GRAFTECH INTERNATIONAL LTD
Form 10-K
February 27, 2017
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UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K
(Mark One)
x ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
for the fiscal year ended December 31, 2016
OR
¨ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
for the transition period from to
Commission file number: 1-13888

GRAFTECH INTERNATIONAL LTD.
(Exact name of registrant as specified in its charter)

Delaware	27-2496053
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification Number)
Suite 300 - Park Center I 6100 Oak Tree Boulevard Independence, Ohio	44131 (Zip Code)

Registrant's telephone number, including area code: (216) 676-2000

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

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

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

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 x No ¨

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 ¨ No x

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, 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 x No ¨

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of 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. x

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 definitions of "large accelerated filer," "accelerated filer", "non-accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act.

Large Accelerated Filer ¨ Accelerated Filer ¨ Non-Accelerated Filer ¨ Smaller reporting company ¨

Indicate by check mark whether the registrant is a shell company (as defined in Exchange Act Rule 12b-2).
Yes ¨ No x
None of the oustanding common stock of the registrant is held by a non-affiliate of the registrant and therefore the aggregate market value of common stock held by non-affiliates of the registrant is zero. On February 1, 2017, 100 shares of our common stock were outstanding.

(Explanatory Note: The registrant is a voluntary filer and not subject to the filing requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934. Although not subject to these filing requirements, the registrant has filed all reports that would have been required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months had the registrant been subject to such requirements.)

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PART I

Preliminary Notes

Important Terms. We use the following terms to identify various matters. These terms help to simplify the presentation of information in this Report.
"Brookfield" means BCP IV GrafTech Holdings LP, an affiliate of Brookfield Asset Management Inc., and the direct owner of GrafTech
"Common Stock" means GTI common stock, par value $.01 per share.
"Credit Agreement" refers to the credit agreement providing for our senior secured revolving and term credit facilities, dated as of April 23, 2014, as amended as of November 19, 2014, February 27, 2015, June 26, 2015, July 28, 2015 and April 27, 2016, as further amended, supplemented, restated or otherwise modified from time to time.
"GrafTech Finance" refers to GrafTech Finance Inc. only. GrafTech Finance is an indirect wholly-owned, special purpose finance subsidiary of GTI and the borrower under the Revolving Facility.
"GrafTech Global" refers to GrafTech Global Enterprises Inc. only. GrafTech Global is an indirect wholly-owned subsidiary of GTI and the direct or indirect holding company for many of our operating subsidiaries. GrafTech Global is a guarantor of the Revolving Facility.
"GTI" refers to GrafTech International Ltd. only. GTI is our U.S. parent company. GTI is a guarantor of the Revolving Facility.
"Indenture" refers to the indenture dated November 20, 2012, under which the Senior Notes were issued.
"MTM Adjustment" refers to our accounting policy regarding pension and other post-employment benefits plans ("OPEB") whereby we immediately recognize the change in the fair value of plan assets and net actuarial gains and losses annually in the fourth quarter of each year (referred to as "mark-to-market").
"Revolving Facility" refers to the senior secured revolving credit facility provided under the Credit Agreement, at the relevant time.
"Senior Notes" means our 6.375% senior notes due 2020 issued on November 20, 2012.
"Senior Subordinated Notes" means our senior subordinated promissory notes issued on November 30, 2010, in connection with the Seadrift Coke L.P. ("Seadrift") and C/G Electrodes LLC ("C/G") acquisitions, in an aggregate principal amount of $200 million. The Senior Subordinated Notes were non-interest bearing, due on November 30, 2015 and repaid in full in August 2015. Because the Senior Subordinated Notes are non-interest bearing, we were required to record them at each measurement date at their then present value (determined using an interest rate of 7.00%).
"Subsidiaries" refers to those companies that, at the relevant time, are or were majority owned or wholly-owned directly or indirectly by GTI or its predecessors to the extent that those predecessors' activities related to the graphite and carbon business.
"We," "GrafTech," "us" or "our" refers to GTI and its subsidiaries collectively or, if the context so requires, GTI, GrafTech Global, GrafTech Finance or GrafTech International Holdings Inc., individually.
Presentation of Financial, Market and Legal Data. References to cost in the context of our low cost advantages and strategies do not include the impact of special charges, expenses or credits, such as those related to investigations, lawsuits, claims, restructurings or impairments, or the impact of changes in accounting principles.
Unless otherwise noted, when we refer to "dollars", we mean U.S. dollars. Unless otherwise noted, all dollars are presented in thousands.
References to spot prices for graphite electrodes mean prices under individual purchase orders (not part of an annual or other extended purchase arrangement) for near term delivery for standard size graphite electrodes used in large electric arc steel melting furnaces (sometimes called "melters" or "melter applications") as distinct from, for example, a ladle furnace or a furnace producing non-ferrous metals.
Neither any statement made in this Report nor any charge taken by us relating to any legal proceedings constitutes an admission as to any wrongdoing.

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Unless otherwise noted, market and market share data in this Report are our own estimates. Market data relating to the steel, electronics, semiconductor, solar, thermal management, transportation, petrochemical and other metals industries, our general expectations concerning such industries and our market position and market share within such industries, both domestically and internationally, are derived from trade publications relating to those industries and other industry sources as well as assumptions made by us, based on such data and our knowledge of such industries. Market and market share data relating to the graphite and carbon industry as well as information relating to our competitors, our general expectations concerning such industry and our market position and market share within such industry, both domestically and internationally, are derived from the sources described above and public filings, press releases and other public documents of our competitors as well as assumptions made by us, based on such data and our knowledge of such industry. Such data are used to provide a gauge of our competitiveness against our competitors and are intended to describe things such as customer or potential customer bases, industries, or subsets of the industries in which we compete and intermediate or end use applications of the product or technology involved. Unless otherwise noted, references to "market share" are based on sales volumes for the relevant year. Similarly, product descriptions are used to help understand how we develop, produce, source, manage, market, sell, or account for products. Market data and product descriptions are not intended to define markets or products from an antitrust, trade regulation, trade remedy, or other regulatory purpose. Our estimates involve risks and uncertainties and are subject to change based on various factors, including those discussed under “Risk Factors-Risks Relating to Us” and “Risk Factors-Forward Looking Statements” in this Report. We cannot guarantee the accuracy or completeness of this market and market share data and have not independently verified it. None of the sources mentioned above has consented to the disclosure or use of data in this Report.

The GRAFTECH logo, GRAFCELL®, GRAFOAM®, GRAFIHXtm, eGraf® and HOTPRESSED™ are our trademarks and trade names used in this report. This Report also contains trademarks and trade names belonging to other parties.

We make available, free of charge, on or through our web site, our annual reports on Form 10-K, our quarterly reports on Form 10-Q, our current reports on Form 8-K and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act as soon as reasonably practicable after we electronically file them with, or furnish them to, the U.S. Securities and Exchange Commission (“SEC”). We maintain our website at http://www.graftech.com. The information contained on our web site is not part of this Report. The SEC maintains a website that contains reports, proxy and information statements, and other information regarding issuers that file electronically. Please see http://www.sec.gov for more information.

We have a code of ethics (which we call our Code of Conduct and Ethics) that applies to our principal executive officer, principal financial officer, principal accounting officers and controller, and persons performing similar functions, as well as our other employees, and which is intended to comply, at a minimum, with the Sarbanes-Oxley Act of 2002 and the SEC rules adopted thereunder. A copy of our Code of Conduct and Ethics is available on our web site. We intend to report timely on our website any disclosures concerning amendments or waivers of our Code of Conduct and Ethics that would otherwise require the filing of a Form 8-K with the SEC.

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Item 1. Business

Introduction

Our vision is to enable customer leadership, better and faster than our competition, through the creation, innovation and manufacture of graphite and carbon material science-based solutions. We have over 125 years of experience in the research and development of graphite and carbon-based solutions and our intellectual property portfolio is extensive. Our business was founded in 1886 by the National Carbon Company. We are a leading manufacturer of a broad range of high quality graphite electrodes, products essential to the production of electric arc furnace ("EAF") steel and various other ferrous and nonferrous metals.

We currently manufacture our graphite electrodes in 4 manufacturing facilities strategically located in North America and Europe. We believe our Industrial Materials business has the largest manufacturing capacity and one of the lowest manufacturing cost structure of all of our major competitors and delivers the highest-level quality products. We currently have the operating capability, depending on product demand and mix, to manufacture approximately 195,000 metric tons of graphite electrodes. Beginning in 2013 and continuing through 2015, we announced and implemented rationalization plans designed to significantly improve our competitiveness, allow us to better serve customers and position our Industrial Materials business for success. As a result we have reduced our manufacturing facilities and reduced graphite electrode capacity. Additionally, we initiated changes to the Company's operating and management structure in order to streamline, simplify and decentralize the organization, resulting in savings within our corporate functions. These strategic initiatives addressed three key areas: profitability, cash flow and future growth.

We hold approximately 201 issued and pending patent applications related to our Industrial Materials business.

On August 15, 2015, GrafTech became an indirect wholly owned subsidiary of Brookfield Asset Management Inc. through a tender offer to our shareholders and subsequent merger transaction. Brookfield Asset Management is an experienced operator of industrial, natural resource and other tangible asset businesses. This transaction has provided us with a stable equity partner with experience in cyclical capital intensive industries.

Industrial Materials Segment

Industrial Materials is our only reportable segment and it delivers high quality graphite electrodes and needle coke products. Graphite electrodes are key components of the conductive power systems used to produce steel and non-ferrous metals. Approximately 75% of our graphite electrodes sold are consumed in the EAF steel melting process, the steel making technology used by all "mini-mills," typically at a rate of one graphite electrode every eight to ten operating hours. We believe that mini-mills constitute the higher long-term growth sector of the steel industry and that there is currently no commercially viable substitute for graphite electrodes in EAF steel making. The remaining approximately 25% of electrodes sold are primarily used in various other ferrous and non-ferrous melting applications, including steel refining (ladle furnace operations for both EAF and basic oxygen furnace steel production), fused materials, chemical processing, and alloy metals.

Additionally, through our Seadrift subsidiary, we are a producer of petroleum needle coke. Needle coke is the key raw material in the manufacture of the graphite electrodes used in melting operations. Petroleum needle coke, a crystalline form of carbon derived from decant oil, is used in the production of graphite electrodes. Our Needle coke production allows us to be the only vertically integrated graphite electrode manufacturer. We believe that Seadrift is the world's second largest petroleum-based needle coke producer and assuming normal annual maintenance, a product mix of only normal premium petroleum needle coke production and related by-products, the annual capacity is approximately 140,000 metric tons. Seadrift currently provides a substantial portion of our needle coke requirements.

Our Industrial Materials segment, which had net sales of $825 million in 2014, $533 million in 2015 and $438 million in 2016 manufactures and delivers high quality graphite electrodes and needle coke products, as well as provides customer technical services. We estimate that the worldwide sales for products serviced by our Industrial Materials segment was approximately $3.5 billion in 2015 and approximately $2.7 billion in 2016. The decline in worldwide sales is primarily the result of lower prices and volumes driven primarily by decreased EAF steel production. This decrease is caused by increased imports to the markets we serve and increased blast furnace steel production as iron ore prices have fallen.

Graphite Electrode Products. Graphite electrodes are consumed primarily in EAF steel production, the steel making technology used by all “mini-mills.” Graphite electrodes are also consumed in the refining of steel in ladle furnaces and in other smelting processes such as production of titanium dioxide.

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Electrodes act as conductors of electricity in the furnace, generating sufficient heat to melt scrap metal, iron ore or other raw materials used to produce steel or other metals. The electrodes are consumed in the course of that production.

Electric arc furnaces operate using either alternating electric current or direct electric current. The vast majority of electric arc furnaces use alternating current. Each of these alternating current furnaces typically uses nine electrodes (in three columns of three electrodes each) at one time. The other electric arc furnaces, which use direct current, typically use one column of three electrodes. The size of the electrodes varies depending on the size of the furnace, the size of the furnace's electric transformer and the planned productivity of the furnace. In a typical furnace using alternating current and operating at a typical number of production cycles per day, one of the nine electrodes is fully consumed (requiring the addition of a new electrode), on average, every eight to ten operating hours. The actual rate of consumption and addition of electrodes for a particular furnace depends primarily on the efficiency and productivity of the furnace. Therefore, demand for graphite electrodes is directly related to the amount and efficiency of EAF steel production.

EAF steel production requires significant heat (as high as 5,000° F) to melt the raw materials in the furnace, primarily scrap metal. Heat is generated as electricity (as much as 150,000 amps) passes through the electrodes and creates an electric arc between the electrodes and the raw materials.

Graphite electrodes are currently the only known commercially available products that have the high levels of electrical conductivity and the capability of sustaining the high levels of heat generated in an electric arc furnace producing steel. Therefore, graphite electrodes are essential to the production of steel in electric arc furnaces. We believe there is currently no commercially viable substitute for graphite electrodes in EAF steel making. We estimate that, on average, the cost of graphite electrodes represents about 1-2% of the total cost of producing steel in a typical electric arc furnace.

EAF steel production was estimated to be approximately 395 million metric tons in 2016, representing approximately 25% of the world's steel production. The World Steel Association's utilization rate for the total steel market was 70% in 2015 and 69% in 2016. EAF steel capacity utilization rates typically follow the trends of the overall steel industry, however recently blast furnace utilization has increased to the detriment of EAF production as iron ore and coal prices have fallen faster than the price of scrap steel.

Relationship Between Graphite Electrode Demand and EAF Steel Production. The improved efficiency of electric arc furnaces has resulted in a decrease in the average rate of consumption of graphite electrodes per metric ton of steel produced in electric arc furnaces (called "specific consumption"). We estimate that the average EAF melter specific consumption is approximately 1.7 kilograms of graphite electrodes per metric ton produced.

Over the long term, specific consumption will continue to decrease at a gradual pace, as the EAF steel makers investment cost (relative to the benefits) increases to achieve further efficiencies in specific consumption. Another contributing factor is the ongoing electrode quality improvements of graphite electrode manufacturers.

We further believe that the rate of decline in the future will be impacted by the addition of modern EAF steel making capacity which tends to have lower specific consumption than older electric arc furnaces. To the extent that this new capacity replaces old capacity, it has the effect of accelerating the reduction in industry wide specific consumption due to the efficiency of new electric arc furnaces relative to the old. However, to the extent that this new capacity increases industry wide EAF steel production capacity and that capacity is utilized, it creates additional demand for graphite electrodes.

Over the long term, graphite electrode demand is estimated to grow at an average annual net growth rate of approximately 1%-2%, based on the anticipated growth of EAF steel production (average historical growth rate of 1%-2%), partially offset by the decline in future specific consumption.

Production Capacity. We believe that the worldwide total graphite electrode manufacturing capacity was approximately 1.88 million metric tons for 2014, 1.85 million metric tons for 2015 and approximately 1.70 million metric tons for 2016. We believe that the worldwide graphite electrode industry manufacturing capacity utilization rate excluding China was approximately 68% for 2015 and 76% for 2016 and including China capacity utilization was approximately 64% in 2015 and 63% in 2016.. We routinely update our estimates as more information, which can vary, becomes available, as stated capacities in some cases are effective capacity adjusted for production yields and product mix.

We have the capability, depending on product demand and mix, to manufacture approximately 195,000 metric tons of graphite electrodes during 2016. This production capacity is down approximately 60,000 metric tons from previous years due to our rationalization initiatives. See Note 4 to the Financial Statements for a discussion on these rationalization activities. As a result of our acquisition of Seadrift in November 2010, our graphite electrode production is vertically integrated. Seadrift currently provides a substantial portion of our needle coke requirements.

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Petroleum Needle Coke and Coke Products. We produce petroleum needle coke. Petroleum needle coke, a crystalline form of carbon derived from decant oil, is used primarily in the production of graphite electrodes. We are one of three petroleum needle coke producers in the world, and this backward integration reduces our reliance on other suppliers. Needle coke is the key raw material in the manufacture of graphite electrodes which are consumed in EAF steel production. Graphite electrode producers combine petroleum or coal tar ("pitch") needle coke with binders and other ingredients to form graphite electrodes. Petroleum and pitch needle coke, relative to other varieties of coke, are distinguished by their needle-like structure and their quality, which is measured by the presence of impurities, principally sulfur, nitrogen and ash. The needle-like structure of petroleum and pitch needle coke creates expansion along the length of the electrode, rather than the width, which reduces the likelihood of fractures. Impurities reduce quality because they increase the coefficient of thermal expansion and electrical resistivity of the graphite electrode, which can lead to uneven expansion and a build-up of heat and cause the graphite electrode to oxidize rapidly and break. Petroleum and pitch needle coke are typically low in these impurities. In order to minimize fractures caused by disproportionate expansion over the width of an electrode, and minimize the effect of impurities, large-diameter graphite electrodes (18 inches to 32 inches) employed in high-intensity electric arc furnace applications are comprised almost exclusively of petroleum and pitch needle coke.

Engineered Solutions Business

We also produce other graphite products within our Engineered Solutions business, which includes advanced graphite materials, advanced energy technologies, refractory products and advanced composite materials. Advanced graphite materials are highly engineered synthetic graphite products used in many areas due to their unique properties and our ability to tailor them to specific solutions. These products are used in transportation, alternative energy, metallurgical, chemical, oil and gas exploration and various other industries. Advanced energy technologies products consist of electronic thermal management solutions, fuel cell components, and sealing materials. Refractory products are used in blast furnaces and submerged arc furnaces due to their high thermal conductivity and the ease with which they can be machined to large or complex shapes. Advanced composite materials are highly engineered carbon products that are woven into various shapes, primarily to support the aerospace and defense industries.

During the first quarter of 2016, we announced that we are exploring strategic options for our Engineered Solutions business to focus our efforts on our graphite electrode business. During the second quarter of 2016, our Engineered Solutions business qualified as held for sale status. All results have been excluded from continuing operations for both the current and prior years, unless otherwise noted. See Note 3 "Discontinued Operations and Assets Held for Sale" for significant components of the results of our Engineered Solutions segment.

During the fourth quarter of 2016, we sold our advanced composite materials business, which produced highly engineered carbon products that are woven into various shapes, primarily to support the aerospace and defense industries. We are continuing to negotiate with potential buyers for the remaining Engineered Solutions' businesses.

Business Strategies

We believe that, by growing our revenues, successfully implementing LEAN initiatives, and maximizing our cash flows, we will deliver enhanced financial performance. We believe this strategy will position us to capitalize on growth opportunities that may arise. We have transformed our operations, building competitive advantages to enable us to compete successfully, to realize enhanced performance as economic conditions improve and to exploit growth opportunities from our intellectual property portfolio. Our business strategies are designed to expand upon our competitive advantages by:

Leveraging Our Unique Global Manufacturing Network. We believe that our global manufacturing network, our backward integration and our research and development provides us with competitive advantages in product quality, product costs, timely and reliable delivery, and operational flexibility to adjust product mix to meet the diverse needs of a wide range of segments and customers.

We continue to leverage our network to seek to achieve significant increases in throughput generated from our existing assets, through productivity improvements, capital expenditures, and other efficiency initiatives. We believe we can further exploit our network by focusing our technical and customer service capabilities on:

- large global customers to whom we believe we are well positioned to offer products that meet their volume, product quality, product mix, delivery reliability and service needs at competitive prices; and

customers in targeted segments where we have competitive advantages to meet identified customer needs due to the range and quality of our products, the utilization of our capacity, the value of our customer technical service and our low cost supplier advantage.

We sell our products in every major geographic region. Sales of our products to buyers outside the U.S. accounted for approximately 76% of net sales in 2014, approximately 80% of net sales in 2015 and 83% in 2016. No single customer or group of affiliated customers accounted for more than 10% of our total net sales in 2014, 2015 or 2016.

Driving Continuous Improvement with LEAN and Six Sigma. We believe a consistent focus on our customers and diligence towards aligning our processes to satisfy these customers is essential in today's global market. We have undertaken a comprehensive launch of LEAN and Six Sigma with dedicated resources at all of our key manufacturing plants intended to create a common language and tool set centering around LEAN and Six Sigma.

Our focus on waste reduction using a team approach creates knowledge at all levels of the organization. Concentrating on creating flow within processes enables us to capitalize on lower inventories while still maintaining a high percentage of on-time-delivery. Our metric driven behavior and process of deploying corrective actions to anomalies drives us towards customer centric solutions. We believe we will be able to continue to leverage our stream-lined processes as a sustainable competitive advantage with shorter lead times, lower costs, higher quality products, and exceptional service.

Delivering Exceptional and Consistent Quality. We believe that our products are among the highest quality products available in our industry. We have been recognized as a preferred or certified supplier by many major steel companies and have received numerous technological innovation and other awards by industry groups, customers and others. Using our technological capabilities, we continually seek to improve the consistent overall quality of our products and services, including the performance characteristics of each product, the uniformity of the same product manufactured at different facilities and the expansion of the range of our products. We believe that improvements in overall quality create significant efficiencies and opportunities for us, provide us the opportunity to increase sales volumes and potential demand share, and create production efficiencies for our customers.

Providing Superior Technical Service. We believe that we are recognized as one of the industry leaders in providing value added technical services to customers for our major product lines. We have a large customer technical service organization, with supporting engineering and scientific groups with more than 90 engineers and specialists around the world dedicated to our Industrial Materials business, and we believe that we are recognized as one of the industry leaders in providing value added technical services to customers for our major product lines. A portion of these employees assist key steel and other metals customers in furnace applications, operations and upgrades to reduce energy consumption, improve raw material costs and increase output.

Maintaining Liquidity and Building Value. We believe that our business strategies and our rationalization and related activities support our goal of growing revenues and operating income and maximizing the cash generated from operations. Maintaining liquidity remains a priority for us. As of December 31, 2016, we had Senior Notes with a carrying value of $274 million which will mature in 2020 with a redemption value of $300 million. We had outstanding borrowings on our Credit Agreement totaling $90.7 million and cash and cash equivalents of $11.6 million. As of December 31, 2015, we had outstanding borrowings under our Credit Agreement of $98 million, $268 million of Senior Notes and cash and cash equivalents of $6.9 million.

We continually review our assets, product lines and businesses to seek out opportunities to maximize value, through re-deployment, merger, acquisition, divestiture or other means, which could include taking on more debt. We may at any time buy or sell assets, product lines or businesses.

Production Planning

We plan and source production of our products globally. We have evaluated virtually every aspect of our global supply chain, and we have redesigned and implemented changes to our global manufacturing, marketing and sales processes to leverage the strengths of our repositioned manufacturing network. Among other things, we have reduced manufacturing bottlenecks, improved product and service quality and delivery reliability, expanded our range of products, improved our global sourcing for our customers and have closed or plan to close high cost manufacturing locations when lower cost manufacturing locations can absorb or expand to meet needed production capacity.

We deploy synchronous work process improvements at most of our manufacturing facilities. We have also installed and continue to install and upgrade proprietary process technologies at our manufacturing facilities, and use statistical process controls in our manufacturing processes for all products, and employ LEAN processing improvement techniques.

Our global manufacturing network also helps us to minimize risks associated with dependence on any single economic region.

Manufacturing

Graphite Electrode Products. The manufacture of a graphite electrode takes, on average, about two months. We manufacture graphite electrodes ranging in size up to 30 inches in diameter and over 11 feet in length, and weighing as much as 5,900 pounds (2.6 metric tons). The manufacture of graphite electrodes includes six main processes: forming the electrode, baking the electrode, impregnating the electrode with a special pitch that improves the strength, rebaking the electrode, graphitizing the electrode using electric resistance furnaces, and machining.

We currently manufacture graphite electrodes in the United States, Mexico, France and Spain and we have an electrode machining center in Brazil. During 2016, we temporarily idled our U.S. facility to align with overall demand.

Petroleum Needle Coke and Coke Products. Petroleum needle coke is produced through a manufacturing process very similar to a refinery. The production process converts decant oil into petroleum needle coke shaped in a needle-like structure. We produce petroleum needle coke at one manufacturing facility in the U.S.

Quality Standards and Maintenance. Most of our global manufacturing facilities are certified and registered to ISO 9001-2008 international quality standards and some are certified to QS 9001-2008. Maintenance at our facilities is conducted on an ongoing basis.

Raw Materials and Suppliers. The primary raw materials for electrodes are engineered by-products and residues of the petroleum and coal industries. We use these raw materials because of their high carbon content. The primary raw materials for graphite electrodes are calcined needle coke and pitch. We purchase raw materials from a variety of sources and believe that the quality and cost of our raw materials on the whole is competitive with those available to our competitors. We obtained a substantial portion of our 2016 needle coke requirements internally and plan to do the same in 2017.

The primary raw material used by Seadrift to make petroleum needle coke is decant oil, a by-product of the gasoline refining process. Seadrift is not dependent on any single refinery for decant oil. While Seadrift has purchased a substantial majority of its raw material inventory from a limited number of suppliers in recent years, we believe that there is an abundant supply of suitable decant oil in the United States available from a variety of sources.

We purchase energy from a variety of sources. Electric power used in manufacturing processes is purchased from local suppliers under contracts with pricing based on rate schedules or price indices. Our electric costs can vary significantly depending on these rates and usage. Natural gas used in manufacturing processes is purchased from local suppliers primarily under annual volume contracts with pricing based on various natural gas price indices.

Distribution

We deploy various demand management and inventory management techniques to seek to ensure we can meet our customers’ delivery requirements while still maximizing the utilization of our production capacity. We can experience significant variation in our customers’ delivery requirements as their specific needs vary and change through the year. We generally seek to maintain appropriate inventory levels, taking into account these factors as well as the significant differences in manufacturing cycle times for graphite electrode products and our customers’ products.

Finished products are usually stored at our manufacturing facilities. Limited quantities of some finished products are also stored at local warehouses around the world to meet customer needs.

Sales and Customer Service

We believe our product quality, our global manufacturing network and our low cost structure allow us to deliver a broad range of product offerings across various segments. We differentiate and sell the value of our product offerings, depending on the segment or specific product application, primarily based on product quality and performance, delivery reliability, price, and customer technical service.

We price our products based on the value that we believe we deliver to our customers. Pricing may vary within any given industry, depending on the segment within that industry and the value of the offer to a specific customer. We believe that we can achieve increased competitiveness, customer demand, and profitability through our value

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added offerings to customers. In certain segments where the product is less differentiated, these value added offerings have less impact on our competitiveness.

We have a large customer technical service organization, with supporting application engineering and scientific groups and more than 90 engineers and specialists around the world dedicated to our Industrial Materials business. We believe that we are recognized as one of the industry leaders in providing value added technical services to customers for our major product lines.

We deploy these selling methods and our customer technical service to address the specific needs of all products. Our direct sales force currently operates from 6 sales offices located around the world.

We sell our Industrial Materials products primarily through our direct sales force, independent sales representatives and distributors, all of whom are trained and experienced with our products.

Historically, our graphite electrode customers generally seek to negotiate to secure the reliable supply of their anticipated volume requirements on an annual basis, sometimes called the “graphite electrode book building process”. These orders are subject to renegotiation or adjustment to meet changing conditions. The balance of our graphite electrode customers purchase their electrodes as needed at current market prices.

We have customer technical service personnel based around the world to assist customers to maximize their production and minimize their costs. A portion of our engineers and technicians provide technical service and advice to key steel and other metals customers. These services relate to furnace applications and operation, as well as furnace upgrades to reduce energy consumption, improve raw material costs and increase output.

Technology

We believe that we are an industry leader in graphite and carbon materials science and high temperature processing know-how and that we operate premier research, development and testing facilities for our industry. We have over 125 years of experience in the research and development of graphite and carbon technologies.

Research and Development. We conduct our research and development both independently and in conjunction with our strategic suppliers, customers and others. We opened a new dedicated innovation and technology center located near our corporate headquarters in Ohio in February 2015 which focuses on all products. This facility drives innovation to support new product development and commercialize the next generation technologies in carbon and graphite material science. The activities at this center are integrated with the efforts of our engineers at our manufacturing facilities who are focused on improving manufacturing processes.

Research and development expenses amounted to $9.7 million in 2014, $3.4 million in the period January 1 through August 14, 2015, $1.1 million in the period August 15 through December 31, 2015 and $2.4 million in 2016. We believe that our technological and manufacturing strengths and capabilities provide us with a significant growth opportunity as well as a competitive advantage.

Intellectual Property. We believe that our intellectual property, consisting primarily of patents and proprietary know-how, provides us with competitive advantages and is important to our growth opportunities. Our intellectual property portfolio is extensive, with approximately 201 carbon and graphite U.S. and foreign patents and published patent applications focused on our Industrial Materials business, which we believe is more than any of our major competitors (in the business segments in which we operate).

We own, and have obtained licenses to, various trade names and trademarks used in our businesses. For example, the trade name and trademark UCAR are owned by Union Carbide Corporation (which was acquired by Dow Chemical Company) and are licensed to us on a worldwide, exclusive and royalty-free basis until 2025. This particular license automatically renews for successive ten-year periods. It permits non-renewal by Union Carbide in 2025 or at the end of any renewal period upon five years’ notice of non-renewal.

We rely on patent, trademark, copyright and trade secret laws as well as appropriate agreements to protect our intellectual property. Among other things, we seek to protect our proprietary know-how and information, through the requirement that employees, consultants, strategic partners and others, who have access to such proprietary information and know-how, enter into confidentiality or restricted use agreements.

Competition

Competition in the Industrial Materials segment is intense and is based primarily on product differentiation and quality, delivery reliability, price, and customer service, depending on the segment or specific product application.

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In the most demanding product applications (that is, graphite electrodes that can operate in the largest, most productive and demanding EAF steel mills in the world), we compete primarily on product quality, delivery reliability, price and customer technical service. We believe these are prerequisite capabilities that not all producers of graphite electrodes possess or can demonstrate consistently. We primarily compete with higher quality graphite electrode producers, although this segment of the graphite electrode market has become increasingly competitive in recent years as more graphite electrode producers have improved the quality of their offerings and become qualified suppliers to some of the largest and most sophisticated EAF customers.

In other product applications, including ladle furnaces requiring less demanding performance and certain other ferrous and non-ferrous segments, we compete based on product differentiation, product quality and price. We believe our product quality, global manufacturing network, proximity to regional and local customers and the related lower cost structure allows us to deliver a broad range of product offerings across these various segments.

We believe that there are no current commercially viable substitutes for graphite electrodes in EAF steel production. We believe that there are certain cost and technology barriers to entry into our industry, including the need for extensive product and process know-how and other intellectual property and a high initial capital investment. It also requires high quality raw material sources and a developed energy supply infrastructure. However, competing manufacturers, particularly Chinese manufacturers, have been able to expand their sales and manufacturing geographically.

There are a number of international graphite electrode producers, including SGL Carbon A.G. (Germany), Tokai Carbon Co., Ltd. (Japan), Showa Denko Carbon K.K. (Japan), Graphite India Limited (India), HEG Limited (India), SEC Corporation Limited (Japan), Nippon Carbon Co., Ltd. (Japan), Energoprom Group (Russia), Fangda Carbon New Material Technology Co., Ltd. (China), Nantong Yangzi Carbon Co. Ltd (China), Kaifeng Carbon Co., Ltd. (China) and Sinosteel Jilin Carbon Co., Ltd (China), as well as a number of others. In October 2016, SGL Carbon A.G. agreed to sell its performance products business, which is comprised mainly of their graphite electrode product line to Showa Denko Carbon K.K.

All graphite electrode manufacturers, even those without multinational manufacturing operations, are capable of, and many in fact are, supplying their products globally and are experiencing increased competition from Indian, Russian and Chinese graphite electrode manufacturers. The Chinese government has strongly supported and invested heavily in industrial expansion in recent years and continues to do so. As a part of this expansion, Chinese production of graphite electrodes has increased and the quality of the electrodes produced in China has improved. The Chinese currency policies regarding the Renminbi may provide Chinese producers with a competitive advantage with respect to exports of graphite electrodes.

Coke represents a significant portion of the cost to produce a graphite electrode. Competition in the needle coke industry is based primarily on price, reliability and product specifications. Our Seadrift facility competes primarily on the specifications and price of its needle coke.

We believe there are currently approximately nine other firms producing needle coke. These competitors include Phillips 66 (U.S.), Petrocokes Japan Limited (Japan), Mitsubishi Chemical Company, Baosteel Group (China), C-Chem Co., Ltd. (Japan), Indian Oil Company Limited (India), JX Holdings Inc. (Japan), Petrochina International Jinzhou Co., Ltd. (China) and Anshan Kaitan Thermo-Energy New Materials Co., Ltd (China).

Environmental Matters

We are subject to a wide variety of federal, state, local and foreign environmental laws and regulations that govern our properties, neighboring properties, and our current and former operations worldwide. These laws and regulations relate to the presence, use, storage, handling, generation, treatment, emission, release, discharge and disposal of wastes and other substances, including the packaging, labeling and transportation of products that are defined as hazardous or toxic or otherwise believed to have potential to harm the environment or human health. These laws and regulations (and the enforcement thereof) are periodically changed and are becoming increasingly stringent. We have incurred substantial costs in the past, and will continue to incur additional costs in the future, to comply with these legal requirements.

The principal U.S. laws to which our properties and operations are subject include:

- the Clean Air Act, the Clean Water Act and the Resource Conservation and Recovery Act and similar state and local laws which regulate air emissions, water discharges and hazardous waste generation, treatment, storage, handling, transportation and disposal;

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- the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, and the Small Business Liability Relief and Brownfields Revitalization Act of 2002, and similar state laws that provide for the reporting of, responses to and liability for, releases of hazardous substances into the environment; and
- the Toxic Substances Control Act and related laws that are designed to track and control chemicals that are produced or imported into the United States and assess the risk to health and to the environment of new products at early developmental stages.

Further, laws and regulations adopted or proposed in various states impose or may impose, as the case may be, environmental monitoring, reporting and/or remediation requirements if operations cease or property is transferred or sold.

We believe that we are currently in compliance in all material respects with the federal, state, local and foreign environmental laws and regulations to which we are subject. We have experienced some level of regulatory scrutiny at most of our current and former facilities and, in some cases, have been required to take corrective or remedial actions and incur related costs in the past, and may experience further regulatory scrutiny, and may be required to take further corrective or remedial actions and incur additional costs, in the future. Although it has not been the case in the past, these costs could have a material adverse effect on us in the future.

We have received and may in the future receive notices from the U.S. Environmental Protection Agency (“U.S. EPA”) or state environmental protection agencies, as well as claims from other parties, alleging that we are a potentially responsible party (“PRP”) under Superfund and similar state laws for past and future remediation costs at waste disposal sites and other contaminated properties. Although Superfund liability is joint and several, in general, final allocation of responsibility at sites where there are multiple PRPs is made based on each PRP's relative contribution of hazardous substances to the site. Based on information currently available to us, we believe that any potential liability we may have as a PRP will not have a material adverse effect on us.

As a result of amendments to the Clean Air Act enacted in 1990, certain of our U.S. facilities have been or will be required to comply with new reporting requirements and standards for air emissions that have been or may be adopted by the U.S. EPA and state environmental protection agencies pursuant to new and revised regulations that have been or could be promulgated, including the possible promulgation of future maximum achievable control technology standards that apply specifically to our manufacturing sector(s), or more generally to our operation(s) or equipment. Achieving compliance with the regulations that have been promulgated to date has resulted in the need for additional administrative and engineered controls, changes to certain manufacturing processes, and increased monitoring and reporting obligations. Similar foreign laws and regulations have been or may also be adopted to establish new standards for air emissions, which may also require additional controls on our manufacturing operations outside the U.S. Based on information currently available to us, we believe that compliance with these regulations will not have a material adverse effect on us.

As mentioned, our manufacturing operations located outside of the U.S. are also subject to their national and local laws and regulations related to environmental protection and product safety. Under the European Union's (“EU”) regulations concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (commonly referred to as “REACH”), enacted in 2007, manufacturers within the EU and importers into the EU of certain chemical substances are required to register and evaluate the potential impacts of those substances on human health and the environment. Under REACH, the continued importation into the EU, manufacture and/or use of certain chemical substances may be restricted, and manufacturers and importers of certain chemicals will be required to undertake evaluations of those substances. The requirements of REACH are being phased in over a period of years, and compliance is requiring and will continue to require expenditures and resource commitments. Based on information currently available to us, we believe that compliance with these regulations will not have a material adverse effect on us.

International accords, foreign laws and regulations, and U.S. federal, state and local laws and regulations are increasingly being enacted to address concerns about the effects that carbon dioxide (“CO2”) emissions and other identified greenhouse gases (“GHG”) may have on the environment and climate worldwide. These effects are widely referred to as Climate Change. Some members of the international community have taken actions in the past to address Climate Change issues on a global basis. In 1997, an international Kyoto Protocol set binding GHG emission reduction targets for the participating industrialized countries. Participating members of the international community continue to meet at annual meetings of the United Nations Framework Convention on Climate Change ("UNFCC") to reach global agreements on Climate Change to replace the expired Kyoto Protocol.

The EU Emissions Trading Scheme ("EU ETS") enacted under the provisions of the 1997 Kyoto Protocol requires certain listed energy-intensive industries to participate in an international "cap and trade" system of GHG

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emission allowances. A third phase of the EU ETS started in January 2013 under Directive 2009/29/EC, which instituted a number of program changes. EU Member States brought into force the necessary laws, regulations and administrative provisions to comply with this EU Directive. Carbon and graphite manufacturing is still not a covered industry sector in the revised Annex 1 of this Directive. However, one of our European manufacturing operations was required to comply with these provisions under a more general fuel combustion category, because their combustion units met the applicability levels. The operations subject to these provisions was eligible to receive free carbon dioxide emission allowances under the member state allocation program.

In December 2015, the 21st Conference of Parties for the UNFCC concluded with more than 190 countries adopting the Paris Agreement, which then came into force and legally binding on the parties in November 2016, after the three criteria in Article 21 were satisfied. The Paris Agreement is a partly binding and partly voluntary agreement to cut global carbon emissions in an effort to limit the rise in global temperatures. The U.S. has pledged to achieve significant reductions in CO2 emissions by 2020. The U.S. may sign a future international Climate Change agreement and/or enact new national Climate Change legislation to reduce GHG emissions in accordance with established goals and deadlines. Such new legislation could impact our industry directly or indirectly, for example by higher energy costs. One or more of our U.S. facilities could be covered by such new legislation and we could incur additional compliance obligations and related expenses.

In 2009, a Final Mandatory Reporting of Greenhouse Gases Rule was issued by the U.S. EPA, which requires facilities with specified GHG sources that emit over the annual threshold quantities to monitor and report their GHG emissions annually. In addition, corporations that are large suppliers of petroleum products (including, by definition, importers and exporters that exceed the annual GHG threshold quantities) must also submit an annual activity report to the U.S. EPA. Some of our operations are covered under this Rule, and we believe that we have the necessary administrative systems in place to comply with the requirements. Under various other foreign and U.S. state regulations, we are currently required to report certain GHG emissions to the pertinent authorities. Furthermore, in December 2009, the U.S. EPA issued an “endangerment and cause or contribute finding” for GHG, under Section 202(a) of the Clean Air Act, allowing it to issue new rules that directly regulate GHG emissions under the existing federal New Source Review, Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs. In May 2010, the U.S. EPA set GHG emissions thresholds to define when permits under these programs are required for new and existing industrial facilities. Under these programs, new or significantly modified facilities must also use best available control technologies to minimize GHG emissions. Therefore, we may incur future expenses to modify our air permits, implement additional administrative and engineered controls, invest in capital improvements, and/or make changes in certain manufacturing processes at our U.S. facilities to achieve compliance with these regulations or to expand our operations.

Based on information currently available to us, we believe that compliance with international accords, U.S. and foreign laws and regulations concerning Climate Change which have been promulgated, or that could be promulgated in the future, will not have a material adverse effect on us.

We have sold or closed a number of facilities that had operated solid waste management units on site. In most cases where we divested the properties, we have retained ownership of on-site landfills. When our landfills were or are to be sold, we obtained or seek to obtain financial assurance we believe to be adequate to protect us from any potential future liability associated with these landfills. When we have closed landfills, we believe that we have done so in material compliance with applicable laws and regulations. We continue to monitor these landfills and observe any reporting obligations we may have with respect to them pursuant to applicable laws and regulations. To date, the costs associated with the retained landfills have not been, and we do not anticipate that future costs will be, material to us.

Estimates of future costs for compliance with U.S. and foreign environmental protection laws and regulations, and for environmental liabilities, are necessarily imprecise due to numerous uncertainties, including the impact of potential new laws and regulations, the availability and application of new and diverse technologies, the extent of insurance coverage, the potential discovery of contaminated properties, or the identification of new hazardous substance disposal sites at which we may be a PRP and, in the case of sites subject to Superfund and similar state and foreign laws, the final determination of remedial requirements and the ultimate allocation of costs among the PRPs. Subject to the inherent imprecision in estimating such future costs, but taking into consideration our experience to date regarding environmental matters of a similar nature and facts currently known, we estimate that our costs and capital expenditures (in each case, before adjustment for inflation) for environmental protection regulatory compliance programs and for remedial response actions will not increase materially over the next several years.

Furthermore, we establish accruals for environmental liabilities when it is probable that a liability has been or will be incurred, and the amount of the liability can be reasonably estimated. We adjust the accrual as new remedial

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actions or other commitments are made, and when new information becomes available that changes the prior estimates previously made.

Insurance

We maintain insurance against civil liabilities relating to personal injuries to third parties, for loss of or damage to property, for business interruptions and for environmental matters, that provides coverage, subject to the applicable coverage limits, deductibles and retentions, and exclusions, that we believe are appropriate upon terms and conditions and for premiums that we consider fair and reasonable in the circumstances. We cannot assure you, however, that we will not incur losses beyond the limits of or outside the coverage of our insurance.

Employees

As of December 31, 2016, we had 1,244 employees in our Industrial Materials business and supporting corporate functions (excluding contractors), a decrease of 75 employees from December 31, 2015. A total of 425 employees were in Europe (including Russia), 593 were in Mexico and Brazil, 6 were in South Africa, 211 were in the U.S. and 9 were in the Asia Pacific region. As of December 31, 2016, 750 of our employees were hourly employees.

As of December 31, 2016, approximately 53% of our worldwide employees were covered by collective bargaining or similar agreements, which expire at various times in each of the next several years. As of December 31, 2016, approximately 536 employees, or 43% of our employees, were covered by agreements which expire, or are subject to renegotiation, at various times through December 31, 2017. We believe that, in general, our relationships with our unions are satisfactory and that we will be able to renew or extend our collective bargaining or similar agreements on reasonable terms as they expire. We cannot assure, however, that renewed or extended agreements will be reached without a work stoppage or strike or will be reached on terms satisfactory to us.

We have not had any material work stoppages or strikes during the past decade.

Item 1A. Risk Factors

An investment in our securities involves significant risks. You should carefully read all of the information included in this report and carefully consider, among other matters, the following risk factors, as well as any discussed under Item 7, “Management's Discussion and Analysis of Financial Conditions and Results of Operations.” If any of the conditions or events described in the following risk factors were to occur, our business, financial condition, results of operations or growth prospects could be affected materially and adversely. In that case, the market price of our securities could decline and you could lose part or all of your investment.

The risks described below are not the only ones facing us. Additional risks not presently known to us, or that we currently deem immaterial, individually or in the aggregate, may also impair our business operations.

RISKS RELATING TO US

A downturn in global economic conditions may materially adversely affect our business.

A global, regional or localized economic downturn may reduce customer demand or inhibit our ability to produce our products, negatively impacting our operating results. Our business and operating results have been and will continue to be sensitive to economic downturns (including credit market tightness which can impact our liquidity as well as that of our customers, suppliers and other business partners), declining consumer and business confidence, fluctuating commodity prices, volatile exchange rates and other challenges that can affect the economy. Our customers may experience deterioration of their businesses, cash flow shortages and difficulty obtaining financing, leading them to delay or cancel plans to purchase products, and they may not be able to fulfill their obligations in a timely fashion. Further, suppliers and other business partners may experience similar conditions, which could impact their ability to fulfill their obligations to us. Also, it could be difficult to find replacements for business partners without incurring significant delays or cost increases). Such events and other economic matters would negatively impact our revenues and results of operations.

As more fully described under “Management's Discussion and Analysis of Financial Condition and Results of Operations,” we are currently facing a challenging environment for our products, particularly our Industrial Materials products, as a result of global economic conditions.

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The International Monetary Fund reported GDP growth figures for 2016 at approximately 3.1 percent. We believe that worldwide the graphite electrode industry manufacturing capacity utilization rate excluding China was approximately 68% for 2015 and 76% for 2016 and including China capacity utilization was approximately 64% in 2015 and 63% in 2016.. These lower capacity utilization rates may continue to be driven by a challenging environment for our customers which would negatively impact demand for our Industrial Materials products and may adversely affect our revenue and results of operations for 2017.

We are dependent on the global steel industry.

We sell our Industrial Materials products, which accounted for 100% of our total net sales within continuing operations in 2016, primarily to the EAF steel production industry. Our customers, including major steel producers, are experiencing and may continue to experience downturns or financial distress that could adversely impact our ability to collect our accounts receivable or to collect them on a timely basis.

The steel industry has historically been highly cyclical and is affected significantly by general economic conditions. Significant customers for the steel industry include companies in the automotive, construction, appliance, machinery, equipment and transportation industries, all of which continue to be affected by the general economic downturn and the deterioration in financial markets, including severely restricted liquidity and credit availability.

We sell products used in the transportation, semiconductor, solar, petrochemical, electronics, and other industries which are susceptible to global and regional economic downturns

Many of our other products are sold primarily to the electronics, transportation, alternative energy, and oil and gas exploration industries. These are global basic industries, and they are experiencing various degrees of contraction, growth and consolidation. Customers in these industries are located in every major geographic region. As a result, our customers are affected by changes in global and regional economic conditions. This, in turn, affects overall demand and prices for our products sold to these industries. As a result of changes in economic conditions, demand and pricing for our products sold to these industries has fluctuated and in some cases declined significantly, which could have a material adverse effect on our results of operations.

Demand for our products sold to these industries may be adversely affected by improvements in our products as well as in the manufacturing operations of customers, which reduce the rate of consumption or use of our products.

Sales volumes and prices of our products sold to these industries are impacted by the supply/demand balance as well as overall changes in demand, excess capacity and growth of and consolidation within, the end markets for our products. In addition to the factors mentioned above, the supply/demand balance is affected by factors such as business cycles, rationalization, and increases in capacity and productivity initiatives within our industry and the end markets for our products, and certain of such factors are affected by decisions by us. Changes in the supply/demand balance could have a material adverse effect on our results of operations.

In addition, a continuation of the current difficult economic conditions may lead current or potential customers of our Engineered Solutions business to delay or reduce technology purchases or slow their adoption of new technologies. This may result in a continued reduction, or slower rate of recovery, of sales of our Engineered Solutions products and increased price competition, which could materially and adversely affect our financial position and results of operations.

Our indebtedness could limit our financial and operating activities, and adversely affect our ability to incur additional debt to fund future needs.

As of December 31, 2016, we had approximately $365.4 million of total indebtedness principal outstanding, This includes $274.1 million of Senior Notes ($300.0 million due upon maturity). The Company also has access to a $225 million Revolving Facility (subject to a $25 million minimum liquidity requirement). As of December 31, 2016, the Company had $61.2 million of borrowings and $12.3 million of letters of credit, for a total of $73.5 million drawn against the Revolving Facility.

. This substantial amount of indebtedness could:

- require us to dedicate a substantial portion of our cash flow to the payment of principal and interest, thereby reducing the funds available for operations and future business opportunities;

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- make it more difficult for us to satisfy our obligations with respect to the Senior Notes, including our repurchase obligations;
- limit our ability to borrow additional money if needed for other purposes, including working capital, capital expenditures, debt service requirements, acquisitions and general corporate or other purposes, on satisfactory terms or at all;
- limit our ability to adjust to changing economic, business and competitive conditions;
- place us at a competitive disadvantage with competitors who may have less indebtedness or greater access to financing;
- make us more vulnerable to an increase in interests rates, a downturn in our operating performance or a decline in general economic conditions; and
- make us more susceptible to changes in credit ratings, which could impact our ability to obtain financing in the future and increase the cost of such financing.

If compliance with our debt obligations under the Revolving Facility materially limits our financial or operating activities, or hinders our ability to adapt to changing industry conditions, we may lose market share, our revenue may decline and our operating results may be negatively affected.

The Credit Agreement governing the Revolving Facility and the indenture governing the Senior Notes includes covenants that could restrict or limit our financial and business operations.

The Credit Agreement and the Indenture contain a number of restrictive covenants that, subject to certain exceptions and qualifications, restrict or limit GTI's ability and the ability of GTI's subsidiaries to, among other things:

- incur, repay or refinance indebtedness;
- create liens on or sell our assets;
- engage in certain fundamental corporate changes or changes to our business activities;
- make investments or engage in mergers or acquisitions;
- engage in sale-leaseback transactions;
- pay dividends or repurchase stock;
- engage in certain affiliate transactions;
- enter into agreements or otherwise restrict GTI's subsidiaries from making distributions or paying dividends to the borrowers under the Revolving Facility; and
- repay intercompany indebtedness owed to GTI or make distributions or pay dividends to GTI.

The Credit Agreement also contains certain affirmative covenants and requires us to comply with financial coverage ratios regarding both our cash interest expense and our senior secured debt relative to our EBITDA (as defined in the Credit Agreement).

These covenants and restrictions could affect our ability to operate our business, and may limit our ability to react to market conditions or take advantage of potential business opportunities as they arise. Additionally, our ability to comply with these covenants may be affected by events beyond our control, including general economic and credit conditions and industry downturns.

If we fail to comply with the covenants in the Credit Agreement and are unable to obtain a waiver, or amendment, an event of default would result, and the lenders could, among other things, declare outstanding amounts due and payable, refuse to lend additional amounts to us, require deposit of cash collateral in respect of outstanding letters of credit, or refuse to waive any restrictive covenants in the Credit Agreement, including the restriction which prohibits dividends and distributions from GTI's subsidiaries to GTI to fund payment of indebtedness, including the Senior Notes, during a default or event of default. If we were unable to repay or pay the amounts due, the lenders could, among other things, proceed against the collateral granted to them to secure such indebtedness, which includes substantially all of the assets of GTI and its U.S. subsidiaries and certain assets of certain of GTI's foreign subsidiaries.

Our cash flows may not be sufficient to service our indebtedness, and if we are unable to satisfy our obligations under our indebtedness, we may be required to seek other financing alternatives, which may not be successful.

Our ability to make timely payments of principal and interest on our debt obligations, including the Senior Notes and our obligations under the Revolving Facility, depends on our ability to generate positive cash flows from operations, which is subject to general economic conditions, competitive pressures and certain financial, business and other factors beyond our control. If our cash flows and capital resources are insufficient to make these payments, we may be required to seek additional financing sources, reduce or delay capital expenditures, sell assets or operations or refinance our indebtedness. These actions could have a material adverse effect on our business, financial conditions and results of operations. In addition, we may not be able to take any of these actions, and, even if successful, these actions may not permit us to meet our scheduled debt service obligations. Our ability to restructure or refinance the debt under the Revolving Facility will depend on, among other things, the condition of the capital markets and our financial condition at such time. There can be no assurance that we will be able to restructure or refinance any of our indebtedness on commercially reasonable terms or at all. If we cannot make scheduled payments on our debt, we will be in default and the outstanding principal and interest on our debt could be declared to be due and payable, in which case we could be forced into bankruptcy or liquidation or required to substantially restructure or alter our business operations or debt obligations.

Borrowings under the Revolving Facility bear interest at a variable rate, which subjects us to interest rate risk, which could cause our debt service obligations to increase significantly.

All of our borrowings under the Revolving Facility are at variable rates of interest and expose us to interest rate risk. If interest rates increase, our debt service obligations on this variable rate indebtedness would increase even though the amount borrowed remained the same.

We may not be able to raise the funds necessary to finance a change of control repurchase under the Indenture governing the Senior Notes.

Upon the occurrence of a change of control repurchase event under the Indenture, holders of Senior Notes may require us to purchase their Senior Notes. However, it is possible that we would not have sufficient funds at that time to make the required purchase of Senior Notes. We cannot assure you that we will have sufficient financial resources, or will be able to arrange financing, to pay the repurchase price in cash with respect to any Senior Notes tendered by holders for repurchase upon a change of control. Our failure to repurchase the Senior Notes when required would result in an event of default under the Indenture which could, in turn, constitute a default under the terms of our other indebtedness, if any.

The Credit Agreement governing the Revolving Facility includes covenants that could restrict or limit our ability to repurchase the Senior Notes in a change of control repurchase event.

Upon the occurrence of a change of control repurchase event under the indenture governing the Senior Notes, holders of Senior Notes may require us to purchase their Senior Notes. The Credit Agreement contains a restrictive covenant on the repurchase or retirement of indebtedness, which could limit or restrict our ability to make the required repurchase of Senior Notes. If the repurchase of Senior Notes does violate covenants in the Credit Agreement and if we are unable to obtain a waiver or amendment, an event of default would occur if we repurchased the Senior Notes, and the lenders under the Credit Agreement could, among other things, declare outstanding amounts thereunder due and payable, refuse to lend additional amounts to us, and require a deposit of cash collateral in respect of outstanding letters of credit. If we were unable to repay or pay the amounts due, the lenders could, among things, proceed against the collateral granted to them to secure such indebtedness, which includes substantially all of the assets of GTI and GTI's U.S. subsidiaries and certain assets of certain of GTI's foreign subsidiaries.

A lowering or withdrawal of the ratings assigned to our debt securities by rating agencies may increase our future borrowing costs and reduce our access to capital.

Any rating assigned to our debt could be lowered or withdrawn entirely by a rating agency if, in that rating agency's judgment, future circumstances relating to the basis of the rating, such as adverse changes, so warrant. Any future lowering of our ratings likely would make it more difficult or more expensive for us to obtain additional debt financing. In January 2016, Moody's downgraded our Senior Notes from B1 to Caa1.

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Disruptions in the capital and credit markets, which may continue indefinitely or intensify, could adversely affect our results of operations, cash flows and financial condition, or those of our customers and suppliers.

Disruptions in the capital and credit markets may adversely impact our results of operations, cash flows and financial condition, or those of our customers and suppliers. Disruptions in the capital and credit markets as a result of uncertainty, changing or increased regulation, reduced alternatives or failures of significant financial institutions could adversely affect our access to liquidity needed to conduct or expand our businesses or conduct acquisitions or make other discretionary investments, as well as our ability to effectively hedge our currency or interest rate risks and exposures. Such disruptions may also adversely impact the capital needs of our customers and suppliers, which, in turn, could adversely affect our results of operations, cash flows and financial condition.

We are subject to risks associated with operations in multiple countries.

A substantial majority of our net sales are derived from sales outside the U.S., and a majority of our operations and our total property, plant and equipment and other long- lived assets are located outside the U.S. As a result, we are subject to risks associated with operating in multiple countries, including:

- currency devaluations and fluctuations in currency exchange rates, including impacts of transactions in various currencies, impact on translation of various currencies into dollars for U.S. reporting and financial covenant compliance purposes, and impacts on results of operations due to the fact that costs of our foreign subsidiaries are primarily incurred in local currencies while their products are primarily sold in dollars and euros;
- imposition of or increases in customs duties and other tariffs;
- imposition of or increases in currency exchange controls, including imposition of or increases in limitations on conversion of various currencies into dollars, euros, or other currencies, making of intercompany loans by subsidiaries or remittance of dividends, interest or principal payments or other payments by subsidiaries;
- imposition of or increases in revenue, income or earnings taxes and withholding and other taxes on remittances and other payments by subsidiaries;
- imposition of or increases in investment or trade restrictions by the U.S. or by non-U.S. governments or trade sanctions adopted by the U.S.;
- inability to definitively determine or satisfy legal requirements, inability to effectively enforce contract or legal rights and inability to obtain complete financial or other information under local legal, judicial, regulatory, disclosure and other systems; and
- nationalization or expropriation of assets, and other risks which could result from a change in government or government policy, or from other political, social or economic instability.

We cannot assure you that such risks will not have a material adverse effect on us or that we would be able to mitigate such material adverse effects in the future.

In addition to the factors noted above, our results of operations and financial condition are affected by inflation, deflation and stagflation in each country in which we have a manufacturing facility. We cannot assure you that future increases in our costs will not exceed the rate of inflation or the amounts, if any, by which we may be able to increase prices for our products.

Our ability to grow and compete effectively depends on protecting our intellectual property. Failure to protect our intellectual property could adversely affect us.

We believe that our intellectual property, consisting primarily of patents and proprietary know-how and information, is important to our growth. Failure to protect our intellectual property may result in the loss of the exclusive right to use our technologies. We rely on patent, trademark, copyright and trade secret laws and confidentiality and restricted use agreements to protect our intellectual property. Some of our intellectual property is not covered by any patent or patent application or any such agreement.

Patents are subject to complex factual and legal considerations. Accordingly, there can be uncertainty as to the validity, scope and enforceability of any particular patent. Therefore, we cannot assure you that:

- any of the U.S. or foreign patents now or hereafter owned by us, or that third parties have licensed to us or may in the future license to us, will not be circumvented, challenged or invalidated;
- any of the U.S. or foreign patents that third parties have non-exclusively licensed to us, or may non-exclusively license to us in the future, will not be licensed to others; or
- any of the patents for which we have applied or may in the future apply will be issued at all or with the breadth of claim coverage sought by us.

Moreover, patents, even if valid, only provide protection for a specified limited duration.

We cannot assure you that agreements designed to protect our proprietary know-how and information will not be breached, that we will have adequate remedies for any such breach, or that our strategic alliance suppliers and customers, consultants, employees or others will not assert rights against us with respect to intellectual property arising out of our relationships with them.

In addition, effective patent, trademark and trade secret protection may be limited, unavailable or not applied for in the U.S. or in any of the foreign countries in which we operate.

Further, we cannot assure you that the use of our patented technology or proprietary know-how or information does not infringe the intellectual property rights of others.

Intellectual property protection does not protect against technological obsolescence due to developments by others or changes in customer needs.

The protection of our intellectual property rights may be achieved, in part, by prosecuting claims against others whom we believe have misappropriated our technology or have infringed upon our intellectual property rights, as well as by defending against misappropriation or infringement claims brought by others against us. Our involvement in litigation to protect or defend our rights in these areas could result in a significant expense to us, adversely affect the development of sales of the related products, and divert the efforts of our technical and management personnel, regardless of the outcome of such litigation.

If necessary, we may seek licenses to intellectual property of others. However, we can give no assurance to you that we will be able to obtain such licenses or that the terms of any such licenses will be acceptable to us. Our failure to obtain a license from a third party for its intellectual property that is necessary for us to make or sell any of our products could cause us to incur substantial liabilities and to suspend the manufacture or shipment of products or use of processes requiring the use of such intellectual property.

Our current and former manufacturing operations are subject to increasingly stringent health, safety and environmental requirements.

We use and generate hazardous substances in our manufacturing operations. In addition, both the properties on which we currently operate and those on which we have ceased operations are and have been used for industrial purposes. Further, our manufacturing operations involve risks of personal injury or death. We are subject to increasingly stringent environmental, health and safety laws and regulations relating to our current and former properties, neighboring properties, and our current raw materials, products, and operations. These laws and regulations provide for substantial fines and criminal sanctions for violations and sometimes require evaluation and registration or the installation of costly pollution control or safety equipment or costly changes in operations to limit pollution or decrease the likelihood of injuries. It is also possible that the impact of such regulations on our suppliers could affect the availability and cost of our raw materials. In addition, we may become subject to potential material liabilities for the investigation and cleanup of contaminated properties, for claims alleging personal injury or property damage resulting from exposure to or releases of hazardous substances, or for personal injury as a result of an unsafe workplace. Further, alleged noncompliance with or stricter enforcement of, or changes in interpretations of, existing laws and regulations, adoption of more stringent new laws and regulations, discovery of previously unknown contamination or imposition of new or increased requirements could require us to incur costs or become the basis of new or increased liabilities that could be material.

We may face risks related to greenhouse gas emission limitations and climate change.

There is growing scientific, political and public concern that emissions of greenhouse gases (“GHG”) are altering the atmosphere in ways that are affecting, and are expected to continue to affect, the global climate. Legislators,

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regulators and others, as well as many companies, are considering ways to reduce GHG emissions. GHG emissions are regulated in the European Union via an Emissions Trading Scheme (“ETS”), otherwise known as a “Cap and Trade” program. In the United States, environmental regulations issued in 2009 and 2010 require reporting of GHG emissions by defined industries, activities and suppliers, and regulate GHG as a pollutant covered under the New Source Review, Prevention of Significant Deterioration (“PSD”) and Title V Operating Permit programs of the Clean Air Act Amendments. It is possible that some form of regulation of GHG emissions will also be forthcoming in other countries in which we operate or market our products. Regulation of GHG emissions could impose additional costs, both direct and indirect, on our business, and on the businesses of our customers and suppliers, such as increased energy and insurance rates, higher taxes, new environmental compliance program expenses, including capital improvements, environmental monitoring, and the purchase of emission credits, and other administrative costs necessary to comply with current requirements and potential future requirements or limitations that may be imposed, as well as other unforeseen or unknown costs. To the extent that similar requirements and limitations are not imposed globally, such regulation may impact our ability to compete with companies located in countries that do not have such requirements or do not impose such limitations. The company may also realize a change in competitive position relative to industry peers, changes in prices received for products sold, and changes to profit or loss arising from increased or decreased demand for products produced by the company. The impact of any future GHG regulatory requirements on our global business will be dependent upon the design of the regulatory schemes that are ultimately adopted and, as a result, we are unable to predict their significance to our operations at this point in time.

The potential physical impacts of climate change on the Company's operations are uncertain and will likely be particular to the geographic circumstances. These physical impacts may include changes in rainfall and storm patterns, shortages of water or other natural resources, changing sea levels, and changing global average temperatures. For instance, our Seadrift facility in Texas and our Calais facility in France, are located in geographic areas less than 50 feet above sea level. As a result, any future rising sea levels could have an adverse impact on their operations and on their suppliers. Due to these uncertainties, any future physical effects of climate change may or may not adversely affect the operations at each of our production facilities, the availability of raw materials, the transportation of our products, the overall costs of conducting our business, and our financial performance.

We face certain litigation and legal proceedings risks that could harm our business.

We are involved in various product liability, occupational, environmental, and other legal claims, demands, lawsuits and other proceedings arising out of or incidental to the conduct of our business. The results of these proceedings are difficult to predict. Moreover, many of these proceedings do not specify the relief or amount of damages sought. Therefore, as to a number of the proceedings, we are unable to estimate the possible range of liability that might be incurred should these proceedings be resolved against us. Certain of these matters involve types of claims that, if resolved against us, could give rise to substantial liability, which could have a material adverse effect on our financial position, liquidity and results of operations.

We are dependent on supplies of raw materials and energy. Our results of operations could deteriorate if that supply increases in cost or is substantially disrupted for an extended period.

We purchase raw materials and energy from a variety of sources. In many cases, we purchase them under short term contracts or on the spot market, in each case at fluctuating prices. The availability and price of raw materials and energy may be subject to curtailment or change due to:

- limitations which may be imposed under new legislation or regulation;
- supplier's allocations to meet demand of other purchasers during periods of shortage (or, in the case of energy suppliers, extended cold weather);
- interruptions or cessations in production by suppliers, and
- market and other events and conditions.

Petroleum and coal products, including decant oil, petroleum coke and pitch, our principal raw materials, and energy, particularly natural gas, have been subject to significant price fluctuations.

We have in the past entered into, and may continue in the future to enter into, derivative contracts and short duration fixed rate purchase contracts to effectively fix a portion of our exposure to certain products.

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A substantial increase in raw material or energy prices which cannot be mitigated or passed on to customers or a continued interruption in supply, particularly in the supply of decant oil, petroleum coke or energy, would have a material adverse effect on us.

Seadrift could be impacted by a reduction in the availability of low sulfur decant oil or an increase in the pricing of petroleum needle coke feedstocks.

Seadrift uses low sulfur decant oil in the manufacture of petroleum needle coke. There is no assurance that Seadrift will always be able to obtain an adequate quantity of suitable feedstocks or that capital would be available to install equipment to allow for utilization of higher sulfur decant oil, which is more readily available in the United States, in the event that suppliers of lower sulfur decant oil were to become more limited in the future. Seadrift purchases approximately 1.5 million barrels of low sulfur decant oil annually. The prices paid by Seadrift for such feedstocks are governed by the market for heavy fuel oils, which prices can fluctuate widely for various reasons including, among other things, worldwide oil shortages and cold winter weather. Seadrift's petroleum needle coke is used in the manufacture of graphite electrodes, the price of which is subject to rigorous industry competition thus restricting Seadrift's ability to pass through raw material price increases.

We may divest or acquire businesses.

We may divest or acquire businesses to rationalize or expand our businesses and enhance our cash flows. No assurance can be given that we will be successful in any of such activities or as to the impact thereof on us financial or otherwise.

We have significant goodwill on our balance sheet that is sensitive to changes in the market, which could result in impairment charges.

Our annual impairment test of goodwill was performed in the fourth quarter. The estimated fair values of our reporting units were based on discounted cash flow models derived from internal earnings forecasts and assumptions. The assumptions and estimates used in these valuations incorporated the current and expected economic environment. Our graphite electrode reporting unit's fair value exceeds its carrying value (see Note 5 "Goodwill and Other Intangible Assets" to the Financial Statements). A further deterioration in the global economic environment or in any of the input assumptions in our calculation could adversely affect the fair value of our reporting units and result in further impairment of some or all of the goodwill on the balance sheet. See Item 7 "Management's Discussion and Analysis of Financial Conditions and Results of Operations-Critical Accounting Policies" for further information regarding goodwill.

Our results of operations could deteriorate if our manufacturing operations were substantially disrupted for an extended period.

Our manufacturing operations are subject to disruption due to extreme weather conditions, floods, hurricanes and tropical storms and similar events, major industrial accidents, cybersecurity attacks, strikes and lockouts, adoption of new laws or regulations, changes in interpretations of existing laws or regulations or changes in governmental enforcement policies, civil disruption, riots, terrorist attacks, war, and other events. We cannot assure you that no such events will occur. If such an event occurs, it could have a material adverse effect on us.

We have non-dollar-denominated intercompany loans and have had in the past, and may in the future have, foreign currency financial instruments and interest rate swaps and caps. The related gains and losses have in the past been, and may in the future be, significant.

As part of our cash management, we have non-dollar denominated intercompany loans between our subsidiaries. These loans are deemed to be temporary and, as a result, remeasurement gains and losses on these loans are recorded as currency gains / losses in other income (expense), net, on the Consolidated Statements of Income.

Additionally, we have in the past entered into, and may in the future enter into, interest rate swaps and caps to attempt to manage interest rate expense. We have also in the past entered into, and may in the future enter into, foreign currency financial instruments to attempt to hedge global currency exposures. We may purchase or sell these financial instruments, and open and close hedges or other positions, at any time. Changes in currency exchange rates or interest rates have in the past resulted, and may in the future result, in significant gains or losses with respect thereto. These instruments are marked-to-market monthly and gains and losses thereon are recorded in Other Comprehensive Income in the Consolidated Balance Sheets.

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There may be volatility in our results of operations between quarters.

Sales of our products fluctuate from quarter to quarter due to such factors as changes in economic conditions, changes in competitive conditions, scheduled plant shutdowns by customers, national vacation practices, changes in customer production schedules in response to seasonal changes in energy costs, weather conditions, strikes and work stoppages at customer plants and changes in customer order patterns including those in response to the announcement of price increases or price adjustments. We have experienced, and expect to continue to experience, volatility with respect to demand for and prices of our industrial material products, specifically graphite electrodes, both globally and regionally. We have also experienced volatility with respect to prices of raw materials and energy, and we expect to experience volatility in such prices in the future. Accordingly, results of operations for any quarter are not necessarily indicative of the results of operations for a full year.

The graphite and carbon industry is highly competitive. Our market share, net sales or net income could decline due to vigorous price and other competition.

Competition in the graphite and carbon products industry (other than, generally, with respect to new products) is based primarily on price, product differentiation and quality, delivery reliability, and customer service. Electrodes, in particular, are subject to rigorous price competition. In such a competitive market, changes in market conditions, including customer demand and technological development, could adversely affect our competitiveness, sales and/or profitability.

Competition with respect to new products is, and is expected to be, generally based primarily on product innovation, price, performance and cost effectiveness as well as customer service.

Competition could prevent implementation of price increases, require price reductions or require increased spending on research and development, marketing and sales that could adversely affect us.

RISKS RELATING TO OUR SECURITIES

GTI is a holding company and all of its operations are conducted through its subsidiaries.

GTI is a holding company and derives substantially all of its cash flow from its subsidiaries. Since GTI's operations are conducted through its subsidiaries, its cash flow and its consequent ability to service its indebtedness, including the Senior Notes, is dependent upon the earnings of its subsidiaries and the distribution of those earnings to GTI or upon the payments of funds by those subsidiaries to GTI or the repayment of intercompany indebtedness owed to GTI. GTI's subsidiaries are separate and distinct legal entities with trade payables and other liabilities. In addition to any statutory restrictions, the payment of dividends and the making of distributions and the making of loans and advances to GTI by its subsidiaries are subject to contractual restrictions provided in the Revolving Facility. In addition, any right GTI may have to receive assets of any of its subsidiaries upon their liquidation or reorganization (and the consequent right of the holders of the Senior Notes to participate in those assets) is effectively subordinated to the claims of such subsidiary's creditors, including trade creditors.

The Senior Notes are structurally subordinated to all of the existing and future liabilities, including trade payables, of GTI's subsidiaries that are not, or do not become, guarantors of the Senior Notes.

The Senior Notes are not guaranteed by all of GTI's subsidiaries or any of GTI's foreign subsidiaries. The Senior Notes are therefore structurally subordinated to all of the existing and future liabilities, including trade payables, of any non-guarantor subsidiary such that, in the event of an insolvency, liquidation, reorganization, dissolution or other winding up of any such subsidiary, all of such subsidiary's creditors (including trade creditors and preferred stockholders, if any) would be entitled to payment in full out of such subsidiary's assets before the holders of the Senior Notes would be entitled to any payment.

As of December 31, 2016, GTI's subsidiaries that are not guarantors of the Senior Notes had total liabilities, including trade payables (but excluding intercompany liabilities), of approximately $137.5 million or 24% of our total liabilities, and total assets (excluding intercompany receivables) of approximately $719.7 million, or 65% of our total assets. In addition, for the year ended December 31, 2016, our subsidiaries that are not guarantors of the Senior Notes generated approximately $350.9 million, or 80%, of our consolidated revenues and approximately $77.5 million of our consolidated operating loss of $92.1 million.

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Under certain circumstances, subsidiary guarantees may be released.

Those subsidiaries that provide guarantees of the Senior Notes will be released from such guarantees upon the occurrence of certain events, including the following:

- the unconditional release or discharge of any guarantee or indebtedness that resulted in the creation of the guarantee of the Senior Notes by such subsidiary guarantor;
- the sale or other disposition, including by way of merger or consolidation or the sale of its capital stock following which such subsidiary guarantor is no longer a subsidiary of the Company; or
- GTI's exercise of its legal defeasance option or its covenant defeasance option as described in the indenture applicable to the Senior Notes.

If any such subsidiary guarantee is released, no holder of the Senior Notes will have a claim as a creditor against any such subsidiary and the indebtedness and other liabilities, including trade payables and preferred stock, if any, of such subsidiary will be effectively senior to the claim or any holders of the Senior Notes.

We may incur substantially more debt ranking senior or equal in right of payment with the Senior Notes, including secured debt, which would increase the risks described herein.

The agreements relating to our debt, including the Credit Agreement, limit but do not prohibit our ability to incur additional debt, and the amount of debt that we could incur could be substantial. Accordingly, we could incur significant additional debt in the future, including additional debt under the Revolving Facility. Much of this additional debt could constitute secured debt, to which the Senior Notes would be effectively subordinated to the extent of the value of the collateral securing such debt (the collateral securing the Revolving Facility consists of substantially all of the assets of GTI and its U.S. subsidiaries and certain assets of certain of GTI's foreign subsidiaries). In addition, if we form or acquire any subsidiaries in the future, those subsidiaries also could incur debt, which debt would be effectively senior to the Senior Notes if those subsidiaries are not required to guarantee the Senior Notes. If new debt is added to our current debt levels, the related risks that we now face could intensify.

In addition, certain types of liabilities are not considered “Indebtedness” under the Credit Agreement, and the Credit Agreement does not impose any limitation on the amount of liabilities incurred by the subsidiaries, if any, that might be designated as “unrestricted subsidiaries.”

The ability of holders of Senior Notes to require us to repurchase Senior Notes as a result of a disposition of “substantially all” of our assets may be uncertain.

The definition of change of control in the indenture governing the Senior Notes includes a phrase relating to the sale of “all or substantially all” of our assets. Although there is a limited body of case law interpreting the phrase “substantially all,” there is no precise established definition of such phrase under applicable law. Accordingly, the ability of a holder of Senior Notes to require us to repurchase its Senior Notes as a result of a sale or other disposition of less than all of our assets to another person or group may be uncertain.

If we default on our obligations to pay our other indebtedness, we may not be able to make payments on the Senior Notes.

Any default under the agreements governing our indebtedness, including a default under the Revolving Facility, that is not waived by the required lenders, and the remedies sought by the holders of such indebtedness, could prevent us from paying principal, premium, if any, and interest on the Senior Notes and substantially decrease the market value of the Senior Notes. If we are unable to generate sufficient cash flow and are otherwise unable to obtain funds necessary to meet required payments of principal, premium, if any, and interest on our indebtedness, or if we otherwise fail to comply with the various covenants, including financial and operating covenants in the instruments governing our indebtedness (including covenants in the Credit Agreement and the indenture that governs the Senior Notes), we could be in default under the terms of the agreements governing such indebtedness, including the Credit Agreement and the indenture governing the Senior Notes. In the event of such default:

- the holders of such indebtedness may be able to cause all of our available cash flow to be used to pay such indebtedness and, in any event, could elect to declare all the funds borrowed thereunder to be due and payable, together with accrued and unpaid interest;

- the lenders under the Revolving Facility could elect to terminate their commitments thereunder, cease making further loans and institute foreclosure proceedings against our assets; and
- we could be forced into bankruptcy or liquidation.

Upon any such bankruptcy filing, we would be stayed from making any ongoing payments on the Senior Notes, and the holders of the Senior Notes would not be entitled to receive post-petition interest or applicable fees, costs or charges, or any "adequate protection" under Title 11 of the United States Code (the "Bankruptcy Code"). Furthermore, if a bankruptcy case were to be commenced under the Bankruptcy Code, we could be subject to claims, with respect to any payments made within 90 days prior to commencement of such a case, that we were insolvent at the time any such payments were made and that all or a portion of such payments, which could include repayments of amounts due under the Senior Notes, might be deemed to constitute a preference, under the Bankruptcy Code, and that such payments should be voided by the bankruptcy court and recovered from the recipients for the benefit of the entire bankruptcy estate. Also, in the event that we were to become a debtor in a bankruptcy case seeking reorganization or other relief under the Bankruptcy Code, a delay and/or substantial reduction in payment under the Senior Notes may otherwise occur. If our operating performance declines, we may in the future need to obtain waivers from the required lenders under the Revolving Facility to avoid being in default. If we breach our covenants under the Credit Agreement and seek a waiver, we may not be able to obtain a waiver from the required lenders. If this occurs, we would be in default under the Revolving Facility, the lenders could exercise their rights, as described above, and we could be forced into bankruptcy or liquidation.

Federal and state statutes could allow a court to void the Senior Notes or any of our subsidiaries' guarantees of the Senior Notes under fraudulent transfer laws and require noteholders to return payments received by us or the subsidiary guarantors to us or the subsidiary guarantors or to fund for the benefit of their respective creditors or subordinate the Senior Notes or the guarantees to other claims of us or the subsidiary guarantors.

Under the federal bankruptcy laws and comparable provisions of state fraudulent transfer laws, the Senior Notes or any of the guarantees thereof could be voided, or claims with respect to the Senior Notes or any of the guarantees could be subordinated to all other debts of GTI or the subsidiary guarantors. In addition, a bankruptcy court could void (i.e., cancel) any payments by GTI or the subsidiary guarantors pursuant to their guarantees and require those payments to be returned to GTI or the subsidiary guarantors or to a fund for the benefit of us or their respective creditors, or subordinate the Senior Notes or the guarantees to other claims of GTI or the subsidiary guarantors. The bankruptcy court might take these actions if it found, among other things, that GTI or the applicable subsidiary guarantor:

- received less than reasonably equivalent value or fair consideration for the issuance of the Senior Notes or the incurrence of its guarantee; and
- was (or was rendered) insolvent by such issuance or such incurrence;
- was engaged or about to engage in a business or transaction for which its assets constituted unreasonably small capital to carry on its business;
- intended to incur, or believed that it would incur, obligations beyond its ability to pay as the obligations matured; or
- was a defendant in an action for money damages, or had a judgment for money damages docketed against it and, in either case, after final judgment, the judgment was unsatisfied.

A court would likely find that GTI or a subsidiary guarantor received less than fair consideration or reasonably equivalent value for the Senior Notes or its guarantee to the extent that it did not receive direct or indirect substantial benefit from the issuance of the Senior Notes or the incurrence of the guarantee. A court could also void the Senior Notes or any guarantee if it found that GTI or the subsidiary guarantor issued the Senior Notes or incurred the guarantee with actual intent to hinder, delay, or defraud any present or future creditors. Although courts in different jurisdictions measure solvency differently, in general, an entity would be deemed insolvent if the sum of its debts, including contingent and unliquidated debts, exceeds the fair value of its assets or if the present fair saleable value of its assets is less than the amount that would be required to pay the expected liability on its debts, including contingent and unliquidated debts, as they become due. We cannot predict what standard a court would apply in order to determine whether any of the Issuer or a subsidiary guarantor was insolvent as of the relevant date or whether, regardless of the method of valuation, a court would determine that the subsidiary guarantor was insolvent on that date, or whether a court would determine that the payments thereunder constituted fraudulent transfers or conveyances on other grounds. If the

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issuance of the Senior Notes or the incurrence of the guarantee is deemed to be a fraudulent transfer, it could be voided altogether, or it could be subordinated to all other debts of GTI or the subsidiary guarantor, as applicable. In such case, any payment by GTI or the applicable subsidiary guarantor pursuant to the Senior Notes or its guarantee could be required to be returned to us or the applicable subsidiary guarantor or to a fund for the benefit of our or their respective creditors. Moreover, in such a case a court could subordinate the Senior Notes or guarantees to other claims of us or the subsidiary guarantor. If a guarantee is voided or held unenforceable for any other reason, holders of the Senior Notes would cease to have a claim against the subsidiary guarantor based on the guarantee and would be creditors only of GTI and any subsidiary guarantor whose guarantee was not similarly voided or otherwise held unenforceable.

Each guarantee will contain a provision intended to limit the subsidiary guarantor's liability to the maximum amount that it could incur without rendering the incurrence of obligations under its guarantee a fraudulent transfer. This provision may not be effective to protect the guarantees from being voided or subordinated under fraudulent transfer or conveyance law.

Forward Looking Statements

Forward Looking Statements and Risks. This Report contains forward looking statements. In addition, we or our representatives have made or may make forward looking statements on telephone or conference calls, by webcasts or emails, in person, in presentations or written materials, or otherwise. These include statements about such matters as future, targeted or expected (or the impact of current, future, expected or targeted): outlook for 2017 or beyond; operational and financial performance; growth prospects and rates; future or targeted profitability, cash flow, liquidity and capital resources, production rates, inventory levels and EBITDA; the impact of rationalization, product line change, cost and liquidity initiatives; changes in the operating rates or efficiency in our operations or our competitors' or customers' operations; product quality; diversification, new products, and product improvements and their impact on our business; the integration or impact of acquired businesses; divestitures, asset sales, investments and acquisitions that we may make in the future; possible debt or equity financing or refinancing (including factoring and supply chain financing) activities; the impact of customer bankruptcies; conditions and changes in the global financial and credit markets; possible changes in control of the Company and the impacts thereof; the impact of accounting changes; and currency exchange and interest rates and changes therein; .changes in production capacity in our operations and our competitors' or customers' operations and the utilization rates of that capacity; growth rates for, prices and sales of, and demand for, our products and our customers' products; costs of materials and production, including increases or decreases therein, our ability to pass on any such increases in our product prices or impose surcharges thereon, or customer or market demand to reduce our prices due to such decreases; changes in customer order patterns due to changes in economic conditions; productivity, business process and operational initiatives; the markets we serve and our position in those markets; financing and refinancing activities; investments and acquisitions and the performance of the businesses underlying such acquisitions and investments; employment and contributions of key personnel; employee relations and collective bargaining agreements covering many of our operations; tax rates and the effects of jurisdictional mix; capital expenditures and changes therein; nature and timing of restructuring and rationalization charges and payments; inventory and supply chain management; customer and supplier contractual provisions and related opportunities and issues; competitive activities; strategic plans, initiatives and business projects; regional and global economic and industry market conditions, the timing and magnitude of changes in such conditions; interest rate management activities; currency rate management activities; deleveraging activities; rationalization, restructuring, realignment, strategic alliance, raw material and supply chain, technology development and collaboration, investment, acquisition, venture, operational, tax, financial and capital projects; legal proceedings, investigations, contingencies, and environmental compliance including any regulatory initiatives with respect to greenhouse gas emissions; consulting projects; and costs, working capital, revenues, business opportunities, debt levels, cash flows, cost savings and reductions, margins, earnings and growth. The words “will,” “may,” “plan,” “estimate,” “project,” “believe,” “anticipate,” “expect,” “intend,” “should,” “would,” “could,” “target,” “goal,” “continue to,” “positioned t expressions, or the negatives thereof, identify some of these statements.

Our expectations and targets are not predictors of actual performance and historically our performance has deviated, often significantly, from our expectations and targets. Actual future events and circumstances (including future results and trends) could differ materially, positively or negatively, from those set forth in these statements due to various factors. These factors include:

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- the possibility that additions to capacity for producing EAF steel, increases in overall EAF steel production capacity, and increases or other changes in steel production may not occur or may not occur at the rates that we anticipate or may not be as geographically disbursed as we anticipate;
- the possibility that increases or decreases in graphite electrode manufacturing capacity (including growth by producers in developing countries), competitive pressures (including changes in, and the mix, distribution, and pricing of, competitive products), reduction in specific consumption rates, increases or decreases in customer inventory levels, or other changes in the graphite electrode markets may occur, which may impact demand for, prices or unit and dollar volume sales of graphite electrodes and growth or profitability of our graphite electrodes business;
- the possible failure of changes in EAF steel production or graphite electrode production to result in stable or increased, or offset decreases in, graphite electrode demand, prices, or sales volume;
- the possibility that a determination that we have failed to comply with one or more export controls or trade sanctions to which we are subject with respect to products or technology exported from the United States or other jurisdictions could result in civil or criminal penalties, denial of export privileges and loss of revenues from certain customers;
- the possibility that, for all of our product lines, capital improvement and expansion in our customers' operations or increases in demand for their products may not occur or may not occur at the rates that we anticipate or the demand for their products may decline, which may affect their demand for the products we sell to them, which could affect our profitability and cash flows as well as the recoverability of our assets;
- the possibility that assumptions related to future expectations of financial performance materially change and impact our goodwill and long-lived asset carrying values;
- the possibility that our financial assumptions and expectations materially change as a result of government or state-owned government subsidies, incentives and trade barriers;
- the possibility that current economic disruptions or other conditions may result in idling or permanent closing of blast furnace capacity or delay of blast furnace capacity additions or replacements which may affect demand and prices for our refractory products;
- the possibility that continued global consolidation of the world's largest steel producers could impact our business or industry;
- the possibility that average graphite electrode revenue per metric ton in the future may be different than current spot or market prices due to changes in product mix, changes in currency exchange rates, changes in competitive market conditions or other factors;
- the possibility that price increases, adjustments or surcharges may not be realized or that price decreases may occur;
- the possibility that current challenging economic conditions and economic demand reduction may continue to impact our revenues and costs;
- the possibility that U.S., European, Chinese, or other governmental monetary or fiscal policy may adversely affect global economic activity and demand for our products;
- the possibility that potential future cuts in defense spending by the United States government as a part of efforts to reduce federal budget deficits could reduce demand for certain of our products and associated revenue;
- the possibility that decreases in prices for energy and raw materials may lead to downward pressure on prices for our products and delays in customer orders for our products as customers anticipate possible future lower prices;
- the possibility that customers may delay or cancel orders;
- the possibility that we may not be able to reduce production costs or delay or cancel raw material purchase commitments;

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- the possibility that economic, political and other risks associated with operating globally, including national and international conflicts, terrorist acts, political and economic instability, civil unrest, community activism and natural or nuclear calamities might interfere with our supply chains, customers or activities in a particular location;
- the possibility that reductions in customers' production, increases in competitors' capacity, competitive pressures, or other changes in other markets we serve may occur, which may impact demand for, prices of or unit and dollar volume sales of, our other products, or growth or profitability of our other product lines, or change our position in such markets;
- the possibility that we will not be able to hire and retain key personnel, maintain appropriate relations with unions, associations and employees or to renew or extend our collective bargaining or similar agreements on reasonable terms as they expire or do so without a work stoppage or strike;
- the possibility that an adverse determination in litigation pending in Brazil involving disputes related to the proper interpretation of certain collectively bargained wage increase provisions applicable to both us and other employers in the Bahia region might result in the filing of claims against our Brazilian subsidiary;
- the possibility that a Brazilian graphite electrode antitrust investigation could result in material fines or penalties;
- the possibility that we will fail to retain or develop new customers or applications for our Engineered Solutions products or such new product applications will not be adopted by the market place;
- the possibility that our manufacturing capabilities may not be sufficient or that we may experience delays in expanding or fail to expand our manufacturing capacity to meet demand for existing, new or improved products;
- the possibility that we may propose acquisitions or divestitures in the future, that we may not complete the acquisitions or divestitures, and that investments and acquisitions that we may make in the future may not be successfully integrated into our business or provide the performance or returns expected or that divestitures may not generate the proceeds anticipated;
- the possibility that challenging conditions or changes in the capital markets will limit our ability to undertake refinancing activities or obtain financing for growth and other initiatives, on acceptable terms or at all;
- the possibility that conditions or changes in the global equity markets may have a material impact on our future pension funding obligations and liabilities on our balance sheet;
- the possibility that the amount or timing of our anticipated capital expenditures may be limited by our financial resources or financing arrangements or that our ability to complete capital projects may not occur timely enough to adapt to changes in market conditions or changes in regulatory requirements;
- the possibility that the actual outcome of uncertainties associated with assumptions and estimates using judgment when applying critical accounting policies and preparing financial statements may have a material impact on our results of operations or financial position;
- the possibility that we may be unable to protect our intellectual property or may infringe the intellectual property rights of others, resulting in damages, limitations on our ability to produce or sell products or limitations on our ability to prevent others from using that intellectual property to produce or sell products;
- the occurrence of unanticipated events or circumstances or changing interpretations and enforcement agendas relating to legal proceedings or compliance programs;
- the occurrence of unanticipated events or circumstances or changing interpretations and enforcement agendas relating to health, safety or environmental compliance or remediation obligations or liabilities to third parties or relating to labor relations;
- the possibility that new or expanded regulatory initiatives with respect to greenhouse gas emissions could increase the capital intensive nature of our business and add to our costs of production;
- the possibility that our provision for income taxes and effective income tax rate or cash tax rate may fluctuate significantly due to (i) changes in applicable tax rates or laws, (ii) changes in the sources of our income, (iii) changes in tax planning, (iv) new or changing interpretations of applicable regulations, (v) changes in profitability,

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(vi) changes in our estimate of our future ability to use foreign tax credits or other tax attributes, and (vii) other factors;

- the possibility of changes in interest or currency exchange rates or in inflation or deflation;
- the possibility that our outlook could be significantly impacted by, among other things, developments in North Africa, the Middle East, North Korea, and other areas of concern, the occurrence of further terrorist acts and developments resulting from the war on terrorism;
- the possibility that interruption in our major raw material, energy or utility supplies due to, among other things, natural or nuclear disasters, process interruptions, actions by producers and capacity limitations, may adversely affect our ability to manufacture and supply our products or result in higher costs;
- the possibility that the magnitude of changes in the cost of major raw materials, energy or utility suppliers by reason of shortages, changes in market pricing, pricing terms in applicable supply contracts, or other events may adversely affect our ability to manufacture and supply our products or result in higher costs;
- the possibility of interruptions in production at our facilities due to, among other things, critical equipment failure, which may adversely affect our ability to manufacture and supply our products or result in higher costs;
- the possibility that we may not achieve the earnings or other financial or operational metrics that we provide as guidance from time to time;
- the possibility that the anticipated benefits from rationalizations and other cost savings initiatives may be delayed or may not occur, may vary in cost or may result in unanticipated disruptions;
- the possibility of security breaches affecting our information technology systems;
- the possibility that our disclosure or internal controls may become inadequate because of changes in conditions or personnel or that those controls may not operate effectively and may not prevent or detect misstatements or errors;
- the possibility that severe economic conditions may adversely affect our business, liquidity or capital resources;
- the possibility that delays may occur in the financial statement closing process;
- the possibility of changes in performance that may affect financial covenant compliance or funds available for borrowing; and
- other risks and uncertainties, including those described elsewhere in this Report or our other SEC filings, as well as future decisions by us.

Occurrence of any of the events or circumstance described above could also have a material adverse effect on our business, financial condition, results of operations or cash flows or the market price of our common stock.

No assurance can be given that any future transaction about which forward looking statements may be made will be completed or as to the timing or terms of any such transaction.

All subsequent written and oral forward looking statements by or attributable to us or persons acting on our behalf are expressly qualified in their entirety by these factors. Except as otherwise required to be disclosed in periodic reports required to be filed by public companies with the SEC pursuant to the SEC's rules, we have no duty to update these statements.

Item 1B. Unresolved Staff Comments

- Not applicable.

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Item 2. Properties

We currently operate the following facilities, which are owned or leased as indicated.

Location of Facility	Primary Use	Owned or Leased
U.S.		
Independence, Ohio	Corporate Headquarters	Leased
Brooklyn Heights, Ohio	Innovation and Technology Center	Leased
St. Marys, Pennsylvania	Graphite Electrode Manufacturing Facility	Owned
Port Lavaca, Texas	Needle Coke Manufacturing Facility	Owned
Europe		
Calais, France	Graphite Electrode Manufacturing Facility	Owned
Moscow, Russia	Sales Office	Leased
Pamplona, Spain	Graphite Electrode Manufacturing Facility and Sales Office	Owned
Bussigny, Switzerland	Sales Office	Leased
Other International		
Beijing, China	Sales Office	Leased
Hong Kong, China	Sales Office	Leased
Monterrey, Mexico	Graphite Electrode Manufacturing Facility and Sales Office	Owned
Assets Held for Sale:		
Parma, Ohio	Advanced Graphite Materials Machine Shop	Owned
Lakewood, Ohio	Advanced Electronics Technologies Manufacturing Facility and Sales Office	Owned
Sharon Center, Ohio	Advanced Electronics Technologies Manufacturing Facility	Owned
Columbia, Tennessee	Advanced Graphite Materials and Refractory Products Manufacturing, Warehousing Facility and Sales Office	Owned
Lawrenceburg, Tennessee	Refractory Products Manufacturing Facility	Owned

Clarksburg, West Virginia	Advanced Graphite Materials Manufacturing Facility, Machine Shop and Sales Office	Owned
Malonno, Italy	Advanced Graphite Materials Manufacturing and Machine Shop and Sales Office	Owned
Meyerton, South Africa	Refractory Machine Shop and Sales Office	Owned
Salvador, Bahia, Brazil	Graphite Electrode Machine Shop (will be maintained after sale)	Owned
Shanghai, China	Sales Office	Leased

During the first quarter of 2016, we announced that we are exploring strategic options for our Engineered Solutions business to focus our efforts on our graphite electrode business. The assets categorized above as "Assets Held for Sale" represent mostly the assets pertaining to our Engineered Solutions business. A portion of our facility in Salvadore, Bahia, Brazil is currently being marketed as we have eliminated graphite electrode production in this facility. We will maintain a graphite electrode machine shop at our Brazil facility after any potential sale. Other than the assets discussed therein, we believe that our facilities, which are of varying ages and types of construction, are in good condition, are suitable for our operations and generally provide sufficient capacity to meet our requirements for the foreseeable future.

Item 3. Legal Proceedings

We are involved in various investigations, lawsuits, claims, demands, environmental compliance programs, labor disputes and other legal proceedings arising out of or incidental to the conduct of our business. While it is not

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possible to determine the ultimate disposition of each of these matters and proceedings, we do not believe that their ultimate disposition will have a material adverse effect on our financial position, results of operations or cash flows. Litigation has been pending in Brazil brought by employees seeking to recover additional amounts under certain wage increase provisions applicable in 1989 and 1990 under collective bargaining agreements to which employers in the Bahia region of Brazil were a party (including our subsidiary in Brazil), plus interest thereon. Prior to October 1, 2015, we were not party to such litigation. Companies in Brazil have recently settled claims arising out of these provisions and, in May 2015, the litigation was remanded, in favor of the employees, by the Brazil Supreme Court to the lower courts for further proceedings which included procedural aspects of the case, such as admissibility of instruments filed by the parties. We cannot predict the outcome of such litigation. On October 1, 2015, an action was filed by current and former employees against our subsidiary in Brazil to recover amounts under such provisions, plus interest thereon, which amounts together with interest could be material to us. We intend to vigorously defend such action.

Item 4. Mine Safety Disclosures

•Not applicable.

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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

There is no market for our Common Stock.

Holders

As of December 31, 2016, Brookfield was the sole holder of our Common Stock.

Dividend Policies and Restrictions

It has generally been the policy of our Board of Directors to retain earnings to finance strategic and other plans and programs, conduct business operations, fund acquisitions, meet obligations and repay debt. We did not pay any cash dividends in 2014, 2015 or 2016. We periodically review our dividend policy.

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Item 6. Selected Financial Data

The data set forth below should be read in conjunction with “Part I. Preliminary Notes-Important Terms”, “Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations” and the Consolidated Financial Statements and Notes thereto.

	Predecessor				Successor	
	Year Ended December 31,			For the Period January 1 Through August 14, 2015	For the Period August 15 Through December 31, 2015	Year Ended December 31,
	2012	2013	2014			2016
	(Dollars in thousands)					
Statement of Operations Data: (a)		(a)				
Net sales	$1,003,283	$893,844	$825,145	$339,907	$193,133	$ 437,963
Income (loss) from continuing operations (b)	105,846	(35,591)	(152,520)	(101,970)	(28,625)	(108,869)
Net income (loss)	117,641	(27,259)	(285,376)	(120,649)	(33,551)	(235,843)
Basic earnings (loss) per common share:						
Income (loss) from continuing operations per share	$0.76	$(0.26)	$(1.12)	$(0.74)	N/A	N/A
Weighted average common shares outstanding (in thousands)	138,552	135,067	136,155	137,152	N/A	N/A
Diluted earnings (loss) per common share:						
Income (loss) from continuing operations per share	$0.76	$(0.26)	$(1.12)	$(0.74)	N/A	N/A
Weighted average common shares outstanding (in thousands)	139,700	135,067	136,155	137,152	N/A	N/A
Balance sheet data (at period end):						
Total assets	$2,297,915	$2,217,848	$1,833,805	N/A (d)	$1,422,015	$ 1,172,276
Other long-term obligations (c)	125,000	97,947	107,586	N/A (d)	94,318	82,148
Total long-term debt	535,709	541,593	341,615	N/A (d)	362,455	356,580
Other financial data:						
Net cash provided by operating activities	$101,400	$116,837	$120,903	$28,323	$23,115	$ 22,815
Net cash used in investing activities	(119,962)	(83,801)	(78,952)	(39,918)	(17,484)	(10,471)
Net cash (used in) provided by financing activities	24,112	(37,645)	(35,077)	20,824	(23,072)	(8,317)

(a) 2012 and 2013 results do not represent complete discontinued operations as adjustments for interest allocations and Corporate and R&D expense were not reclassified prior to 2014. All interest remains in continuing operations and an estimate of 80% of Corporate and R&D expenses was assumed to support continuing operations.

(b) Income by period includes items listed below, which are pre-tax in nature unless otherwise noted.

(c) Represents pension and post-retirement benefits and related costs and miscellaneous other long-term obligations.

(d) A closing balance sheet as of August 14, 2015 was not required as part of previous filings.

For the Year Ended December 31, 2012:

- a non-cash interest charge of $10.7 million related to the amortization of the discount on the Senior Subordinated Notes,
- a $22.3 million charge related to the amortization of acquired intangible assets,

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- a $8.8 million loss for the MTM Adjustment for our pension and OPEB benefit plans, driven primarily by a decrease in the discount rate due to lower interest rates.

For the Year Ended December 31, 2013:

- a $62.1 million charge for rationalization and rationalization related activities. This includes $18.9 million of severance and related charges, and $28.3 million of accelerated depreciation expense
- a non-cash interest charge of $11.5 million related to the amortization of the discount on the Senior Subordinated Notes,
- a $20.5 million charge related to the amortization of acquired intangible assets,
- a $14.4 million gain for the MTM Adjustment for our pension and OPEB benefit plans, driven primarily by a increase in discount rates.

For the Year Ended December 31, 2014:

- A goodwill impairment of $76.1 million related to our needle coke reporting unit,
- a $40.8 million charge for rationalization and rationalization related activities. This includes $22.4 million of rationalization related depreciation expense, $7.9 million of severance and contract termination costs,
- a non-cash interest charge of $12.3 million related to the amortization of the discount on the Senior Subordinated Notes,
- a $19.0 million charge related to the amortization of acquired intangible assets,
- a $19.0 million loss for the MTM Adjustment for our pension and OPEB benefit plans, driven primarily by a decrease in discount rates and adoption of new mortality tables in 2014.

For the Period January 1 through August 14, 2015:

- a $35.4 million goodwill impairment charge related to our needle coke reporting unit,
- $4.4 million charge for rationalization and related activities,
- $23.6 million of charges related to our tender offer and proxy battle, which includes a $12.7 million charge related to stock-based compensation which was the result of change of control provisions that were triggered by our acquisition,
- a non-cash interest charge of $12.0 million related to the accelerated amortization of the discount on the Senior Subordinated Notes,
- a $10.8 million charge related to the amortization of acquired intangible assets,

For the Period August 15 through December 31, 2015:

- a $1.8 million loss for the MTM adjustment for our pension and OPEB benefit plans

For the year ended December 31, 2016:

- a lower of cost or market adjustment to inventory of $19.0 million
- a $2.8 million charge to lower the carrying value of assets held for sale
- a $2.9 million gain for the MTM adjustment for our pension and OPEB benefit plans

Quarterly Data:

The following quarterly selected consolidated financial data have been derived from the Consolidated Financial Statements for the periods indicated which have not been audited. The selected quarterly consolidated financial data set forth below should be read in conjunction with "Part I. Preliminary Notes–Presentation of Financial, Market and Legal Data," "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations" and the Consolidated Financial Statements and Notes thereto.

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	Predecessor			Successor	
	First Quarter	Second Quarter	For the Period July 1 Through August 14, 2015	For the Period August 15 Through September 30, 2015	Fourth Quarter
	(Dollars in thousands, except per share data)				
2015					
Net sales	$162,494	$125,809	$51,604	$74,774	$118,359
Gross profit	16,492	14,218	4,196	6,887	5,401
Net income (loss) (a)	(55,608)	(22,817)	(42,224)	(7,303)	(26,250)
Basic loss per common share	(0.08)	(0.17)	(0.31)	N/A	N/A

	Successor			
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
	(Dollars in thousands, except per share data)			
2016				
Net sales	$95,576	$115,365	$111,590	$115,432
Gross profit (loss)	(12,975)	(8,405)	(6,910)	(737)
Net income (loss) (b)	(36,375)	(128,399)	(22,967)	(48,102)

(a) Net income by quarter for 2015 includes the following items:

First Quarter

- $35.4 million impairment charge to write down goodwill associated with the Needle Coke reporting unit;
- Rationalization and related charges of $3.4 million;
- Amortization of acquired intangibles totaling $4.3 million, and
- Interest expense of $8.9 million, driven by $4.8 million of expense related to the Senior Notes.

Second Quarter

- Rationalization and related charges $0.8 million;
- Expenses related to our proxy and tender offer totaling $3.3 million;
- Amortization of intangibles totaling $4.4 million;
- Interest expense of $9.2 million driven primarily by $4.8 of expense related to the Senior Notes.

Third Quarter

- Expenses related to our proxy and tender offer totaling $21.2 million;
- Interest expense of $12.7 million, driven by $4.8 million of expense related to the Senior Notes and $4.5 million of additional expense resulting from the prepayment our Senior Subordinated Notes

Fourth Quarter

- a $1.8 million loss for the MTM adjustment for our pension and OPEB benefit plans

(b) Net income by quarter for 2016 includes the following items:

First Quarter

- $11.1 million lower of cost or market adjustment to inventory;
- Amortization of intangibles totaling $3.6 million.

Second Quarter

- $3.5 million lower of cost or market adjustment to inventory
- Amortization of intangibles totaling $3.6 million.

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Third Quarter

- $4.9 million lower of cost or market adjustment to inventory;
- Amortization of intangibles totaling $3.5 million.

Fourth Quarter

- a $2.9 million gain for the MTM adjustment for our pension and OPEB benefit plans;
- Amortization of intangibles totaling $3.6 million;
- A $0.5 million favorable adjustment to the lower of cost or market inventory reserve.

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Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations.

General

Management's Discussion and Analysis of Financial Condition and Results of Operations ("MD&A") is designed to provide information that is supplemental to, and should be read together with, our Consolidated Financial Statements and the accompanying notes. Information in this Item is intended to assist the reader in obtaining an understanding of our Consolidated Financial Statements, the changes in certain key items in those financial statements from year-to-year, the primary factors that accounted for those changes, any known trends or uncertainties that we are aware of that may have a material effect on our future performance, as well as how certain accounting principles affect our Consolidated Financial Statements. In addition, this Item provides information about our business segments and how the results of those segments impact our financial condition and results of operations as a whole.

Executive Summary

The world economy continued to experience rates of growth below pre-recession levels. The year began with the International Monetary Fund (IMF) forecasting a global growth rate of 3.4 percent. This estimate was revised downward twice during the year with additional downside risk noted after the United Kingdom's referendum to exit the European Union ("Brexit") ending at the most recent estimate of 3.1 percent. The graphite electrode industry saw further price declines in 2016, however, some indicators signal a potential bottoming out. The steel industry has experienced increases in the costs of key raw materials to run blasts furnaces coupled with declines in the price of scrap steel needed in EAF plants. These factors are beginning to re-balance the economics that make EAF mills more competitive. This resulted in an increase in our sales volume over the prior year, however, the decline in prices more than offset volume increases. Declines in the price of oil and our rationalization initiatives over the past 3 years have significantly improved our cost structure and have positioned us to benefit from any potential recovery.

In the first half of 2016, we completed our evaluation of strategic alternatives for our Engineered Solutions segment and determined that we would sell its businesses. This will allow us to focus on our core competency, which is to be a leading low-cost, high quality provider of graphite electrodes. As of June 30, 2016 the Engineered Solutions business qualified for held for sale status. As a result, the operations of the Engineered solutions have been excluded from continuing operations and are shown in discontinued operations for all current and prior periods.

We have two major product categories within our continuing operations: graphite electrodes and needle coke products, which comprise our only reportable segment, Industrial Materials.

Reference is made to the information under "Part I" for background information on our businesses, industry and related matters.

Global Economic Conditions and Outlook

2017 Outlook. We are impacted in varying degrees, both positively and negatively, as global, regional or country conditions fluctuate. Our discussions about market data and global economic conditions below are based on or derived from published industry accounts and statistics.

In its January, 2017 report, the International Monetary Fund (IMF) estimated global growth at 3.4 percent in 2017. The IMF noted however that there is significant uncertainty in the forecast for advanced economies due to potential changes in the policy stance of the United States under the new administration.

In its short range outlook released on October 11, 2016, the World Steel Association (WSA) forecasts that global steel demand will increase by 0.2% percent to 1,501 million tons in 2016 and will increase 0.5% in 2017. This estimate is higher than the 1,488 million tons that WSA forecasted in April for 2016. WSA noted that the increase was primarily attributable to a better than expected forecast for China and continued growth in emerging economies. In developed economies, the WSA expects steel demand to grow by 0.2% in 2016 and 1.1% in 2017. This represents a downward of the estimate by 1.5% for 2016 due to slower growth in the United States and the effects of Brexit.

Financing Transactions

Senior Notes

On November 20, 2012, the Company issued $300 million principal amount of Senior Notes. These Senior Notes are the Company's senior unsecured obligations and rank pari passu with all of the Company's existing and future senior unsecured indebtedness. The Senior Notes are guaranteed on a senior unsecured basis by each of the Company's existing and future subsidiaries that guarantee certain other indebtedness of the Company or another guarantor. The Senior Notes bear interest at a rate of 6.375% per year, payable semi-annually in arrears on May 15 and November 15 of each year. The Senior Notes mature on November 15, 2020.

The Company is entitled to redeem some or all of the Senior Notes at any time on or after November 15, 2016, at the redemption prices set forth in the Indenture. In addition, prior to November 15, 2016, the Company may redeem some or all of the Senior Notes at a price equal to 100% of the principal amount thereof, plus accrued and unpaid interest, if any, plus a “make whole” premium determined as set forth in the Indenture.

If, prior to maturity, a change in control (as defined in the Indenture) of the Company occurs and thereafter certain downgrades of the ratings of the Senior Notes as specified in the Indenture occur, the Company will be required to offer to repurchase any or all of the Senior Notes at a repurchase price equal to 101% of the aggregate principal amount of the Senior Notes, plus any accrued and unpaid interest.

The Senior Notes also contain covenants that, among other things, limit the ability of the Company and certain of its subsidiaries to: (i) create liens or use assets as security in other transactions; (ii) engage in certain sale/leaseback transactions; and (iii) merge, consolidate or sell, transfer, lease or dispose of substantially all of their assets.

The Senior Notes also contain customary events of default, including (i) failure to pay principal or interest on the Senior Notes when due and payable, (ii) failure to comply with covenants or agreements in the Indenture or the Senior Notes which failures are not cured or waived as provided in the Indenture, (iii) failure to pay indebtedness of the Company, any Subsidiary Guarantor or Significant Subsidiary (as defined in the Indenture) within any applicable grace period after maturity or acceleration and the total amount of such indebtedness unpaid or accelerated exceeds $50.0 million, (iv) certain events of bankruptcy, insolvency, or reorganization, (v) failure to pay any judgment or decree for an amount in excess of $50.0 million against the Company, any Subsidiary Guarantor or any Significant Subsidiary that is not discharged, waived or stayed as provided in the Indenture, (vi) cessation of any subsidiary guarantee to be in full force and effect or denial or disaffirmance by any Subsidiary Guarantor of its obligations under its subsidiary guarantee, and (vii) a default under the Company's Senior Subordinated Notes. In the case of an event of default, the principal amount of the Senior Notes plus accrued and unpaid interest may be accelerated.

Revolving Credit Facility

On April 23, 2014, the Company and certain of its subsidiaries entered into an Amended and Restated Credit Agreement with a borrowing capacity of $400 million and a maturity date of April 2019 (the "Revolving Facility").

On February 27, 2015, GrafTech and certain of its subsidiaries entered into a further Amended and Restated Credit Agreement that provides for, among other things, greater financial flexibility and a $40 million senior secured delayed draw term loan facility (the "Term Loan Facility").

On July 28, 2015, GrafTech and certain of its subsidiaries entered into an amendment to the Amended and Restated Credit Agreement to change the terms regarding the occurrence of a default upon a change in control (which is defined thereunder to include the acquisition by any person of more than 25 percent of GrafTech’s outstanding shares) to exclude the acquisition of shares by Brookfield (see Note 2). In addition, effective upon such acquisition, the financial covenants were eased, resulting in increased availability under the Revolving Facility. The size of the Revolving Facility was also reduced from $400 million to $375 million. The size of the Term Loan Facility remained at $40 million.

On April 27, 2016, GrafTech and certain of its subsidiaries entered into an amendment to the Revolving Facility. The size of the Revolving Facility was permanently reduced from $375 million to $225 million. New covenants were also added to the Revolving Facility, including a requirement to make mandatory repayments of outstanding amounts under the Revolving Facility and the Term Loan Facility with the proceeds of any sale of all or any substantial part of the assets included in the Engineered Solutions segment and a requirement to maintain minimum liquidity (consisting of domestic cash, cash equivalents and availability under the Revolving Facility) in excess of $25 million. The covenants were also modified to provide for: the elimination of certain exceptions to the Company’s negative covenants limiting the Company’s ability to make certain investments, sell assets, make restricted payments, incur liens and incur debt;

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a restriction on the amount of cash and cash equivalents permitted to be held on the balance sheet at any one time without paying down the Revolving Facility and the Term Loan Facility; and changes to the Company’s financial covenants so that until the earlier of March 31, 2019 or the Company has $75 million in trailing twelve month EBITDA (as defined in the Revolving Facility), the Company is required to maintain trailing twelve month EBITDA above certain minimums ranging from ($40 million) to $35 million after which the Company’s existing financial covenants under the Revolving Facility will apply.

With this amendment, the Company has full access to the $225 million Revolving Facility, subject to the $25 million minimum liquidity requirement. As of December 31, 2016, the Company had $61.2 million of borrowings on the Revolving Facility and $12.3 million of letters of credit drawn against the Revolving Facility.

The $40 million Term Loan Facility was fully drawn on August 11, 2015, in connection with the repayment of the Senior Subordinated Notes. The balance of the Term Loan Facility was $29.5 million as of December 31, 2016.

The interest rate applicable to the Revolving Facility and Term Loan Facility is LIBOR plus a margin ranging from 2.25% to 4.75% (depending on our total senior secured leverage ratio). The borrowers pay a per annum fee ranging from 0.35% to 0.70% (depending on our senior secured leverage ratio) on the undrawn portion of the commitments under the Revolving Facility.

Senior Subordinated Notes

On November 30, 2010, in connection with the acquisition of Seadrift Coke LP and C/G Electrodes LLC, we issued Senior Subordinated Notes for an aggregate total face amount of $200 million. These Senior Subordinated Notes were non-interest bearing and scheduled to mature in 2015. Because the Notes were non-interest bearing, we were required to record them at their present value (determined using an interest rate of 7%). The difference between the face amount of the Notes and their present value was recorded as debt discount. The debt discount was amortized using the imputed interest method, over the life of the Notes.

On August 11, 2015, we prepaid the entire $200,000,000 aggregate principal amount of the Notes after the Company's receipt of the proceeds of the issuance of Preferred Stock to Brookfield's affiliate. See Note 2 to the Financial Statements for further discussion of the Preferred stock issuance.

Customer Base

We are a global company and sell our products in every major geographic market. Sales of these products to buyers outside the U.S. accounted for about 76% in 2014, 80% in 2015 and 83% in 2016. In 2016, three of our ten largest customers were based in Europe, and one each in the U.S., Korea, Japan, Brazil, Russia, Egypt and India, however, all are multi-national operations.

In 2016, eight of our ten largest customers were purchasers of our Industrial Materials products. No single customer or group of affiliated customers accounted for more than 10% of our net sales in 2016.

Results of Operations and Segment Review

2016. The world economy continued to experience rates of growth below pre-recession levels. The year began with the International Monetary Fund (IMF) forecasting a global growth rate of 3.4 percent. This estimate was revised downward twice during the year with additional downside risk noted after the United Kingdom's referendum to exit the European Union ("Brexit") ending at the most recent estimate of 3.1 percent. The graphite electrode industry saw further price declines in 2016, however, some indicators signal a potential bottoming out. The steel industry has experienced increases in the costs of key raw materials to run blasts furnaces coupled with declines in the price of scrap steel needed in EAF plants. These factors are beginning to re-balance the economics that make EAF mills more competitive. This resulted in an increase in our sales volume over the prior year, however, the decline in prices more than offset volume increases. Declines in the price of oil and our rationalization initiatives over the past 3 years have significantly improved our cost structure and have positioned us to benefit from any potential recovery.

In the first half of 2016, we completed our evaluation of strategic alternatives for our Engineered Solutions segment and determined that we would sell its businesses. This will allow us to focus on our core competency, which is to be a leading low-cost, high quality provider of graphite electrodes. As of June 30, 2016 the Engineered Solutions

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business qualified for held for sale status. As a result the operations of the Engineered solutions have been excluded from continuing operations and are shown in discontinued operations for all current and prior periods.

2015. Our business faced significant headwinds in the major industries that we serve throughout 2015. The U.S. and European steel markets, which represent our largest markets, have been flooded with large quantities of low cost imports, primarily from China. These imports and over-capacity in the steel industry have driven down prices as demand has not kept pace. Additionally, there has been a significant decline in the price of iron ore which is a key raw material for blast furnaces. Scrap steel, which is the key raw material for EAF production, has experienced price reductions as well, however not at the same rate as iron ore. As a result, steel producers are utilizing blast furnaces at rates higher than we have historically seen. These pressures have reduced EAF steel production and driven down the prices and volumes on graphite electrodes. While the decline in the price of oil has benefited our Industrial Materials cost structure overall, it contributed to lower pricing for petroleum needle coke and, indirectly, graphite electrodes. Our Engineered Solutions segment suffered from declining prices and volumes as demand for our thermal solutions serving the advanced consumer electronics markets has declined. This decline in demand was driven by both decreased demand for the end product as well as competition from low cost producers. Our advanced graphite materials product line experienced new sales of high temperature furnace systems in 2014 that were not repeated in 2015 due to the bankruptcy of the primary customer we served.

2014. The slow rates of global economic growth continued throughout 2014. The year began with the IMF estimating 2014 growth at a rate of 3.7%, which was revised downward throughout the year to 3.3%. The World Steel Association noted that steel production, excluding China, increased 1.3% in 2014. This slow economic growth and stagnation in steel production year over year exerted continued downward pressure on prices for our Industrial Materials products during the year, which negatively impacted our profitability in 2014.

Our Engineered Solutions segment experienced 2014 sales growth in one of our AGM product group lines prior to the unexpected bankruptcy of our primary customer in that field. Our advanced consumer electronics products experienced pricing pressure and decreased demand throughout 2014 which decreased margins and sales. In the second quarter of 2014, we announced that we were ceasing production of our isomolded product group within AGM and undertaking rationalization initiatives to reduce costs and increase our global competitiveness.

In the third quarter of 2014 we announced rationalization initiatives to the Company’s operating and management structure in order to streamline, simplify and decentralize the organization. The Company incurred significant costs during 2014 related to these rationalization plans.

The tables presented in our year-over-year comparisons summarize our consolidated statements of income and illustrate key financial indicators used to assess the consolidated financial results. Financial information is presented for the years ended December 31, 2014, 2015, and 2016.

Throughout our MD&A, changes that are less than 5% or less than $1.0 million, may be deemed not material and excluded from the discussion. During 2014, as part of our initiative to decentralize the organization and reduce the costs of the global headquarter functions, the performance measure of our existing segments was changed to reflect our new management and operating structure. In the first quarter of 2016, the Company reorganized its businesses and moved the Refractory product line from the Industrial Materials segment to the Engineered Solutions segment. Advanced materials products will now be a part of the business segment where these products are produced. During the second quarter of 2016, our Engineered Solutions business qualified as held for sale status. All of Engineered Solutions' results have been excluded from continuing operations for both the current and prior years. All amounts below reflect these changes.

Results of Operations for 2016 as Compared to 2015

Business Combination Accounting

As a result of business combination accounting resulting from our acquisition by Brookfield (see Note 2 "Preferred Share Issuance and Merger" to the Financial Statements), the Company's financial statements are separated into two distinct periods, the period before the consummation of the Brookfield transaction (labeled predecessor) and the period after that date (labeled successor), to indicate the application of the different basis of accounting between the periods presented. There were no operational activities that changed as a result of the acquisition of the predecessor.

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(in thousands)	Predecessor For the Period January 1 Through August 14, 2015	Successor For the Period August 15, 2015 Through December 31, 2015	For the Year Ended December 31, 2016
Net sales	$339,907	$193,133	$437,963
Cost of sales	305,001	180,845	448,016
Additions to lower of cost or market inventory reserve	—	—	18,974
Gross profit (loss)	34,906	12,288	(29,027)
Research and development	3,377	1,083	2,399
Selling and administrative expenses	64,383	23,485	57,725
Impairment of long-lived assets and goodwill	35,381	—	2,843
Rationalizations	14	283	59
Operating loss	(68,249)	(12,563)	(92,053)
Other expense (income), net	1,421	(813)	(2,188)
Interest expense	26,211	9,999	26,914
Interest income	(363)	(6)	(358)
Loss from continuing operations before provision for income taxes	(95,518)	(21,743)	(116,421)
(Benefit) provision for income taxes	6,452	6,882	(7,552)
Net loss from continuing operations	$(101,970)	$(28,625)	$(108,869)
Loss from discontinued operations, net of tax	(18,679)	(4,926)	(126,974)
Net loss	$(120,649)	$(33,551)	$(235,843)

Net sales. Net sales for our Industrial Materials segment decreased from $339.9 million in the period January 1 through August 14, 2015, and $193.1 million in the period August 15 through December 31, 2015, to $438.0 million in 2016. This decrease was driven by a 27% decrease in prices for graphite electrodes. The price decrease was driven by overcapacity within the graphite electrode industry. Our customers were also negatively impacted by imported finished steel from China, which drove down production levels in the markets that we serve. The decrease in price was partially offset by a 12% increase in sales volumes.

Cost of sales. We experienced a decrease in cost of sales from $305.0 million in the period January 1 through August 14, 2015 and $180.8 million in the period August 15 through December 31, 2015 to $448.0 million in 2016. We achieved this reduction despite a 12% increase in sales volumes and increased depreciation expense resulting from the increase in fixed asset carrying value due to the step-up in value after our acquisition by Brookfield. We have benefited from the decrease in oil prices, which has driven down the price of decant oil, the key raw material to our production platform. Additionally, costs savings resulting from our rationalization initiatives that we have undertaken over the last 3 years generated the remainder of the favorable impact to cost of sales.

Lower of cost or market inventory adjustment. In 2016, we incurred a lower of cost or market adjustment of $19.0 million in certain product lines within our graphite electrode business reflecting the aforementioned decreased pricing.

Research and Development. Research and development expenses decreased from $3.4 million in the period January 1 through August 14, 2015, and $1.1 million in the period August 15 through December 31, 2015 to $2.4 million in 2016. This decrease was primarily driven by headcount reductions and our cost cutting efforts.

Selling and administrative expenses. Selling and general administrative expenses decreased from $64.4 million in the period January 1 through August 14, 2015, and $23.5 million in the period August 15 through December 31, 2015 to

$57.7 million in 2016. This decrease was primarily driven by the reduction in non-recurring charges: fees associated with our proxy and tender offer represented $23.6 million in 2015 while we incurred one-time charges of $5.8 million in 2016 for organizational restructuring. Additionally, we incurred a $2.9 million decrease in our 2016 MTM

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adjustment as compared to 2015. The remainder of the decrease was the result of headcount reductions and cost-cutting measures.

Impairments. As a result of our ongoing monitoring of triggering events, we recorded a goodwill impairment charge in our needle coke reporting unit totaling $35.4 million during the first quarter of 2015. During the fourth quarter of 2016 we impaired the value of assets held for sale at our facility in Brazil totaling $2.8 million.

Other expense (income). Other expense (income) decreased from $1.4 million of expense in the period January 1 through August 14, 2015, and $0.8 million of income in the period August 15 through December 31, 2015 to $2.2 million of income in 2016. The decrease was due to advantageous foreign currency impacts on non-operating assets and liabilities.

Interest expense. Interest expense decreased from $26.2 million in the period January 1 through August 14, 2015, and $10.0 million in the period August 15 through December 31, 2015 to $26.9 million in 2016. The decrease was due to prepayment of our Senior Subordinated Notes in 2015.

Loss from discontinued operations. We experienced an increase in the loss from discontinued operations from $18.7 million in the period January 1 through August 14, 2015, and $4.9 million in the period August 15 through December 31, 2015 to $127.0 million in 2016. This increase was primarily due to $119.9 million impairment charge to adjust the carrying value of assets held for sale to their fair value.

Segment operating income (loss). The following table represents our operating income (loss) by segment for 2015 and 2016:

	Predecessor	Successor	
	For the Period January 1 Through August 14, 2015	For the Period August 15, 2015 Through December 31, 2015	For the Year Ended December 31, 2016
	(Dollars in thousands)		
Industrial Materials	$(24,900)	$(2,529)	$(63,827)
Corporate, R&D and Other Expenses	(43,349)	(10,034)	(28,226)
Total operating loss	$(68,249)	$(12,563)	$(92,053)

Provision for income taxes. The following table summarizes the expense for income taxes in 2015 and 2016:

	Predecessor	Successor	
	For the Period January 1 Through August 14, 2015	For the Period August 15, 2015 Through December 31, 2015	For the Year Ended December 31, 2016
	(Dollars in thousands)		
Tax (benefit) expense	$6,452	$6,882	$(7,552)
Loss from continuing operations before provision for income taxes	(95,518)	(21,743)	$(116,421)
Effective tax rates	(6.8)%	(31.7)%	6.5 %

During 2015, the effective tax rate differs from the U.S. statutory rate of 35 percent primarily due to recent losses in the U.S. where we receive no tax benefit due to a full valuation allowance and taxes on worldwide earnings from various other countries. The recognition of the valuation allowance does not result in or limit the Company’s ability to utilize these tax assets in the future.

During 2016, the effective rate differs from the U.S. statutory rate of 35% primarily due to recent losses in the U.S. and Switzerland where we receive no tax benefit due to a full valuation allowance and taxes on worldwide earnings from various other countries. The recognition of the valuation allowance does not result in or limit the Company’s ability to utilize these tax assets in the future.

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Results of Operations for 2015 as Compared to 2014

Business Combination Accounting

As a result of business combination accounting resulting from our acquisition by Brookfield (see Note 2 "Preferred Share Issuance and Merger" to the Financial Statements), the Company's financial statements are separated into two distinct periods, the period before the consummation of the Brookfield transaction (labeled predecessor) and the period after that date (labeled successor), to indicate the application of the different basis of accounting between the periods presented. There were no operational activities that changed as a result of the acquisition of the predecessor.

(in thousands)	For the Year Ended December 31, 2014	For the Period January 1 Through August 14, 2015	For the Period August 15 Through December 31, 2015
Net sales	$825,145	$339,907	$193,133
Cost of sales	757,156	305,001	180,845
Gross profit (loss)	67,989	34,906	12,288
Research and development	9,738	3,377	1,083
Selling and administrative expenses	94,629	64,383	23,485
Impairment of long-lived assets and goodwill	75,650	35,381	—
Rationalizations	7,946	14	283
Operating loss	(119,974)	(68,249)	(12,563)
Other expense (income), net	2,920	1,421	(813)
Interest expense	35,736	26,211	9,999
Interest income	(320)	(363)	(6)
Loss from continuing operations before provision for income taxes	(158,310)	(95,518)	(21,743)
(Benefit) provision for income taxes	(5,790)	6,452	6,882
Net loss from continuing operations	$(152,520)	$(101,970)	$(28,625)
Loss from discontinued operations, net of tax	(132,856)	(18,679)	(4,926)
Net loss	$(285,376)	$(120,649)	$(33,551)

Net sales. Net sales for our Industrial Materials segment decreased from $825.1 million in 2014 to $339.9 million in the period January 1 through August 14, 2015, and $193.1 million in the period August 15 through December 31, 2015. This decrease was driven by a 23% decrease in volumes in our graphite electrode business caused by softening demand in the steel markets, particularly in EAF environments. This drove a decrease in the weighted average sales prices of 8 percent during 2015. Our graphite electrode product line was also negatively impacted by $37.8 million due to foreign currency rate declines primarily in the Euro region.

Cost of sales. We experienced decreases in cost of sales from $757.2 million in 2014 to $305.0 million in the period January 1 through August 14, 2015, and $180.8 million in the period August 15 through December 31, 2015. Lower volumes in our Industrial Materials segment resulted in a reduction of $105.2 million of cost in 2015 as compared to the same period of 2014. Decreases in the value of currencies in relation to the US Dollar, primarily in the euro region, benefited cost of sales by $37.5 million in the twelve months ended December 31, 2015 as compared to the same period of 2014. The remaining reduction in cost was driven by our improved cost structure resulting from our rationalization initiatives.

Research and Development. Research and development expenses were $9.7 million in 2014 compared to $3.4 million in the period January 1 through August 14, 2015, and $1.1 million in the period August 15 through December 31, 2015. This decrease was primarily driven by headcount reductions and our cost cutting efforts. Additionally, for the year ended December 31, 2014 our MTM adjustment resulted in an expense of $2.0 million in research and development. There was no significant MTM adjustment in 2015 within research and development.

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Selling and administrative expenses. Selling and general administrative expenses decreased from $94.6 million 2014 to $64.4 million in the period January 1 through August 14, 2015, and $23.5 million in the period August 15 through December 31, 2015. This decrease was primarily driven by headcount reductions and cost cutting efforts. Additionally, we incurred a $6.5 million decrease in our 2015 MTM adjustment as compared to 2014. Our 2015 selling and administrative expenses also included fees associated with our proxy and tender offer totaling $23.6 million as compared to $8.2 million in 2014.

Impairments. As a result of our ongoing monitoring of triggering events, we recorded a goodwill impairment charge in our needle coke reporting unit totaling $35.4 million during the first quarter of 2015. This charge was driven by the margin contraction for petroleum needle coke and followed a similar charge totaling $76.1 million in the fourth quarter of 2014.

Rationalizations. We recorded a $7.9 million charge for rationalizations in 2014 compared to none in the period January 1 through August 14, 2015, and $0.3 million in the period August 15 through December 31, 2015. Our Industrial Materials and corporate rationalization programs were announced in 2013 and 2014 respectively and these programs wound down through 2015 and are substantially complete.

Other expense (income). Other expense (income) decreased from $2.9 million of expense in 2014 to $1.4 million in the period January 1 through August 14, 2015, and $0.8 million of income in the period August 15 through December 31, 2015. The decrease was due to advantageous foreign currency impacts on non-operating assets and liabilities.

Segment operating income (loss). The following table represents our operating loss by segment for 2014 and 2015:

	For the Year Ended December 31, 2014	For the Period January 1 Through August 14, 2015	For the Period August 15 Through December 31, 2015
	(Dollars in thousands)		
Industrial Materials	$(51,300)	$(24,900)	$(2,529)
Corporate, R&D and Other Expenses	(68,674)	(43,349)	(10,034)
Total segment operating loss	$(119,974)	$(68,249)	$(12,563)

Provision for income taxes. The following table summarizes the expense for income taxes in 2014 and 2015:

	For the Year Ended December 31, 2014	For the Period January 1 Through August 14, 2015	For the Period August 15 Through December 31, 2015
	(Dollars in thousands)		
Tax (benefit) expense	$(5,790)	$6,452	$6,882
Loss from continuing operations before provision for income taxes	$(158,310)	$(95,518)	$(21,743)
Effective Tax Rates	3.7 %	(6.8)%	(31.7)%

During the twelve months ended December 31, 2014, the effective tax rate differs from the U.S. statutory rate of 35 percent primarily due to the recording of a valuation allowance against our U.S. deferred tax assets. During 2014, GrafTech impaired certain long-lived assets and announced the exit of certain product lines within our AGM product group as well as impaired goodwill on the needle coke reporting unit. See Note 3 and Note 6 to the Financial Statements. The impairment charges and other rationalization related charges were incurred primarily in the U.S. Therefore, it is no longer assured that it is more likely than not that we will generate sufficient future U.S. taxable income to realize our U.S. net deferred tax assets. As a result of recent losses, we recognized a $73.4 million non-cash charge in 2014 to increase the valuation allowance against these U.S. deferred tax assets, which adversely impacted our effective tax rate. The recognition of the valuation allowance does not result in or limit our ability to utilize these tax assets in the future.

Effects of Inflation

We incur costs in the U.S. and each of the non-U.S. countries in which we have a manufacturing facility. In general, our results of operations, cash flows and financial condition are affected by the effects of inflation on our costs incurred in each of these countries.

Currency Translation and Transactions

We translate the assets and liabilities of our non-U.S. subsidiaries into U.S. dollars for consolidation and reporting purposes in accordance with FASB ASC 830, Foreign Currency Matters. Foreign currency translation

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adjustments are generally recorded as part of stockholders' equity and identified as part of accumulated other comprehensive loss on the Consolidated Balance Sheets until such time as their operations are sold or substantially or completely liquidated.

We account for our Russian, Swiss, Luxembourg and Mexican subsidiaries using the dollar as the functional currency, as sales and purchases are predominantly dollar-denominated. Our remaining subsidiaries use their local currency as their functional currency.

We also record foreign currency transaction gains and losses from non-permanent intercompany balances as part of other (income) expense, net.

Significant changes in currency exchange rates impacting us are described under "Effects of Changes in Currency Exchange Rates" and "Results of Operations."

Effects of Changes in Currency Exchange Rates

When the currencies of non-U.S. countries in which we have a manufacturing facility decline (or increase) in value relative to the U.S. dollar, this has the effect of reducing (or increasing) the U.S. dollar equivalent cost of sales and other expenses with respect to those facilities. In certain countries where we have manufacturing facilities, and in certain instances where we price our products for sale in export markets, we sell in currencies other than the dollar. Accordingly, when these currencies increase (or decline) in value relative to the dollar, this has the effect of increasing (or reducing) net sales. The result of these effects is to increase (or decrease) operating profit and net income.

Many of the non-U.S. countries in which we have a manufacturing facility have been subject to economic and political changes, which have impacted currency exchange rates. We cannot predict changes in currency exchange rates in the future or whether those changes will have net positive or negative impacts on our net sales, cost of sales or net income.

For net sales of Industrial Materials, the impact of these events was an decrease of $1.2 million in 2014, an increase of $37.8 million in 2015, and a increase of $0.4 million in 2016. For Industrial Materials cost of sales, the impact of these events were decreases of $4.8 million, $37.5 million and $10.1 million in 2014, 2015 and 2016, respectively.

As part of our cash management, we have intercompany loans between some of our subsidiaries. These loans are deemed to be temporary and, as a result, remeasurement gains and losses on these loans are recorded as currency gains / losses in other income (expense), net, on the Consolidated Statements of Income.

We had a net total currency loss of $1.5 million in 2014, no net currency gain or loss in 2015 and a net currency loss of $0.6 million in 2016 resulting from the remeasurement of intercompany loans and the effect of transaction gains and losses on intercompany activities.

We have in the past and may in the future use various financial instruments to manage certain exposures to specific financial market risks caused by changes in currency exchange rates, as described under "Item 7A–Quantitative and Qualitative Disclosures about Market Risks."

Liquidity and Capital Resources

Our sources of funds have consisted principally of cash flow from operations and debt including the Revolving Facility. Our uses of those funds (other than for operations) have consisted principally of capital expenditures, cash paid for acquisitions and associated expenses and debt reduction payments and other obligations. Disruptions in the U.S. and international financial markets could adversely affect our liquidity and the cost and availability of financing to us in the future.

As of December 31, 2016, we had cash and cash equivalents of $11.6 million, long-term debt in the principal amount of $382.4 million, short-term debt of $8.9 million and stockholders' equity of $577 million. The Company has access to a $225 million Revolving Facility (subject to a $25 million minimum liquidity requirement). As of December 31, 2016, the Company had $61.2 million of borrowings and $12.3 million of letters of credit, for a total of $73.5 million drawn against the Revolving Facility.

In the event that operating cash flows fail to provide sufficient liquidity to meet our business needs, including capital expenditures, any such shortfall would need to be made up by increased borrowings under our Revolving Facility, to the extent available. During 2016, as a result of a strategic review, we decided to sell our Engineered Solutions businesses. In November, 2016, we completed the sale of our Fiber Materials Inc. business. Cash proceeds from this and future sales will be used for repayment of borrowings outstanding under the Revolving Facility. We cannot

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assure you that we will, or will be able to, consummate any such sales on acceptable terms or at all or as to the price, terms or conditions of any such sales.

We use cash flow from operations and funds available under the Revolving Facility (subject to continued compliance with the financial covenants and representations under the Revolving Facility) as well as cash on hand as our primary sources of liquidity.

As of December 31, 2016, we were in compliance with all financial and other covenants contained in the Revolving Facility, as applicable.

As of December 31, 2015 and December 31, 2016 approximately 75% of debt consists of fixed rate obligations.

As a part of our cash management activities, we manage accounts receivable credit risk, collections, and accounts payable vendor terms to maximize our free cash at any given time and minimize accounts receivable losses.

Long-Term Contractual, Commercial and Other Obligations and Commitments. The following tables summarize our long-term contractual obligations and other commercial commitments as of December 31, 2016.

	Payments Due by Year Ending December 31,				
	Total	2017	2018-2019	2020-2021	2022+
	(Dollars in Thousands)				
Contractual and Other Obligations					
Long-term debt (a)	$391,300	$8,852	$82,448	$300,000	$—
Interest on long-term debt (b)	75,703	19,125	38,250	18,328	$—
Leases	8,959	2,637	3,939	1,481	902
Total contractual obligations	475,962	30,614	124,637	319,809	902
Postretirement, pension and related benefits (c)	116,898	11,882	23,342	23,146	58,528
Other long-term obligations	11,898	7,996	689	360	2,853
Uncertain income tax provisions	3,338	—	1,348	1,990	—
Total contractual and other obligations (d)	$608,096	$50,492	$150,016	$345,305	$62,283
Other Commercial Commitments					
Guarantees (e)	5,681	5,681	—	—	—
Total other commercial commitments	$5,681	$5,681	$—	$—	$—

(a) Senior Notes presently valued at $274 million as a result of purchase accounting and will accrete to the full redemption value of $300 million in 2020.

(b) Represents interest payments required on Senior Notes with a fixed interest rate of 6.375%

(c) Represents estimated postretirement, pension and related benefits obligations based on actuarial calculations.

(d) Additional letters of credit of $12.3 million are issued under the Revolving Facility.

(e) Represents surety bonds which are renewed annually. If rates were unfavorable, the letters of credit under our Revolving Facility would be utilized.

Cash Flow and Plans to Manage Liquidity. Typically, our cash flow fluctuates significantly between quarters due to various factors. These factors include customer order patterns, fluctuations in working capital requirements, timing of capital expenditures, acquisitions, stock repurchases and other factors.

Certain of our obligations could have material impact on our liquidity. Cash flow from operations and from financing activities services payment of our obligations, thereby reducing funds available to us for other purposes. The Company has access to a $225 million Revolving Facility (subject to a $25 million minimum liquidity requirement). As of December 31, 2016, the Company had $61.2 million of borrowings and $12.3 million of letters of credit, for a total of $73.5 million drawn against the Revolving Facility.

Continued volatility in the global economy may require additional borrowings under our Revolving Facility. An improving economy, while resulting in improved results of operations, could increase our cash requirements to purchase inventories, make capital expenditures and fund payables and other obligations until increased accounts receivable are converted into cash. A downturn could significantly negatively impact our results of operations and cash flows, which, coupled with increased borrowings, could negatively impact our credit ratings, our ability to comply with debt covenants, our ability to secure additional financing and the cost of such financing, if available.

As of December 31, 2016, we were in compliance with all financial and other covenants contained in the Revolving Facility, as applicable.

In order to seek to minimize our credit risks, we reduce our sales of, or refuse to sell (except for cash on delivery or under letters of credit) our products to some customers and potential customers. In the current economic environment, our customers may experience liquidity shortages or difficulties in obtaining credit, including letters of credit. Our unrecovered trade receivables worldwide have not been material during the last 3 years individually or in the aggregate. We cannot assure you that we will not be materially adversely affected by accounts receivable losses in the future.

We manage our capital expenditures taking into account quality, plant reliability, safety, environmental and regulatory requirements, prudent or essential maintenance requirements, global economic conditions, available capital resources, liquidity, long-term business strategy and return on invested capital for the relevant expenditures, cost of capital and return on invested capital of the relevant segment and the Company as a whole, and other factors.

We had positive cash flow from operating activities during 2014, 2015 and 2016. Although the global economic environment experienced significant swings in these periods, our working capital management and cost-control initiatives allowed us to remain operating cash flow positive in both times of declining and improving operating results.

Prior to 2013, we experienced increased inventory levels resulting from lower sales volumes driven by reduced demand for our products as well as from contractually obligated raw material purchases. We have since closed two graphite electrode manufacturing facilities to better align our production with customer demand and we reduced inventories in 2013 through 2016. We expect to continue to reduce inventory levels over the next 12 months which will provide positive cash flows and increase our liquidity.

Off-Balance Sheet Arrangements and Commitments. We have not undertaken or been a party to any material off-balance-sheet financing arrangements or other commitments (including non-exchange traded contracts), other than:

- Notional amount of foreign exchange and commodity contracts.
- Commitments under non-cancelable operating leases that, as of December 31, 2016, totaled no more than $2.6 million in each year and $9.0 million in the aggregate and as of December 31, 2016.
- Letters of credit outstanding under the Revolving Facility of $12.3 million as of December 31, 2016.
- Surety bonds and letters of credit with other banks totaling $5.7 million.

We are not affiliated with or related to any special purpose entity other than GrafTech Finance, our wholly-owned and consolidated finance subsidiary.

Cash Flows.

The following is a discussion of our cash flow activities:

	Predecessor		Successor	
	For the Year Ended December 31, 2014	For the January 1 Through August 14, 2015	For the Period August 15 Through December 31, 2015	For the Year Ended December 31, 2016
	(Dollars in millions)			
Cash flow provided by (used in):				
Operating activities	$120.9	$ 28.3	$23.1	$ 22.8
Investing activities	(79.0)	(39.9)	(17.5)	(10.5)
Financing activities	(35.1)	20.8	(23.1)	(8.3)

Operating Activities

Cash flow from operating activities represents cash receipts and cash disbursements related to all our activities other than to investing and financing activities. Operating cash flow is derived by adjusting net income for:

- Non-cash items such as depreciation and amortization; stock-based compensation charges; pension and post-retirement gains and losses, inventory write-downs

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- Gains and losses attributed to investing and financing activities such as gains and losses on the sale of assets and currency (gains) and losses
- Changes in operating short and long-term assets and liabilities which reflect timing differences between the receipt and payment of cash associated with transactions and when they are recognized in results of operations

The net impact of the changes in working capital (operating assets and liabilities), which are discussed in more detail below, include the impact of changes in: receivables, inventories, prepaid expenses, accounts payable, accrued liabilities, interest payable, and payments of other current liabilities. We continue to maximize our operating cash flows by focusing on those working capital items that are most directly affected by changes in sales volume, such as accounts receivable, inventories and accounts payable.

In 2014, changes in working capital resulted in a net source of funds of $56.8 million which was impacted by:

- source of funds of $28.5 million from the decrease in accounts receivable, which was due primarily to the timing of sales and collections during the year;
- source of funds from inventory reductions of $77.9 million primarily due to the planned reduction of inventory levels built up in prior years ; and
- use of funds of $33.5 million from a decreases in accounts payable and rationalization liabilities.

In the period January 1 through August 14, 2015, changes in working capital resulted in a net source of funds of $45.6 million which was impacted by:

- net cash inflows in accounts receivable of $61.0 million from the decrease in accounts receivable due to the timing and collection of customer sales and collections;
- net cash outflows from decreases in accounts payable and accruals of $18.7 million, due primarily to changes in tax accruals and payables; and
- a increase in interest payable of $2.3 million.

In the period August 15 through December 31, 2015, changes in working capital resulted in a net source of funds of $26.8 million which was impacted by:

- use of funds of $9.5 million from the increase in accounts receivable, which was due primarily to the timing of sales and collections during the year;
- source of funds from prepaid and other asset reductions of $14.2 million primarily related to value added tax (VAT) receivable collections;
- source of funds from inventory reductions of $47.9 million primarily due to the planned reduction of inventory levels built up in prior years ; and
- use of funds of $19.8 million from a decreases in accounts payable and rationalization liabilities.

In 2016, changes in working capital resulted in a net source of funds of $68.6 million which was impacted by:

- source of funds of $3.4 million from the decrease in accounts receivable, which was due primarily to the timing of sales and collections during the year;
- source of funds from inventory reductions of $53.5 million primarily due to the planned reduction of inventory levels built up in prior years ; and
- source of funds of $15.8 million from increases in accounts payable and rationalization liabilities.
- use of funds of $2.8 million for the extinguishment our rationalization related liabilities.

Operating cash flow also included cash outflows of $14.5 million, $14.6 million and $11.0 million for contributions to pension and post retirement plans in 2014, 2015 and 2016, respectively.

Investing Activities.

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Net cash used in investing activities was $79.0 million in 2014 and included:
- capital expenditures of $85.0 million;
- cash outflows of $2.0 million related to derivative instruments;
- cash inflows of $2.8 million related to insurance recoveries; and
- cash inflows of $5.0 million related to the sale of fixed assets.

Net cash used in investing activities was $39.9 million in the period of January 1 through August 14 through December 31, 2015 and included:
- capital expenditures of $32.3 million;
- payments for derivative instruments of $8.3 million; and
- cash inflows of $0.6 million related to the sale of fixed assets

Net cash used in investing activities was $17.5 million in the period of August 15 through December 31, 2015 and included:
- capital expenditures of $18.4 million; and
- cash inflows of $0.6 million related to the sale of fixed assets

Net cash used in investing activities was $10.5 million in 2016 and included:
- capital expenditures of $27.9 million;
- proceeds from the sale of fixed assets of $1.1 million; and
- cash inflows of $15.9 million from the divestiture of our Fiber Materials Inc. business.

Financing Activities.

Net cash flow used by financing activities was $35.1 million in 2014 and included:
- net payments on our Revolving Facility of $24.0 million;
- cash outflows of $9.5 million related to our supply chain financing agreement; and
- cash paid for refinancing fees and debt issuance costs of $3.3 million.

Net cash flow provided by financing activities was $20.8 million in the period January 1 through August 14, 2015 and included:
- cash proceeds of $150.0 million from our issuance of preferred shares;
- cash inflows for net borrowings on our Revolving Facility of $79.5 million;
- $200 million cash outflow for the prepayment of our Senior Subordinated Notes;
- cash outflows of $5.1 million for refinancing fees; and
- cash outflows of $3.4 million for issuance costs related to our preferred share issuance.

Net cash flow used by financing activities was $23.1 million for the period August 15 through December 31, 2015 and included:
- net payments on our Revolving Facility of $21.5 million; and
- cash outflows of $1.4 million for issuance costs related to our preferred share issuance.

Net cash flow used by financing activities was $8.3 million in 2016 and included:
- net payments on our Revolving Facility of $7.1 million; and
- net payments of $0.9 million for related to refinancing fees paid.

Costs Relating to Protection of the Environment

We have been and are subject to increasingly stringent environmental protection laws and regulations. In addition, we have an on-going commitment to rigorous internal environmental protection standards. Environmental considerations are part of all significant capital expenditure decisions. The following table sets forth certain information regarding environmental expenses and capital expenditures.

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	For the Year Ended December 31,		
	2014	2015	2016
	(Dollars in thousands)		
Expenses relating to environmental protection	$10,439	$6,507	$8,255
Capital expenditures related to environmental protection	13,051	2,082	1,693

Critical Accounting Policies

Critical accounting policies are those that require difficult, subjective or complex judgments by management, often as a result of the need to make estimates about the effect of matters that are inherently uncertain and may change in subsequent periods. Our significant accounting policies are described in Note 1 “Business and Summary of Significant Accounting Policies” of the Notes to the Consolidated Financial Statements. The following accounting policies are deemed to be critical.

Business Combinations and Goodwill. The application of the purchase method of accounting for business combinations requires the use of significant estimates and assumptions in the determination of the fair value of assets acquired and liabilities assumed in order to properly allocate purchase price consideration between goodwill and assets that are depreciated and amortized. Our estimates of the fair values of assets and liabilities acquired are based on assumptions believed to be reasonable and, when appropriate, include assistance from independent third-party appraisal firms.

As a result of our acquisition by Brookfield, we have a significant amount of goodwill. Goodwill is tested for impairment annually or more frequently if an event or circumstance indicates that an impairment loss may have been incurred. Application of the goodwill impairment test requires judgment, including the identification of reporting units, assignment of assets and liabilities to reporting units, assignment of goodwill to reporting units and determination of the fair value of each reporting unit. We estimate the fair value of each reporting unit using a discounted cash flow methodology. This requires us to use significant judgment including estimation of future cash flows, which is based upon relevant market data, internal forecasts, estimation of the long-term growth for our business, the useful life over which cash flows will occur, determination of the weighted average cost of capital for purposes of establishing discount rate.

Refer to Note 1 “Business and Summary of Significant Accounting Policies” of the Notes to the Consolidated Financial Statements for information regarding our goodwill impairment testing.

Predecessor and Successor Reporting. On August 17, 2015, the Company was acquired by affiliates of Brookfield Asset Management Inc. (see Note 2 "Preferred Share Issuance and Merger"). We elected to account for the acquisition under the acquisition method of accounting. Under the acquisition method of accounting, the assets and liabilities of GTI were adjusted to their preliminary fair market value as of August 15, 2015, as this was the day that Brookfield effectively took control of the Company.

Our consolidated statements of operations subsequent to the Merger will include amortization expense relating to the fair value adjustments and depreciation expense based on the the fair value of the Company's property, plant and equipment that had previously been carried at historical cost less accumulated depreciation. Therefore, the Company's financial information prior to the Merger is not comparable to the financial information subsequent to the Merger. As a result, the financial statements and certain note presentations are separated into two distinct periods, the period before the consummation of the Merger (labeled "Predecessor") and the period after the date of merger (labeled "Successor"), to indicate the application of the different basis of accounting between the periods presented.

Reliance on Estimates. In preparing the Consolidated Financial Statements, we use and rely on estimates in determining the economic useful lives of our assets, obligations under our employee benefit plans, provisions for doubtful accounts, provisions for restructuring charges and contingencies, tax valuation allowances, evaluation of goodwill, other intangible assets, pension and postretirement benefit obligations and various other recorded or disclosed amounts, including inventory valuations. Estimates require us to use our judgment. While we believe that our estimates for these matters are reasonable, if the actual amount is significantly different than the estimated amount, our assets, liabilities or results of operations may be overstated or understated.

Employee Benefit Plans. We sponsor various retirement and pension plans, including defined benefit and defined contribution plans and postretirement benefit plans that cover most employees worldwide. Excluding the defined contribution plans, accounting for these plans requires assumptions as to the discount rate, expected return on plan assets, expected salary increases and health care cost trend rate. See Note 12 “Retirement Plans and Postretirement Benefits” of the Notes to the Consolidated Financial Statements for further details.

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Contingencies. We account for contingencies by recording an estimated loss when information available prior to issuance of the Consolidated Financial Statements indicates that it is probable that an asset has been impaired or a liability has been incurred at the date of the Consolidated Financial Statements and the amount of the loss can be reasonably estimated. Accounting for contingencies such as those relating to environmental, legal and income tax matters requires us to use our judgment. While we believe that our accruals for these matters are adequate, if the actual loss is significantly different from the estimated loss, our results of operations may be overstated or understated. Legal costs expected to be incurred in connection with a loss contingency are expensed as incurred.

Impairments of Long-Lived Assets. We record impairment losses on long-lived assets used in operations when events and circumstances indicate that the assets might be impaired and the future undiscounted cash flows estimated to be generated by those assets are less than the carrying amount of those assets. Assets to be disposed are reported at the lower of the carrying amount or fair value less estimated costs to sell. Estimates of the future cash flows are subject to significant uncertainties and assumptions. If the actual value is significantly less than the estimated fair value, our assets may be overstated. Future events and circumstances, some of which are described below, may result in an impairment charge:

- new technological developments that provide significantly enhanced benefits over our current technology;
- significant negative economic or industry trends;
- changes in our business strategy that alter the expected usage of the related assets; and
- future economic results that are below our expectations used in the current assessments.

Accounting for Income Taxes. When we prepare the Consolidated Financial Statements, we are required to estimate our income taxes in each of the jurisdictions in which we operate. This process requires us to make the following assessments:

- estimate our actual current tax liability in each jurisdiction;
- estimate our temporary differences resulting from differing treatment of items for tax and accounting purposes (which result in deferred tax assets and liabilities that we include within the Consolidated Balance Sheets); and
- assess the likelihood that our deferred tax assets will be recovered from future taxable income and, if we believe that recovery is not more likely than not, a valuation allowance is established

If our estimates are incorrect, our deferred tax assets or liabilities may be overstated or understated.

Revenue Recognition. Revenue from sales of our commercial products is recognized when persuasive evidence of an arrangement exists, delivery has occurred, title has passed, the amount is determinable and collection is reasonably assured. Sales are recognized when both title and the risks and rewards of ownership are transferred to the customer or services have been rendered and fees have been earned in accordance with the contract.

Volume discounts and rebates are recorded as a reduction of revenue in conjunction with the sale of the related products. Changes to estimates are recorded when they become probable. Shipping and handling revenues relating to products sold are included as an increase to revenue. Shipping and handling costs related to products sold are included as an increase to cost of sales.

Discontinued Operations and Assets Held for Sale

When Management commits to a plan to sell assets or asset groups and a sale is probable, we reclassify those assets or asset groups into "Assets Held for Sale". Upon reclassification to assets held for sale, we evaluate the book value of the disposal groups against their fair value less costs to sell and as a result may impair the assets / asset groups. As and if new information becomes available on the fair value of the assets/asset groups , we may adjust accordingly the impairment.

Once the assets of a business have been classified as held for sale, we evaluate if the divestiture represents a strategic shift in operations and if so, we exclude the results of this business from continuing operations. All results are reported as gain or loss from discontinued operations, net of tax. During the second quarter of 2016, our Engineered Solutions business qualified as discontinued operations and as such, all results have been excluded from operations. See Note 3 "Discontinued Operations and Related Assets Held for Sale".

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Recent Accounting Pronouncements

We discuss recently adopted and issued accounting standards in Note 1 “Business and Summary of Significant Accounting Policies” of the Notes to the Consolidated Financial Statements.

Description of Our Financing Structure

We discuss our financing structure in more detail in Note 7 “Long-Term Debt and Liquidity” of the Notes to the Consolidated Financial Statements.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

We are exposed to market risks primarily from changes in interest rates, currency exchange rates, energy commodity prices and commercial energy rates. We, from time to time, routinely enter into various transactions that have been authorized according to documented policies and procedures to manage these well-defined risks. These transactions relate primarily to financial instruments described below. Since the counterparties to these financial instruments are large commercial banks and similar financial institutions, we do not believe that we are exposed to material counterparty credit risk. We do not use financial instruments for trading purposes.

Our exposure to changes in interest rates results primarily from floating rate long-term debt tied to LIBOR or Euro LIBOR. Our exposure to changes in currency exchange rates results primarily from:

- sales made by our subsidiaries in currencies other than local currencies;
- raw material purchases made by our foreign subsidiaries in currencies other than local currencies; and
- investments in and intercompany loans to our foreign subsidiaries and our share of the earnings of those subsidiaries, to the extent denominated in currencies other than the dollar.

Our exposure to changes in energy commodity prices and commercial energy rates results primarily from the purchase or sale of refined oil products and the purchase of natural gas and electricity for use in our manufacturing operations.

Currency Rate Management. We enter into foreign currency derivatives from time to time to attempt to manage exposure to changes in currency exchange rates. These foreign currency derivatives, which include, but are not limited to, forward exchange contracts and purchased currency options, attempt to hedge global currency exposures. Forward exchange contracts are agreements to exchange different currencies at a specified future date and at a specified rate. Purchased foreign currency options are instruments which give the holder the right, but not the obligation, to exchange

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different currencies at a specified rate at a specified date or over a range of specified dates. Forward exchange contracts and purchased currency options are carried at market value.

The outstanding foreign currency derivatives as of December 31, 2016 represented a net unrealized loss of $0.2 million. There were no outstanding gains or losses as of December 31, 2015.

Energy Commodity Management. We periodically enter into commodity derivative contracts and short duration fixed rate purchase contracts to effectively fix some or all of our natural gas and refined oil product exposure. We had no outstanding contracts as of December 31, 2015 and December 31, 2016.

Interest Rate Risk Management. We periodically implement interest rate management initiatives to seek to minimize our interest expense and the risk in our portfolio of fixed and variable interest rate obligations.

We periodically enter into agreements with financial institutions that are intended to limit, or cap, our exposure to incurrence of additional interest expense due to increases in variable interest rates. These instruments effectively cap our interest rate exposure. We currently do not have any such instruments outstanding.

Sensitivity Analysis. We use sensitivity analysis to quantify potential impacts that market rate changes may have on the fair values of our foreign currency derivatives and our commodity derivatives. The sensitivity analysis represents the hypothetical changes in value of the hedge position and does not reflect the related gain or loss on the forecasted underlying transaction. As of December 31, 2016, a 10% appreciation or depreciation in the value of the U.S. dollar against foreign currencies from the prevailing market rates would result in a corresponding increase or decrease of $1.9 million, respectively, in the fair value of the foreign currency hedge portfolio. We had no exposure to commodity prices as we had no commodity hedges outstanding as of December 31, 2016. Because of the high correlation between the hedging instrument and the underlying exposure, fluctuations in the value of the instruments are generally offset by reciprocal changes in the value of the underlying exposure.

We had no interest rate derivative instruments outstanding as of December 31, 2016. A hypothetical increase in interest rates of 100 basis points (1%) would have increased our interest expense by $1.0 million for the twelve months ended December 31, 2016.

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Item 8. Financial Statements and Supplementary Data

(Unless otherwise noted, all dollars are presented in thousands)

See the Table of Contents located at the beginning of this Report for more detailed page references to information contained in this Item.

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Management’s Report on Internal Control over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act as a process, designed by, or under the supervision of, the chief executive officer and chief financial officer and effected by the board of directors, management and other personnel of a company, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles, and includes those policies and procedures that:

- pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect transactions and dispositions of assets of the company;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles and that receipts and expenditures of the company are being made only in accordance with authorizations of management and the board of directors; and
- provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of assets of the company that could have a material effect on its financial statements.

Internal control over financial reporting has inherent limitations which may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions or because the level of compliance with related policies or procedures may deteriorate.

Management has conducted an assessment of the effectiveness of our internal control over financial reporting as of December 31, 2016 using the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in Internal Control-Integrated Framework (2013). Based on that assessment, management concluded that our internal control over financial reporting was effective as of December 31, 2016. The effectiveness of the Company’s internal control over financial reporting as of December 31, 2016 has not been audited by Deloitte & Touche LLP, our independent registered public accounting firm.

Date: February 27, 2017

/S/ Jeffrey C. Dutton
Jeffrey C. Dutton
President and Chief Executive Officer

/S/ Quinn J. Coburn
Quinn J. Coburn
Vice President and Chief Financial Officer

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Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of GrafTech International Ltd.

In our opinion, the consolidated statements of operations and comprehensive income (loss), of stockholders' equity and of cash flows for the year ended December 31, 2014, before the effects of the adjustments to retrospectively reflect the discontinued operations described in Note 3 and before the effects of the adjustments to retrospectively reflect the change in the composition of reportable segments described in Note 5, present fairly, in all material respects, the results of operations and cash flows of GrafTech International Ltd. and its subsidiaries for the year ended December 31, 2014, in conformity with accounting principles generally accepted in the United States of America (the 2014 financial statements before the effects of the adjustments discussed in Notes 3 and 5 are not presented herein). These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit, before the effects of the adjustments described above, of these financial statements in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

As noted in Note 7 to the consolidated financial statements, the Company amended its revolving agreement and entered into a new senior secured delayed draw term loan.

We were not engaged to audit, review, or apply any procedures to the adjustments to retrospectively reflect the discontinued operations described in Note 3 and the adjustments to retrospectively reflect the change in the composition of reportable segments described in Note 5 and accordingly, we do not express an opinion or any other form of assurance about whether such adjustments are appropriate and have been properly applied. Those adjustments were audited by other auditors.

/s/ PricewaterhouseCoopers LLP
PricewaterhouseCoopers LLP
Cleveland, Ohio
March 2, 2015

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM
To the Board of Directors and Stockholders of
GrafTech International Ltd. and subsidiaries:

We have audited the accompanying consolidated balance sheets of GrafTech International Ltd. and its subsidiaries (the "Company") as of December 31, 2016 and 2015, and the related consolidated statements of operations and comprehensive income (loss), stockholders' equity, and cash flows for the years ended December 31, 2016 and 2015 (January 1, 2015 to August 14, 2015, Predecessor Period, and August 15, 2015 to December 31, 2015, Successor Period). These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits. The consolidated financial statements of the Company for the year ended December 31, 2014, before the effects of the retrospective adjustments for the discontinued operations discussed in Note 3 and before the effects of the retrospective adjustments to the disclosures for a change in the composition of reportable segments discussed in Note 5 to the consolidated financial statements, were audited by other auditors whose report, dated March 2, 2015, expressed an unqualified opinion on those statements.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States) and in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. Our audits included consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion. An audit also includes examining, on a test basis, evidence supporting the amounts and disclosures in the consolidated financial statements, assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, such 2016 and 2015 consolidated financial statements present fairly, in all material respects, the financial position of GrafTech International Ltd. and its subsidiaries as of December 31, 2016 and 2015, and the results of their operations and their cash flows for the years ended December 31, 2016 and 2015 (January 1, 2015 to August 14, 2015, Predecessor Period, and August 15, 2015 to December 31, 2015, Successor Period), in conformity with accounting principles generally accepted in the United States of America.

We also have audited the retrospective adjustments to the 2014 consolidated financial statements for the operations discontinued in 2016, as discussed in Note 3 to the consolidated financial statements. We also have audited the adjustments to the 2014 consolidated financial statements to retrospectively adjust the disclosures for a change in the composition of reportable segments in 2016, as discussed in Note 5 to the consolidated financial statements. Our procedures over discontinued operations included (1) obtaining the Company's underlying accounting analysis prepared by management of the retrospective adjustments for discontinued operations and comparing the retrospectively adjusted amounts per the 2014 financial statements to such analysis, (2) comparing previously reported amounts to the previously issued financial statements for such year, (3) testing the mathematical accuracy of the accounting analysis, and (4) on a test basis, comparing the adjustments to retrospectively adjust the financial statements for discontinued operations to the Company's supporting documentation. Our procedures over the change in reportable segments included (1) comparing the adjustment amounts of segment revenues, operating income, and assets to the Company's underlying analysis and (2) testing the mathematical accuracy of the reconciliation of segment amounts to the consolidated financial statements. In our opinion, such retrospective adjustments are appropriate and have been properly applied. However, we were not engaged to audit, review, or apply any procedures to the 2014 consolidated financial statements of the Company other than with respect to the retrospective adjustments and, accordingly, we do not express an opinion or any other form of assurance on the 2014 consolidated financial statements taken as a whole.

/s/ Deloitte & Touche LLP
Deloitte & Touche LLP
Cleveland, Ohio
February 27, 2017

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GRAFTECH INTERNATIONAL LTD. AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
(Dollars in thousands, except share data)

	Successor As of December 31, 2015	As of, December 31, 2016
ASSETS		
Current assets:		
Cash and cash equivalents	$6,927	$11,610
Accounts and notes receivable, net of allowance for doubtful accounts of $244 as of December 31, 2015 and $326 as of December 31, 2016	82,390	80,568
Inventories	218,130	156,111
Prepaid expenses and other current assets	21,150	21,665
Current assets of discontinued operations	98,281	60,979
Total current assets	426,878	330,933
Property, plant and equipment	571,329	585,704
Less: accumulated depreciation	20,166	76,849
Net property, plant and equipment	551,163	508,855
Deferred income taxes	15,326	19,803
Goodwill	172,059	171,117
Other assets	152,614	141,568
Long-term assets of discontinued operations	103,975	—
Total assets	$1,422,015	$1,172,276
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$40,147	$47,663
Short-term debt	4,772	8,852
Accrued income and other taxes	5,933	5,256
Rationalizations	1,195	75
Other accrued liabilities	20,987	30,519
Current liabilities of discontinued operations	23,082	20,042
Total current liabilities	96,116	112,407
Long-term debt	362,455	356,580
Other long-term obligations	94,318	82,148
Deferred income taxes	57,430	42,906
Long-term liabilities of discontinued operations	1,167	850
Commitments and Contingencies – Notes 11 and 13		
Stockholders' equity:		
Preferred stock, par value $.01, 10,000,000 shares authorized, none issued	—	—
Common stock, par value $.01, 225,000,000 shares authorized, 100 shares authorized and issued as of December 31, 2015 and 2016	—	—
Additional paid – in capital	854,337	854,337
Accumulated other comprehensive loss	(10,257)	(7,558)
Accumulated deficit	(33,551)	(269,394)
Total stockholders' equity	810,529	577,385
Total liabilities and stockholders' equity	$1,422,015	$1,172,276

See accompanying Notes to the Consolidated Financial Statements

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GRAFTECH INTERNATIONAL LTD. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE INCOME (LOSS)
(Dollars in thousands, except per share data)

	Predecessor		Successor	
	For the Year Ended December 31, 2014	For the Period January 1 Through August 14, 2015	For the Period August 15 Through December 31, 2015	For the Year Ended December 31, 2016
Net sales	$825,145	$339,907	$193,133	$437,963
Cost of sales	757,156	305,001	180,845	448,016
Additions to lower of cost or market inventory reserve	—	—	—	18,974
Gross profit (loss)	67,989	34,906	12,288	(29,027)
Research and development	9,738	3,377	1,083	2,399
Selling and administrative expenses	94,629	64,383	23,485	57,725
Impairment of long-lived assets and goodwill	75,650	35,381	—	2,843
Rationalizations	7,946	14	283	59
Operating loss	(119,974)	(68,249)	(12,563)	(92,053)
Other expense (income), net	2,920	1,421	(813)	(2,188)
Interest expense	35,736	26,211	9,999	26,914
Interest income	(320)	(363)		