased governmental regulation, limitations on exploration and

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drilling activity or other factors, could have a material adverse effect on our business, even in a stronger natural gas and oil price environment.

We may be adversely affected by decreased demand for frac sand or the development of either effective alternative proppants or new processes to replace hydraulic fracturing.

Frac sand is a proppant used in the completion and re-completion of natural gas and oil wells through hydraulic fracturing. Frac sand is the most commonly used proppant and is less expensive than ceramic proppant, which is also used in hydraulic fracturing to stimulate and maintain oil and natural gas production. A significant shift in demand from frac sand to other proppants, such as ceramic proppants, could have a material adverse effect on our financial condition and results of operations. The development and use of other effective alternative proppants, or the development of new processes to replace hydraulic fracturing altogether, could also cause a decline in demand for the frac sand we produce and could have a material adverse effect on our financial condition and results of operations.

Federal, state and local legislative and regulatory initiatives relating to hydraulic fracturing and the potential for related regulatory action or litigation could result in increased costs and additional operating restrictions or delays for our customers, which could negatively impact our business, financial condition and results of operations.

A significant portion of our business supplies frac sand to hydraulic fracturing operators in the oil and natural gas industry. Although we do not directly engage in hydraulic fracturing activities, our customers purchase our frac sand for use in their hydraulic fracturing operations. Increased regulation of hydraulic fracturing may adversely impact our business, financial condition and results of operations.

The federal Safe Drinking Water Act (the “SDWA”) regulates the underground injection of substances through the Underground Injection Control Program (the “UIC Program”). Hydraulic fracturing generally has been exempt from federal regulation under the UIC Program, and the hydraulic fracturing process has been typically regulated by state or local governmental authorities. The EPA, however, has taken the position that certain aspects of hydraulic fracturing with fluids containing diesel fuel may be subject to regulation under the UIC Program, specifically as “Class II” UIC wells. In February 2014, the EPA released an interpretive memorandum to clarify UIC Program requirements under the SDWA for underground injection of diesel fuels in hydraulic fracturing for oil and gas extraction and issued technical guidance containing recommendations for EPA permit writers to consider in implementing these UIC “Class II” requirements. Among other things, the memorandum and technical guidance clarified that any owner or operator who injects diesel fuels in hydraulic fracturing for oil or gas extraction must obtain a UIC “Class II” permit before injection.

The EPA also issued final rules in 2012 that included the first federal air standards for natural gas and oil wells that are hydraulically fractured, along with other requirements for several other sources of pollution in the oil and gas industry that had not been regulated at the federal level. Building on the 2012 rules, the EPA announced in May 2016 additional regulations to reduce methane and smog-forming emissions from new, modified or reconstructed sources in the oil and natural gas industry. In June 2017, the EPA issued two proposals to stay certain of these requirements and reconsider the entirety of the 2016 rules; however, the rules currently remain in effect.

In May 2016, the EPA also finalized rules regarding criteria for aggregating multiple small surface sites into a single source for air-quality permitting purposes applicable to the oil and natural gas industry.

In addition, the EPA published in May 2014 an advance notice of proposed rulemaking regarding Toxic Substances Control Act reporting of the chemical substances and mixtures used in hydraulic fracturing. In June 2016, the EPA finalized effluent limit guidelines that waste water from shale resource extraction operations must meet before discharging to publicly owned wastewater treatment plants. Subsequently, compliance dates for certain sources have been extended by the EPA..

In March 2015, the federal Bureau of Land Management ("BLM") published a final rule that established new or more stringent standards for hydraulic fracturing on federal and Indian land. After several rounds of litigation, BLM rescinded this rule in December 2017; however, the rescission is currently being challenged in court. BLM also issued final rules to reduce methane emissions from venting, flaring, and leaks during oil and gas operations on public lands in November 2016; however, in December 2017, BLM postponed compliance requirements for certain provisions of the 2016 methane venting rule. BLM’s December 2017 delay decision is also currently being challenged in court.

In addition, the EPA has commenced a study of the potential environmental impacts of hydraulic fracturing activities, a committee of the U.S. House of Representatives (the “House”) conducted an investigation of hydraulic fracturing practices and a subcommittee of the Secretary of Energy Advisory Board (the “SEAB”) of the U.S. Department of Energy was tasked with recommending steps to improve the safety and environmental performance of hydraulic fracturing. As part of these studies, the EPA, the House committee and the SEAB subcommittee requested that certain companies provide them with information concerning the chemicals used in the hydraulic fracturing process. These studies could potentially spur initiatives to further regulate hydraulic fracturing under the SDWA or otherwise. In December 2016, the EPA issued a final assessment of the

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potential environmental effects of hydraulic fracturing on drinking water and groundwater that found hydraulic fracturing may in some cases result in impacts to drinking water resources. Additionally, from time to time, legislation is introduced before the U.S. Congress to provide for federal regulation of hydraulic fracturing under the SDWA and to require disclosure of the chemicals used in the hydraulic fracturing process. If this or similar legislation becomes law, the legislation could establish an additional level of federal regulation that may lead to additional permitting requirements or other operating restrictions, making it more difficult to complete natural gas and oil wells in shale formations. This could increase our customers' costs of compliance and doing business or otherwise adversely affect the hydraulic fracturing services they perform, which may negatively impact demand for our frac sand products.

In addition, various state, local and foreign governments have implemented, or are considering, increased regulatory oversight of hydraulic fracturing through additional permitting requirements, operational restrictions, disclosure requirements and temporary or permanent bans on hydraulic fracturing. A number of local municipalities across the United States have instituted measures resulting in temporary or permanent bans on or otherwise limiting or delaying hydraulic fracturing in their jurisdictions. Such moratoriums and bans could make it more difficult to conduct hydraulic fracturing operations and increase our customers' cost of doing business, which could negatively impact demand for our frac sand products. A number of states have also enacted legislation or issued regulations which impose various disclosure requirements on hydraulic fracturing operators. The availability of information regarding the constituents of hydraulic fracturing fluids could make it easier for third parties opposing the hydraulic fracturing process to initiate individual or class action legal proceedings based on allegations that specific chemicals used in the hydraulic fracturing process could adversely affect groundwater and drinking water supplies or otherwise cause harm to human health or the environment. Moreover, disclosure to third parties or to the public, even if inadvertent, of our customers' proprietary chemical formulas could diminish the value of those formulas and result in competitive harm to our customers, which could indirectly impact our business, financial condition and results of operations.

The adoption of new laws or regulations at the federal, state, local or foreign levels imposing reporting obligations on, or otherwise limiting or delaying, the hydraulic fracturing process could make it more difficult to complete natural gas and oil wells in shale formations, increase our customers' costs of compliance and doing business and otherwise adversely affect the hydraulic fracturing services they perform, which could negatively impact demand for our frac sand products. In addition, heightened political, regulatory and public scrutiny of hydraulic fracturing practices could potentially expose us or our customers to increased legal and regulatory proceedings, and any such proceedings could be time-consuming, costly or result in substantial legal liability or significant reputational harm. Any such developments could have a material adverse effect on our business, financial condition and results of operations, whether directly or indirectly. For example, we could be directly affected by adverse litigation involving us, or indirectly affected if the cost of compliance limits the ability of our customers to operate in the geographic areas we serve.

Our operations are dependent on our rights and ability to mine our properties and on our having renewed or received the required permits and approvals from governmental authorities and other third parties.

We hold numerous governmental, environmental, mining and other permits, water rights and approvals authorizing operations at each of our facilities. A decision by a governmental agency or other third party to deny or delay issuing a new or renewed permit or approval, or to revoke or substantially modify an existing permit or approval, could have a material adverse effect on our ability to continue operations at the affected facility. Expansion of our existing operations is also predicated on securing the necessary environmental or other permits, water rights or approvals, which we may not receive in a timely manner or at all. In addition, our facilities are located near existing and proposed third-party industrial operations that could affect our ability to fully extract, or the manner in which we extract, the mineral deposits to which we have mining rights.

Title to, and the area of, mineral properties and water rights may also be disputed. Mineral properties sometimes contain claims or transfer histories that examiners cannot verify. A successful claim that we do not have title to one or more of our properties or lack appropriate water rights could cause us to lose any rights to explore, develop and extract any minerals on that property, without compensation for our prior expenditures relating to such property. Our business may suffer a material adverse effect in the event one or more of our properties are determined to have title

deficiencies.

In some instances, we have received access rights or easements from third parties, which allow for a more efficient operation than would exist without the access or easement. A third party could take action to suspend the access or easement, and any such action could be materially adverse to our results of operations or financial condition.

We may not be able to successfully implement capacity expansion plans within our projected timetable, the actual costs of any capacity expansion may exceed our estimated costs and we may not be able to secure demand for the incremental production capacity. In addition, actual operating costs once we have completed the capacity expansion may be higher than anticipated.

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We undertake projects from time to time to expand our production capacity. The completion of these projects may be affected by market conditions and demand for our products. In addition, under our current business plan, we expect to fund any expansion plans through a combination of cash on our balance sheet and cash generated from our operating and financing activities. If the assumptions on which we base our estimated capital expenditures change or are inaccurate, we may require additional funding. Such funding may not be available on terms acceptable to us, or at all. Moreover, actual operating costs once we have completed a capacity expansion may be higher than initially anticipated. We also may not secure off-take commitments for the incremental production from our capacity expansion plans, and we may not be able to secure adequate demand for the incremental production. Furthermore, substantial investments in transportation infrastructure may be required to effectively execute the capacity expansion, and we may not be successful in expanding our logistical capabilities to accommodate the additional production capacity.

Any failure to successfully implement any capacity expansion plans due to an inability to obtain necessary permits, insufficient funding, delays, unanticipated costs, adverse market conditions or other factors, or failure to realize the anticipated benefits of our capacity expansion plans, including securing demand for the incremental production, could have a material adverse effect on our business, financial condition and results of operations.

Our future performance will depend on our ability to succeed in competitive markets, and on our ability to appropriately react to potential fluctuations in demand for and supply of our products.

We operate in a highly competitive market that is characterized by a small number of large, national producers and a larger number of small, regional or local producers. Competition in the industry is based on price, consistency and quality of product, site location, distribution capability, customer service, reliability of supply, breadth of product offering and technical support. As transportation costs are a significant portion of the total cost to customers of commercial silica-in many instances transportation costs can represent more than 50% of delivered cost-the commercial silica market is typically local, and competition from beyond the local area is limited. Notable exceptions to this are the frac sand and fillers and extenders markets, where certain product characteristics are not available in all deposits and not all plants have the requisite processing capabilities, necessitating that some products be shipped for extended distances.

We compete with national producers such as Fairmount Santrol Holdings Inc., Unimin Corporation, Hi-Crush Partners LP and Emerge Energy Services LP. Our competitors may have greater financial and other resources than we do, may develop technology superior to ours or may have production facilities that are located closer to key customers than ours.

Because the markets for our products are typically local, we also compete with smaller, regional or local producers. There typically is an increasing number of small producers servicing the frac sand market when there is increased demand for hydraulic fracturing services. If demand for hydraulic fracturing services decreases and the supply of frac sand available in the market increases, prices in the frac sand market could continue to materially decrease as less-efficient producers exit the market, selling frac sand at below market prices. Furthermore, our competitors may choose to consolidate, which could provide them with greater financial and other resources than us and negatively impact demand for our frac sand products. In addition, oil and natural gas exploration and production companies and other providers of hydraulic fracturing services could acquire their own frac sand reserves, expand their existing frac sand production capacity or otherwise fulfill their own proppant requirements and existing or new frac sand producers could add to or expand their frac sand production capacity, which would negatively impact demand for our frac sand products. We may not be able to compete successfully against either our larger or smaller competitors in the future, and competition could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

If our customers delay or fail to pay a significant amount of our outstanding receivables, it could have a material adverse effect on our liquidity, consolidated results of operations, and financial condition.

We bill our customers for our products in arrears and are, therefore, subject to our customers delaying or failing to pay our invoices. In weak economic environments, we may experience increased delays or failures due to, among other reasons, a reduction in our customers' cash flow from operations and their access to the credit markets. If our

customers delay or fail to pay us a significant amount of our outstanding receivables, it could have a material adverse effect on our liquidity, consolidated results of operations, and financial condition.

Some of our customers may experience financial difficulties, including insolvency. If a customer cannot provide us with reasonable assurance of payment, we will fully reserve the outstanding accounts receivable balance for the customer and only recognize revenue when we collect payment for our products shipped, assuming all other criteria for revenue recognition have been met. Although we will continue to try to obtain payments from these customers, it is likely that one or more of these customers will not pay us for our products. With respect to customers that are in bankruptcy proceedings, we similarly may not be able to collect sums owed to us by these customers and we also may be required to refund pre-petition amounts paid to us during the preference period (typically 90 days) prior to the bankruptcy filing.

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A large portion of our sales is generated by our top ten customers, and the loss of, or a significant reduction in purchases by our largest customers could adversely affect our operations.

Our top ten customers made up 58%, 52%, and 56% of our total sales revenue during the years ended December 31, 2017, 2016, and 2015, respectively. As of December 31, 2017, we had 23 long-term, competitively-bid minimum purchase supply agreements with 19 customers in the oil and gas proppants end market, six of which were among our top ten overall customers. These agreements have initial terms expiring between 2018 and 2022. While some of our largest customers have entered into supply agreements with us, these customers may not continue to purchase the same levels of our commercial silica products in the future due to a variety of reasons, contract requirements notwithstanding. For example, some of our top customers could go out of business or, alternatively, be acquired by other companies that purchase the same products and services provided by us from other third-party providers. Our customers could also seek to capture and develop their own sources of commercial silica. If any of our major customers substantially reduces or altogether ceases purchasing our commercial silica products, depending on market conditions, we could suffer a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

In addition, the long-term minimum purchase supply agreements may negatively impact our results of operations.

Some of our long-term agreements are for sales at fixed prices that are adjusted only for certain cost increases. As a result, in periods with increasing prices, our sales could grow at a slower rate than industry spot prices.

Increasing costs, a lack of dependability or availability of transportation services, transload network access or infrastructure or an oversupply of transportation services could have a material adverse effect on our business.

Because of the relatively low cost of producing commercial silica, transportation and related costs including freight charges, fuel surcharges, transloading fees, switching fees, railcar lease costs, demurrage costs and storage fees, tend to be a significant component of the total delivered cost of sales. The high relative cost of transportation related expense tends to favor manufacturers located in close proximity to the customer. In addition, when we expand our commercial silica production, we need increased transportation services and transload network access. We contract with truck, rail and barge services to move commercial silica from our production facilities to transload sites and our customers, and increased costs under these contracts could adversely affect our results of operations. In addition, we bear the risk of non-delivery under our contracts. Labor disputes, derailments, adverse weather conditions or other environmental events, an increasingly tight railcar leasing market and changes to rail freight systems could interrupt or limit available transportation services. A significant increase in transportation service rates, a reduction in the dependability or availability of transportation or transload services, or relocation of our customers' businesses to areas farther from our plants or transloads could impair our ability to deliver our products economically to our customers and to expand our markets. Further, reduced demand for commercial silica could result in railcar over-capacity, requiring us to pay railcar storage fees while, at the same time, continuing to incur lease costs for those railcars in storage, which could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

Seasonal and severe weather conditions could have a material adverse impact on our business.

Our business could be materially adversely affected by weather conditions. Severe weather conditions may affect our customers' operations, thus reducing their need for our products. Weather conditions may impact our operations, resulting in weather-related damage to our facilities and equipment or an inability to deliver equipment, personnel and products to job sites in accordance with contract schedules. In addition, climate change may lead to the increased frequency and severity of extreme weather events. Any such interference with our operations could force us to delay or curtail services and potentially breach our contractual obligations or result in a loss of productivity and an increase in our operating costs.

Our production process consumes large amounts of natural gas and electricity. An increase in the price or a significant interruption in the supply of these or any other energy sources could have a material adverse effect on our financial condition or results of operations.

Energy costs, primarily natural gas and electricity, represented approximately 3% of our total sales in 2017. Natural gas is the primary fuel source used for drying in the commercial silica production process and, as such, our profitability is impacted by the price and availability of natural gas we purchase from third parties. The price and

supply of natural gas are unpredictable and can fluctuate significantly based on international, political and economic circumstances, as well as other events outside our control, such as changes in supply and demand due to weather conditions, actions by OPEC and other oil and natural gas producers, regional production patterns and environmental concerns. In addition, potential climate change regulations or carbon or emissions taxes could result in higher production costs for energy, which may be passed on to us in whole or in part. In the past, the price of natural gas has been extremely volatile, and we believe this volatility may continue. In order to manage this risk, we may hedge natural gas prices through the use of derivative financial instruments, such as forwards, swaps and futures. However, these measures carry risk (including nonperformance by counterparties) and do not in any event entirely eliminate

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the risk of decreased margins as a result of natural gas price increases. A significant increase in the price of energy that is not recovered through an increase in the price of our products or covered through our hedging arrangements or an extended interruption in the supply of natural gas or electricity to our production facilities could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

Increases in the price of diesel fuel may adversely affect our results of operations.

Diesel fuel costs generally fluctuate with increasing and decreasing world crude oil prices, and accordingly are subject to political, economic and market factors that are outside of our control. Our operations are dependent on earthmoving equipment, railcars and tractor trailers, and diesel fuel costs are a significant component of the operating expense of these vehicles. We use earthmoving equipment in our mining operations, and we ship the vast majority of our products by either railcar or tractor trailer. To the extent that we perform these services with equipment that we own, we are responsible for buying and supplying the diesel fuel needed to operate these vehicles. To the extent that these services are provided by independent contractors, we may be subject to fuel surcharges that attempt to recoup increased diesel fuel expenses. To the extent we are unable to pass along increased diesel fuel costs to our customers, our results of operations could be adversely affected.

Diminished access to water may adversely affect our operations.

The mining and processing activities in which we engage at a number of our facilities require significant amounts of water, and some of our facilities are located in areas that are water-constrained. We have obtained water rights that we currently use to service the activities on our various properties, and we plan to obtain all required water rights to service other properties we may develop or acquire in the future. However, the amount of water that we are entitled to use pursuant to our water rights must be determined by the appropriate regulatory authorities in the jurisdictions in which we operate. Such regulatory authorities may amend the regulations regarding such water rights, increase the cost of maintaining such water rights or eliminate our current water rights, and we may be unable to retain all or a portion of such water rights. These new regulations, which could also affect local municipalities and other industrial operations, could have a material adverse effect on our operating costs and effectiveness if implemented. Such changes in laws, regulations or government policy and related interpretations pertaining to water rights may alter the environment in which we do business, which may negatively affect our financial condition and results of operations.

If we cannot successfully complete acquisitions or integrate acquired businesses, our growth may be limited and our financial condition may be adversely affected.

Our business strategy includes supplementing internal growth by pursuing acquisitions of complementary businesses. Any acquisition involves potential risks, including, among other things:

- the validity of our assumptions about mineral reserves, future production, sales, capital expenditures, operating expenses and costs, including synergies;
- an inability to successfully integrate the businesses we acquire;
- the use of a significant portion of our available cash or borrowing capacity to finance acquisitions and the subsequent decrease in our liquidity;
- a significant increase in our interest expense or financial leverage if we incur additional debt to finance acquisitions;
- the assumption of unknown liabilities, losses or costs for which we are not indemnified or for which our indemnity is inadequate;
- the diversion of management’s attention from other business concerns;
- an inability to hire, train or retain qualified personnel both to manage and to operate our growing business and assets;
- the incurrence of other significant charges, such as impairment of goodwill or other intangible assets, asset devaluation or restructuring charges;
- unforeseen difficulties encountered in operating in new geographic areas;
- customer or key employee losses at the acquired businesses; and
- the accuracy of data obtained from production reports and engineering studies, geophysical and geological analyses and other information used when deciding to acquire a property, the results of which are often inconclusive and subject to various interpretations.

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If we cannot successfully complete acquisitions or integrate acquired businesses, our growth may be limited and our financial condition may be adversely affected.

We will be required to make substantial capital expenditures to maintain, develop and increase our asset base. The inability to obtain needed capital or financing on satisfactory terms, or at all, could have an adverse effect on our growth and profitability.

Although we currently use a significant amount of our cash reserves and cash generated from our operations to fund the maintenance and development of our existing mineral reserves and our acquisitions of new mineral reserves, we may depend on the availability of credit to fund future capital expenditures. Our ability to obtain bank financing or to access the capital markets for future equity or debt offerings may be limited by our financial condition at the time of any such financing or offering, the covenants contained in our existing credit facilities or future debt agreements, adverse market conditions or other contingencies and uncertainties that are beyond our control. Our failure to obtain the funds necessary to maintain, develop and increase our asset base could adversely impact our growth and profitability.

Even if we are able to obtain financing or access the capital markets, incurring additional debt may significantly increase our interest expense and financial leverage, and our level of indebtedness could restrict our ability to fund future development and acquisition activities. In addition, the issuance of additional common stock in an equity offering may result in significant stockholder dilution.

Our substantial indebtedness and pension obligations could adversely affect our financial flexibility and our competitive position.

We have, and we will continue to have, a significant amount of indebtedness. As of December 31, 2017, we had $511.2 million of outstanding indebtedness. Under our senior secured credit facility, as of December 31, 2017, we had a $50.0 million line-of-credit, of which $4.5 million is being used for outstanding letters of credit, leaving $45.5 million of borrowing availability. Our substantial level of indebtedness increases the risk that we may be unable to generate cash sufficient to pay amounts due in respect of our indebtedness. We also have, and will continue to have, significant pension obligations. As of December 31, 2017, our unfunded pension obligations totaled $30.0 million.

Our substantial indebtedness and pension obligations could have other important consequences to you and significant effects on our business. For example, they could:

- increase our vulnerability to adverse changes in general economic, industry and competitive conditions;
- require us to dedicate a substantial portion of our cash flow from operations to make payments on our indebtedness and pension obligations, thereby reducing the availability of our cash flow to fund working capital, capital expenditures and other general corporate purposes;
- limit our flexibility in planning for, or reacting to, changes in our business and the industry in which we operate;
- restrict us from exploiting business opportunities;
- make it more difficult to satisfy our financial obligations, including payments on our indebtedness;
- place us at a disadvantage compared to our competitors that have less debt and pension obligations; and
- limit our ability to borrow additional funds for working capital, capital expenditures, acquisitions, debt service requirements, execution of our business strategy or other general corporate purposes.

Our senior secured credit facility contains certain restrictions and financial covenants that may restrict our business and financing activities

Our existing senior secured credit facility contains, and any future financing agreements that we may enter into will likely contain, operating and financial restrictions and covenants that may restrict our ability to finance future operations or capital needs or to engage in, expand or pursue our business activities.

Our ability to comply with these restrictions and covenants is uncertain and will be affected by the levels of cash flow from our operations and events or circumstances beyond our control. If market or other economic conditions deteriorate, our ability to comply with these covenants may be impaired. If we violate any of the restrictions, covenants, ratios or tests in our senior secured credit facility, a significant portion of our indebtedness may become immediately due and payable and our lenders' commitment to make further loans to us may terminate. We might not have, or be able to obtain, sufficient funds to make these accelerated payments. In addition, our obligations under our

senior secured credit facility are secured by substantially all of our assets, and if we are unable to repay our indebtedness under our senior secured credit facility, the lenders could seek to foreclose on our assets.

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We may incur substantial debt in the future to enable us to maintain or increase our production levels and to otherwise pursue our business plan. This debt may impair our ability to operate our business.

Our business plan requires a significant amount of capital expenditures to maintain and grow our production levels. If commercial silica prices were to decline for an extended period of time, if the costs of our acquisition and development operations were to increase substantially or if other events were to occur which reduced our sales or increased our costs, we may be required to borrow significant amounts in the future to enable us to finance the expenditures necessary to replace the reserves we produce. The cost of the borrowings and our obligations to repay the borrowings could have important consequences to us, including:

- our ability to obtain additional financing, if necessary, for working capital, capital expenditures, acquisitions or other purposes may be impaired or such financing may not be available on favorable terms, or at all;
- covenants contained in our existing and future credit and debt arrangements will require us to meet financial tests that may affect our flexibility in planning for, and reacting to, changes in our business, including possible acquisition opportunities;
- we will need a substantial portion of our cash flow to make principal and interest payments on our indebtedness and to improve the funded status of our defined benefit pension plan, reducing the funds that would otherwise be available for operations and future business opportunities; and
- our debt level will make us more vulnerable than our less leveraged competitors to competitive pressures or a downturn in our business or the economy generally.

Our ability to service our indebtedness will depend on, among other things, our future financial and operating performance, which will be affected by prevailing economic conditions and financial, business, regulatory and other factors, some of which are beyond our control. If our operating results are not sufficient to service our current or future indebtedness, we will be forced to take actions such as reducing or delaying business activities, acquisitions, investments and/or capital expenditures; selling assets; restructuring or refinancing our indebtedness; or seeking additional equity capital or bankruptcy protection. We may not be able to affect any of these remedies on satisfactory terms or at all.

Certain of our contracts contain provisions requiring us to deliver minimum amounts of frac sand or purchase minimum amounts of services. Noncompliance with these contractual obligations may result in penalties or termination of the agreement.

In certain instances, we commit to deliver products or purchase services, under penalty of nonperformance. Our inability to meet the minimum contract requirements may permit the counterparty to terminate the agreements or require us to pay a fee. The amount of the fee would be based on the difference between the minimum amount contracted for and the amount delivered or purchased. In such events, our business, financial condition and results of operations may be materially adversely affected.

Inaccuracies in our estimates of mineral reserves and resource deposits could result in lower than expected sales and higher than expected costs.

We base our mineral reserve and resource estimates on engineering, economic and geological data assembled and analyzed by our mining engineers, which are reviewed periodically by outside firms. However, commercial silica reserve estimates are necessarily imprecise and depend to some extent on statistical inferences drawn from available drilling data, which may prove unreliable. There are numerous uncertainties inherent in estimating quantities and qualities of commercial silica reserves and non-reserve commercial silica deposits and costs to mine recoverable reserves, including many factors beyond our control. Estimates of economically recoverable commercial silica reserves necessarily depend on a number of factors and assumptions, all of which may vary considerably from actual results, such as:

- geological and mining conditions and/or effects from prior mining that may not be fully identified by available data or that may differ from experience;
- assumptions concerning future prices of commercial silica products, operating costs, mining technology improvements, development costs and reclamation costs; and
- assumptions concerning future effects of regulation, including the issuance of required permits and taxes by governmental agencies.

Any inaccuracy in our estimates related to our mineral reserves and non-reserve mineral deposits could result in lower than expected sales and higher than expected costs.

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A shortage of skilled labor together with rising labor costs in the mining industry may further increase operating costs, which could adversely affect our results of operations.

Efficient mining using modern techniques and equipment requires skilled laborers, preferably with several years of experience and proficiency in multiple mining tasks, including processing of mined minerals. If the shortage of experienced labor continues or worsens or if we are unable to train the necessary number of skilled laborers, there could be an adverse impact on our labor productivity and costs and our ability to grow our business may be limited.

Our business may suffer if we lose, or are unable to attract and retain, key personnel.

We depend to a large extent on the services of our senior management team and other key personnel. Members of our senior management and other key employees have extensive experience and expertise in evaluating and analyzing industrial mineral properties, maximizing production from such properties, marketing industrial mineral production and developing and executing financing and hedging strategies. Competition for management and key personnel is intense, and the pool of qualified candidates is limited. The loss of any of these individuals or the failure to attract additional personnel, as needed, could have a material adverse effect on our operations and could lead to higher labor costs or the use of less-qualified personnel. In addition, if any of our executives or other key employees were to join a competitor or form a competing company, we could lose customers, suppliers, know-how and key personnel. We do not maintain key-man life insurance with respect to any of our employees. Our success will be dependent on our ability to continue to attract, employ and retain highly skilled personnel.

Difficulty in truckload driver and independent contractor recruitment and retention may have a materially adverse effect on our business.

With respect to our trucking services, difficulty in attracting or retaining qualified drivers and independent contractors could have a materially adverse effect on our growth and profitability. The truckload transportation industry periodically experiences a shortage of qualified drivers, particularly during periods of economic expansion, in which alternative employment opportunities are more plentiful and freight demand increases, or during periods of economic downturns, in which unemployment benefits might be extended and financing is limited for independent contractors who seek to purchase equipment or for students who seek financial aid for driving school. Our independent contractors are responsible for paying for their own equipment, fuel, and other operating costs, and significant increases in these costs could cause them to seek higher compensation from us or seek other opportunities within or outside the trucking industry. The trucking industry suffers from a high driver turnover rate, which requires us to continually recruit a substantial number of drivers to operate our equipment. If we were unable to attract qualified drivers and contract with independent contractors, we could be forced to, among other things, limit our growth, decrease the number of our tractors in service, adjust our driver compensation package or independent contractor compensation, or pay higher rates to third-party truckload carriers, which could adversely affect our profitability and results of operations if not offset by a corresponding increase in customer rates.

Our profitability could be negatively affected if we fail to maintain satisfactory labor relations.

As of December 31, 2017, various labor unions represented approximately 22% of our employees. If we are unable to renegotiate acceptable collective bargaining agreements with these labor unions in the future, we could experience, among other things, strikes, work stoppages or other slowdowns by our workers and increased operating costs as a result of higher wages, health care costs or benefits paid to our employees. An inability to maintain good relations with our workforce could cause a material adverse effect on our business and results of operations.

We rely upon patents, trade secrets and contractual restrictions to protect our proprietary rights. Failure to protect our intellectual property rights may undermine our competitive position, and protecting our rights or defending against third-party allegations of infringement may be costly.

Our commercial success depends on our proprietary information and technologies, know-how and other intellectual property. Because of the technical nature of our business, we rely primarily on patents, trade secrets, trademarks and contractual restrictions to protect our intellectual property rights. The measures we take to protect our patents, trade secrets and other intellectual property rights may be insufficient. Failure to protect, monitor and control the use of our existing intellectual property rights could cause us to lose our competitive advantage and incur significant expenses. It is possible that our competitors or others could independently develop the same or similar technologies or otherwise obtain access to our unpatented technologies. In such case, our patents and trade secrets would not prevent third

parties from competing with us. As a result, our results of operations may be adversely affected. Furthermore, third parties or employees may infringe or misappropriate our proprietary technologies or other intellectual property rights, which could also harm our business and results of operations. Policing unauthorized use of intellectual property rights can be difficult and expensive, and adequate remedies may not be available.

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In addition, third parties may claim that our products infringe or otherwise violate their patents or other proprietary rights and seek corresponding damages or injunctive relief. Defending ourselves against such claims, with or without merit, could be time-consuming and result in costly litigation. An adverse outcome in any such litigation could subject us to significant liability to third parties (potentially including treble damages) or temporary or permanent injunctions prohibiting the manufacture or sale of our products, the use of our technologies or the conduct of our business. Any adverse outcome could also require us to seek licenses from third parties (which may not be available on acceptable terms, or at all) or to make substantial one-time or ongoing royalty payments. Protracted litigation could also result in our customers or potential customers deferring or limiting their purchase or use of our products until resolution of such litigation. In addition, we may not have insurance coverage in connection with such litigation and may have to bear all costs arising from any such litigation to the extent we are unable to recover them from other parties. Any of these outcomes could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

We may have to utilize significant cash to meet our unfunded pension obligations and post-retirement health care liabilities and these obligations are subject to increase.

Many of our employees participate in our defined benefit pension plans. In 2017, we made no contribution payments toward reducing the unfunded liability of our defined benefit pension plans. Declines in interest rates or the market values of the securities held by the plans, or other adverse changes, could materially increase the underfunded status of our plans and affect the level and timing of required cash contributions. To the extent we use cash to reduce these unfunded liabilities, the amount of cash available for our working capital needs would be reduced. In addition, under the Employee Retirement Income Security Act of 1974, as amended ("ERISA"), the Pension Benefit Guaranty Corporation ("PBGC") has the authority to institute proceedings to terminate a pension plan if (1) the plan has not met the minimum funding requirements, (2) the plan cannot pay current benefits when due, (3) a lump sum payment has been made to a participant who is a substantial owner of the sponsoring company (and certain other technical conditions exist) or (4) the loss to the PBGC is reasonably expected to increase unreasonably over time if the plan is not terminated. In the event our tax-qualified pension plans are terminated by the PBGC, we could be liable to the PBGC for the underfunded amount, which could trigger default provisions in our credit facilities. As of December 31, 2017, our pension obligation was $122.1 million (with plan assets of $92.1 million). The amount of cash ultimately required to fund these obligations will vary based on a number of factors including future return on assets, mortality rates and other such actuarial assumptions. Based on current assumptions, we expect to pay $7.2 million in the year 2018, a total of $14.7 million for the two-year period from 2019 through 2020, a total of $15.0 million for the two-year period from 2021 through 2022 and a total of $38.0 million thereafter.

We also have a post-retirement health and life insurance plan for many of our employees. The post-retirement benefit plan is unfunded. We derive post-retirement benefit expense from an actuarial calculation based on the provisions of the plan and a number of assumptions provided by us including information about employee demographics, retirement age, future health care costs, turnover, mortality, discount rate, amount and timing of claims and a health care inflation trend rate. We previously maintained a Voluntary Employees' Beneficiary Association trust that was used to partially fund health care benefits for future retirees. Benefits were funded to the extent contributions were tax deductible, which under current legislation is limited. In 2017, the trust terminated upon depletion of its assets, which were used in accordance with trust terms. In general, retiree health benefits are paid as covered expenses are incurred. Our post-retirement healthcare obligations were $22.8 million as of December 31, 2017. Based on current assumptions, we expect to pay $1.4 million in the year 2018, a total of $2.7 million for the two-year period from 2019 through 2020, a total of $2.9 million for the two-year period from 2021 through 2022 and a total of $7.2 million thereafter.

See "Management's Discussion and Analysis of Financial Condition and Results of Operations - Contractual Obligations."

Failure to maintain effective quality control systems at our mining, processing and production facilities could have a material adverse effect on our business and operations.

The performance, quality and safety of our products are critical to the success of our business. These factors depend significantly on the effectiveness of our quality control systems, which, in turn, depends on a number of factors, including the design of our quality control systems, our quality-training program and our ability to ensure that our

employees adhere to the quality control policies and guidelines. Any significant failure or deterioration of our quality control systems could have a material adverse effect on our business, financial condition, results of operations and reputation.

Our sales and profitability fluctuate on a seasonal basis and are affected by a variety of other factors.
Our sales and profitability are affected by a variety of factors, including actions of competitors, changes in general economic conditions, weather conditions and seasonal periods. As a result, our results of operations may fluctuate on a quarterly basis and relative to corresponding periods in prior years, and any of these factors could adversely affect our business

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and cause our results of operations to decline. For example, we sell more of our products in the second and third quarters in the building products and recreation end markets due to the seasonal rise in construction driven by more favorable weather conditions. We sell fewer of our products in the first and fourth quarters due to reduced construction and recreational activity largely as a result of adverse weather conditions. Any unanticipated decrease in demand for our products during the second and third quarters could have a material adverse effect on our sales and profitability.

We may be subject to interruptions or failures in our information technology systems.

We rely on our information technology systems to process transactions, summarize our operating results and manage our business. Our information technology systems are subject to damage or interruption from power outages, computer and telecommunications failures, computer viruses, cyber attack or other security breaches, catastrophic events, such as fires, floods, earthquakes, tornadoes, hurricanes, acts of war or terrorism, and usage errors by our employees. If our information technology systems are damaged or cease to function properly, we may have to make a significant investment to fix or replace them, and we may suffer loss of critical data and interruptions or delays in our operations.

We may be the target of attempted cyber attacks, computer viruses, malicious code, phishing attacks, denial of service attacks and other information security threats. To date, cyber attacks have not had a material impact on our financial condition, results or business; however, we could suffer material financial or other losses in the future and we are not able to predict the severity of these attacks. Our risk and exposure to these matters remains heightened because of, among other things, the evolving nature of these threats, the current global economic and political environment, our prominent size and scale and our role in the financial services industry, the outsourcing of some of our business operations, the ongoing shortage of qualified cyber security professionals, and the interconnectivity and interdependence of third parties to our systems. The occurrence of a cyber attack, breach, unauthorized access, misuse, computer virus or other malicious code or other cyber security event could jeopardize or result in the unauthorized disclosure, gathering, monitoring, misuse, corruption, loss or destruction of confidential and other information that belongs to us, our customers, our counterparties, third-party service providers or borrowers that is processed and stored in, and transmitted through, our computer systems and networks. The occurrence of such an event could also result in damage to our software, computers or systems, or otherwise cause interruptions or malfunctions in our, our customers', our counterparties' or third parties' operations. This could result in significant losses, loss of customers and business opportunities, reputational damage, litigation, regulatory fines, penalties or intervention, reimbursement or other compensatory costs, or otherwise adversely affect our business, financial condition or results of operations.

The reliability and capacity of our information technology systems is critical to our operations and the implementation of our growth initiatives. Any material disruption in our information technology systems, or delays or difficulties in implementing or integrating new systems or enhancing current systems, could have an adverse effect on our business, and results of operations.

A terrorist attack or armed conflict could harm our business.

Terrorist activities, anti-terrorist efforts and other armed conflicts involving the United States could adversely affect the U.S. and global economies and could prevent us from meeting financial and other obligations. We could experience loss of business, delays or defaults in payments from payors or disruptions of fuel supplies and markets if pipelines, production facilities, processing plants or refineries are direct targets or indirect casualties of an act of terror or war. Such activities could reduce the overall demand for oil and natural gas, which, in turn, could also reduce the demand for our products and services. Terrorist activities and the threat of potential terrorist activities and any resulting economic downturn could adversely affect our results of operations, impair our ability to raise capital or otherwise adversely impact our ability to realize certain business strategies.

Risks Related to Environmental, Mining and Other Regulation

We and our customers are subject to extensive environmental and health and safety regulations which impose, and will continue to impose, significant costs and liabilities. In addition, future regulations, or more stringent enforcement of existing regulations, could increase those costs and liabilities, which could adversely affect our results of operations.

We are subject to a variety of federal, state and local regulatory environmental requirements affecting the mining and mineral processing industry, including among others, those relating to employee health and safety, environmental permitting and licensing, air and water emissions, greenhouse gas emissions, water pollution, waste management, remediation of soil and groundwater contamination, land use, reclamation and restoration of properties, hazardous materials and natural resources. These laws, regulations and permits have had, and will continue to have, a significant effect on our business. Some environmental laws impose substantial penalties for noncompliance, and others, such as CERCLA, impose strict, retroactive and joint and several liability for the remediation of releases of hazardous substances. Liability under CERCLA, or similar state and local laws, may be imposed as a result of conduct that was lawful at the time it occurred or for the conduct of, or conditions

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caused by, prior operators or other third parties. Failure to properly handle, transport, store or dispose of hazardous materials or otherwise conduct our operations in compliance with environmental laws could expose us to liability for governmental penalties, cleanup costs and civil or criminal liability associated with releases of such materials into the environment, damages to property or natural resources and other damages, as well as potentially impair our ability to conduct our operations. In addition, future environmental laws and regulations could restrict our ability to expand our facilities or extract our mineral deposits or could require us to acquire costly equipment or to incur other significant expenses in connection with our business. Future events, including changes in any environmental requirements (or their interpretation or enforcement) and the costs associated with complying with such requirements, could have a material adverse effect on us.

Any failure by us to comply with applicable environmental laws and regulations may cause governmental authorities to take actions that could adversely impact our operations and financial condition, including:

- issuance of administrative, civil and criminal penalties;
- denial, modification or revocation of permits or other authorizations;
- imposition of injunctive obligations or other limitations on our operations, including cessation of operations; and
- requirements to perform site investigatory, remedial or other corrective actions.

Moreover, environmental requirements, and the interpretation and enforcement thereof, change frequently and have tended to become more stringent over time. For example, greenhouse gas emission regulation is becoming more rigorous. We expect to be required to report annual greenhouse gas emissions from our operations to the EPA, and additional greenhouse gas emission related requirements at the supranational, federal, state, regional and local levels are in various stages of development. The U.S. Congress has considered, and may adopt in the future, various legislative proposals to address climate change, including a nationwide limit on greenhouse gas emissions. In addition, the EPA has issued regulations, including the “Tailoring Rule,” that subject greenhouse gas emissions from certain stationary sources to the Prevention of Significant Deterioration and Title V provisions of the federal Clean Air Act. Any such regulations could require us to modify existing permits or obtain new permits, implement additional pollution control technology, curtail operations or increase significantly our operating costs. Any regulation of greenhouse gas emissions, including, for example, through a cap-and-trade system, technology mandate, emissions tax, reporting requirement or other program, could adversely affect our business, financial condition, reputation, operating performance and product demand.

In addition to environmental regulation, we are subject to laws and regulations relating to human exposure to crystalline silica. Several federal and state regulatory authorities, including MSHA and OSHA, may continue to propose changes in their regulations regarding workplace exposure to crystalline silica, such as permissible exposure limits and required controls and personal protective equipment. For instance, in June 2016, OSHA issued final regulations that will reduce permissible exposure limits to 50 micrograms of respirable crystalline silica per cubic meter of air, averaged over an 8-hour day.

We may not be able to comply with any new laws and regulations that are adopted, and any new laws and regulations could have a material adverse effect on our operating results by requiring us to modify our operations or equipment or shut down some or all of our plants. Additionally, our customers may not be able to comply with any new laws and regulations, and any new laws and regulations could have a material adverse effect on our customers by requiring them to shut down old plants or to relocate plants to locations with less stringent regulations farther away from our facilities. We cannot at this time reasonably estimate our costs of compliance or the timing of any costs associated with any new laws and regulations, or any material adverse effect that any new standards will have on our customers and, consequently, on our operations.

We are subject to various lawsuits relating to the actual or alleged exposure of persons to silica. See “Risks Related to Our Business-Silica-related health issues and litigation could have a material adverse effect on our business, reputation or results of operations.”

We are subject to the Federal Mine Safety and Health Act of 1977, which imposes stringent health and safety standards on numerous aspects of our operations.

Our operations are subject to the Federal Mine Safety and Health Act of 1977, as amended by the Mine Improvement and New Emergency Response Act of 2006, which imposes stringent health and safety standards on numerous aspects

of mineral extraction and processing operations, including the training of personnel, operating procedures, operating equipment and other matters. Our failure to comply with such standards, or changes in such standards or the interpretation or enforcement thereof, could have a material adverse effect on our business and financial condition or otherwise impose significant restrictions on our ability to conduct mineral extraction and processing operations.

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Silica-related health issues and litigation could have a material adverse effect on our business, reputation or results of operations.

The inhalation of respirable crystalline silica is associated with the lung disease silicosis. There is evidence of an association between crystalline silica exposure or silicosis and lung cancer and a possible association with other diseases, including immune system disorders such as scleroderma. These health risks have been, and may continue to be, a significant issue confronting the commercial silica industry. Concerns over silicosis and other potential adverse health effects, as well as concerns regarding potential liability from the use of silica, may have the effect of discouraging our customers' use of our silica products. The actual or perceived health risks of mining, processing and handling silica could materially and adversely affect silica producers, including us, through reduced use of silica products, the threat of product liability or employee lawsuits, increased scrutiny by federal, state and local regulatory authorities of us and our customers or reduced financing sources available to the commercial silica industry.

Since at least 1975, we and/or our predecessors have been named as a defendant, usually among many defendants, in numerous products liability lawsuits brought by or on behalf of current or former employees of our customers alleging damages caused by silica exposure. As of February 16, 2018, there were a total of 60 active silica-related products liability claims pending in which we were a defendant and 1 inactive claim. Almost all of the claims pending against us arise out of the alleged use of our silica products in foundries or as an abrasive blast media, involve various other defendants and have been filed in the states of Texas, Louisiana and Mississippi, although some cases have been brought in many other jurisdictions over the years.

Prior to the fourth quarter of 2012, we had insurance policies for both our predecessors that covered certain claims for alleged silica exposure for periods prior to certain dates in 1985 and 1986 (with respect to various insurance). As a result of a settlement with a former owner and its insurers in the fourth quarter of 2012, some of these policies are no longer available to us and we will not seek reimbursement for any defense costs or claim payments from these policies. Other insurance policies, however, continue to remain available to us and will continue to make such payments on our behalf. The silica-related litigation brought against us to date and associated litigation costs, settlements and verdicts have not resulted in a material liability to us to date. However, we continue to have silica exposure claims filed against us, including claims that allege silica exposure for periods not covered by insurance, and the costs, outcome and impact to us of any pending or future claims is not certain. Any such pending or future claims or inadequacies of our insurance coverage could have a material adverse effect on our business, reputation, financial condition, results of operations, cash flows and prospects. For further information, see "Business-Legal Proceedings."

We and our customers are subject to other extensive regulations, including licensing, plant and wildlife protection and reclamation regulation, which impose, and will continue to impose, significant costs and liabilities. In addition, future regulations, or more stringent enforcement of existing regulations, could increase those costs and liabilities, which could adversely affect our results of operations.

In addition to the regulatory matters described above, we and our customers are subject to extensive governmental regulation on matters such as permitting and licensing requirements, plant and wildlife protection, wetlands protection, reclamation and restoration of mining properties after mining is completed, the discharge of materials into the environment and the effects that mining and hydraulic fracturing have on groundwater quality and availability.

Our future success depends, among other things, on the quantity of our commercial silica and other mineral deposits and our ability to extract these deposits profitably, and our customers being able to operate their businesses as they currently do.

In order to obtain permits and renewals of permits in the future, we may be required to prepare and present data to governmental authorities pertaining to the impact that any proposed exploration or production activities may have on the environment. Certain approval procedures may require preparation of archaeological surveys, endangered species studies and other studies to assess the environmental impact of new sites or the expansion of existing sites. Compliance with these regulatory requirements is expensive and significantly lengthens the time needed to develop a site. Finally, obtaining or renewing required permits is sometimes delayed or prevented due to community opposition and other factors beyond our control. The denial of a permit essential to our operations or the imposition of conditions with which it is not practicable or feasible to comply could impair or prevent our ability to develop or expand a site. Significant opposition to a permit by neighboring property owners, members of the public or other third parties or

delay in the environmental review and permitting process also could impair or delay our ability to develop or expand a site. New legal requirements, including those related to the protection of the environment, could be adopted that could materially adversely affect our mining operations (including our ability to extract mineral deposits), our cost structure or our customers' ability to use our commercial silica products. Such current or future regulations could have a material adverse effect on our business and we may not be able to obtain or renew permits in the future.

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Our inability to acquire, maintain or renew financial assurances related to the reclamation and restoration of mining property could have a material adverse effect on our business, financial condition and results of operations.

We are generally obligated to restore property in accordance with regulatory standards and our approved reclamation plan after it has been mined. We are required under federal, state and local laws to maintain financial assurances, such as surety bonds, to secure such obligations. The inability to acquire, maintain or renew such assurances, as required by federal, state and local laws, could subject us to fines and penalties as well as the revocation of our operating permits. Such inability could result from a variety of factors, including:

- the lack of availability, higher expense or unreasonable terms of such financial assurances;
- the ability of current and future financial assurance counterparties to increase required collateral; and
- the exercise by financial assurance counterparties of any rights to refuse to renew the financial assurance instruments.

Our inability to acquire, maintain or renew necessary financial assurances related to the reclamation and restoration of mining property could have a material adverse effect on our business, financial condition and results of operations.

Mine closures entail substantial costs, and if we close one or more of our mines sooner than anticipated, our results of operations may be adversely affected.

We base our assumptions regarding the life of our mines on detailed studies that we perform from time to time, but our studies and assumptions do not always prove to be accurate. If we close any of our mines sooner than expected, sales will decline unless we are able to increase production at any of our other mines, which may not be possible. The closure of an open pit mine also involves significant fixed closure costs, including accelerated employment legacy costs, severance-related obligations, reclamation and other environmental costs and the costs of terminating long-term obligations, including energy contracts and equipment leases. We accrue for the costs of reclaiming open pits, stockpiles, tailings ponds, roads and other mining support areas over the estimated mining life of our property. If we were to reduce the estimated life of any of our mines, the fixed mine closure costs would be applied to a shorter period of production, which would increase production costs per ton produced and could materially and adversely affect our results of operations and financial condition.

Applicable statutes and regulations require that mining property be reclaimed following a mine closure in accordance with specified standards and an approved reclamation plan. The plan addresses matters such as removal of facilities and equipment, re-grading, prevention of erosion and other forms of water pollution, re-vegetation and post-mining land use. We may be required to post a surety bond or other form of financial assurance equal to the cost of reclamation as set forth in the approved reclamation plan. The establishment of the final mine closure reclamation liability is based on permit requirements and requires various estimates and assumptions, principally associated with reclamation costs and production levels. If our accruals for expected reclamation and other costs associated with mine closures for which we will be responsible were later determined to be insufficient, our business, results of operations and financial condition would be adversely affected.

Our trucking services are highly regulated, and increased direct and indirect costs of compliance with, or liability for violation of, existing or future regulations could have a material adverse effect on our business.

The Department of Transportation (DOT) and various state agencies exercise broad powers over our trucking services, generally governing matters including authorization to engage in motor carrier service, equipment operation, safety, and financial reporting. In the future, we may become subject to new or more restrictive regulations, such as regulations relating to engine exhaust emissions, hours of service that our drivers may provide in any one time period, security and other matters, which could substantially impair equipment productivity and increase our costs. In addition, our operations most comply with the Fair Labor Standard Act, which governs such matters as wages and overtime, and which is administered by the Department of Labor (DOL). We may be audited periodically by the DOT or the DOL to ensure that we are in compliance with various safety, hours-of-service, wage and other rules and regulations. If we were found to be out of compliance, the DOT or the DOL could restrict or otherwise impact our trucking services, which would adversely affect our profitability and results of operations.

Risks Related to the Ownership of Our Common Stock

Our stock price could be volatile, and you may not be able to resell shares of your common stock at or above the price you paid.

The stock market has and continues to experience extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of the underlying businesses. These broad market fluctuations may adversely affect the market price of our common stock, regardless of our actual operating performance.

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In addition to the risks described in this section, the market price of our common stock may fluctuate significantly in response to a number of factors, most of which we cannot control, including:

- quarterly variations in our operating results compared to market expectations;
- announcements of acquisitions of or investments in other businesses and properties or dispositions;
- changes in preferences of our customers;
- announcements of new services or products or significant price reductions by us or our competitors;
- size of the public float;
- stock price performance of our competitors;
- fluctuations in stock market prices and volumes;
- default on our indebtedness or foreclosure on our properties;
- actions by competitors;
- changes in our management team or key personnel;
- changes in ratings and financial estimates by securities analysts;
- negative earnings or other announcements by us or other industrial companies;
- downgrades in our credit ratings or the credit ratings of our competitors;
- issuances of capital stock; and
- global economic, legal and regulatory factors unrelated to our performance.

Numerous factors affect our business and cause variations in our operating results and affect our net sales, including overall economic trends, our ability to identify and respond effectively to customer preferences, actions by competitors, pricing, the level of customer service that we provide, changes in product mix or sales channels, our ability to source and distribute products effectively and weather conditions.

Volatility in the market price of our common stock may prevent investors from being able to sell their common stock at or above the price at which you purchased the stock. As a result, you may suffer a loss on your investment.

Securities class action litigation has often been instituted against companies following periods of volatility in the overall market and in the market price of a company's securities. This litigation, if instituted against us, could result in substantial costs, reduce our profits, divert our management's attention and resources and harm our business.

Anti-takeover provisions in our charter documents and Delaware law might discourage or delay acquisition attempts for us that you might consider favorable.

Our certificate of incorporation and bylaws contain provisions that may make the acquisition of our company more difficult without the approval of our Board. These provisions:

- authorize the issuance of undesignated preferred stock, the terms of which may be established and the shares of which may be issued without stockholder approval, and which may include super voting, special approval, dividend, or other rights or preferences superior to the rights of the holders of common stock;
- prohibit stockholder action by written consent, which requires all stockholder actions to be taken at a meeting of our stockholders;
- provide that the Board is expressly authorized to make, alter or repeal our bylaws; and
- establish advance notice requirements for nominations for elections to our Board or for proposing matters that can be acted upon by stockholders at stockholder meetings.

Our certificate of incorporation also contains a provision that provides us with protections similar to Section 203 of the Delaware General Corporation Law (the "DGCL"), and will prevent us from engaging in a business combination with a person who acquires at least 15% of our common stock for a period of three years from the date such person acquired such common stock, unless Board or stockholder approval is obtained prior to the acquisition. These anti-takeover provisions and other provisions under Delaware law could discourage, delay or prevent a transaction involving a change in control of our company, even if doing so would benefit our stockholders. These provisions could also discourage proxy contests and make it more difficult for you and other stockholders to elect directors of your choosing and to cause us to take other corporate actions you desire.

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If securities or industry analysts do not publish research or publish inaccurate or unfavorable research about our business, our stock price and trading volume could decline.

The trading market for our common stock depends in part on the research and reports that securities or industry analysts publish about us or our business. If one or more of the analysts who covers us downgrades our stock or publishes inaccurate or unfavorable research about our business, our stock price would likely decline. If one or more of these analysts ceases coverage of us or fails to publish reports on us regularly, demand for our stock could decrease, which could cause our stock price and trading volume to decline.

Holders of our common stock may not receive dividends on our common stock.

Holders of our common stock are entitled to receive only such dividends as our Board may declare out of funds legally available for such payments. We are incorporated in Delaware and are governed by the DGCL. The DGCL allows a corporation to pay dividends only out of a surplus, as determined under Delaware law or, if there is no surplus, out of net profits for the fiscal year in which the dividend was declared and for the preceding fiscal year. Under the DGCL, however, we cannot pay dividends out of net profits if, after we pay the dividend, our capital would be less than the capital represented by the outstanding stock of all classes having a preference upon the distribution of assets. While management and our Board remain committed to evaluating additional ways of creating shareholder value, any determination to pay dividends and other distributions in cash, stock or property by us in the future will be at the discretion of our Board and will be dependent on then-existing conditions, including business conditions, our financial condition, results of operations, liquidity, capital requirements, contractual restrictions including restrictive covenants contained in debt agreements and other factors. While we have declared and paid a quarterly cash dividend on our common stock as described under Part II, Item 5 of this Annual Report on Form 10-K, we are not required to declare future cash dividends on our common stock.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

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ITEM 2. PROPERTIES

Our corporate headquarters is located in Frederick, Maryland. In addition, we maintain corporate support centers and sales offices in Chicago, Illinois and Houston, Texas.

As of December 31, 2017, we operate 19 production facilities located primarily in the eastern half of the United States, with operations in Alabama, Illinois (3), Louisiana, Michigan, Missouri (2), New Jersey, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas (3), Virginia, West Virginia and Wisconsin. We own two sites in the development stage in Texas, and two undeveloped sites located in Wisconsin and Arkansas. We also own three transload sites and operate additional transload sites via service contracts with our transload operating partners. Additionally, we operate corporate laboratories located at our Berkeley Springs, West Virginia and Houston, Texas facilities that provide critical technical expertise, analytical testing resources and application development to promote product value and cost savings.

We generally own our principal production properties, although some land is leased. Substantially all of our owned assets are pledged as security under our senior secured credit facility; for additional information regarding our indebtedness, see Note J - Debt and Capital Leases to our Financial Statements in Part II, Item 8 of this Annual Report on Form 10-K for information related to our credit facilities.

Corporate offices, including sales locations are leased. In general, we consider our facilities, taken as a whole, to be suitable and adequate for our current operations.

Our Production Facilities

The following is a detailed description of our 19 production facilities, our two sites in development state, and our currently undeveloped sites.

Crane County, Texas

Our Crane County facility is currently in development, and will use natural gas and electricity to produce whole grain silica through surface mining methods. The reserves at Crane County contain windblown dune sand lying above ancient dunes of clayey sand, all of the Quaternary age. The facility is located approximately 25 miles southwest of Odessa, Texas in Crane County and is located 5 miles south of U.S. Interstate 20 on a main Farm-to-Market Road. Once the product is processed, it will be shipped by truck.

We acquired the Crane County facility in connection with the purchase of 3200 acres of ranch land in May 2017. The fully automated, state-of-the-art facility may become operational as early as the first quarter of 2018 and features a 4 million ton per year plant with a wet plant, intermediate stockpile, dry plant, screening plant, and loadout.

The plant will primarily produce a range of API/ISO certified frac sand grades. The Crane County plant's location in West Texas allows it to ship regional sand by truck.

Lamesa, Texas

Our Lamesa facility is currently in development, and will use natural gas and electricity to produce whole grain silica through surface mining methods. The reserves at Lamesa contain windblown dune sand lying above ancient dunes of clayey sand, all of the Quaternary age. The facility is located in Dawson County, approximately 55 miles north of Midland, Texas and 60 miles south of Lubbock, Texas. The site is located 13 miles north and west of Lamesa, Texas using state, farm-to-market and private roads. U.S. Route 87 runs through Lamesa and directly leads north to Lubbock and south to Midland. Once the product is processed, it will be shipped by truck.

We acquired the Lamesa facility in connection with the purchase of 3500 acres of ranch land in 2017. The fully automated, state-of-the-art facility will become operational as early as second quarter 2018 and features a 2.6 million ton per year plant with a wet plant, intermediate stockpile, dry plant, screening plant, and loadout. The plant will primarily produce a range of API/ISO certified frac sand grades. The Crane County plant's location in West Texas allows it to ship regional sand by truck.

Festus, Missouri

The Festus facility uses natural gas and electricity to produce whole grain silica from a sandstone reserve that we lease. The ore is mined by a contractor using both surface and underground hard-rock mining methods. The reserves are part of the St.

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Peter Sandstone Formation that stretches north-south from Minnesota to Missouri and east-west from Illinois to Nebraska and South Dakota. The facility is located approximately 30 miles south of St. Louis and is accessible by major highways including U.S. Interstate 55. Once the product is appropriately processed, it is packaged in bulk and shipped by truck to either barge or rail.

We acquired the Festus facility in August 2017 in connection with the closing of our MS Sand acquisition in August 2017. To date the operation has produced sand for oil and gas proppants. Since acquiring the facility we have begun an expansion to increase capacity. The Festus operation’s production techniques and distribution model allow the Festus facility to serve all major silica markets.

Ottawa, Illinois

Our surface mines in Ottawa use natural gas and electricity to produce whole grain and ground silica through a variety of mining methods, including hard rock mining, mechanical mining and hydraulic mining. The reserves are part of the St. Peter Sandstone Formation that stretches north-south from Minnesota to Missouri and east-west from Illinois to Nebraska and South Dakota. The facility is located approximately 80 miles southwest of Chicago and is accessible by major highways including U.S. Interstate 80. Once the product is appropriately processed, it is shipped either in bulk or packaged form by rail by either the CSX Corporation or the BNSF Railway Company (via the Illinois Railway short line), truck or barge.

We acquired the Ottawa facility in 1987 by merger with the Ottawa Silica Company, which had historically used the property to produce whole grain and ground silica for customers in industrial and specialty products end markets. Since acquiring the facility we have renovated and upgraded its production capabilities to enable it to produce multiple products through various processing methods, including washing, hydraulic sizing, grinding, screening and blending. These production techniques allow the Ottawa facility to meet a wide variety of focused specifications on product composition from customers. As such, the Ottawa facility services multiple end markets, such as glass, building products, foundry, fillers and extenders, chemicals and oil and gas proppants. In November 2009, we expanded the frac sand capacity of this facility by 500,000 tons. During the fourth quarter of 2011, we completed a follow-on expansion project that added an additional 900,000 tons of frac sand capacity.

Voca, Texas

Our surface mines at the Voca facility use propane and electricity to produce whole grain silica through hard rock mining. The majority of reserves in Voca are sandstones of the Middle and Lower Hickory members of the Riley Formation in central Texas. The facility is located approximately 110 miles northwest of Austin, Texas in McCulloch County and is accessible by state highways. Once product is processed, it is shipped primarily by customer truck.

We acquired the Voca facility upon the closing of our Cadre Services, Inc. ("Cadre") acquisition in July 2014. The fully automated, state-of-the-art facility became operational in 2011 and features one of the industry’s largest on-site storage capacities. The plant was recently expanded in 2014 and produces a range of API/ISO certified frac sand grades. The Voca plant’s location in central Texas allows it to economically serve oil & gas customers in the Permian basin.

Tyler, Texas

Our Tyler facility uses natural gas and electricity to produce whole grain silica through surface mining methods. The reserves at Tyler contain mostly unconsolidated sand of the Queen City Sand formation (Eocene Age). The facility is located approximately 9 miles north of Tyler, Texas in Smith County and is located immediately adjacent to U.S. Interstate 20. Once product is processed, it is shipped by truck.

We acquired the Tyler facility in connection with the closing of the acquisition of NBI in August 2016. The fully automated, state-of-the-art facility became operational in 2011 and features one of the industry’s largest on-site storage capacities. The plant was recently expanded in 2014 and produces a range of API/ISO certified frac sand grades. The Tyler plant's location in Northeast Texas allows it to ship regional sand directly to the wellheads in the Texas and Louisiana basins by truck.

Mill Creek, Oklahoma

Our surface mines in Mill Creek use natural gas and electricity to produce whole grain, ground and fine ground silica through hydraulic mining. The reserves are part of the Oil Creek Formation in south central Oklahoma. The facility is located approximately 100 miles southeast of Oklahoma City and is accessible by major highways including U.S.

Interstate 35. Once the product is appropriately processed, it is packaged in bulk and shipped either by rail by BNSF Railway Company or by truck.

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We acquired the Mill Creek facility in 1987 by merger with the Pennsylvania Glass Sand Corporation, which had historically used the property to produce whole grain silica for customers in industrial and specialty products end markets. Since acquiring the facility we have renovated and upgraded its production capabilities to enable it to produce multiple products through various processing methods, including hydraulic sizing, fluid bed drying, grinding and air sizing. These production techniques allow the Mill Creek facility to meet a wide variety of focused specifications on product composition from customers. As such, the Mill Creek facility services multiple end markets, such as glass, foundry, fillers and extenders, building products and oil and gas proppants.

Sparta, Wisconsin

Our facility at Sparta uses natural gas and electricity to produce whole grain silica products through dredging. The reserve geology is that of high purity alluvial sands with the primary erosional source being the Wonewoc Formation. The Wonewoc Sandstone Formation is known for its round, coarse grains and superior crush strength properties, which makes it an ideal substrate for oil and gas proppants. The Sparta property was acquired on December 30, 2011, and site development began in April 2012. The property is located 25 miles northeast of La Crosse; approximately 120 miles northwest of Madison, Wisconsin; and is readily accessible by both U.S. Interstate 90 and the Canadian Pacific railroad.

Utica, Illinois

Our surface mine at the Utica facility uses natural gas and electricity to produce whole grain silica products through surface mining. The reserves are part of the St. Peter Formation sandstone stretches north-south from Minnesota to Missouri and east-west from Illinois to Nebraska and South Dakota. We acquired the Utica property and plant in 2015 from Quality Sand Products LLC. The facility is located approximately 80 miles southwest of Chicago and is accessible by major highways including U.S. Interstate 80. Once the product is appropriately processed, it is shipped by truck or on the nearby Union Pacific Railroad.

Mapleton Depot, Pennsylvania

Our surface mines in Mapleton Depot use natural gas, fuel oil and electricity to produce whole grain silica through hard rock mining. The reserves are part of the Ridgeley (sometimes called the Oriskany) Sandstone Formation in central Pennsylvania. The facility is located approximately 40 miles northwest of Harrisburg and is accessible by major highways including U.S. Interstates 99, 80 and 76 and U.S. Routes 22 and 322. Once the product is appropriately processed, it is packaged in bulk and shipped either by rail by Norfolk Southern Corporation or by truck. We acquired the Mapleton Depot facility in 1987 by merger with the Pennsylvania Glass Sand Corporation, which had historically used the property to produce whole grain silica for customers in industrial and specialty products end markets. Since acquiring the facility, we have renovated and upgraded its production capabilities to enable it to produce multiple products through various processing methods, including hydraulic sizing, fluid bed drying, scalping and a low iron circuit. These production techniques allow the Mapleton Depot facility to meet a wide variety of focused specifications on product composition from customers. As such, the Mapleton Depot facility services multiple end markets, such as glass, specialty glass, building products, recreation, and oil and gas proppants.

Pacific, Missouri

Our surface mines at the Pacific facility use natural gas and electricity to produce whole grain, ground and fine ground silica through a variety of mining methods, including hard rock and hydraulic mining. The reserves are part of the St. Peter Sandstone Formation that stretches north-south from Minnesota to Missouri and east-west from Illinois to Nebraska and South Dakota. The facility is located approximately 50 miles southwest of St. Louis and is accessible by major highways including U.S. Interstate 44. Once the product is appropriately processed, it is packaged in bulk and shipped either by rail directly by Union Pacific Corporation and through open switching on the same line by BNSF Railway Company or by truck.

We acquired the Pacific facility in 1987 by merger with the Pennsylvania Glass Sand Corporation, which had historically used the property to produce whole grain silica for customers in industrial and specialty products end markets. Since acquiring the facility we have renovated and upgraded its production capabilities to enable it to produce multiple products through

various processing methods, including hydraulic sizing, fluid bed drying, grinding, dry screening, classifying and microsizing. In August 2010, we expanded this facility’s processing capabilities to include the processing of frac sand.

These production techniques allow the Pacific facility to meet a wide variety of focused specifications on product composition from customers. As such, the Pacific facility services multiple end markets, such as glass, foundry, fillers and extenders and oil and gas proppants.

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Kosse, Texas

Our surface mine in Kosse uses mechanical mining to extract sand ore from the reserve. The plant uses natural gas and electricity to produce whole grain silica. The reserves are part of the Simsboro member of the Rockdale Formation in central Texas. The facility is located approximately 90 miles south of Dallas and is accessible by major highways including U.S. Interstates 45 and 35. Once the product is appropriately processed, it is shipped by truck.

We acquired the Kosse facility in 1987 by merger with the Ottawa Silica Company, which had historically used the property to produce whole grain silica for customers in industrial and specialty products end markets. Since acquiring the facility, we have renovated and upgraded its production capabilities to enable it to produce multiple products through various processing methods, including washing, hydraulic sizing, fluid bed drying, and dry screening. These production techniques allow the Kosse facility to meet a wide variety of focused specifications on product composition from customers. As such, the Kosse facility services multiple end markets, such as building products, recreation, and oil and gas proppants.

Berkeley Springs, West Virginia

Our surface mines at the Berkeley Springs facility use hard rock mining methods to produce high-purity sandstone. The plant uses propane, fuel oil and electricity to make whole grain, ground, and fine ground silica. Berkeley Springs also produces a synthetic magnesium-silica product called Florisil.

The reserves are part of the Ridgeley Sandstone Formation along the Warm Springs Ridge in eastern West Virginia. The facility is located approximately 100 miles northwest of Baltimore and is accessible by major highways including U.S. Interstate 70. Once the product is appropriately processed, it is packaged in bulk and shipped by rail by the CSX Corporation or truck.

We acquired the Berkeley Springs facility in 1987 by merger with the Pennsylvania Glass Sand Corporation, which had historically used the property to produce whole grain silica for customers in industrial and specialty products end markets. Since acquiring the facility we have renovated and upgraded its production capabilities to enable it to produce multiple products through various processing methods, including primary, secondary and tertiary crushing, grinding, flotation, dewatering, fluid bed drying, mechanical screening and rotary drying processing. These production techniques allow the Berkeley Springs facility to meet a wide variety of focused specifications from customers producing specialty epoxies, resins and polymers, geothermal energy equipment and fiberglass. As such, the Berkeley Springs facility services multiple end markets, such as glass, building products, foundry, chemicals and fillers and extenders.

Columbia, South Carolina

Our surface mines in Columbia use natural gas, fuel oil and electricity to produce whole grain, ground and fine ground silica through dune mining. The reserves are part of the Tuscaloosa Formation in central South Carolina. The facility is located approximately 10 miles southwest of Columbia and is accessible by major highways including U.S. Interstates 26 and 20. Once the product is appropriately processed, it is bagged or shipped in bulk either by rail by Norfolk Southern Corporation or by truck.

We acquired the Columbia facility in 1987 by merger with the Pennsylvania Glass Sand Corporation, which had historically used the property to produce whole grain silica for customers in industrial and specialty products end markets. Since acquiring the facility, we have renovated and upgraded its production capabilities to enable it to produce multiple products through various processing methods, including hydraulic sizing, fluid bed drying, scalping and grinding. These production techniques allow the Columbia facility to meet a wide variety of focused specifications on product composition from customers. As such, the Columbia facility services multiple end markets, such as glass, building products, fillers and extenders, filtration and oil and gas proppants.

Dubberly, Louisiana

Our surface mines in Dubberly use natural gas and electricity to produce whole grain silica through dredge mining. The reserves are part of the Sparta Formation. The facility is located approximately 30 miles east of Shreveport and is accessible by major highways including U.S. Interstate 20 and state Highway 532. Once the product is appropriately processed, it is bagged or shipped in bulk by truck.

We acquired the Dubberly facility in 1987 by merger with the Ottawa Silica Company, which had historically used the property to produce whole grain silica for customers in industrial and specialty products end markets. Since acquiring the facility, we have renovated and upgraded its production capabilities to enable it to produce multiple products through various

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processing methods, including screening, washing, fluid bed drying and conditioning to remove heavy and iron bearing minerals. These production techniques allow the Dubberly facility to meet a wide variety of focused specifications on product composition from customers. As such, the Dubberly facility services multiple end markets, such as glass, foundry and building products.

Montpelier, Virginia

Our surface mines in Montpelier use fuel oil and electricity to produce aplite through hard rock mining. The reserves are part of an igneous rock complex that is unique to this location. The facility is located approximately 20 miles northwest of Richmond and is accessible by major highways including U.S. Interstates 64 and 95. Once the product is appropriately processed, it is packaged in bulk and shipped either by rail by Norfolk Southern Corporation or CSX Corporation or by truck.

We acquired the Montpelier facility in 1993 from The Feldspar Company, which had historically used the property to produce aplite for customers in industrial and specialty products end markets. Since acquiring the facility, we have renovated and upgraded its production capabilities to enable it to produce multiple products through various processing methods, including hydraulic crushing and sizing, washing, fluid bed drying and grinding. These production techniques allow the Montpelier facility to meet a wide variety of focused specifications on product composition from customers. As such, the Montpelier facility services multiple end markets, such as glass, building products and recreation.

Hurtsboro, Alabama

Our surface mines in Hurtsboro use propane and electricity, to produce whole grain silica. Sand feed for processing is trucked in from surrounding mine locations. The reserves are mined from the Cusseta member of the lower Ripley Formation. The facility is located approximately 75 miles east of Montgomery and is accessible by major highways including U.S. Interstate 85 and state Highway 431. Once the product is appropriately processed, it is shipped in bulk by truck.

We acquired the Hurtsboro facility in 1988 from Warrior Sand & Gravel Company, which had historically used the property to produce whole grain silica for customers in industrial and specialty products end markets. Since acquiring the facility, we have renovated and upgraded its production capabilities to enable it to produce multiple products through various processing methods, including trucking in sand from surrounding locations, hydraulic sizing, screening and fluid bed drying. These production techniques allow the Hurtsboro facility to meet a wide variety of focused specifications on product composition from customers. As such, the Hurtsboro facility services multiple end markets, such as foundry, building products and recreation.

Jackson, Tennessee

Our surface mines in Jackson use natural gas and electricity to produce whole grain and ground silica. Sand is purchased from a local dredging company whose reserves are alluvial sands associated with an ancient river system. The facility is located approximately 75 miles east of Memphis and is accessible by major highways including U.S. Interstate 40. Once the product is appropriately processed, it is shipped in bulk by truck.

We acquired the Jackson facility in 1997 from Nicks Silica Company, which had historically used the property to produce whole grain and ground silica for customers in industrial and specialty products end markets. Since acquiring the facility, we have renovated and upgraded its production capabilities, turning it into one of our premier grinding facilities and enabling it to produce multiple products through various processing methods, including rotary drying, screening and grinding. These production techniques allow the Jackson facility to meet a wide variety of focused specifications on product composition from customers. As such, the Jackson facility services multiple end markets, such as fiberglass, building products, ceramics, fillers and extenders and recreation.

Mauricetown, New Jersey

Our surface mines near the Mauricetown facility use natural gas, fuel oil and electricity, to produce whole grain silica through dredge mining. The reserves are mined from alluvial sands in the Maurice River Valley and are similar to those found in the Cohansey, Bridgeton and Cape May deposits. The facility is located approximately 50 miles south of Philadelphia and is accessible by major highways including U.S. Interstate 295 and state Highway 55. Once the product is appropriately processed, it is packaged in bags or bulk and shipped either by rail by Winchester & Western Railroad or by truck.

We acquired the Mauricetown facility in 1999 from Unimin Corporation, which had historically used the property to produce whole grain silica for customers in industrial and specialty products end markets. Since acquiring the facility, we have renovated and upgraded its production capabilities, including the construction of a new wet processing plant, to enable it to

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produce multiple products through various processing methods, including washing, hydraulic sizing, fluid bed drying, rotary drying and scalping. These production techniques allow the Mauricetown facility to meet a wide variety of focused specifications on product composition from customers. As such, the Mauricetown facility services multiple end markets, such as foundry, filtration, building products and recreation.

Rockwood, Michigan

Our surface mines at the Rockwood facility use natural gas and electricity to produce whole grain silica. Rockwood's own reserves are part of the Sylvania Formation and are notable for their low iron content, making them particularly valuable to customers producing specialty glass for architectural or alternative energy applications. Currently sandstone ore is purchased from two local construction material companies from those companies' reserves. The facility is located approximately 30 miles southwest of Detroit and is accessible by major highways including U.S. Interstate 75. Once the product is appropriately processed, it is packaged in bulk and shipped by rail via the Canadian National Railway or truck.

We acquired the Rockwood facility in 1987 by merger with the Ottawa Silica Company, which had historically used the property to produce whole grain and ground silica for customers in industrial and specialty products end markets. Since acquiring the facility we have renovated and upgraded its production capabilities to enable it to produce multiple products through various processing methods, including fluid bed drying, dry screening and classifying. These production techniques allow the Rockwood facility to meet a wide variety of focused specifications on product composition from customers. As such, the Rockwood facility services multiple end markets, such as glass, building products, oil and gas proppants and chemicals. During the fourth quarter of 2011, we completed the addition of 250,000 tons of annual frac sand capacity at the Rockwood facility by installing an entirely new processing circuit.

Rochelle, Illinois

Our Rochelle site is a resin coated sand processing plant. The Rochelle property was purchased in 2011, and we spent 2011 and 2012 planning and constructing a resin coating facility on the property.

The Rochelle facility has two process lines, each with the capacity to coat 200 million pounds, or 100,000 tons, of substrate. The facility has the flexibility to coat numerous substrates using novolac or polyurethane coating technology. Sand can be received and shipped both by truck and rail to help meet customer requirements. One of the competitive strengths of the facility is the capability to ship by the BNSF and Union Pacific railroads to many key locations throughout United States.

Fairchild, Wisconsin

Fairchild is a sandstone deposit with over 39 million tons of proven reserves near the town of Fairchild, Wisconsin. We acquired the reserves in 2014 from Forenergy, LLC and performed additional exploration and permitting on the site in 2015. There is no facility currently on the property and it is currently being permitted for operations. We received a non-metallic reclamation permit in July 2015 from Eau Claire County. The reserve is comprised of high purity sands of the Wonewoc Formation. The Wonewoc Sandstone Formation is known for its round, coarse grains and superior crush strength properties, which makes it an ideal oil and gas proppant. The property is located approximately 30 miles southeast of Eau Claire and 50 miles north of our Sparta plant; it is accessible by the Union Pacific rail line and highways including U.S. Interstate 94 and state Highways 10 and 12.

Batesville, Arkansas

Batesville is a sandstone deposit with over 34 million tons of probable reserves near the town of Batesville, Arkansas. We acquired the reserves in 2010 from White Buck, LLC. There is no facility on the property and it is not currently fully permitted. The deposit has high purity sandstone and can provide a long-term supplement to the reserves at our Mill Creek operations. The reserves are part of the St. Peter Sandstone deposit, which is part of the same formation being mined at our Ottawa and Pacific operations. The property is located approximately 85 miles northeast of Little Rock and is accessible by highways including state Highways 67 and 167.

Our Reserves

We believe we have a broad and high-quality mineral reserves base due to our strategically located mines and facilities. "Reserves" are defined by SEC Industry Guide 7 as that part of a mineral deposit which could be economically and legally extracted or produced at the time of the reserve determination. Industry Guide 7 divides reserves between "proven (measured) reserves" and "probable (indicated) reserves" which are defined as follows:

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- Proven (measured) reserves. Reserves for which (1) quantity is computed from dimensions revealed in outcrops, trenches, workings or drill holes; grade and/or quality are computed from the results of detailed sampling and (2) the sites for inspection, sampling and measurement are spaced so closely and the geologic character is so well defined that size, shape, depth and mineral content of reserves are well-established.
- Probable (indicated) reserves. Reserves for which quantity and grade and/or quality are computed from information similar to that used for proven (measured) reserves, but the sites for inspection, sampling, and measurement are farther apart or are otherwise less adequately spaced. The degree of assurance, although lower than that for proven (measured) reserves, is high enough to assume continuity between points of observation.

We categorize our reserves as proven or probable in accordance with these SEC definitions. We estimate that we had a total of approximately 765 million tons of proven and probable mineable mineral reserves as of December 31, 2017. Compared to 467 million tons of proven and probable mineable mineral reserves we had as of December 31, 2016, the increase of 298 million tons was primarily due to greenfield development projects at Crane County and Lamesa and our Mississippi Sand acquisitions during the year ended December 31, 2017. The quantity and nature of the mineral reserves at each of our properties are estimated by our internal Mine Planning department. Our mining engineer updates our reserve estimates annually, making necessary adjustments for operations at each location during the year and additions or reductions due to property acquisitions and dispositions, quality adjustments and mine plan updates. Before acquiring new reserves, we perform surveying, drill core analysis and other tests to confirm the quantity and quality of the acquired reserves. In some instances, we acquire the mineral rights to reserves without actually taking ownership of the properties.

Description of Deposits

The following is a description of the nature of our silica sand and aplite deposits for each of our reserve locations:

Crane County, Texas

The deposit has a minimum silica (SiO2) content of 98%. The controlling attributes are grain crush strength and size distribution. All areas of the deposit are characterized by clean, low-clay content sand in windblown dunes. In many areas, a more clayey sand lies beneath the clean sand. In all cases the sand is unconsolidated.

Lamesa, Texas

The deposit has a minimum silica (SiO2) content of 98%. The controlling attributes are grain crush strength and size distribution. All areas of the deposit are characterized by clean, low-clay content sand in windblown dunes. In many areas, a more clayey sand lies beneath the clean sand. In all cases the sand is unconsolidated.

Festus, Missouri

The deposit has a minimum silica (SiO2) content of 98%. The controlling attributes are grain crush strength and size distribution. The top half of the deposit tends to have a coarser grain size distribution and exhibits stronger rock.

Ottawa, Illinois

The deposit has a minimum silica (SiO2) content of 99%. The controlling attributes are grain crush strength, iron (Fe2O3) content and grain size distribution. Iron is concentrated near the surface, where orange iron staining is evident and also increases where the bottom contact becomes concentrated in iron pyrite. Maximum average full face iron content is 0.045%. The deposit tends to run a coarser grain size distribution in the top half of deposit.

Voca, Texas

The deposit has a minimum silica (SiO2) content of 99%. The controlling attributes are sand grain crush strength and size distribution. The majority of the sand reserves are hosted within the Hickory Sandstone, the basal member of the Riley Formation. The Cambrian age Hickory sandstone member consists chiefly of yellow, brown, or red sandstone overlying Pre-Cambrian granites.

Tyler, Texas

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The deposit has a minimum silica (SiO2) content of 98%. The controlling attributes are crush strength and size distribution of the sand grains. The Queen City Sand formation, an Eocene Age unconsolidated sand deposit, makes up the Tyler reserves. The Queen City Sand consists mainly of white, brown, and grayish-green sand found mostly as loose particles.

Mill Creek, Oklahoma

The deposit has a minimum silica (SiO2) content of 99%. The controlling attributes are iron (Fe2O3) content, calcium (CaO) content and grain size distribution. The sand/overburden contact is occasionally concentrated in calcium and any sand with greater than 0.03% CaO is removed during the overburden removal process. Sand with iron greater than 0.03% Fe2O3 is not mined.

Sparta, Wisconsin

The deposit has a minimum silica (SiO2) content of 99%. The controlling attributes are sand grain crush strength and size distribution. A thin layer of silt overlies the 50 to 100 foot thick sand deposit. The deposit is unconsolidated and well graded and can be used to manufacture three main API product grades, 40/70, 30/50, and 20/40 as well as the non-API 100-mesh product.

Utica, Illinois

The deposit has a minimum silica (SiO2) content of 99%. The controlling attributes are sand grain crush strength and size distribution. The deposit is well graded and can produce a variety of products.

Mapleton Depot, Pennsylvania

The deposit has a minimum silica (SiO2) content of 99%. The controlling attribute is iron (Fe2O3) as most sales have low iron specifications. Higher-iron ore is stockpiled and used when oil and gas proppant production is required, or is blended when very low iron ore is available.

Pacific, Missouri

The deposit has a minimum silica (SiO2) content of 99%. The controlling attributes are iron (Fe2O3) and calcium (CaO) content. Calcium can be concentrated at the upper sand contact with overlying carbonate cap rock. This enriched calcium zone is known from drill sample results and is stripped during the overburden removal process. Average full mining face washed sand samples are less than 0.03% iron and 0.05% calcium.

Kosse, Texas

The deposit has a minimum silica (SiO2) content of 99%. The controlling attributes are iron content (Fe2O3), sand grain crush strength and size distribution. Multiple areas of deposit can be mined at any one time to assure consistency of ore and to smooth out variability of attributes. Maximum sand irons are 0.045%.

Berkeley Springs, West Virginia

The deposit has a minimum silica (SiO2) content of 99%. The controlling attribute is iron (Fe2O3). Ore that is higher than 0.06% iron is not mined. Ore less than 0.06% iron is mined and blended for feed to plant.

Columbia, South Carolina

The deposit has a minimum silica (SiO2) content of 99%. The controlling attributes are iron content (Fe2O3) and percentage of clay/slimes. Clay content increases at depth and generally the pit bottom follows a marker bed at 250-foot elevation where clay content is in excess of 11%. Generally, sand having iron values greater than 0.03% is not mined.

Dubberly, Louisiana

The deposit has a minimum silica (SiO2) content of 99%. The controlling attributes are iron (Fe2O3) content and grain size distribution. Mining full-face average for iron is 0.045%. Fine and coarse areas are blended to meet the grain size average.

Montpelier, Virginia

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The Montpelier anorthosite contains andesine feldspar which is mined and processed to create an alumina rich product. The general term aplite is used to denote the product. The controlling attributes are titanium (TiO2), aluminum (AI2O3), iron (Fe2O3) and phosphorous (P2O5).

The Montpelier anorthosite is approximately 1,000 million years in age and intruded into the older Precambrian Sabot Gneiss. The overall dome shape of the orebody has been altered by multiple structural and metamorphic events that result in the present day foliated and folded deposit. The deposit is highly weathered and soft near the surface. Hardness and strength increase with depth.

Aplite is used as a flux agent in glass making and is sold to the same glass end markets and used in the same processes and in a similar manner as our silica product.

Hurtsboro, Alabama

The deposit has a minimum silica (SiO2) content of 99%. The controlling attribute is grain size distribution. Sand reserves are located on the crests of rolling hills and mining occurs from multiple pits and faces within pits to assure optimum grain size distribution is available to meet the market product mix.

Jackson, Tennessee

The deposit has a minimum silica (SiO2) content of 99%. The controlling attribute of iron (Fe2O3) content is managed through keeping clay overburden from intermixing with the sand and maintaining adequate washing of sand in the wet processing of the sand.

Mauricetown, New Jersey

The deposit has a minimum silica (SiO2) content of 99%. The controlling attribute is grain size distribution. Occasional zones high in clay are avoided in the course of dredge mining.

Rockwood, Michigan

The deposit has a minimum silica (SiO2) content of 99%. The controlling attribute is iron content (Fe2O3). Mineable sand must have less than 0.01% Fe2O3.

Fairchild, Wisconsin

The deposit has a minimum silica (SiO2) content of 99%. The controlling attributes are sand grain crush strength and size distribution. Topsoil, clay and eroded sand cover the 40 to 100 feet thick sandstone formation. The deposit is well graded with varying degrees of consolidation.

Batesville, Arkansas

The deposit has a minimum silica (SiO2) content of 99%. The controlling attribute is iron (Fe2O3) content, sand grain crush strength and size distribution. The deposit has two horizons; a low iron horizon where sand has less than 0.009% Fe2O3 and a regular iron horizon where sand has greater than 0.009% Fe2O3.

Mineral Rights

The mineral rights and access to mineral reserves for the majority of our operations are secured through land that is owned in fee. There are no underlying agreements and/or royalties associated with Berkeley Springs, Dubberly, Jackson, Lamesa, Mauricetown, Montpelier, Ottawa, Pacific, Rockwood, Sparta, Tyler, Utica, Voca and Batesville.

The mineral rights and access to mineral reserves at our Mill Creek operation are a combination of land owned in fee and one mineral lease. A non-participating royalty is paid to the original sellers of the fee property that covers almost all of the reserves. The lease agreements involve an annual minimum payment and a non-participating per-ton production royalty payment.

The Columbia operation mineral reserves and rights are secured under a long-term mineral lease. The lease includes an annual minimum payment and a production royalty based on gross revenue.

The Hurtsboro operation mineral reserves and rights are secured under two mineral leases. Both are long-term leases that include an annual minimum payment and a production royalty payment based on average selling price. These mineral leases

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have been renewed in the past, and it is expected that if mining is still occurring on these properties the leases can be extended again.

The mineral rights and access to mineral reserves at our Kosse operation are a combination of land owned in fee and one long-term mineral lease. The lease is for 25 acres and a minimum royalty is paid annually.

The Mapleton Depot operation mineral reserves and rights are secured under two long-term mineral leases. One of the leases is with a Commission of the Pennsylvania State government. Annual minimum royalty is nominal, and production royalty payments are based on selling price with a minimum per-ton royalty.

The Festus operation leases its reserves from another company that is also the mining contractor for those reserves. There is a royalty associated with the mineral lease agreement.

When our Fairchild and Crane County reserves were acquired, we entered into royalty agreements with the companies that sold us the land. The non-participating royalty interest is based on tons of frac sand sold. Currently the Fairchild site remains undeveloped, while the Crane County site is in development.

None of our operations, except for Mapleton Depot, are on government land and, accordingly, we do not have any other government leases or associated mining claims.

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Summary of Reserves

The following table provides information on our production facilities that have reserves as well as our undeveloped sites in Fairchild, Wisconsin and Batesville, Arkansas, as of December 31, 2017. Included is the location and area of the facility; the type, amount and ownership status of its reserves; and the primary end markets that it serves. Our facility in Rochelle, Illinois has no reserves.

Mine/Plant Location	Acreage Owned/Leased	Proven Reserves	Probable Reserves	Combined Proven and Probable Reserves	2017 Tons Mined	Primary End Markets Served
	(in acres)	(tonnage data in thousands)				
Crane County	3200 owned	123,900	47,500	171,400	—	Oil and gas proppants
Lamesa	3523 owned	102,900	16,300	119,200	—	Oil and gas proppants
Festus	635 leased	18,114	7,411	25,525	901	Oil and gas proppants
Ottawa	2,100 owned	127,871	—	127,871	4,367	Oil and gas proppants, glass, chemicals, foundry
Voca	1,061 owned	29,823	41,900	71,723	2,424	Oil and gas proppants
Tyler	1,356 owned	19,128	20,100	39,228	1,617	Oil and gas proppants
Mill Creek	2,174 owned 16 mineral lease	—	11,533	11,533	2,084	Oil and gas proppants, glass, foundry, building products
Sparta	660 owned	24,926	2,740	27,666	1,565	Oil and gas proppants
Utica	148 owned	7,243	—	7,243	2,048	Oil and gas proppants
Mapleton	1,761 owned 194 mineral lease 98 access lease	2,672	2,100	4,772	738	Glass, building products
Pacific	524 owned	16,129	7,994	24,123	719	Oil and gas proppants, glass, foundry, fillers and extenders
Kosse	1,053 owned 25 mineral lease	10,830	—	10,830	—	Oil and gas proppants, building products, recreational products
Berkeley	4,435 owned	1,727	6,000	7,727	534	Glass, building products, fillers and extenders
Columbia	648 lease 204 owned	4,742	—	4,742	439	Glass, building products, fillers and extenders
Dubberly	356 owned	4,525	—	4,525	278	Glass, foundry, building products
Montpelier[(1)]	824 owned	—	12,965	12,965	224	Glass, building products
Hurtsboro	117 owned 1,108 mineral lease	478	—	478	149	Foundry, building products
Jackson	132 owned	—	—	—	145	Fiberglass, building products
Mauricetown	1,279 owned	11,814	—	11,814	270	Filtration, foundry, building products
Rockwood[(2)]	872 owned	8,363	—	8,363	—	Glass, building products
Fairchild	632 owned	38,975	—	38,975	—	—
Batesville	477 owned	—	34,732	34,732	—	—
Total		554,160	211,275	765,435	18,502	

(1) Montpelier’s reserves are comprised entirely of the mineral aplite.

(2) Rockwood's products were produced from or sourced from a third party. It did not mine any of its reserves in 2017.

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Our Logistics Network

In order to expand our supply chain network and leverage our logistics capabilities to meet our customers' needs in oil and gas basins, we continue to expand our transload network to ensure product is available to meet the in-basin needs of our customers. This approach allows us to provide strong customer service and puts us in a position to take advantage of opportunistic spot market sales. As of December 31, 2017, we have 56 transload facilities strategically located in or near major shale basins in the United States. Most of our transloads are operated by third-party transload service providers via service agreements, which include both longer term contracts (generally 2 to 5 years) and month-to-month arrangements.

We lease a significant number of railcars for shipping purposes and for short-term storage of our products, particularly our frac sand products. As of December 31, 2017, we leased a fleet of 7,111 railcars, of which no empty cars were in storage.

Our recent acquisition of Sandbox extends our delivery capability directly to our customers' wellhead locations. Sandbox provides "last mile" logistics to companies in the oil and gas industry, which increases efficiency and provides a lower cost logistics solution for our customers. Sandbox has operations in Texas (Midland/Odessa, Kenedy, Dallas/Fort Worth, Tyler); Morgantown, West Virginia; western North Dakota; northeast of Denver, Colorado; Oklahoma City, Oklahoma; Cambridge, Ohio and Mansfield, Pennsylvania, where its major customers are located. We will continue to make strategic investments and develop partnerships with transload operators and transportation providers that will enhance our portfolio of supply chain services that we can provide to customers.

The map below shows the location of our production facilities, transload facilities and Sandbox operation sites:

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ITEM 3. LEGAL PROCEEDINGS

In addition to the matter described below, we are subject to various legal proceedings, claims, and governmental inspections, audits or investigations arising out of our business which cover matters such as general commercial, governmental regulations, antitrust and trade regulations, product liability, environmental, intellectual property, employment and other actions. Although the outcomes of these routine claims cannot be predicted with certainty, in the opinion of management, the ultimate resolution of these matters will not have a material adverse effect on our financial position or results of operations.

Prolonged inhalation of excessive levels of respirable crystalline silica dust can result in silicosis, a disease of the lungs. Breathing large amounts of respirable silica dust over time may injure a person's lungs by causing scar tissue to form. Crystalline silica in the form of quartz is a basic component of soil, sand, granite and most other types of rock. Cutting, breaking, crushing, drilling, grinding and abrasive blasting of or with crystalline silica containing materials can produce fine silica dust, the inhalation of which may cause silicosis, lung cancer and possibly other diseases including immune system disorders such as scleroderma. Sources of exposure to respirable crystalline silica dust include sandblasting, foundry manufacturing, crushing and drilling of rock, masonry and concrete work, mining and tunneling, and cement and asphalt pavement manufacturing.

Since at least 1975, we and/or our predecessors have been named as a defendant, usually among many defendants, in numerous lawsuits brought by or on behalf of current or former employees of our customers alleging damages caused by silica exposure. Prior to 2001, the number of silicosis lawsuits filed annually against the commercial silica industry remained relatively stable and was generally below 100, but between 2001 and 2004 the number of silicosis lawsuits filed against the commercial silica industry substantially increased. This increase led to greater scrutiny of the nature of the claims filed, and in June 2005 the U.S. District Court for the Southern District of Texas issued an opinion in the former federal silica multi-district litigation remanding almost all of the 10,000 cases then pending in the multi-district litigation back to the state courts from which they originated for further review and medical qualification, leading to a number of silicosis case dismissals across the United States. In conjunction with this and other favorable court rulings establishing "sophisticated user" and "no duty to warn" defenses for silica producers, several states, including Texas, Ohio and Florida, have passed medical criteria legislation that requires proof of actual impairment before a lawsuit can be filed.

As a result of the above developments, the filing rate of new claims against us over the past few years has decreased to below pre-2001 levels, and we were named as a defendant in zero, two, and zero new silicosis cases filed in 2015, 2016 and 2017, respectively. As of December 31, 2017, there were a total of 59 active silica-related products liability claims pending in which we were a defendant and 1 inactive claim. Almost all of the claims pending against us arise out of the alleged use of our silica products in foundries or as an abrasive blast media, and involve various other defendants. Prior to the fourth quarter of 2012, we had insurance policies for both our predecessors that cover certain claims for alleged silica exposure for periods prior to certain dates in 1985 and 1986 (with respect to certain insurance). As a result of a settlement with a former owner and its insurers in the fourth quarter of 2012, some of these policies are no longer available to us and we will not seek reimbursement for any defense costs or claim payments from these policies. Other insurance policies, however, continue to remain available to us and will continue to make such payments on our behalf.

The silica-related litigation brought against us to date has not resulted in material liability to us. However, we continue to have silica-related products liability claims filed against us, including claims that allege silica exposure for periods for which we do not have insurance coverage. Any such pending or future claims or inadequacies of our insurance coverage could have a material adverse effect on our business, reputation or results of operations. For more information regarding silica-related litigation, see Part I, Item 1A "Risk Factors—Risks Related to Our Business—Silica-related health issues and litigation could have a material adverse effect on our business, reputation or results of operations."

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ITEM 4. MINE SAFETY DISCLOSURES

Safety is one of our core values and we strive for excellence in the achievement of a workplace free of injuries and occupational illnesses. Our health and safety leadership team has developed comprehensive safety policies and standards, which include detailed standards and procedures for safe production, addressing topics such as employee training, risk management, workplace inspection, emergency response, accident investigation and program auditing. We place special emphasis on the importance of continuous improvement in occupational health, personal injury avoidance and prevention, emergency preparedness, and property damage elimination. In addition to strong leadership and involvement from all levels of the organization, these programs and procedures form the cornerstone of our safety initiatives, ensuring that employees are provided a safe and healthy environment and are intended as a means to reduce workplace accidents, incidents and losses, comply with all mining-related regulations and provide support for both regulators and the industry to improve mine safety. While we want to have productive operations in full regulatory compliance, we know it is equally essential that we motivate and train our people to think, practice and feel a personal responsibility for health and safety on and off the job.

All of our production facilities, with the exception of our resin-coated sand facility, are classified as mines and are subject to regulation by the Federal Mine Safety and Health Administration ("MSHA") under the Federal Mine Safety and Health Act of 1977 (the “Mine Act”). MSHA inspects our mines on a regular basis and issues various citations and orders when it believes a violation has occurred under the Mine Act. Following passage of The Mine Improvement and New Emergency Response Act of 2006, MSHA significantly increased the numbers of citations and orders charged against mining operations. The dollar penalties assessed for citations issued has also increased in recent years. Information concerning mine safety violations or other regulatory matters required by Section 1503(a) of the Dodd-Frank Wall Street Reform and Consumer Protection Act and Item 104 of Regulation S-K (17 CFR 229.104) is included in Exhibit 95.1 to this Annual Report filed on Form 10-K.

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PART II.

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Market Information

Shares of our common stock, traded under the symbol "SLCA," have been publicly traded since February 1, 2012, when our common stock was listed and began trading on the NYSE.

The following table sets forth for the indicated periods, the high and low sales prices, per share, for our common stock on the NYSE:

	Sales Price	
	High	Low
Fiscal 2017		
First Quarter	$61.49	$42.27
Second Quarter	$50.39	$31.79
Third Quarter	$37.00	$24.26
Fourth Quarter	$36.55	$27.42
Fiscal 2016		
First Quarter	$22.72	$14.96
Second Quarter	$35.60	$22.14
Third Quarter	$46.56	$32.73
Fourth Quarter	$58.24	$42.47

Holders of Record

On February 16, 2018, there were 80,539,945 shares of our common stock outstanding, which were held by approximately 123 stockholders of record. Because many of our shares of common stock are held by brokers and other institutions on behalf of stockholders, we are unable to estimate the total number of stockholders represented by these record holders. For additional information related to ownership of our stock by certain beneficial owners and management, refer to Item 12, "Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters."

Dividend

We pay dividends on our common stock after the Board declares them. Management and the Board remain committed to evaluating additional ways of creating shareholder value. Any determination to pay dividends and other distributions in cash, stock, or property by U.S. Silica in the future will be at the discretion of the Board and will be dependent on then-existing conditions, including our business conditions, our financial condition, results of operations, liquidity, capital requirements, contractual restrictions including restrictive covenants contained in debt agreements and other factors.

In 2016 and 2017, we declared dividends as follows:

Declaration date	Dividends per common share
February 22, 2016	$ 0.0625
May 5, 2016	$ 0.0625
July 21, 2016	$ 0.0625
November 3, 2016	$ 0.0625
February 16, 2017	$ 0.0625
May 4, 2017	$ 0.0625
July 21, 2017	$ 0.0625
November 2, 2017	$ 0.0625

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Purchase of Equity Securities by the Issuer and Affiliated Purchasers

From time to time, we repurchase our common stock in the open market pursuant to programs approved by the Board. We may repurchase our common stock for a variety of reasons, such as to offset dilution related to equity-based incentives and to optimize our capital structure.

In November 2017, the Board authorized us to repurchase up to $100.0 million of our common stock through December 11, 2018. We are authorized to repurchase, from time to time, shares of our outstanding common stock on the open market or in privately negotiated transactions. Stock repurchases will be funded using our available liquidity. The timing and amount of stock repurchases will depend on a variety of factors, including the market conditions as well as corporate and regulatory considerations. The share repurchase program may be suspended, modified or discontinued at any time and we have no obligation to repurchase any additional amount of our common stock under the program. We intend to make all repurchases in compliance with applicable regulatory guidelines and to administer the plan in accordance with applicable laws, including Rule 10b-18 of the Securities Exchange Act of 1934, as amended. As part of the program, as of December 31, 2017, we have repurchased 727,081 shares of our common stock at an average price of $34.41 and are authorized to repurchase up to an additional $75.0 million of our common stock.

We consider several factors in determining when to make share repurchases including, among other things, our cash needs, the availability of funding, our future business plans and the market price of our stock. We expect that cash provided by future operating activities, as well as available liquidity, will be the sources of funding for our share repurchase program. Based on the anticipated amounts to be generated from those sources of funds in relation to the remaining authorization approved by our Board under the June 2012 share repurchase program, we do not expect that future share repurchases will have a material impact on our short-term or long-term liquidity.

The following table presents the total number of shares of our common stock that we purchased during the fourth quarter of 2017, the average price paid per share, the number of shares that we purchased as part of our publicly announced repurchase program, and the approximate dollar value of shares that still could have been purchased at the end of the applicable fiscal period pursuant to our share repurchase program:

Period	Total Number of Shares Purchased		Average Price Paid Per Share	Total Number of Shares Purchased as Part of Publicly Announced Program[1]	Maximum Dollar Value of Shares that May Yet Be Purchased Under the Program[1]
October 2017	164	[2]	$ 28.14	—	
November 2017	12,923	[2]	$ 33.21	—	
December 2017	—	[2]	$ —	727,081	
Total	13,087		$ 33.14	727,081	$ 75,000,000

(1) A program covering the repurchase of up to $100 million of our common stock was approved by the Board in November 2017. This program expires on December 11, 2018.

(2) Represents shares withheld by U.S. Silica to pay taxes due upon the vesting of employee restricted stock and restricted stock units.

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Securities Authorized for Issuance under Equity Compensation Plans

The table below contains information about securities authorized for issuance under our Amended and Restated 2011 Incentive Compensation Plan (the “2011 Plan”) as of December 31, 2017. The features of the 2011 Plan are disclosed further in Note N - Equity-based Compensation to our consolidated Financial Statements in Part II, Item 8 of this Annual Report on Form 10-K.

	Number of securities to be issued upon exercise of outstanding options, warrants and rights (A)	Weighted-average exercise price of outstanding options, warrants and rights (B)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column A) (C)
Equity compensation plans approved by security holders	908,919	$ 28.46	4,452,870
Equity compensation plans not approved by security holders	—	—	—
Total	908,919	28.46	4,452,870

U.S. Silica Holdings, Inc. Comparative Stock Performance Graph

The information contained in this U.S. Silica Holdings, Inc. Comparative Stock Performance Graph section shall not be deemed to be "soliciting material" or "filed" or incorporated by reference in future filings with the SEC, or subject to the liabilities of Section 18 of the Exchange Act, except to the extent that we specifically incorporate it by reference into a document filed under the Securities Act or the Exchange Act.

The graph below compares the cumulative total shareholder return on our common stock to the cumulative total return on the Russell 3000 index, the Standard and Poor’s SmallCap 600 Energy Sector index and the Standard and Poor's SmallCap 600 GICS Oil & Gas Equipment & Services Sub-Industry index, assuming $100 was invested on January 31, 2012, the first day our stock traded on the NYSE, and the reinvestment of all dividends. We have elected to add the Standard and Poor’s SmallCap 600 Energy Sector index this year because this index is used in relative total shareholder return performance share units that we have granted to employees.

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ITEM 6. SELECTED FINANCIAL DATA

The following table and discussion sets forth our consolidated statement of operations data for the periods presented. The results of operations by segment are discussed in further detail following this combined overview.

	Year Ended December 31,				
	2017[5]	2016[5]	2015	2014[2]	2013
	(amounts in thousands, excluding per share and per ton figures)				
Statement of Operations Data:					
Sales	$1,240,851	$559,625	$642,989	$876,741	$545,985
Operating income (loss)	168,511	(53,531)	26,672	176,167	111,241
Income (loss) before income taxes	136,526	(77,745)	117	158,723	96,017
Net income (loss)	145,206	(41,056)	11,868	121,540	75,256
Earnings (loss) per share - basic	$1.79	$(0.63)	$0.22	$2.26	$1.42
Earnings (loss) per share - diluted	$1.77	$(0.63)	$0.22	$2.24	$1.41
Cash dividends declared per common share	$0.25	$0.25	$0.44	$0.50	$0.38
Statement of Cash Flows Data:					
Net cash provided by (used in):					
Operating activities	$238,156	$381	$61,492	$171,411	$46,451
Investing activities	(507,672)	(201,657)	49	(190,906)	(135,113)
Financing activities	$(57,142)	$635,424	$(47,530)	$208,964	$105,896
Other Financial Data:					
Capital expenditures	$384,622	$46,450	$53,646	$92,609	$60,470
Operating Data:					
Total tons sold	15,128	9,875	10,025	10,927	8,161
Average selling price (per ton)	$82.02	$56.67	$64.14	$80.24	$66.90
Segment cost of goods sold (per ton)[1]	56.19	47.51	48.27	51.20	42.04
Oil & Gas Proppants:					
Sales	$1,020,365	$362,550	$430,435	$662,770	$347,439
Segment contribution margin	301,972	11,445	88,928	256,137	145,916
Industrial & Specialty Products:					
Sales	$220,486	$197,075	$212,554	$213,971	$198,546
Segment contribution margin	88,781	78,988	70,137	61,102	56,983
Balance Sheet Data:					
Cash, cash equivalents and short-term investments [3]	$384,567	$711,225	$298,926	$338,209	$148,577
Total assets [3][4]	2,307,283	2,073,220	1,108,619	1,226,727	853,547
Total long-term debt, including current portion [4]	489,075	494,175	491,705	495,086	366,196
Total liabilities [3][4]	910,777	799,930	724,452	822,911	544,253
Total stockholders' equity	$1,396,506	$1,273,290	$384,167	$403,816	$309,294

(1) Segment cost of goods sold (per ton) equals segment cost of goods sold, divided by total tons sold.

(2) We acquired Cadre on July 31, 2014, and included Cadre's financial position and results of operations in our 2014 financial information above. As a result, our 2014 financial information may not be comparable to prior years. See Note D - Business Combinations to our Consolidated Financial Statements in Item 8 of this Annual Report on Form 10-K for more information related to this acquisition.

(3) In 2015, we changed the presentation of book overdraft from being classified as a liability to a reduction to our cash and cash equivalents. 2014 and 2013 cash and cash equivalents amounts presented are recasted to reflect this change.

(4) 2014 and 2013 amounts include the reclassification of deferred debt issuance costs related to the adoption of ASU 2015-03. See Note B - Summary of Significant Accounting Policies to our Consolidated Financial Statements in

Item 8 of this Annual Report on Form 10-K for more information.

(5) We acquired White Armor and MS Sand on April 1, 2017 and August 16, 2017, respectively, and NBI and Sandbox on August 16, 2016 and August 22, 2016, respectively, and have included their financial position and results of operations in our 2017 and 2016 financial information above. As a result, our 2017 and 2016 financial information may not be comparable to prior years. See Note D - Business Combinations to our Consolidated Financial Statements in Item 8 of this Annual Report on Form 10-K for more information related to this acquisition.

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ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion and analysis of our financial condition and results of operations should be read together with Item 6, "Selected Financial Data", the description of the business appearing in Item 1, "Business", of this report, and the Consolidated Financial Statements in Item 8 of this Annual Report on Form 10-K and the related notes included elsewhere in this report. This discussion contains forward-looking statements as a result of many factors, including those set forth under Item 1, "Business—Forward-Looking Statements" and Item 1A, "Risk Factors", and elsewhere in this Annual Report on Form 10-K. These statements are based on current expectations and assumptions that are subject to risks and uncertainties. Actual results could differ materially from those discussed in or implied by forward-looking statements. Factors that could cause or contribute to these differences include those discussed below and elsewhere in this report, particularly in Item 1A, "Risk Factors."

Overview

We are one of the largest domestic producers of commercial silica, a specialized mineral that is a critical input into a variety of attractive end markets. During our 118-year history, we have developed core competencies in mining, processing, logistics and materials science that enable us to produce and cost-effectively deliver over 239 products to customers across these markets. As of December 31, 2017, we operate 19 production facilities across the United States and control 765 million tons of reserves of commercial silica, which can be processed to make 323 million tons of finished products that meet American Petroleum Institute (API) frac sand specifications.

Our operations are organized into two segments based on end markets served: (1) Oil & Gas Proppants and (2) Industrial & Specialty Products. Our segments are complementary because our ability to sell to a wide range of customers across end markets allows us to maximize recovery rates in our mining operations, optimize our asset utilization and reduce the cyclicality of our earnings.

Acquisitions

On August 16, 2016, we completed the acquisition of New Birmingham, Inc. ("NBI"), the ultimate parent company of NBR Sand, LLC ("NBR"), a regional sand producer located near Tyler, Texas. The acquisition of NBI increased our regional frac sand product offering in our Oil & Gas Proppants segment. On August 22, 2016, we completed the acquisition (the "Sandbox Acquisition") of Sandbox Enterprises, LLC ("Sandbox") as a "last mile" logistics solution for frac sand in the oil and gas industry.

On April 1, 2017, we completed the acquisition of White Armor (the "White Armor acquisition"), a product line of cool roof granules used in industrial roofing applications. On August 16, 2017, we completed the acquisition of Mississippi Sand, LLC ("MS Sand"). MS Sand is a frac sand mining and logistics company based in St. Louis, Missouri.

See accompanying Note D - Business Combinations to our Consolidated Financial Statements in Part 2, Item 8 of this Annual Report on Form 10-K for pro forma results and other details regarding these acquisitions.

Recent Trends and Outlook

Oil and gas proppants end market trends

Increased demand for frac sand has historically been driven by the growth in the use of hydraulic fracturing as a means to extract hydrocarbons from shale formations. According to the IHS Markit Proppant IQ, Proppant Market Analysis 2017 Q4 release, published November 2017, U.S. raw sand proppant demand is expected to be 33% higher in 2017 than its previous peak in 2014, and is expected to continue to grow.

Declines in oil prices beginning in 2015 reduced oil and gas drilling and completion activity in North America during 2015 and most of 2016. As of September 30, 2016, the U.S. land rig count had fallen over 70% from its peak in 2014. Demand for frac sand fell in conjunction with the rig count and activity levels, partially offset by higher proppant per well to optimize recovery and production rates. The North American market for proppant stabilized and began to grow during the last quarter of 2016 due to increases in North America oil and gas drilling and completion activity. As of December 31, 2017, U.S. land rig count increased 43% since December 31, 2016. Driven by the corresponding increase in frac sand demand, sales, tons sold and average selling price all increased sequentially during the three months ended December 31, 2017 compared to the three months ended September 30, 2017, June 30, 2017, and

March 31, 2017, as summarized below.

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Amounts in thousands, except per ton data	December 31,	September 30,	June 30,	March 31,	Percentage change for Three Months Ended December 31, 2017 vs. September 30, 2017	Percentage change for Three Months Ended September 30, 2017 vs. June 30, 2017	Percentage change for Three Months Ended June 30, 2017 vs. March 31, 2017
Oil & Gas Proppants	2017	2017	2017	2017			
Sales	$306,019	$286,369	$235,018	$192,959	7%	22 %	22 %
Tons Sold	3,171	3,147	2,745	2,532	1%	15 %	8 %
Average Selling Price per Ton	$96.51	$91.00	$85.62	$76.21	6%	6 %	12 %

However, if the recovery in oil and gas drilling and completion activity does not continue, demand for frac sand may decline, which could result in us selling fewer tons, selling tons at lower prices, or both. If we sell less frac sand, or sell frac sand at lower prices, our revenue, net income, cash generated from operating activities, and liquidity would be adversely affected. We could evaluate actions to reduce cost and improve liquidity. For instance, depending on market conditions, we could implement additional cost improvement projects or reduce our capital spending by delaying or canceling capital projects.

We believe fluctuations in frac sand demand and price may occur as the market adjusts to changing supply and demand due to energy pricing fluctuations. We continue to expect long-term growth in oil and gas drilling in North American shale basins.

Oil and natural gas exploration and production companies' and oilfield service providers’ preferences and expectations have been evolving in recent years. A proppant supplier's logistics capabilities have become an important differentiating factor when competing for business, on both a spot and contract basis. Many of our customers increasingly seek convenient in-basin and wellhead proppant delivery capability from their proppant supplier. We believe that, over time, proppant customers will prefer to consolidate their purchases across a smaller group of suppliers with robust logistics capabilities and a broad offering of proppants.

Industrial and specialty products end market trends

Demand in the industrial and specialty products end markets is relatively stable and is primarily influenced by key macroeconomic drivers such as housing starts, light vehicle sales, repair and remodel activity and industrial production. The primary end markets served by our production used in Industrial & Specialty Products are foundry, building products, sports and recreation, glassmaking and filtration. We have been increasing our value-added product offerings in the industrial and specialty products end markets. These new higher margin product sales have increased our Industrial & Specialty Products segment's profitability. For instance, on April 1, 2017, we completed the White Armor acquisition, a product line of cool roof granules used in industrial roofing applications.

Our Strategy

The key drivers of our growth strategy include:

- Expand our Oil & Gas Proppants production capacity and product portfolio. We continue to consider and execute several initiatives to increase our frac sand production capacity and augment our proppant product portfolio. We are evaluating Greenfield opportunities and are expanding production capacities and maximizing production efficiencies of our existing facilities.
- Increase our presence and product offering in industrial and specialty products end markets. Our research and business development teams work in tandem with our customers to develop new products, which we expect will either increase our presence and market share in certain industrial and specialty products end markets or allow us to enter new markets. We manage a robust pipeline of new products in various stages of development. Some of these products have already come to market, resulting in a positive impact on our financial results. We continue to work toward offering more value-driven industrial and specialty products that will enhance the profitability of the business. For instance, on April 1, 2017, we completed the White Armor acquisition, a product line of cool roof granules used in

industrial roofing applications.

- Optimize product mix and further develop value-added capabilities to maximize margins. We continue to actively manage our product mix at each of our plants to ensure we maximize our profit margins. This requires us to use our proprietary expertise in balancing key variables, such as mine geology, processing capacities, transportation availability, customer requirements and pricing. We expect to continue investing in ways to increase the value we

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provide to our customers by expanding our product offerings, improving our supply chain management, upgrading our information technology, and creating a world class customer service model.

- Expand our supply chain network and leverage our logistics capabilities to meet our customers' needs in each strategic oil and gas basin. We continue to expand our transload network to ensure product is available to meet the in-basin needs of our customers. This approach allows us to provide strong customer service and puts us in a position to take advantage of opportunistic spot market sales. Our plant sites are strategically located to provide access to key Class I railroads, which enables us to cost effectively send product to each of the strategic basins in North America. We can ship product by truck, barge and rail with an ability to connect to short-line railroads as necessary to meet our customers' evolving in-basin product needs. We believe that our supply chain network and logistics capabilities are a competitive advantage that enables us to provide superior service for our customers. We expect to continue to make strategic investments and develop partnerships with transload operators and transportation providers that will enhance our portfolio of supply chain services that we can provide to customers. As of December 31, 2017, we have storage capacity at 56 transloads located near all of the major shale basins in the United States. Our acquisition of Sandbox extends our delivery capability directly to our customers' wellhead locations, which increases efficiency and provides a lower cost logistics solution for our customers. Sandbox has operations in Texas (Midland/Odessa, Kenedy, Dallas/Fort Worth, Tyler); Morgantown, West Virginia; western North Dakota; northeast of Denver, Colorado; Oklahoma City, Oklahoma; Cambridge, Ohio and Mansfield, Pennsylvania, where its major customers are located.
- Evaluate both Greenfield and Brownfield expansion opportunities and other acquisitions. We expect to continue leveraging our reputation, processing capabilities and infrastructure to increase production, as well as explore other opportunities to expand our reserve base.

We may accomplish this by developing Greenfield projects, where we can capitalize on our technical knowledge of geology, mining and processing and our strong reputation within local communities. For instance, in May 2017, we purchased a new Greenfield site in Crane County, Texas, which depending on market conditions, could become operational as early as the first quarter of 2018 and add approximately 4 million tons of annual frac sand capacity. Additionally, in July 2017, we purchased a new Greenfield site near Lamesa, Texas, which depending on market conditions, could become operational as early as the second quarter of 2018 and add approximately 2.6 million tons of annual frac sand capacity.

We are continuing to actively pursue acquisitions to grow by taking advantage of our asset footprint, our management's experience with high-growth businesses, and our strong customer relationships. Our primary objective is to acquire assets with differing levels of frac sand qualities that are complementary to our Oil & Gas Proppants segment, with a focus on mining, processing and logistics to further enhance our market presence. We prioritize acquisitions that provide opportunities to realize synergies (and, in some cases, the acquisition may be immediately accretive assuming synergies), including entering new geographic and frac sand product markets, acquiring attractive customer contracts and improving operations. On August 16, 2016, we completed our acquisition of NBI, the ultimate parent company of NBR Sand, LLC, a regional sand producer located near Tyler, Texas. On August 22, 2016, we completed the acquisition of Sandbox, a provider of logistics solutions and technology for the transportation of proppant used in hydraulic fracturing in the oil and gas industry. On August 16, 2017, we completed our acquisition of MS Sand, a frac sand mining and logistics company based in St. Louis, Missouri. We are in active discussions to acquire additional assets fitting this strategy, which, if completed, could be "significant" under Regulation S-X and could require additional sources of financing. There can be no assurance that we will reach a definitive agreement and complete any of these potential transactions. See the risk factors disclosed in Item 1A of Part I of this Annual Report on Form 10-K, including the risk factor entitled, "If we cannot successfully complete acquisitions or integrate acquired businesses, our growth may be limited and our financial condition may be adversely affected."

- Maintain financial strength and flexibility. We intend to maintain financial strength and flexibility to enable us to better manage through industry downturns and pursue acquisitions and new growth opportunities as they arise. In March 2016, we completed a public offering of 10,000,000 shares of our common stock for total cash net proceeds of $186.2 million. In November 2016, we executed another offering of 10,350,000 shares of common stock raising net cash proceeds of $467.0 million. As of December 31, 2017, we had $384.6 million of cash on hand and $45.5 million of availability under our revolving credit facility (the "Revolver").

How We Generate Our Sales

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We derive our sales primarily by mining and processing minerals that our customers purchase for various uses. Our sales are primarily a function of the price per ton and the number of tons sold. The price invoiced reflects product, transportation and additional services as applicable, such as storage and transloading the product from railcars to trucks for delivery to the customer site. We invoice the majority of our customers on a per shipment basis, although for some larger customers, we consolidate invoices weekly or monthly. Service sales are billed periodically after services are completed. Depending on the types of services, the total amount billed includes labor, equipment costs, freight, handling and other costs. Our ten largest customers accounted for approximately 58%, 52% and 56% of total sales during the years ended December 31, 2017, 2016 and 2015, respectively. Sales to two of our customers accounted for 15% and 12% of our total sales during the years ended December 31, 2017. Sales to one of our customers accounted for 13% of our total sales during the year ended December 31, 2016. Sales to two of our customers accounted for 13% and 12% of our total sales during the year ended December 31, 2015. No other customers accounted for 10% or more of our total sales. At December 31, 2017, two of our customers' accounts receivable represented 19% and 11% of our total accounts receivable, net of allowance. At December 31, 2016, two of our customers' accounts receivable represented 14% and 10% of our total accounts receivable, net of allowance. No other customers accounted for 10% or more of our total accounts receivable.

We primarily sell our products under short-term price agreements or at prevailing market rates. For a number of customers, we sell under long-term, competitively-bid contracts. Some customers provide advance payments for future shipments. A percentage of these advance payments is recognized as revenue with each ton of applicable product shipped to the customer. Selling more tons under supply contracts enables us to be more efficient from a production, supply chain and logistics standpoint. As discussed in Part I, Item 1A., "Risk Factors, of this Annual Report on Form 10-K—"A large portion of our sales is generated by our top ten customers, and the loss of, or significant reduction in, purchases by our largest customers could adversely affect our operations," these customers may not continue to purchase the same levels of product in the future due to a variety of reasons, contract requirements notwithstanding.

As of December 31, 2017, we have 23 minimum purchase supply agreements in the Oil & Gas Proppants segment with initial terms expiring between 2018 and 2022. As of December 31, 2016, we had seven minimum purchase supply agreements in the Oil & Gas Proppants segment with initial terms expiring between 2017 and 2019. These agreements define, among other commitments, the volume of product that our customers must purchase, the volume of product that we must provide and the price that we will charge and that our customers will pay for each product. Prices under these agreements are generally fixed and subject to certain contractual adjustments. Sometimes these agreements may undergo negotiations regarding pricing and volume requirements, which may occur more often in volatile market conditions. While these negotiations continue, we may deliver sand at prices or at volumes below the requirements in our existing supply agreements.

Collectively, sales to customers with minimum purchase supply agreements accounted for 32% and 22% of our total company sales during the years ended December 31, 2017 and 2016, respectively. Although sales under minimum purchase supply agreements may result in us realizing lower margins than we otherwise might during periods of high market prices, we believe such lower margins are offset by the benefits derived from the product mix and sales volume stability afforded by such supply agreements, which helps us lower market risk arising from adverse changes in spot prices and market conditions.

In the industrial and specialty end markets we have not historically entered into long term minimum purchase supply agreements with our customers because of the high cost to our customers of switching providers. We may periodically do so when capital or other investment is required to meet customer needs. Instead, we often enter into supply agreements with our customers with targeted volumes and terms of one to five years. Prices under these agreements are generally fixed and subject to annual increases.

The Costs of Conducting Our Business

The principal expenses involved in conducting our business are labor costs, electricity and drying fuel costs, maintenance and repair costs for our mining and processing equipment and facilities and transportation costs. Transportation and related costs include freight charges, fuel surcharges, transloading fees, switching fees, railcar lease costs, demurrage costs, storage fees and labor costs. We believe the majority of our operating costs are relatively

stable in price, but can vary significantly based on the volume of product produced. We benefit from owning the majority of the mineral deposits that we mine and having long-term mineral rights leases or supply agreements for our other primary sources of raw material, which limit royalty payments.

Additionally, we incur expenses related to our corporate operations, including costs for sales and marketing; research and development; and finance, legal, environmental, health and safety functions of our organization. These costs are principally driven by personnel expenses.

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How We Evaluate Our Business

Our management team evaluates our business using a variety of financial and operational metrics. Our business is organized into two segments, Oil & Gas Proppants and Industrial & Specialty Products. We evaluate the performance of these segments based on their tons sold, average selling price and contribution margin earned. Additionally, we consider a number of factors in evaluating the performance of the business as a whole, including total tons sold, average selling price, segment contribution margin, and Adjusted EBITDA. We view these metrics as important factors in evaluating our profitability and review these measurements frequently to analyze trends and make decisions.

Segment Contribution Margin

Segment contribution margin, a non-GAAP measure, is a key metric that management uses to evaluate our operating performance and to determine resource allocation between segments. Segment contribution margin excludes certain corporate costs not associated with the operations of the segment. These unallocated costs include costs that are related to corporate functional areas such as operations management, corporate purchasing, accounting, treasury, information technology, legal and human resources.

Segment contribution margin is not a measure of our financial performance under GAAP and should not be considered an alternative to measures derived in accordance with GAAP. For more details on the reconciliation of segment contribution margin to its most directly comparable GAAP financial measure, net income (loss), see Note T - Segment Reporting to our Financial Statements in Part II, Item 8 of this Annual Report on Form 10-K.

Adjusted EBITDA

Adjusted EBITDA, a non-GAAP measure, is included in this report because it is a key metric used by management to assess our operating performance and by our lenders to evaluate our covenant compliance. Adjusted EBITDA excludes certain income and/or costs, the removal of which improves comparability of operating results across reporting periods. Our target performance goals under our incentive compensation plan are tied, in part, to our Adjusted EBITDA. In addition, our Revolver contains a consolidated total net leverage ratio that we must meet as of the last day of any fiscal quarter whenever usage of the Revolver (other than certain undrawn letters of credit) exceeds 25% of the Revolver commitment, which is calculated based on our Adjusted EBITDA. Noncompliance with the financial ratio covenant contained in the Revolver could result in the acceleration of our obligations to repay all amounts outstanding under the Revolver and the Term Loan. Moreover, the Revolver and the Term Loan contain covenants that restrict, subject to certain exceptions, our ability to make permitted acquisitions, incur additional indebtedness, make restricted payments (including dividends) and retain excess cash flow based, in some cases, on our ability to meet leverage ratios calculated based on our Adjusted EBITDA.

Adjusted EBITDA is not a measure of our financial performance or liquidity under GAAP and should not be considered as an alternative to net income as a measure of operating performance, cash flows from operating activities as a measure of liquidity or any other performance measure derived in accordance with GAAP. Additionally, Adjusted EBITDA is not intended to be a measure of free cash flow for management’s discretionary use, as it does not consider certain cash requirements such as interest payments, tax payments and debt service requirements. Adjusted EBITDA contains certain other limitations, including the failure to reflect our cash expenditures, cash requirements for working capital needs and cash costs to replace assets being depreciated and amortized, and excludes certain non-recurring charges. Management compensates for these limitations by relying primarily on our GAAP results and by using Adjusted EBITDA only supplementally. Our measure of Adjusted EBITDA is not necessarily comparable to other similarly titled captions of other companies due to potential inconsistencies in the methods of calculation.

The following table sets forth a reconciliation of net income (loss), the most directly comparable GAAP financial measure, to Adjusted EBITDA.

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	Year Ended December 31,		
	2017	2016	2015
	(amount in thousands)		
Net income (loss)	$145,206	$(41,056)	$11,868
Total interest expense, net of interest income	25,871	25,779	26,578
Benefit for taxes	(8,680)	(36,689)	(11,751)
Total depreciation, depletion and amortization expenses	97,233	68,134	58,474
EBITDA	259,630	16,168	85,169
Non-cash incentive compensation [1]	25,050	12,107	3,857
Post-employment expenses (excluding service costs) [2]	1,231	1,040	3,335
Business development related expenses[3]	15,288	8,206	10,701
Other adjustments allowable under our existing credit agreements [4]	6,504	2,033	6,446
Adjusted EBITDA	$307,703	$39,554	$109,508

(1) Reflects equity-based compensation expense.

(2) Includes net pension cost and net post-retirement cost relating to pension and other post-retirement benefit obligations during the applicable period, but in each case excluding the service cost relating to benefits earned during such period. See Note P - Pension and Post-retirement Benefits to our Financial Statements in Part II, Item 8 of this Annual Report on Form 10-K.

(3)

Reflects expenses related to business development activities in connection with our growth and expansion initiatives.

Reflects miscellaneous adjustments permitted under our existing credit agreement, including such items as restructuring costs for actions that will provide future cost savings. The year ended December 31, 2017 amount includes a

(4) contract restructuring cost of $6.3 million. Restructuring costs were $3.5 million and $4.8 million, respectively, for the years ended December 31, 2016 and 2015. The year ended December 31, 2016 amount includes a gain on insurance settlement of $1.5 million.

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Results of Operations For the Years Ended December 31, 2017, 2016 and 2015

Sales

	For the Years Ended December 31,			Percent Change	
	2017	2016	2015	'17 vs. '16	'16 vs. '15
	(amounts in thousands, except per ton data)				
Sales:					
Oil & Gas Proppants	$1,020,365	$362,550	$430,435	181%	(16)%
Industrial & Specialty Products	220,486	197,075	212,554	12%	(7)%
Total Sales	$1,240,851	$559,625	$642,989	122%	(13)%
Tons:					
Oil & Gas Proppants	11,595	6,442	6,082	80%	6%
Industrial & Specialty Products	3,533	3,433	3,943	3%	(13)%
Total Tons	$15,128	9,875	10,025	53%	(1)%
Average Selling Price per Ton:					
Oil & Gas Proppants	$88.00	$56.28	$70.77	56%	(20)%
Industrial & Specialty Products	$62.41	$57.41	$53.91	9%	6%
Overall Average Selling Price per Ton:	$82.02	$56.67	$64.14	45%	(12)%

2017 vs. 2016

Total sales increased 122% for the year ended December 31, 2017 compared to 2016, driven by a 53% increase in total tons sold and a 45% increase in overall average selling price. Tons sold in-basin represented 49% and 41% of total company tons sold for the years ended December 31, 2017 and 2016, respectively.

The increase in total sales was driven by Oil & Gas Proppants sales, which increased 181% for the year ended December 31, 2017 compared to 2016. Oil & Gas Proppants tons sold increased 80% and average selling price increased 56%. These increases were driven by growth in demand for our frac sand and the acquisition of Sandbox, NBI and MS Sand.

Industrial & Specialty Products sales increased 12% for the year ended December 31, 2017 compared to 2016 driven by a 3% increase in tons sold and a 9% increase in average selling price. The increase in tons sold is mainly due to additional business with existing customers. The increase in average selling price was primarily a result of new higher-margin product sales and price increases.

2016 vs. 2015

Total sales decreased 13% for the year ended December 31, 2016 compared to 2015, driven by a 12% decrease in overall average selling price and an 1% decrease in total tons sold. Tons sold in-basin represented 41% and 36% of total tons sold for the years ended December 31, 2016 and 2015, respectively. The decrease in total sales was driven by decreases in sales for both segments.

The decrease in Oil & Gas Proppants sales was due to a 20% decrease in average selling price partially offset by a 6% increase in tons sold for the year ended December 31, 2016 compared to 2015. The increase in tons sold was driven by sales from our newly acquired businesses and our market share gain efforts, which were partially offset by decrease in market demand. Average selling price decreased as a result of the decrease in frac sand demand.

Industrial & Specialty Products sales decreased by 7% for the year ended December 31, 2016 compared to 2015. Tons sold decreased 13%, driven by our strategic shift among customers and products. Average selling price increased 6%, which was primarily a result of new higher-margin product sales and price increases.

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Cost of Sales

2017 vs. 2016

Cost of sales increased $390.2 million, or 82%, to $867.5 million for the year ended December 31, 2017 compared to $477.3 million for the year ended December 31, 2016. As a percentage of sales, cost of sales decreased to 70% for the year ended December 31, 2017 compared to 85% for the same period in 2016. These changes result from the main components of cost of sales as discussed below.

We incurred $490.8 million and $249.7 million of transportation and related costs for the years ended December 31, 2017 and 2016, respectively. This increase was due to increased tons sold through our transloads and the Sandbox acquisition. As a percentage of sales, transportation and related costs decreased to 40% for the year ended December 31, 2017 compared to 45% for the same period in 2016.

We incurred $137.2 million and $83.2 million of operating labor costs for the years ended December 31, 2017 and 2016, respectively. The $54.0 million increase in labor costs incurred was primarily due to more tons sold and incremental costs related to Sandbox operations. As a percentage of sales, operating labor costs represented 11% for the year ended December 31, 2017 compared to 15% for the same period in 2016.

We incurred $35.6 million and $26.7 million of electricity and drying fuel (principally natural gas) costs for the years ended December 31, 2017 and 2016, respectively. The increase in electricity and drying fuel costs incurred was due to more tons sold. As a percentage of sales, electricity and drying fuel costs represented 3% for the year ended December 31, 2017 compared to 5% for the same period in 2016.

We incurred $60.9 million and $34.3 million of maintenance and repair costs for the years ended December 31, 2017 and 2016, respectively. The increase in maintenance and repair costs incurred was mainly due to higher production volume and incremental costs related to Sandbox operations and the addition of our Tyler, Texas facility. As a percentage of sales, maintenance and repair costs represented 5% for the year ended December 31, 2017 compared to 6% for the same period in 2016.

2016 vs. 2015

Cost of sales decreased $17.8 million, or 4%, to $477.3 million for the year ended December 31, 2016 compared to $495.1 million for the year ended December 31, 2015. The decrease was mainly a result of fewer tons sold. As a percentage of sales, costs of sales increased to 85% for the year ended December 31, 2016 compared to 77% for the same period in 2015. These changes result from the main components of cost of sales as discussed below.

We incurred $249.7 million and $258.1 million of transportation and related costs for the years ended December 31, 2016 and 2015, respectively. These costs remained relatively flat due to our transportation and logistics cost improvement efforts, which were mostly offset by incremental costs related to NBI and Sandbox operations. As a percentage of sales, transportation and related costs increased to 45% for the year ended December 31, 2016 compared to 40% in 2015 primarily due to a decrease in average selling price.

We incurred $83.2 million and $80.1 million of operating labor costs for the years ended December 31, 2016 and 2015, respectively. The $3.1 million increase in labor costs incurred was primarily due to incremental costs related to NBI and Sandbox operations, partially offset by fewer tons sold and the impact of our restructuring efforts. As a percentage of sales, operating labor costs represented 15% for the year ended December 31, 2016 compared to 12% in 2015.

We incurred $26.7 million and $28.0 million of electricity and drying fuel (principally natural gas) costs for the years ended December 31, 2016 and 2015, respectively. The decrease in electricity and drying fuel costs incurred was mainly driven by fewer tons sold and strategic shift among products. As a percentage of sales, electricity and drying fuel costs represented 5% and 4% for the years ended December 31, 2016 and 2015, respectively.

We incurred $34.3 million and $37.6 million of maintenance and repair costs for the years ended December 31, 2016 and 2015, respectively. The decrease was a result of our cost improvement efforts and fewer tons sold. As a percentage of sales, maintenance and repair costs remained flat at 6% for the year ended December 31, 2016 compared to 2015.

Segment Contribution Margin

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2017 vs. 2016

Oil & Gas Proppants contribution margin increased by $290.5 million to $302.0 million for the year ended December 31, 2017 compared to $11.4 million for the year ended December 31, 2016, driven by a $657.8 million increase in revenue, partially offset by 105% higher cost of sales.

Industrial & Specialty Products contribution margin increased by $9.8 million, or 12%, to $88.8 million for the year ended December 31, 2017 compared to $79.0 million for the year ended December 31, 2016, driven by a $23.4 million increase in revenue, partially offset by 12% higher cost of sales.

2016 vs. 2015

Oil & Gas Proppants contribution margin decreased by $77.5 million, or 87%, to $11.4 million for the year ended December 31, 2016 compared to $88.9 million for the year ended December 31, 2015, driven by a $67.9 million decrease in revenue driven by a decrease in pricing and $9.6 million increase in cost of goods sold due to more tons sold.

Industrial & Specialty Products contribution margin increased by $8.9 million, or 13%, to $79.0 million for the year ended December 31, 2016 compared to $70.1 million for the year ended December 31, 2015, primarily driven by increased higher-margin products sales as a percentage of total sales.

Selling, General and Administrative Expenses

Selling, general and administrative expenses increased by $39.9 million, or 59%, to $107.6 million for the year ended December 31, 2017 compared to $67.7 million for the year ended December 31, 2016. The increase was due to the following factors:

- Compensation related expense increased by $30.8 million for the year ended December 31, 2017 compared to 2016, primarily due to increased equity-based compensation and higher employee headcount due to our acquisitions of NBI, Sandbox and MS Sand.
- Bad debt expense increased by $2.8 million for the year ended December 31, 2017 compared to the year ended December 31, 2016, mainly due to increased sales.
- Business development related expense increased by $7.1 million to $15.3 million for the year ended December 31, 2017 compared to $8.2 million for the year ended December 31, 2016. The increase was due to our growth and expansion initiatives, including costs related to our MS Sand acquisition.

In total, our selling, general and administrative costs represented approximately 9% and 12% of our sales for the years ended December 31, 2017 and 2016, respectively.

Selling, general and administrative expenses increased by $4.9 million, or 8%, to $67.7 million for the year ended December 31, 2016 compared to $62.8 million for the year ended December 31, 2015. The increase was due to the following factors:

- Compensation related expense increased by $11.2 million for the year ended December 31, 2016 compared to 2015, primarily due to increased equity-based compensation and incremental compensation expense related to NBI and Sandbox employees.
- Bad debt expense decreased by $0.9 million for the year ended December 31, 2016 compared to the year ended December 31, 2015, mainly due to a 13% decrease in sales and a recovery of a previously reserved receivable.
- Business development related expense decreased by $2.5 million to $8.2 million for the year ended December 31, 2016 compared to $10.7 million for the year ended December 31, 2015, primarily due to a $6.5 million settlement of an unfavorable arbitration ruling during the year ended December 31, 2015 partially offset by our NBI and Sandbox acquisition-related costs during the year ended December 31, 2016.

In total, our selling, general and administrative costs represented approximately 12% and 10% of our sales for the years ended December 31, 2016 and 2015, respectively.

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Depreciation, Depletion and Amortization

Depreciation, depletion and amortization expense increased by $29.1 million, or 43%, to $97.2 million for the year ended December 31, 2017 compared to $68.1 million for the year ended December 31, 2016. This increase was driven by our acquisitions as well as other capital spending. Depreciation, depletion and amortization costs represented approximately 8% and 12% of our sales for the years ended December 31, 2017 and 2016, respectively.

Depreciation, depletion and amortization expense increased by $9.6 million, or 17%, to $68.1 million for the year ended December 31, 2016 compared to $58.5 million for the year ended December 31, 2015. This increase was driven by incremental expense related to assets acquired in connection with the acquisitions of NBI and Sandbox as well as other capital spending. Depreciation, depletion and amortization costs represented approximately 12% and 9% of our sales for the years ended December 31, 2016 and 2015, respectively.

Operating Income (loss)

Operating income increased by $222.0 million, or 415%, to $168.5 million for the year ended December 31, 2017 compared to a $(53.5) million operating loss for the year ended December 31, 2016. The increase was due to a 122% increase in sales, partially offset by a 82% increase in cost of sales, a 59% increase in selling, general and administrative expense, and a 43% increase in depreciation, depletion and amortization expense.

Operating income decreased by $80.2 million, or 301%, to a $(53.5) million operating loss for the year ended December 31, 2016 compared to $26.7 million operating income for the year ended December 31, 2015. The decrease was due to a 13% decrease in sales, a 17% increase in depreciation, depletion and amortization expense and an 8% increase in selling, general and administrative expense, partially offset by a 4% decrease in cost of sales.

Interest Expense

Interest expense increased by $3.4 million, or 12%, to $31.3 million for the year ended December 31, 2017 compared to $28.0 million for the year ended December 31, 2016, driven by additional long-term liabilities assumed in connection with our acquisitions of NBI and Sandbox.

Interest expense increased by $0.7 million, or 3%, to $28.0 million for the year ended December 31, 2016 compared to $27.3 million for the year ended December 31, 2015, primarily driven by additional long-term liabilities assumed in connection with our acquisitions of NBI and Sandbox.

Provision for Income Taxes

On December 22, 2017, the U.S. government enacted comprehensive tax legislation commonly referred to as the Tax Cuts and Jobs Act (the “Tax Act”). The Tax Act reduces the corporate tax rate to 21 percent, effective January 1, 2018. Because ASC 740-10-25-47 requires the effect of a change in tax laws or rates to be recognized as of the date of enactment, we are required to adjust deferred tax assets and liabilities as of December 22, 2017. Accordingly, we have recorded a deferred income tax benefit of $35.8 million for the year ended December 31, 2017.

The provision for income taxes increased $28.0 million, or 76%, to an $8.7 million income tax benefit for the year ended December 31, 2017, compared to a $36.7 million income tax benefit for the year ended December 31, 2016. The increase was due to increased profit before income taxes, offset primarily by the deferred income tax benefit of the Tax Act for the year ended December 31, 2017. The tax rate for the year ended December 31, 2017 is not predictive of future tax rates due to the deferred income tax benefit of the Tax Act. The tax rate would have been 22% without the tax effects of the deferred income tax benefit of the Tax Act, equity compensation tax benefits and the prior year tax return reconciliation which were all recorded discretely for the year ended December 31, 2017. See Note Q - Income Taxes in Part II, Item 8 to this Annual report on this Form 10-K.

The provision for income taxes decreased $24.9 million, or 212%, to a $36.7 million income tax benefit for the year ended December 31, 2016, compared to a $11.8 million income tax benefit for the year ended December 31, 2015. The decreases were driven by a decreased pre-tax book income and the impact of favorable permanent tax differences including the adoption of ASU 2016-09. For more information related to ASU 2016-09, see Note Q - Income Taxes in Part II, Item 8 to this Annual report on this Form 10-K.

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Historically, our actual effective tax rates have been lower than the statutory effective rate primarily due to the benefit received from statutory depletion allowances. The deduction for statutory depletion does not necessarily change proportionately to changes in income before income taxes.

Net Income (loss)

Net income (loss) was $145.2 million, $(41.1) million and $11.9 million for the years ended December 31, 2017, 2016 and 2015. The year over year changes were due to the factors noted above.

Liquidity and Capital Resources

Overview

Our principal liquidity requirements have historically been to service our debt, to meet our working capital, capital expenditure and mine development expenditure needs, to return cash to our stockholders, and to finance acquisitions. We have historically met our liquidity and capital investment needs with funds generated through operations. We have historically funded our acquisitions through cash on hand or borrowings under our credit facilities and equity issuances. Our working capital is the amount by which current assets exceed current liabilities and is a measure of our ability to pay our liabilities as they become due. In March 2016, we completed a public offering of 10,000,000 shares of our common stock for total cash net proceeds of $186.2 million. In November 2016, we executed another offering of 10,350,000 shares of common stock raising net cash proceeds of $467.0 million. As of December 31, 2017, our working capital was $489.3 million and we had $45.5 million of availability under the Revolver.

We believe that cash on hand, cash generated through operations and cash generated from financing arrangements will be sufficient to meet working capital requirements, anticipated capital expenditures, scheduled debt payments and any dividends declared for at least the next 12 months.

Management and our Board remain committed to evaluating additional ways of creating shareholder value. Any determination to pay dividends and other distributions in cash, stock, or property in the future will be at the discretion of our Board and will be dependent on then-existing conditions, including our business conditions, our financial condition, results of operations, liquidity, capital requirements, contractual restrictions including restrictive covenants contained in debt agreements, and other factors. Additionally, because we are a holding company, our ability to pay dividends on our common stock may be limited by restrictions on the ability of our subsidiaries to pay dividends or make distributions to us, including restrictions under the terms of the agreements governing our indebtedness.

Cash Flow Analysis

A summary of operating, investing and financing activities (in thousands) is shown in the following table:

	As of December 31,		
	2017	2016	2015
Net cash provided by (used in):			
Operating activities	$238,156	$ 381	$61,492
Investing activities	(507,672)	(201,657)	49
Financing activities	(57,142)	635,424	(47,530)

Net Cash Provided by Operating Activities

Operating activities consist primarily of net income adjusted for certain non-cash and working capital items. Adjustments to net income for non-cash items include depreciation, depletion and amortization, deferred revenue, deferred

income taxes, equity-based compensation and bad debt provision. In addition, operating cash flows include the effect of changes in operating assets and liabilities, principally accounts receivable, inventories, prepaid expenses and other current assets, income taxes payable and receivable, accounts payable and accrued expenses.

Net cash provided by operating activities was $238.2 million for the year ended December 31, 2017 compared to $0.4 million for the year ended December 31, 2016. This $237.8 million increase in cash provided by operations was primarily the result of a $186.3 million increase in net income and $51.5 million increase due to other components of operating activities.

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Net cash provided by operating activities was $0.4 million for the year ended December 31, 2016 compared to $61.5 million for the year ended December 31, 2015. This $61.1 million decrease in cash provided by operations was primarily the result of a $52.9 million decrease in net income and the impact of the other components of operating activities.

Net cash provided by operating activities was $61.5 million for the year ended December 31, 2015 compared to $171.4 million for the year ended December 31, 2014. This $109.9 million decrease in cash provided by operations was primarily the result of a $109.7 million decrease in net income and the impact of the other components of operating activities.

Net Cash Provided by / Used in Investing Activities

Investing activities consist primarily of cash consideration paid to acquire businesses, capital expenditures for growth and maintenance and proceeds from the sale and maturity of short-term investments.

Net cash used in investing activities was $507.7 million for the year ended December 31, 2017. This was primarily due to capital expenditures of $384.6 million, cash consideration of $119.8 million paid for acquisition of businesses and capitalized intellectual property costs of $3.6 million. Capital expenditures for 2017 were approximately $49.6 million for a purchase of reserves in Lamesa, Texas, $94.4 million for a purchase of reserves in Crane County, Texas, and $240.6 million for engineering, procurement and construction of our growth projects and other maintenance and cost improvement capital projects.

Net cash used in investing activities was $201.7 million for the year ended December 31, 2016. This was due to $176.7 million of cash consideration that was paid for our NBI and Sandbox acquisitions and capital expenditures of $46.5 million, offset by $21.9 million in proceeds from sales and maturities of short-term investments. Capital expenditures in 2016 were made primarily for a purchase of reserves adjacent to our Ottawa, Illinois facility, engineering, procurement and construction of our growth projects and other maintenance and cost improvement capital projects.

Net cash provided by investing activities was $49 thousand for the year ended December 31, 2015. This was due to $53.6 million in proceeds from sales and maturities of short-term investments being almost fully offset by capital expenditures during the year. Capital expenditures in 2015 were $53.6 million, which were made primarily for the engineering, procurement and construction of our growth projects including the Greenfield raw sand plant near Fairchild, Wisconsin and other maintenance and cost improvement capital projects.

Subject to our continuing evaluation of market conditions, we anticipate that our capital expenditures in 2018 will be in the range of $300 million to $350 million, which is primarily associated with growth projects and other maintenance and cost improvement capital projects. We expect to fund our capital expenditures through cash on our balance sheet, cash generated from our operations and cash generated from financing activities.

Net Cash Provided by / Used In Financing Activities

Financing activities consist primarily of equity issuances, capital contributions, dividend payments, borrowings and repayments related to the Revolver, Term Loan, as well as fees and expenses paid in connection with our credit facilities and advance payments from our customers and capital leases.

Net cash used in financing activities was $57.1 million for the year ended December 31, 2017, driven by $25.0 million in common stock repurchases, $20.4 million of dividends paid, $7.2 million of long-term debt payments, $4.4 million of tax payments related to shares withheld for vested restricted stock and $1.0 million of capital lease repayments partially offset by $0.8 million of proceeds from employee stock options exercised.

Net cash provided by financing activities was $635.4 million for the year ended December 31, 2016, driven by $678.8 million of cash received from common stock issuances and $4.8 million of proceeds from options exercised, both of which were partially offset by $25.7 million of common stock issuances costs, $15.1 million of dividends paid, $5.2 million of long-term debt payments and $1.6 million of tax payments related to shares withheld for vested restricted stock.

Net cash used in financing activities was $47.5 million for the year ended December 31, 2015, driven by $26.8 million in dividend payments, $15.3 million in common stock repurchases and $5.1 million in debt payments.

Share Repurchase Program

See Purchase of Equity Securities by the Issuer and Affiliated Purchasers in Part II, Item 5 and Note C - Capital Structure and Accumulated Comprehensive Income to our Financial Statements in Part II, Item 8 of this Annual Report on Form 10-K for information related to our share repurchase program.

Credit Facilities

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See Note J - Debt and Capital Leases to our Financial Statements in Part II, Item 8 of this Annual Report on Form 10-K for information related to our credit facilities.

Off-Balance Sheet Arrangements

We have no off-balance sheet arrangements that have a current material effect or are likely to have future material effect on our financial condition, changes in financial condition, sales, expenses, results of operations, liquidity, capital expenditures or capital resources.

Contractual Obligations

As of December 31, 2017, the total of our future contractual cash commitments, including the repayment of our debt obligations under the Term Loan, is summarized as follows:

	Total	Less than 1 year	1-3 years	3-5 years	More than 5 years
	(amounts in thousands)				
Principal payments on long-term debt[1]	$489,075	$5,100	$483,975	$—	$—
Estimated interest payments on long-term debt	51,210	20,139	31,071	—	—
Minimum payments on customer note payable	745	245	500	—	—
Minimum payments on note payable secured by royalty interest	24,740	1,750	3,500	3,500	15,990
Retirement plans	90,288	8,710	17,675	18,148	45,755
Capital lease obligations	706	706	—	—	—
Operating leases	305,192	69,892	113,456	66,218	55,626
Minimum purchase obligations[2]	78,027	28,099	29,106	9,622	11,200
Other long-term liabilities[3]	1,368	222	620	72	454
Total Contractual Cash Obligations(4):	$1,041,351	$134,863	$679,903	$97,560	$129,025

(1) Excludes the unamortized debt issuance costs and original issue discount.

(2) Includes estimated future minimum purchase obligation related to transload service agreements and transportation service agreements. As of December 31, 2017, we accrued $0.6 million in shortfall fees under these service agreements.

(3) Includes estimated future minimum royalty payments provided for under our mineral leases.

(4) The above table excludes discounted asset retirement obligations in the amount of $19.0 million at December 31, 2017, the majority of which have a settlement date beyond 2025, as well as indemnification for surety bonds issued on our behalf discussed in Note R - Obligations Under Guarantees to our Consolidated Financial Statements in Item 8 of this Annual Report on Form 10-K.

Environmental Matters

We are subject to various federal, state and local laws and regulations governing, among other things, hazardous materials, air and water emissions, environmental contamination and reclamation and the protection of the environment and natural resources. We have made, and expect to make in the future, expenditures to comply with such laws and regulations, but cannot predict the full amount of such future expenditures. As of December 31, 2017, we had $19.0 million accrued for future reclamation costs, as compared to $11.2 million as of December 31, 2016. We discuss certain environmental matters relating to our various production and other facilities, certain regulatory requirements relating to human exposure to crystalline silica and our mining activity and how such matters may affect our business in the future under Item 1, “Business,” Item 1A, “Risk Factors” and Item 3, “Legal Proceedings.”

Critical Accounting Policies

Our discussion and analysis of our financial condition and results of operations are based upon our consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States of America. The preparation of these financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the dates of the financial statements and the reported revenues and expenses during the reporting periods. We evaluate these estimates and assumptions on an

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ongoing basis and base our estimates on historical experience, current conditions and various other assumptions that are believed to be reasonable under the circumstances. The results of these estimates form the basis for making judgments about the carrying values of assets and liabilities as well as identifying and assessing the accounting treatment with respect to commitments and contingencies. Our actual results may materially differ from these estimates.

A summary of our significant accounting policies is included in Note B to the Consolidated Financial Statements in Item 8 of this Annual Report on Form 10-K. Management believes that the application of these policies on a consistent basis enables us to provide the users of the Consolidated Financial Statements with useful and reliable information about our operating results and financial condition.

Listed below are the accounting policies we believe are critical to our financial statements due to the degree of uncertainty regarding the estimates or assumptions involved, and that we believe are critical to the understanding of our operations.

Revenue Recognition

We derive most of our sales by mining and processing minerals that our customers purchase for various uses. Our product sales are primarily a function of the price per ton and the number of tons sold. The amount invoiced reflects product, transportation and/or additional services as applicable, such as storage, transloading the product from railcars to trucks and last mile logistics to the customer site.

Revenue is recognized from a sale when persuasive evidence of an arrangement exists, the price is fixed and determinable, the product has been delivered, legal title has been transferred to the customer or services are completed and collection of the sale is reasonably assured. Amounts received from customers in advance of revenue recognition are deferred as liabilities.

We primarily sell our products under short-term price agreements or at prevailing market rates. For a limited number of customers, we sell under long-term, minimum purchase supply agreements. As of December 31, 2017, we had 23 minimum purchase supply agreements in the Oil & Gas Proppants segment with initial terms expiring between 2018 and 2022. These agreements define, among other commitments, the volume of product that our customers must purchase, the volume of product that we must provide and the price that we will charge and that our customers will pay for each product. Prices under these agreements are generally fixed and subject to certain contractual adjustments. Sometimes these agreements may undergo negotiations regarding pricing and volume requirements, which may often occur in volatile market conditions. While these negotiations continue, we may deliver sand at prices or at volumes below the requirements in our existing supply agreements.

We invoice the majority of our product customers on a per shipment basis, although for some larger customers, we consolidate invoices weekly or monthly. Standard terms are net 30 days, although extended terms are offered in competitive situations. Sales and other transaction taxes imposed by government entities are reported on a net basis. We invoice services periodically after the services are completed. Depending on the types of services, the total amount billed may include labor, equipment costs, freight, handling and other costs.

Accounts Receivable and Allowance for Doubtful Accounts

Trade accounts receivable are recognized at their invoiced amounts and do not bear interest. Credit is extended based on evaluation of a customer’s financial condition and, generally, collateral is not required. Accounts receivable are generally due within 30 days and are stated at amounts due from customers net of an allowance for doubtful accounts. Accounts outstanding longer than the payment terms are considered past due. We determine our allowance by considering a number of factors, including the length of time trade accounts receivable are past due, our previous loss history, the customer’s current ability to pay its obligation to us, and the condition of the general economy and the industry as a whole. Ongoing credit evaluations are performed. We write-off accounts receivable when they are deemed uncollectible, and payments subsequently received on such receivables are credited to the allowance for doubtful accounts.

Impairment of Long-Lived Assets

We periodically evaluate whether current events or circumstances indicate that the carrying value of our long-lived assets, including property, plant and mine development, goodwill, trade names, intellectual property and customer relationships, to be held and used may not be recoverable. An estimate of future cash flows may be produced by the

long-lived assets, or the appropriate grouping of assets, is compared to the carrying value to determine whether an impairment exists. If an asset is determined to be impaired, the loss is measured based on quoted market prices in active markets, if available. If quoted market prices are not available, the estimate of fair value is based on various valuation techniques, including a discounted value of

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estimated future cash flows. A detailed determination of the fair value may be carried forward from one year to the next if certain criteria have been met. We report an asset to be disposed of at the lower of its carrying value or its estimated net realizable value.

Factors we generally consider important in our evaluation and that could trigger an impairment review of the carrying value of long-lived assets include significant underperformance relative to expected operating trends, significant changes in the way assets are used, underutilization of our tangible assets, discontinuance of certain products by us or by our customers, a decrease in estimated mineral reserves, and significant negative industry or economic trends.

The recoverability of the carrying value of our mineral properties is dependent upon the successful development, start-up and commercial production of our mineral deposit and the related processing facilities. Our evaluation of mineral properties for potential impairment primarily includes assessing the existence or availability of required permits and evaluating changes in our mineral reserves, or the underlying estimates and assumptions, including estimated production costs. Assessing the economic feasibility requires certain estimates, including the prices of products to be produced and processing recovery rates, as well as operating and capital costs.

Although we believe the carrying values of our long-lived assets were realizable as of the relevant balance sheet date, future events could cause us to conclude otherwise.

Mine Reclamation Costs and Asset Retirement Obligations

We recognize the fair value of any liability for conditional asset retirement obligations, including environmental remediation liabilities when incurred, which is generally upon acquisition, construction or development and/or through the normal operation of the asset, if sufficient information exists to reasonably estimate the fair value of the liability. These obligations generally include the estimated net future costs of dismantling, restoring and reclaiming operating mines and related mine sites, in accordance with federal, state, local regulatory and land lease agreement requirements. The liability is accreted over time through periodic charges to earnings. In addition, the asset retirement cost is capitalized as part of the asset's carrying value and amortized over the life of the related asset. Reclamation costs are periodically adjusted to reflect changes in the estimated present value resulting from the passage of time and revisions to the estimates of either the timing or amount of the reclamation and abandonment costs. The reclamation obligation is based on when spending for an existing environmental disturbance will occur. If the asset retirement obligation is settled for other than the carrying amount of the liability, a gain or loss is recognized on settlement. We review, on an annual basis, unless otherwise deemed necessary, the reclamation obligation at each mine site in accordance with ASC guidance for accounting reclamation obligations.

Future remediation costs for inactive mines are accrued based on management's best estimate at the end of each period of the costs expected to be incurred at a site. Such cost estimates include, where applicable, ongoing care, maintenance and monitoring costs. Changes in estimates at inactive mines are reflected in earnings in the period an estimate is revised.

Self-Insurance and Product Liability Claim Reserves

We are self-insured for various levels of employee health insurance coverage, workers' compensation and third party product liability claims alleging occupational disease. We purchase insurance coverage for claim amounts which exceed our self-insured retentions. Depending on the type of insurance, these self-insured retentions range from $100,000 to $500,000 per occurrence.

Our insurance reserves are accrued based on estimates of the ultimate cost of claims expected to occur during the covered period. These estimates are prepared with the assistance of outside actuaries and consultants. Our actuaries periodically review the volume and amount of claims activity, and based upon their findings, we adjust our insurance reserves accordingly. The ultimate cost of claims for a covered period may differ from our original estimates.

Employee Benefit Plans

We provide a range of benefits to our employees and retired employees, including pensions and post-retirement healthcare and life insurance benefits. We record annual amounts relating to these plans based on calculations specified by generally accepted accounting principles, which include various actuarial assumptions, including discount rates, assumed rates of returns, compensation increases, turnover rates, mortality table, and healthcare cost trend rates. We review the actuarial assumptions on an annual basis and make modifications to the assumptions based on current rates and trends when it is deemed appropriate to do so. As required by U.S. generally accepted accounting

principles, the effect of the modifications is generally recorded or amortized over future periods. We believe that the assumptions utilized in recording our obligations under the plans, which are presented in Note P to our Consolidated Financial Statements in Item 8 of this Annual Report on Form 10-K, are reasonable based on advice from our actuaries and information as to assumptions used by other employers.

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Equity-Based Compensation Expense

We recognize equity-based compensation expense in our consolidated statements of income using a fair value based method. Stock option fair value methods use a valuation model for shorter-term, market-traded financial instruments to theoretically value stock option grants even though they are not available for trading and are of longer duration. The Black-Scholes option-pricing model that we use includes the input of certain variables that are dependent on future expectations, including the expected lives of our options from grant date to exercise date, the volatility of our underlying common shares in the market over that time period, and the rate of dividends that we will pay during that time. Our estimates of these variables are made for the purpose of using the valuation model to determine an expense for each reporting period and are not subsequently adjusted. We recognize expense related to the estimated vesting of our performance share units granted. The estimated vesting of the performance share units is principally based on the probability of achieving certain financial performance levels during the vesting periods. For performance share units, the vesting of which is subject to market conditions, a binomial-lattice model (i.e., Monte Carlo simulation model) is used to fair value these awards at grant date. Unlike most of our expenses, the resulting equity-based compensation expense's impact on earnings is a non-cash charge that is never measured by, or adjusted based on, a cash outflow.

Taxes

Deferred taxes are provided on the liability method whereby deferred tax assets are recognized for deductible temporary differences and operating loss and tax credit carry-forwards and deferred tax liabilities are recognized for taxable temporary differences. This approach requires recognition of deferred tax liabilities and assets for the expected future tax consequences of events that have been included in the financial statements or tax returns. Under this method, deferred tax liabilities and assets are determined based upon the difference between the financial statement and tax basis of assets and liabilities using enacted tax rates in effect for the year in which the expenses are expected to reverse. Valuation allowances are provided if, based on the weight of available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized.

We recognize a tax benefit associated with an uncertain tax position when, in our judgment, it is more likely than not that the position will be sustained upon examination by a taxing authority. For a tax position that meets the more-likely-than-not recognition threshold, we initially and subsequently measure the tax benefit as the largest amount that it judges to have a greater than 50% likelihood of being realized upon ultimate settlement with a taxing authority. The liability associated with unrecognized tax benefits is adjusted periodically due to changing circumstances, such as the progress of tax audits, case law developments and new or emerging legislation. Such adjustments are recognized entirely in the period in which they are identified. The effective tax rate includes the net impact of changes in the liability for unrecognized tax benefits and subsequent adjustments as considered appropriate by management. At the adoption date, we applied the uncertain tax position guidance to all tax positions for which the statute of limitations remained open. The adoption of this guidance did not have a material impact on our consolidated financial condition or results of operations.

We evaluate quarterly the realizability of our deferred tax assets by assessing the need for a valuation allowance and by adjusting the amount of such allowance, if necessary. The factors used to assess the likelihood of realization are our forecast of future taxable income and available tax planning strategies that could be implemented to realize the net deferred tax assets. Failure to achieve forecasted taxable income might affect the ultimate realization of the net deferred tax assets. Factors that may affect our ability to achieve sufficient forecasted taxable income include, but are not limited to, the following: a decline in sales or margins, increased competition or loss of market share. In addition, we operate within multiple taxing jurisdictions and are subject to audit in these jurisdictions. These audits can involve complex issues, which may require an extended time to resolve. We believe that adequate provisions for income taxes have been made for all years.

The largest permanent item in computing both our effective tax rate and taxable income is the deduction allowed for statutory depletion. The impact of statutory depletion on the effective tax rate is presented in Note Q to our Consolidated Financial Statements in Item 8 of this Annual Report on Form 10-K. The deduction for statutory depletion does not necessarily change proportionately to changes in income before income taxes.

Recent Accounting Pronouncements

New accounting guidance that has been recently issued but not yet adopted by us, are included in Note B - Summary of Significant Accounting Policies to our Consolidated Financial Statements in Part II, Item 8 of this Annual Report on Form 10-K.

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ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Market Risk

We are exposed to certain market risks, which exist as a part of our ongoing business operations. Such risks arise from adverse changes in market rates, prices and conditions. We address such market risks as discussed in "How We Generate Our Sales" in Item 7 of this Form 10-K, Management's Discussion and Analysis of Financial Condition and Results of Operations.

Interest Rate Risk

We are exposed to interest rate risk arising from adverse changes in interest rates. As of December 31, 2017, we have $489.1 million of debt outstanding under our senior credit facility. Assuming LIBOR is greater than the 1.0% minimum base rate on the Term loan, a hypothetical increase in interest rates by 1.0% would have changed our interest expense by $4.9 million for the year ended December 31, 2017.

We use interest rate derivatives in the normal course of our business to manage both our interest cost and the risks associated with changing interest rates. We do not use derivatives for trading or speculative purposes. The following table summarizes the fair value of our derivative instruments (in thousands) at December 31, 2017 and 2016:

	December 31, 2017				December 31, 2016			
	Maturity Date	Contract/Notional Amount	Carrying Amount	Fair Value	Maturity Date	Contract/Notional Amount	Carrying Amount	Fair Value
Interest rate cap agreement[(1)]	2019	$249 million	$ —	$ —	2019	$249 million	$ 72	$ 72

(1) Agreements limit the LIBOR floating interest rate base to 4%.

Credit Risk

We are subject to risks of loss resulting from nonpayment or nonperformance by our customers. We examine the creditworthiness of third-party customers to whom we extend credit and manage our exposure to credit risk through credit analysis, credit approval, credit limits and monitoring procedures, and for certain transactions, we may request letters of credit, prepayments or guarantees, although collateral is generally not required.

Despite enhancing our examination of our customers' credit worthiness, we may still experience delays or failures in customer payments. Some of our customers have reported experiencing financial difficulties. With respect to customers that may file for bankruptcy protection, we may not be able to collect sums owed to us by these customers and we also may be required to refund pre-petition amounts paid to us during the preference period (typically 90 days) prior to the bankruptcy filing.

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ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The following Consolidated Financial Statements are filed as part of this Annual Report on Form 10-K:

U.S. SILICA HOLDINGS, INC.

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM
Board of Directors and Shareholders
U.S. Silica Holdings, Inc.

Opinion on the financial statements
We have audited the accompanying consolidated balance sheets of US Silica Holdings, Inc. (a Delaware corporation) and subsidiaries (the "Company") as of December 31, 2017 and 2016, the related consolidated statements of operations, statement of comprehensive income, changes in stockholders' equity, and cash flows for each of the three years in the period ended December 31, 2017, and the related notes and schedules (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2016, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2017, in conformity with accounting principles generally accepted in the United States of America.
We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the Company's internal control over financial reporting as of December 31, 2017, based on criteria established in the 2013 Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"), and our report dated February 21, 2018 expressed an unqualified opinion.
Basis for opinion
These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.
We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ GRANT THORNTON LLP

We have served as the Company's auditor since 2004.
Baltimore, Maryland
February 21, 2018

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U.S. SILICA HOLDINGS, INC.
CONSOLIDATED BALANCE SHEETS

	December 31,	
	2017	2016
	(in thousands)	
ASSETS		
Current Assets:		
Cash and cash equivalents	$384,567	$711,225
Accounts receivable, net	212,586	89,006
Inventories, net	92,376	78,709
Prepaid expenses and other current assets	13,715	12,323
Income tax deposits	—	1,682
Total current assets	703,244	892,945
Property, plant and mine development, net	1,169,155	783,313
Goodwill	272,079	240,975
Trade names	33,068	32,318
Intellectual property, net	64,786	57,270
Customer relationships, net	52,153	50,890
Other assets	12,798	15,509
Total assets	$2,307,283	$2,073,220
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current Liabilities:		
Accounts payable	$148,772	$70,778
Dividends payable	5,229	5,221
Accrued liabilities	16,841	13,034
Accrued interest	199	169
Current portion of long-term debt	4,504	4,821
Current portion of capital leases	706	2,237
Current portion of deferred revenue	36,128	13,700
Income tax payable	1,566	—
Total current liabilities	213,945	109,960
Long-term debt, net	506,732	508,417
Deferred revenue	82,286	58,090
Obligations under capital lease	—	717
Liability for pension and other post-retirement benefits	52,867	56,746
Deferred income taxes, net	29,856	50,075
Other long-term obligations	25,091	15,925
Total liabilities	910,777	799,930
Commitments and Contingencies (Note O)		
Stockholders' Equity:		
Preferred stock, $0.01 par value, 10,000,000 shares authorized; 0 issued and outstanding at December 31, 2017 and 2016	—	—
Common stock, $0.01 par value, 500,000,000 shares authorized; 81,267,205 issued and 80,524,255 outstanding at December 31, 2017; 81,184,042 issued and 81,028,898 outstanding at December 31 2016	812	811
Additional paid-in capital	1,147,084	1,129,051
Retained earnings	287,992	163,173
Treasury stock, at cost, 742,950 and 155,144 shares at December 31, 2017 and 2016, respectively	(25,456)	(3,869)

Accumulated other comprehensive loss	(13,926)	(15,876)
Total stockholders' equity	1,396,506	1,273,290
Total liabilities and stockholders' equity	$2,307,283	$2,073,220

The accompanying notes are an integral part of these financial statements.

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U.S. SILICA HOLDINGS, INC.
CONSOLIDATED STATEMENTS OF OPERATIONS

	Year Ended December 31,		
	2017	2016	2015
	(in thousands, except per share amounts)		
Sales:			
Product	$ 1,057,553	$ 523,900	$ 640,464
Service	183,298	35,725	2,525
Total sales	1,240,851	559,625	642,989
Cost of sales (excluding depreciation, depletion and amortization):			
Product	720,312	455,189	494,814
Service	147,203	22,106	252
Total cost of sales (excluding depreciation, depletion and amortization)	867,515	477,295	495,066
Operating expenses:			
Selling, general and administrative	107,592	67,727	62,777
Depreciation, depletion and amortization	97,233	68,134	58,474
Total operating expenses	204,825	135,861	121,251
Operating income (loss)	168,511	(53,531)	26,672
Other (expense) income:			
Interest expense	(31,342)	(27,972)	(27,283)
Other income (expense), net, including interest income	(643)	3,758	728
Total other (expense) income	(31,985)	(24,214)	(26,555)
Income (loss) before income taxes	136,526	(77,745)	117
Income tax benefit	8,680	36,689	11,751
Net income (loss)	$ 145,206	$ (41,056)	$ 11,868
Earnings (loss) per share:			
Basic	$ 1.79	$ (0.63)	$ 0.22
Diluted	$ 1.77	$ (0.63)	$ 0.22
Weighted average shares outstanding:			
Basic	81,051	65,037	53,344
Diluted	81,960	65,037	53,601
Dividends declared per share	$ 0.25	$ 0.25	$ 0.44

The accompanying notes are an integral part of these financial statements.

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U.S. SILICA HOLDINGS, INC.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

	Year Ended December 31,		
	2017	2016	2015
	(in thousands)		
Net income (loss)	$145,206	$(41,056)	$11,868
Other comprehensive income (loss):			
Unrealized gain (loss) on derivatives (net of tax of $(27), $29 and $34 for 2017, 2016, and 2015, respectively)	(44)	49	53
Foreign currency translation adjustment (net of tax of $2, $0 and $0 for 2017, 2016 and 2015, respectively)	(6)	—	—
Unrealized gain (loss) on investments (net of tax of $0, $(4) and $29 for 2017, 2016, and 2015, respectively)	—	(6)	47
Pension and other post-retirement benefits liability adjustment (net of tax of $1,205, $152 and $2,469 for 2017, 2016, and 2015, respectively)	2,000	252	3,547
Comprehensive income (loss)	$147,156	$(40,761)	$15,515

The accompanying notes are an integral part of these financial statements.

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U.S. SILICA HOLDINGS, INC.
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

	Common Stock	Treasury Stock	Additional Paid-In Capital	Retained Earnings	Accumulated Other Comprehensive Loss	Total Stockholders' Equity
	(in thousands, except per share amounts)					
Balance at January 1, 2015	$539	$(542)	$191,086	$232,551	$ (19,818)	$403,816
Net income	—	—	—	11,868	—	11,868
Unrealized gain on derivatives	—	—	—	—	53	53
Unrealized gain on short-term investments	—	—	—	—	47	47
Pension and post-retirement liability	—	—	—	—	3,547	3,547
Cash dividend declared ($0.438 per share)	—	—	—	(23,445)	—	(23,445)
Common stock-based compensation plans activity:						
Equity-based compensation	—	—	3,857	—	—	3,857
Proceeds from options exercised	—	744	(271)	—	—	473
Shares withheld for employee taxes related to vested restricted stock and stock units	—	(792)	(2)	—	—	(794)
Repurchase of common stock	—	(15,255)	—	—	—	(15,255)
Balance at December 31, 2015	539	(15,845)	194,670	220,974	(16,171)	384,167
Net loss	—	—	—	(41,056)	—	(41,056)
Issuance of common stock (stock offerings net of issuance costs of $25,732)	272	—	931,016	—	—	931,288
Unrealized gain on derivatives	—	—	—	—	49	49
Unrealized loss on short-term investments	—	—	—	—	(6)	(6)
Pension and post-retirement liability	—	—	—	—	252	252
Cash dividend declared ($0.25 per share)	—	—	—	(16,893)	—	(16,893)
Common stock-based compensation plans activity:						
Equity-based compensation	—	—	12,107	—	—	12,107
Excess tax benefit from equity-based compensation	—	—	—	148	—	148
Proceeds from options exercised	—	8,465	(3,640)	—	—	4,825
Issuance of restricted stock	—	1,437	(1,437)	—	—	—
Shares withheld for employee taxes related to vested restricted stock and stock units	—	2,074	(3,665)	—	—	(1,591)
Balance at December 31, 2016	811	(3,869)	1,129,051	163,173	(15,876)	1,273,290
Net Income	—	—	—	145,206	—	145,206
Unrealized loss on derivatives	—	—	—	—	(44)	(44)
Foreign currency translation adjustment					(6)	(6)
Pension and post-retirement liability	—	—	—	—	2,000	2,000
Cash dividend declared ($0.25 per share)	—	—	—	(20,387)		(20,387)
Common stock-based compensation plans activity:						
Equity-based compensation	—	—	25,050	—	—	25,050
Proceeds from options exercised	—	1,190	(392)	—	—	798
Issuance of restricted stock	—	1,859	(1,859)	—	—	—
Shares withheld for employee taxes related to						

vested restricted stock and stock units	1	386	(4,766)	—	—	(4,379)
Repurchase of common stock	—	(25,022)				(25,022)
Balance at December 31, 2017	$812	$(25,456)	$1,147,084	$287,992	$ (13,926)	$1,396,506

The accompanying notes are an integral part of these financial statements.

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U.S. SILICA HOLDINGS, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS

	Year Ended December 31,		
	2017	2016	2015
	(in thousands)		
Operating activities:			
Net income (loss)	$145,206	$(41,056)	$11,868
Adjustments to reconcile net income (loss) to net cash provided by operating activities:			
Depreciation, depletion and amortization	97,233	68,134	58,474
Debt issuance amortization	1,382	1,392	1,401
Original issue discount amortization	372	378	382
Deferred income taxes	(20,601)	(36,903)	(10,473)
Loss on disposal of property, plant and equipment	415	563	383
Deferred revenue	28,438	(9,026)	(16,079)
Equity-based compensation	25,050	12,107	3,857
Bad debt provision	1,529	(1,232)	(290)
Other	5,529	3,643	(5,257)
Changes in assets and liabilities, net of effects of acquisitions:			
Accounts receivable	(110,920)	(12,996)	62,465
Inventories	(4,825)	(10,211)	1,708
Prepaid expenses and other current assets	8,787	(509)	(708)
Income taxes	1,469	11,558	(5,837)
Accounts payable and accrued liabilities	59,769	13,121	(42,353)
Accrued interest	28	111	(2)
Liability for pension and other post-retirement benefits	(705)	1,307	1,953
Net cash provided by operating activities	238,156	381	61,492
Investing activities:			
Capital expenditures	(384,622)	(46,450)	(53,646)
Capitalized intellectual property costs	(3,586)	(959)	—
Maturities of short-term investments	—	21,872	53,568
Acquisition of businesses, net of cash acquired	(119,801)	(176,617	